

Global Business Leadership Development for the Fourth Industrial Revolution

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Chapter 1

Leadership in the Digital Age: Disruptions, New Rhythms, and the Beating
Change 1

Peter Smith, The Leadership Alliance Inc., Canada

*Tom Cockburn, Center for Dynamic Leadership Models in Global
Business, Canada*

This chapter introduces the scope and focus of the new book. The reader is briefly introduced to the definitions and debates about leadership and management boundaries, differences, and overlapping responsibilities in the digital age. Drawing on both theory and practice, current issues and topics are covered in depth, providing an introduction and overview of perceptible trends and scenarios relevant to the current post-global financial crisis (GFC) and the emergent IR4.0 leadership outlook for global business. The editors then provide an outline and overview of the chapters, topics, and themes of each chapter and a coherent rationale for this new book as developing discussions and research from our first book in the series, “Dynamic Models of Leadership for Global Business: Enhancing Digitally Connected Environments.”

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Reflecting Emerging Digital Technologies in Leadership Models 26

*Tom Cockburn, Center for Dynamic Leadership Models in Global
Business, Canada*

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In this chapter, Smith and Cockburn reaffirm their claim in a previous book that today’s global business contexts are volatile, uncertain, complex, and ambiguous

(VUCA), and leaders must focus more on complex thinking skills and mindsets than developing behavioral competencies. In so doing, leaders must be familiar with the benefits and drawbacks of emerging digital technologies and use these technologies appropriately. In the previous book, the authors defined flexible and dynamic leadership models that assure success in the above contexts and described learning related processes essential to mastering the ability to adapt at rates consistent with the business complexity leaders now face. In this chapter, they extend their previous research and review newly emerging factors contributing to global business complexity in the era of the Fourth Industrial Revolution (IR4.0) and explain how these elements may be applied by leaders, including CEOs and Boards of Directors, to augment the power of their recommended leadership models.

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The digital revolution transforms business models and presents new privacy issues and ethical dilemmas. Research by MIT Sloan CISR reports that U.S. listed companies that have a digitally savvy board show substantially better financial performance. What is a digitally savvy board? What are the differences between the old and the new world? What are the new ethical dilemmas and how do you prevent making the same mistakes as big tech? Why does innovation fail so often within the existing structures of established companies? Why does the three lines of defense model for risk management have an inhibitory effect on innovation in practice? The author discusses these questions and provides suggestions for improvement of corporate governance of established companies. In the next chapter, the author provides rules of the road for how established companies can monetize their data including some pitfalls for established companies and discusses a number of ethical dilemmas that companies encounter in practice when implementing new digital technologies and services.

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We can treat analytics as a multi-discipline profession because the body of knowledge required for analytics has become extensive, and businesspeople have started to designate teams and departments as being specialists in analytics. An ecosystem of service providers has evolved for this profession, including conferences, degrees, consulting services, certifications, etc. Analytics is best understood as an organizational asset that is used to improve decision making and execution. This chapter outlines the analytics landscape and aims to help organizations gain a shared understanding of issues that must be addressed to plan, build, and use the analytics asset.

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Jayanthi Ranjan, Institute of Management Technology, Nagpur, India

Mary Jeyanthi P., Institute of Management Technology, Nagpur, India

In the contemporary e-era, big data plays a major role across the manufacturing and production industries, service and consultancy industries, and of course, information technology, and it heightens the influence on healthcare industries too. More and bigger data is becoming accessible publicly like Google Trends, Cancer Genome Atlas data portal, etc. Hence, developing big data analytics tools and techniques is the need of the hour in healthcare and pharma. The problem of the healthcare industry generates with the lack of information that is available for decision-making. The volume of data available is no doubt too big, but the integration of data from different players becomes a very tedious task. The aim of this report is to provide a detailed comparative study of pharmaceutical industry from Indian and global perspectives and also to provide the applications of big data analytics in the healthcare industry and indicate the limitations and way forward.

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Leading in the era of digital abundance is a contest terrain as leaders grapple with the challenges of leading and working with the millennial generation at business and society at large. The emerging digital ecosystems emit strong signals for a transformation in leadership models and styles. Drawing on empirical and theoretical work on the movement in the generations of people, especially the workforce in the economic and social world, it is evident that new leadership models need to be

explored in alignment to the digital era. This chapter attempts to evolve a framework of leadership for the digital era. The framework has been used further as an illustration through an initiative designed and implemented for mid-level leaders. The chapter strongly recommends a revisit to leadership concepts and development in the era of digital abundance.

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New attacks and methods seen today indicate an emerging trend and dependency on reverse-engineered technology that was used in the past by espionage and intelligence agencies and their tactics as well as use of modern technology to obtain information and data that is turned into usable intelligence. One of the many disturbing consequences of this is that we are faced with attackers that are versed in stealth, deception, planting false information, and increased training in newer attack technologies that classical tools can no longer reliably find. In addition, advanced attack and deception skills now use OSINT (open source intelligence) data collection tactics that have moved entire attack chains into the espionage and surveillance realm.

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The proliferation of data exposure via social media implies privacy and security are a lost cause. Regulation counters this through personal data usage compliance. Organizations must also keep non-personal data safe from competitors, criminals, and nation states. The chapter introduces leaders to the two data governance fundamentals: data privacy and data security. The chapter argues that data security cannot be achieved until data privacy issues have been addressed. Simply put, data privacy is fundamental to any data usage policy and data security to the data access policy. The fundamentals are then discussed more broadly, covering data and information management, cyber security, governance, and innovations in IT service provisioning. The chapter clarifies the complementary fundamentals and how they reduce data abuse. The link between privacy and security also demystifies the high resource costs in implementing and maintaining security practices and explains why leaders must provide strong IT leadership to ensure IT investment is defined and implemented wisely.

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*Peter E. Johansson, School of Innovation, Design, and Engineering,
Mälardalen University, Sweden*

*Marianne Döös, Department of Education, Stockholm University,
Sweden*

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This chapter aims to explore the possibilities of visualising work-integrated competence networks—here referred to as relatonics—and contribute to the understanding of how to support efforts of organising change. The competence-generating processes of an organisation are problematic in that they are largely hidden in the midst of everyday practice. If not receiving adequate attention, there is the risk of conducting too frequent, disruptive, and unhealthy reorganisations. This strengthens the reason why visualisations of relatonics are of value. The demarcation line between what is hidden, and what is not, is relocated through the use of visualisations of relatonics. A conclusion is that images representing relatonics can be utilised to support informed change decisions.

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Matthew James Kolakowski, Valdosta State University, USA

Sherif A. Ebrahim, Tulane University, USA

The e-learning environment has changed at an unprecedented pace since 2014. As corporate and higher education learning environments continue to immerse themselves in e-learning, what themes and implementation principles will follow? E-learning instructional practices that allow learners to be engaged in instantaneous global collaboration have fundamentally changed higher education and leadership development. This chapter will discuss how the Sharable Content Object Reference Model (SCORM) delivers a positive impact on learners and enhances organizational outcomes. Furthermore, this chapter will offer updates on e-learning pedagogy, as well as how these mediums potentially interconnect with future e-learning technologies.

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Francisco José B. S. Leandro, City University of Macau, China

The future of education matters to all of us. This chapter presents a theoretical-inductive construction of the future of education, inspired by the advancements envisaged in the Fourth Industrial Revolution (also abbreviated to Industry 4.0 or IR4.0).

Recent developments in the technological field make it imperative that university syllabi foster and grow technological and non-cognitive soft skills in tandem. The latter—socio-emotional skills—are considered crucial skills that endow “buoyancy” and resilience to the workforce. Empathy, cultural sensitivity, and tolerance are the key professional skills that should be nurtured among the upcoming generation of digital natives. The chapter builds on a previous publication and aims at advancing concrete proposals for the future of university education.

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Aiding the Fourth Industrial Revolution in the Developing World: Socio-Cultural Leadership in ICT4D – Learnings From Telecentres in a South Asian Country 299

Sampath S. Windsor, Independent Researcher, Australia

Carol Royal, Independent Researcher, Australia

Chatura C. Windsor, Independent Researcher, Australia

Academic research that examines different leadership models utilised in the digital age within ICT4D that facilitates the Fourth Industrial Revolution for the marginalised people are scarce. This study focused on the e-Sri Lanka program, initially funded by the World Bank as a unique South Asian project that established a network of 1,005 Nenasala telecentres. Sri Lanka is further focused on building an e-smart, e-inclusive society through ICT4D. In 2020, the Nenasala 2.0 initiative is to be expanded on the Nenasala network to scale up e-society innovations. This context provides an exciting research bedrock to explore. The research findings revealed that leadership at various organisational levels will be key to Nenasala 2.0 and ICT4D program sustainability. The Nenasala model that benefitted from unique community-based leadership was termed socio-cultural leadership. A replication of the study in other developing countries to identify the leadership needed in ICT4D could prove invaluable as it may identify viable complementary options to commercially orientated telecentres.

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Michael Snowden, The University of Huddersfield, UK

Jamie P. Halsall, The University of Huddersfield, UK

This exploratory study aims at understanding the social aspects of the Fourth Industrial Revolution by suggesting how the interface involving technological innovation and social innovation can resolve societal and socioeconomic problems with stress on

sustainable development. The authors view social innovation and social enterprise as new amalgam for solving social problems in the era of the Fourth Industrial Revolution. By applying theoretical analysis of the existing literature about the correlation between the Fourth Industrial Revolution and social innovation and social enterprise, they aim to describe the opportunities, forms, and the challenges unfolding in this new age. UK and China case studies will provide the empirical evidences that could support social innovators and social enterprises understand the implications in fields of application of the Fourth Industrial Revolution plus the interplay between them.

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This chapter presents a brief reflection on emergent themes, issues, and problematic areas chapter authors have drawn to readers’ attention to and tentatively indicates some potential future directions for research and development whilst recognizing rapidly changing social mores and culture is a deep river running through diverse channels in the Lifeworlds and Workworlds of leaders today. The heroic actions of medical personnel under severely stressed hospital and patient care systems in the current Covid-19 pandemic is noted. The authors have pointed to perceived gaps in leadership regarding the uptake and understanding of digital technologies and suggested that implications include new ways of thinking and new competences for changed ways of working in the networked world of business. Crucially, the authors reiterate that these are deeply human endeavors, and the complexity of the technology does not negate or overwhelm the interactive dynamic complexity of human relations between leaders and others who inhabit and view these conjoined worlds through many cultural windows.

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Foreword

This book addresses concerns relevant to the interests and activities of current and aspiring leaders who are introducing elements of the Fourth Industrial Revolution into their organizations. In their previous book, Smith and Cockburn (2014) together with their collaborative chapter coauthors detailed the new capabilities that leaders must develop to successfully steer their global businesses communities through the new era of social digital connectivity and through situations in which leaders are co-evolving with their environments at ever accelerating rates.

In this new book, Smith and Cockburn and their collaborative-chapter co-authors, provide an updated extension of their previous book (Smith and Cockburn, 2014). This includes updating the leadership capabilities that leaders must develop to successfully address the further complexities associated with introduction of the Fourth Industrial Revolution into their organizations.

In order to set the context of the topics in the book the first chapter gives a very brief overview of key definitions of leadership in organizations which have been discussed in a previous book by Smith and Cockburn (2014). The chapter then provides an overview of the contents of the remaining chapters, each of which addresses a specific area of application of the Fourth Industrial Revolution in a particular line of business.

I highly recommend this book, which contributes significantly to organizational and management knowledge, and participation in global affairs of all kinds, and which helps ensure successful outcomes in today's unpredictable 'Fourth Industrial Revolution' contexts. Each approach does not entail any assumptions of expertise, and is adaptable for all organizations being comprehensible for both technical and non-technical readers, thus enabling all readers to readily apply the models to their own evolving situations.

John Pourdehnad
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REFERENCES

Smith, P. A., & Cockburn, T. (2014). *Impact of Emerging Digital Technologies on Leadership in Global Business*. Hershey, PA: IGI Global. doi:10.4018/978-1-4666-6134-9

Preface

This book aims to address the interests and concerns of relevance to current and aspiring leaders in business organizations; plus academics in higher education and senior students; as well as business consultants; and intelligent laypersons with an interest in subject matter related to adoption of the Fourth Industrial Organization (IR4.0). This book is not aimed at technical or functional specialists or managers specifically, although the broader models, strategic topics, digital technology focus, attitudes and competencies, outlined herein can be successfully applied by them to their leadership roles, or the roles they aspire to have, and may acquire. To enhance and improve clarity each chapter has a list of key terms and definitions. An abstract is provided for each chapter to indicate to readers the overall range and scope of the topic in that chapter.

In our previous book, Smith and Cockburn (2013), *Dynamic Leadership Models for Global Business: Enhancing Digitally Connected Environments*, we outlined a number of areas where leaders have to lift their game in order that their organizations can reap the rewards and ultimately benefits will accrue to our global society in various ways. The metaphorical ‘elephant in the room’ is that many current leaders lack awareness; skills; or in many cases have a demonstrable lack of interest in the new socio-digital technologies. Thus our objectives in this new volume is to provide readers with a range of insights and research data as well as cases from a number of authorities in key fields of research and of practice with particular relevance to adoption of the Fourth Industrial Revolution (IR4.0).

To set the context for the topics in this book, our first chapter gives an overview of key definitions of leadership in organizations, which we discussed in detail in our first book (Smith & Cockburn, 2013). As noted elsewhere, organizations, societies and leaders at all levels today “have their work cut out” as their roles and responsibilities or priorities morph in the slipstream of the turbulent social economic and technological changes occurring across the world today (Smith & Cockburn, 2013). Leaders today have to continuously strive to build and maintain: a sharp, cutting edge profile, as well as to generate loyalty, innovation and sundry other discretionary behaviours amongst staff and other stakeholders in their organizations,

and in their markets; to facilitate better business in the global context of rapidly accelerating technological change (Pretorius & Roux, 2011); plus the fast growing global impact of COVID19 virus! Alongside the above tasks, leaders must frequently re-evaluate their roles and reinvent themselves to address the constantly shifting forms and diverse types of unpredictable opportunities and constraints of operating in the global business environment in a period when, as Helbing, et al (2017) stated: “Everything will become intelligent; soon we will not only have smart phones, but also smart homes, smart factories and smart cities. Should we also expect these developments to result in smart nations and a smarter planet? ”

By the same token, and without becoming excessively ‘intoxicated’ by technological determinism, academics, consultants and leaders must search for more effective, and more dynamic leadership models in order to simply keep pace intellectually, as well as practically, with the complex swirl of health concerns; new digital technologies; socio digital media; and the trans-disciplinary derivatives and related devices or applications surfacing in our lives each day. The practical drawback here is that many current definitions of leadership continue to be based on stable or constant factors interacting in predictable ways. That is, these perspectives tend to eschew any dynamically interactive form of complexity in the context or processes, but instead, favour an assumption “that slightly more complicated types of ‘business as usual’ scenarios will return some-day soon”. Such theories or models typically demonstrate limited range; duration; or diversity; and are lacking practical application by many leaders engaged with navigating the stormy seas of global business. They thus seem somewhat “archaic”. The static models are increasingly coming “under fire”, and so are part of a much contested and often confused area of academic research, and practitioner debate. In addition, there are the often “lagging” public perceptions, fuelled by the popular media, which ignore impacts such as the recent ‘heart-bleed’ virus issue (Kets de Vries, 1993; Higgs, 2003; Ruettimann, 2011; Krohe, 2011, Smith & Cockburn, 2013), or COVID19.

On the other hand, Smith and Cockburn in this book point the reader towards the gender-neutral, flexible, leadership model presented in their first book in this series (*Dynamic Leadership Models for Global Business: Enhancing Digitally Connected Environments*; Smith & Cockburn, 2013) which the authors believe will still be the basic model required to successfully address current and future leadership concerns in the Fourth Industrial Revolutionary (IR4.0) contexts. At the time of writing the Leaders of many nations as well as those in global businesses are under threat and are failing. As many as 40% of all new leaders fail within the first 18 months according to recent surveys, thus the leadership crisis continues to grow more threatening and as the leaders’ world of work grows more complex each year, the leaders’ own self-doubt about their skills is magnified (Newhall, 2011, Smith & Cockburn, 2013, xii).

Preface

In *Dynamic Leadership Models for Global Business: Enhancing Digitally Connected Environments* (Smith & Cockburn, 2013), the authors proposed a dynamic foundation for understanding and practicing leadership based on proven, practical ways to deal with complexity. For example, one may address complexity very successfully by basing one's actions on intuitive decisions that in turn are based on extensive tacit and explicit knowledge and experience. When one does not yet possess extensive experience, another way to successfully make progress is by taking small steps in an experimental fashion, and continuously learning from what seems to produce the results one wants and what doesn't. In this vein, we visualize leaders as members of a complex evolving ecosystem, where individually or in groups they are co-evolving with forces and currents of specific markets or wider business complexity and their own systemic organizational contexts using a variety of dynamic leadership models.

To this end, we set out (Smith & Cockburn, 2013) integrated processes that facilitate this co-evolution without prescribing what the specific leadership models, behaviours, competencies etc. must be. In this manner, based on their learning and experience, each leader may continually tailor their activities and leadership models to address shortfalls perceived between what they are achieving and what they themselves or others expect them to achieve.

Long ago, scholars in organizational behaviour established that there were close links between leadership and learning (Schein, 1972, 1992; Argyris, 1976; Argyris & Schon, 1978); and these links continue to be emphasized worldwide today. Grazier (2005, p. 360) in the USA emphasizes the connection between leading and learning, maintaining, "leaders [...] have to have the insight to admit they don't know everything but are willing to learn. They must be driven to do better tomorrow." The leadership process described in *Dynamic Leadership Models for Global Business: Enhancing Digitally Connected Environment* (2013) and the current (2020) "Global Business development for the Fourth Industrial Revolution (IR4.0)" are designed to take into account the existing knowledge of an individual; his/her colleagues; and their organization. This provides a framework to develop this knowledge further, or as appropriate, to relinquish previous knowledge and skills that are proving counterproductive. This latter activity is termed 'unlearning', and although it has not received as much attention in the literature as that of learning in the workplace (Becker *et al.*, 2006), it is a significant factor in dealing with dynamic complexity.

Leadership has always been equated with authority and 'power over' – in this book (Global Business Development for the Fourth Industrial Revolution (IR4.0) Smith and Cockburn equate leadership with planning, performance-related learning, and "power to" rather than "power over"; however, Smith and Cockburn recognize the lingering nostalgia for the 'heroic' paradigm in the minds of many leaders of organizations. Thus, despite some reservations about his alleged autocratic manner,

Steve Jobs' death prompted many hagiographic reviews crediting him with having merged and changed industries - or at the least initiated whole new products such as the combination of music and the mobile telephony; the iPod; and the iPad; all catering to the 'wired' generation. For every Steve Jobs there are thousands of leaders who must tackle their complex environments without the experience and personal attributes that allow individuals such as Steve to make successful intuitive decisions – depending on the specific organizational context, either of the following two books will be of enormous assistance to them: *Dynamic Leadership Models for Global Business: Enhancing Digitally Connected Environments* (2014) or *Global Business Development for the Fourth Industrial Revolution (IR4.0)* (2020).

CHAPTER 1: LEADERSHIP CONTEXT

Chapter 1 covers in significant detail much the same ground as has been overviewed in this Preface. The authors briefly outline the historical development of 'leadership theory and practice' as foundational for our readers' understanding of leadership, and to contextualize the subsequent chapters.

CHAPTER 2: DYNAMIC LEADERSHIP PROCESS

In Chapter 2, a systemic on-the-job integrated learning approach to leadership is described that provides the foundation for adopting a dynamic leadership model appropriate to the reader's own situation. Very briefly this involves following a four-step incremental leadership process:

1. The first step is to understand your leadership role – what are you expected to achieve?
2. The second step involves analysing how to successfully perform your role. This is accomplished using a performance system model where your performance is viewed as dependent on three elements or fields (Focus, Will, and Capability) that help you structure your activity. These three elements form a dynamic system and your personal performance level depends on the interactions and interdependencies of these three elements.
3. The third step involves your very frequent cycling through a succession of activities in an experiential leadership learning cycle (Smith, 2000) based on the work of Schewhart (2012), Kolb (1984), Honey and Mumford (1989), and Deming (2012).

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4. Step four is concerned with operationalizing steps one through three to obtain the maximum value. Steps one through three are termed single-loop learning (Argyris & Schon, 1974) and step four moves to a higher order, “double loop learning” (Argyris & Schon, 1974).

CHAPTERS 3-15

The remaining chapters *detail* significant current and emerging issues and complex systems, scenarios, problems and social or demographic aspects relevant to technologically driven business landscapes with which leaders must increasingly engage in order to deliver for their organizations.

These chapters are intended only to acquaint you with the general properties of such conditions. These environmental factors are all systemically linked, and the results of their interactions will be dynamic and unique to your particular situation. The environments themselves will also typically be digitally connected, adding a further level of complexity. The first two chapters in this set, chapters three and chapter four, lay out for the readers, the authors’ sense of the changing spirit of leadership in an age of digital abundance. These two chapters consider how the emerging world has already begun to shape the agenda of future leaders in diverse ways. Current projections by McKinsey have suggested that almost half of the fortune 500 companies in the future will be based in emerging nations. The global panoramas that are opening up before the eyes of perceptive leaders today, have much for these leaders to get excited about. In addition, there are some new challenges for much of traditional thinking on leadership, strategy and organizational behaviour; for example, related to the impact of the COVID-19 virus. In this chapter the contributing authors look at how leadership development must be reformed to begin to address the shifting directions in leaders’ strategic thinking, their revised priorities and emerging challenges as well as some of the potential rewards of the new age. In Chapter five the authors discuss their analytics research using illustrative case material from field studies to demonstrate the practical, on-the-ground impact of the new digital technologies, and how these have begun to shape the socio-cultural arenas in which both the “for-profit” and “not-for-profit” leaders act in advanced industrialised countries.

Chapters 6-14 begin to examine human and technological facets and interfaces of the new global business world leaders are now entering. In chapter six, Big data analytics use in healthcare is discussed. In chapter seven, the authors review how the application of learning models and leadership might be applied to create a catapult effect in leadership development for IR4.0. Chapter 8 considers emerging

cyber security risks and challenges and is followed by chapter 9 which reviews data security and data privacy.

Chapter 10 updates these authors' research first presented in our 2014 book, with the latest developments and issues on emerging changes in workplace relationships and how hidden aspects of these interactions and working relationships may be visualised using the relational modelling approach they have developed. Chapters 11 and 12 both refer to the need for an ongoing review of how higher education and learning using digital technology may be underpinned with some core values and orientations towards futures and related perspectives reflective of students evolving in a positive, compatible direction without losing sight of core educational values of critical learning necessary for addressing emergent organisational and social complexity.

Chapters 13 and 14 both consider social innovations and how NGOs and social justice may be pursued in the new era. Chapter 13 addresses that issue in respect of a current telecenters project in an emerging country and how this effort has grown and developed since they first reported it in the 2014 book edited by Smith and Cockburn. Chapter 14 provides a discussion of how the theory and practices involved in social innovation will have to be enhanced and deepened as well as widened in scope at home and abroad-wherever home is in the post-Covid19 world.

Chapter 15 outlines an exploration of the business vista that is now emerging, and how the significant currents and flows driving business have changed and are changing, and the evolution of leadership in digitally connected environments, including IR4.0, will challenge our ideas about business efficiency, sustainability, and the nature of leadership. We will be entering an era of mainstreaming of concepts such as substitution, reusability, circular production systems, and optimization, virtualization and waste elimination (Heck & Rogers, 2014)

As noted above, and in greater detail in the individual chapters, the focus of this book is to alert readers to these matters and raise awareness of the scope, pace and diversity of applications of socio-digital technologies in the emerging global business environment of the Fourth Industrial Revolution (IR4.0) as we move towards the second decade of the present century; plus the need for leadership to be developed to move beyond the current state of 'semi literacy' in terms of technologies (such as those involved in actualization of a Fourth Industrial Revolutionary approach). This book addresses the impact of the emerging technologies on leadership across many disciplines and in diverse fields. Collectively, the editors and authors of chapters look beyond the focus of the immediate technologies to engage with wider scientific and social changes; new norms of behaviour, sensemaking, and cognition with regard to our 'lifeworld' and potential 'workworlds'. Such impacts are often reflected or presaged to varying extents by the applications and devices we construct for our pleasure, or for easing the strains of living and working and for

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opening up the doors to future possibilities for development. As such these continue to drive culture change, reprioritisation, moral as well as business change and, as suggested by a number of the chapter authors, is beginning to shape our strategic leadership thinking, alter agendas and present new vistas for change and positive improvements in the lives of people as well as some potential threats for leaders and the public to attend to.

The various chapters have been written with an eye to not only gaining the intelligent reader's attention, but also to gain their interest. There is a wealth of food for thought; discussion; debate; and reflection; as well as stimulation; and satisfaction of readers' taste for new concepts; all alongside the practical ideas to be gleaned from the case studies provided. The chapter- authors have figuratively 'set the table' for an intellectual feast, and collectively provided a diverse menu, with items to appeal to those with a thirst for a deeper understanding of these matters... "Bon Appétit!!!"

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Chapter 1

Leadership in the Digital Age: Disruptions, New Rhythms, and the Beating Change

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ABSTRACT

This chapter introduces the scope and focus of the new book. The reader is briefly introduced to the definitions and debates about leadership and management boundaries, differences, and overlapping responsibilities in the digital age. Drawing on both theory and practice, current issues and topics are covered in depth, providing an introduction and overview of perceptible trends and scenarios relevant to the current post-global financial crisis (GFC) and the emergent IR4.0 leadership outlook for global business. The editors then provide an outline and overview of the chapters, topics, and themes of each chapter and a coherent rationale for this new book as developing discussions and research from our first book in the series, “Dynamic Models of Leadership for Global Business: Enhancing Digitally Connected Environments.”

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INTRODUCTION

There is a well-researched and growing recognition amongst many commentators today that it is an axiom that 'Business as usual' is no longer a viable option, especially in the period of the surprise emergence of the Covid-19 global pandemic which has caused massive disruption across the global economy. The public health actions taken by governments has wreaked some havoc initially for those in tourism, hospitality and aviation industries but increasingly in other sectors and types of businesses as provinces and whole countries go into lockdown with people told to self-isolate and stay home. Thus, it is not useful to continue with some of the failing models of leadership based upon assumptions of business as usual. There is a new, more urgent rhythm of business and social life. The beat has changed, and the new high performers are playing a different tune and using new instruments. We live today in a world rich in digital resources but share a poverty of leadership competence in exploration and exploitation of these resources to their fullest it seems. We still also have emerging climate issues with environmental degradation and finite physical resources though some –but not all–of these ecological deficiencies might be attenuated with more judicious use of the digital abundance becoming more and more accessible to us globally. Thus, delivering a 'green dividend' from lower carbon emissions from grounding of many airlines, expected reduction commuting by cars in lockdown countries in Europe and elsewhere and rise in virtual meetings globally. However, this green dividend may be partly offset by increased use of energy by those confined or working at home during the lockdown periods ranging from a few weeks to a few months in the current UK planning (Harvey, 2020)

Such emerging digital resources have brought demands for changes in many societies, which go beyond simply increasing access to the technology per se for consumers. For example recent research by Pew Global Researchers (2014) has noted that 20% of the world has mobile and online access and this has reinforced other social demands in particular from the younger generation who are usually the first to take up the newer technologies and access the web. As the report states:

“Majorities in 22 of 24 countries surveyed say it is important that people have access to the internet without government censorship. In 12 nations, at least seven-in-ten hold this view. Support for internet freedom is especially strong in countries where a large percentage of the population is online. And, in most of the countries polled, young people are particularly likely to consider internet freedom a priority.” (Pew Global Research Center, March 19, 2014)

These and other changes also beg many questions about what leaders must do to succeed and what new 'psychological contracts' need to be negotiated between

citizens, followers, employees and the formal and informal leaders in all organizations in order to sensibly and practically define what is allowable, acceptable, desirable, possible and mandatory in the workplace today. We have drawn on the research and practical expertise of authorities from across the world in this edited book. That is fitting since the changes that are emerging continue to widen their application and impact across even the most remote and seemingly inaccessible societies, businesses, governments and cultures, albeit in diverse ways and at different speeds. As mentioned above, the Internet has opened up the world and increasingly; mobile technology has diminished distances and expanded communication as we pointed out in our last two books in the series (Smith & Cockburn, 2013, 2014).

This first chapter in this new book gives a very brief overview of key definitions of leadership in organizations we discussed in detail in our first book. We also point the reader towards the flexible, gender-neutral leadership model we presented in our first book and that we believe will be required to successfully address current and future leadership in digitally defined contexts. At the time of writing the Leaders of many nations and businesses are under threat and are failing. As many as 40% of all new leaders fail within the first 18 months according to recent surveys, thus the leadership crisis continues to grow more threatening and as leaders' world of work grows more complex each year, the leaders' own self-doubt about their skills is magnified (Newhall, 2011, Smith & Cockburn, 2013, xii).

As noted above, both organizations and leaders at all levels today have to work hard and to strive to continuously maintain a sharp, cutting edge profile in their organizations and in their markets (Pretorius & Roux, 2011) or else reinvent themselves to address the constantly shifting unpredictable opportunities and the constraints of operating in a global business environment. By the same token, so too must we search for more effective, dynamic leadership models in order to keep pace intellectually and practically with the heady pace and complex swirl of new socio digital media, devices and applications bubbling to the surface of our lives each day. The practical drawback here is that many current definitions of leadership continue to be a much contested and often confused area of academic research and practitioner debate as well as the often lagging public perceptions fuelled by the popular media (Kets de Vries, 1993; Higgs, 2003; Ruettimann, 2011; Krohe, 2011).

In general, as we have noted before, many definitions are either so broad that they become bland, so narrow that little of any practical significance can be elicited or, in the case of the public perceptions tend to refer to historic or military metaphors of heroic leader (Smith & Cockburn, 2013). In addition, many of these definitions often seem to be based on versions of leadership activities and competences that are out of touch with a globalized world of cloud computing, viral marketing, ecological disasters, and emotional contagion of flash mobs using social media to self-organize a form of collective leadership and the Volatile, Uncertain Complex and Ambiguous

(‘VUCA’) world of today (Smith & Cockburn, 2013, pp.6-7, Lawrence, 2013). Older certainties of a more stable and less disrupted world are gone.

However, the current academic consensus about best leadership practice does revolve more closely around the transformational leadership styles than the older transactional or traits-based models. So although there is debate about the character of it, or how it impacts on the leader or followers, there is at least some implicit or explicit recognition that change is a major factor in the leaders’ world. Transformational leadership therefore is the style with which most readers of this book will be familiar, and most importantly, this style is in harmony with the learning approach that is foundational to the leadership process model we set out in detail in chapter two. The changes today are often based around efficiency and effectiveness gains linked to greater automation, artificial intelligence systems installation, or trawling big data from social media and customer feedback. For instance, the amount of autonomous Internet-connected devices is growing and is expected to reach 200 billion in 2020, so radically altering the Industrial sector.

So, this sort of change begs the question: What are the strategic risks associated with organizations’ increasing dependence on integrated and embedded information and communications systems and technologies that underpin all of that? For instance, the risks posed by these systems that they enable every facet of the organization, impacting customers, employees and trading partners? What metrics allow leaders to quantify, evaluate and cover the risks of not updating systems or alternatively the risks inherent in system failure, hacking, failed installation or poor integration of new or linked IT systems? Some systems for trading work with millions of dollars in transaction each every second of the business day so a system ‘meltdown’ can be very costly to organizations, clients, and the wider community. More generally, although providing the world with many advantages the technologies relies on many finite resources to produce them, so there is an underlying question about sustainability and environmental impact.

We have noted and taken heed of the changes to modern organizations, their technologies, the emerging cultures as well as associated risks at various levels and in different markets indicating the need for greater leader-awareness of these matters. These risks as well as the potential benefits to leaders and the stakeholder communities are amply described, analysed and discussed in the chapters presented in this volume.

The above changes were preceded by a process of structural and cultural changes to organizations, which also continues today. The internal layers of organisations have been stripped down throughout the last 15-20 years of downsizing and de-layering prior to the post-Global Financial Crisis (GFC) restructuring and Sarbanes legislative regime since 2007. Other hitherto pre-existing boundaries within and between organisation and environment have in some senses now become more permeable

as the global socio-digital networks expand and with the greater *interactivity* of such networks. In both the latter descriptions of organizational states and systems today, that is the *internal-internal* and in the *internal-external* systems, greater collaboration is being sought by those engaged in global business at all levels and types of organizations, from strategic alliances to local operational networking.

A number of years ago, Kauffman (1995) related this rapid change process to evolutionary theory of business development and described it as technological co-evolution: one business creating niches for another in the ecological landscape of the new technology market or “technosphere”. However, he also describes two core evolutionary strategies. The first is what he calls the “Red Queen” effect which he links to organizations selfishly competing and over time, as the business landscape gets harder with increasing competition, shortening product and supply lead times, higher expectations of customers, these companies end up having to run faster just to stand still relative to others and to the general pace of change. Crucially however, the new technology developed by one firm often provides a niche for another firm’s product or service to enter. There are symbiotic developments as well as competitive developments similar to the kinds of co-evolutionary developments seen in “predator” and “prey” species in the animal world (Kauffman, 1995, p125).

Globally, this model often also applies to big businesses nowadays, as they inhabit similarly turbulent and chaotic markets with increasing diversity and redundancy leading to high numbers of fatalities. This co-evolutionary model contrasts with the evolutionary stable strategy often found in large, hierarchical organisations that have frozen too readily into compromise solutions. The leader in all sizes of organization in the era of emerging web 3.0, Facebook, Twitter and Wikileaks now faces a different global market, public, regulatory and employee community than previously. So, leaders must change their approach to address the current and imminent challenges they face today or else watch as their organizations fall behind in the race for business until they are so far behind, they cannot catch up. Leadership as we have said elsewhere, has previously always been equated with authority and ‘power over’ – in this book we equate leadership with planning, performance-related learning, and ‘power to’ (Smith & Cockburn, 2013).

In order to thrive and survive in a precarious global economic environment today therefore organizations of all kinds have to strive to continuously reinvent themselves to address rapidly developing or emerging digital technologies which continue to disrupt or demolish markets for many goods and services. However, leaders and managers have new tools and techniques to deploy to increase interest and engagement for staff as well as effectiveness and efficiency of operations, including aspects such as sustainable growth, reduced environmental impact, or staff wellbeing and safety.

Writers and bloggers are presenting ideas to their online audiences on various related topics. For example, a few current examples of the kind referred to drawn from consulting experience and that illustrates actual digital technology applications are presented by Marr (2014). For instance, a construction company whose staff work in hazardous environments is currently using wearable devices to collect and analyze data on employee's body functions. Their aim is to identify ways to detect fatigue and stress levels from the analytics data retrieved and to put systems in place so they can pull people off dangerous jobs if fatigue and stress levels are too high. Other companies are looking for socio-digital tools that can analyze data on staff engagement from their peoples' posts on Facebook or Twitter or recruit based upon information on which browsers or apps job candidates use.

Digital technologies are increasingly now being embedded in various transdisciplinary applications and new domains such as GRIN and BNIC have become mainstream in advanced economies (Smith & Cockburn, 2013). As Ulla de Stricker (2014, p4) notes "The increasing sophistication and scale of the systems organizations use to manage information objects and to amass, manipulate, visualize, and extract data have added to the stresses the organizations experience in dealing with their knowledge." In parallel, leaders face the related dilemma of a constantly shifting economic vistas post-GFC as these and other factors change the character and relative global influence of advanced and emerging markets.

Yet another layer of complexity is added by the changing social mores in mainstream cultures in many societies. These changes include such fundamental areas of life as dining. Reflecting not only the availability of fast food but the pace of life today and the availability of the cheaper travel, the internet, mobile communications and social networking media have contributed to changes in eating habits in the USA for instance (Hartman, 2014). As one commentator has remarked, "The time it takes the average American to prepare dinner is now less than half the length of a Hell's Kitchen episode. Cooking has become a spectator sport, with people watching TV chefs battle it while they grow ever distant from the farmers who produce their food. The loss of culinary skills and regular mealtimes mean 40% of American meals are solitary and eating with friends and family has become the exception rather than the norm" (Nierenberg, The Guardian, 2014).

However, this is not just because people are too busy to stop and cook but, as the Hartman (2014) report authors remark on page one it reflects the spread of information on food and its preparation too: "Research shows people consume social media content far more than they create it, which means many are mainly exploring. As a result, one person's online suggestion to try a Korean hamburger or a peppermint mocha latte—or more powerful, one person posting an appetizing-looking photo of the same—can reach thousands of people in a day. " The report suggests that the growth in Internet access and use has also promoted the growth in

cyber-explorations of food with one site *Allrecipes.com* already in the global top 10 sites. This is now a trans-generational growth phenomenon as older users have begun to catch up with the younger generation of early adopters of social media, helped by retailers like Starbucks, McDonalds, IKEA and others whose online presence on sites such as Twitter, Facebook, allied to their physical locations have been transformed into “Wi-Fi” hotspots operating as online as well as offline “community anchors” (Hartman, 2014, pp2-3).

Globally the related social and work expectations of the upcoming generations of consumers and staff who fall into the category of ‘digital natives’ and thus frequent and enthusiastic users of social media and new technology increases the impact of socio digital technology on behaviors and expectations. This group is the future. They expect digital media to form part of their future whether they are at work or socialising and frequently they make fewer distinctions. Often expecting the same amount of functionality in their workplace technology as their personal devices, hence the growth of the BYOD phenomenon.

However, the BYOD growth rate and complexity is not evenly distributed between continents or populations however. As has been noted in a survey of 3,796 consumers in countries as diverse as Brazil, Russia, India, South Africa, United Arab Emirates, Malaysia, Singapore, Japan, Australia, Belgium, France, Germany, Italy, Spain, Sweden, UK, US, there is a marked difference between emerging rapidly-growing markets and others. The survey indicated different orientations to work and using your own devices. It showed that 75 per cent of respondents in the emerging markets (including Brazil, Russia, India, UAE, and Malaysia) as compared to 44 per cent in more mature markets would prefer to use their own devices at work. “(*Logicalis* White paper, 2014).

Under these circumstances, leadership is best conceived as “a process of continuous optimization and adaption, where the next leadership action is based on what is happening now. In other words, leadership is emergent, and is co-developed with the context in which the leadership is taking place” (Smith & Cockburn, 2013). In *Dynamic Leadership Models for Global Business: Enhancing Digitally Connected Environments* we proposed a dynamic foundation for understanding and practicing leadership based on proven ways to deal with complexity as outlined in chapter 2.

New macro trends and incipient strategic webs of cooperation, new joint ventures, and market coalitions presenting potential future challenges for the current first world powers such as the US (Saddi, et al., 2011, Pew report, 2014). Some of these trends are exemplified by recent actions of countries in the Gulf Cooperation Council (GCC), Brazil, Russia, India and China (BRIC) and the so-called, ‘next 11’ group (Bangladesh, Indonesia, Iran, Mexico, Nigeria, Pakistan, Philippines, South Korea, Vietnam and Turkey). Entropy has also appeared as a result of mega-communities, such as the fragile monetary zone of the EURO, BRICS, and the leadership contest

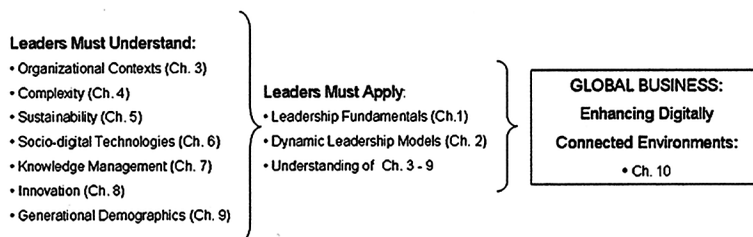
between India and China, the economy of the USA, Japan and emerging Corporate identities as well as popular uprisings and social unrest such as presently occurring in Syria and the Ukraine (Khanna, 2011, Pew, 2014).

In our previous book we outlined the emerging contexts and domains where we saw relevant issues, concerns and applications of our model. We recognised that some issues needed to be resolved in order to enable greater access and participation in the emerging era for all. Prejudices and stereotypes lingered and hindered growth and development or productive engagement such as age-based stereotypes which, according to Blauth et al (2011) severely restrict or constrain productivity and collaboration between the four or five generations working in organizations today. These authors also suggest that an ‘age-blind’ workplace may not be the answer to such issues of collaboration between generations in the workplace (Blauth et al, 2011, p.10).

The editors and authors of this book have also recognised that things were moving fast and further changes were imminent in a diverse array of fields and professional disciplines and that our initial chapter topics were by no means exhaustive or mutually-exclusive but instead are often interconnected in many ways. So, the context for this book has emerged and evolved further as currents of change have escalated in line with the general predictions of exponential acceleration in “Moore’s law”.

The chapters in book one are described in figure 1 below for your information and in order to locate the current book as an extension and advance on the previous research. We would again stress the dynamic interrelationships and the connectedness between the various chapter topics since these continue to be major features of work and life today that we all have to deal with and have if anything grown since last year in some ways. Consequently, such aspects must form part of the leaders’ reflections, understanding and actions to enable organizational as well as career survival.

Figure 1. Dynamic leadership models for global business: Enhancing digitally connected environments
Smith and Cockburn, 2013



The world of demand and supply continues to shift and some of these fields have begun to overlap or at least the demarcation of roles has become blurred in many ways as consumers become or are emerging embryonic ‘prosumers’ in many sectors (Toffler, 2006). A McKinsey Global Lifestyle brief in May 2013 stated that advances in analytics and pricing algorithms are now giving companies the opportunity to deliver personalized pricing to their customers. This emergent world is increasingly technology-driven with exciting new opportunities which demolish older ‘forcefields’ and frames of reference on what is possible in the production of goods and services. However, without become too “technologically intoxicated” the latter drivers also unveil the tantalisingly dynamic global business complexity that imposes new demands and new limits as peoples’ interconnected, social, cultural and economic lives evolve within expanding and increasingly global technological frameworks (Cockburn and McKie, 2004). Nevertheless, nature may still intervene and surprise us all from time to time as the current Covid-19 pandemic has shown though robotic patient testing technology has sped up the testing of people and epidemiology technology and mobile phone apps alerting people to infection ‘hotspots’ or Covid19 patients nearby has been shown to assist in ‘flattening the curve’ in various places such as South Korea though there are some implicit issues regarding privacy and surveillance and ethics in their use which has limited their roll out in other countries.

Meanwhile, the B2C world is being transformed by the array of increasingly diverse digital devices enabling more customisation as well as sharing, crowdsourcing of resources, ideas and new products and services such as venture capital, building, fashion and furniture design. The same innovations have also simultaneously impacted on B2B suppliers and potentially weakened some intellectual property rights. With the increasing functionality the impact of Big data provides the opportunity to outsource not only product evaluation or market pilots but product design to the ‘crowd’. Potentially at least, the organization has a global talent pool to draw from. This goes beyond the older ideas such as initiating a consumer competition with a prize in order to get new ideas.

The other side of this ‘coin’ is the impact on the careers of some of those professions such as that of designers (as well as design courses and education). Some companies now see the worldwide web and the promise of untapped reserves of global ‘crowd’ creativity as a valuable form of customer feedback and a cheaper, more effective option than hiring a trained designer (‘Click’ technology updates on BBC). Frey and Osborne (2013) estimate around 47% of US jobs fall into their ‘at risk’ of computerisation and automation. As these authors state: “While computerisation has been historically confined to routine tasks involving explicit rule-based activities (Autor et al, 2003; Goos, *et al.*, 2009; Autor and Dorn, 2013), algorithms for big data are now rapidly entering domains reliant upon pattern recognition and can readily

substitute for labour in a wide range of non-routine cognitive tasks (Brynjolfsson and McAfee, 2011; McKinsey Global Institute, 2013). In addition, advanced robots are gaining enhanced senses and dexterity, allowing them to perform a broader scope of manual tasks (IFR, 2012b; Robotics-VO, 2013; McKinsey Global Institute, 2013). This is likely to change the nature of work across industries and occupations.”

In addition, a recent report suggests some possible social media backlash is developing as shown by studies purporting to demonstrate the need for “tech breaks” and warnings that social media can also make people lonely, so there are now “Digital Detox” camps for adults as well as some children (Hartman, 2014, p5). The areas where populations are in isolation and lockdown may have given an extra impetus to organisations to think about ways to increase virtual teaming and widening the working-from-home movement generated from the governments’ attempts to suppress the pandemic. So, the future is, as usual, ambiguous for forecasting outcomes. So, although the research survey has generally been positive (since 8 of the 15 theses presented are positive with respect to how the changes in society and economy enacted through the new technology are seen), some of the expert commentators consulted for the Pew research report on “Digital Life 2025”, also point to privacy and surveillance issues, distinctions forming between classes of users and access to sites (Pew 2014).

In other words, organizations, leaders, and all the stakeholders are in a situation where they are co-evolving at an accelerating rate. Leadership is no longer a matter of setting a direction and ensuring it is being followed - leadership for the future is all about having a vision with an uncertain path to its achievement that may only be attempted through awareness, flexibility, agility, and adaptability in the collaborative company of fellow stakeholders.

As we commented elsewhere,

“Leadership today and in the future must be achieved in face of organizational complexity, whereas Yeo (2009, p. 67) states “If anything can go wrong, it will (Murphy’s Law)”. Now and in the future leadership is all about having a vision with an uncertain path to its achievement that may normally only be navigated through flexibility and agility based on the collaborative wisdom of fellow stakeholders.” (Dynamic Leadership Models for Global Business: Enhancing Digitally Connected Environments, Smith and Cockburn, 2013)

In global contexts, the sustainable strength of integral business transformation lies in the capability to continuously create, connect, and execute strategy throughout the entire business system. Leaders must be conscious of the repercussions of their role as context creators in which a collaborative nexus of customer/employee emotional and creative engagement occurs. However, many leaders are not aware

and there are also other tensions and conflicts in workplaces generated from cultural roadblocks to building and maintaining trustful collaboration between employees in different professional specialisms as well as between co-workers and their leaders. Some problems exist precisely because of ‘creative’ or crowd fixes applied locally that have masked conflicts or other issues, embodied some local tacit knowledge or cultural bias. Often that sort of knowledge is not part of the wider knowledge management structure in an organization or reflects demarcations of ‘ownership’ of problems and responsibilities for investigating issues.

For yet other organizations there is a reluctance in the hearts and minds of some leaders with ‘getting their hands dirty’ or doing tasks they feel are boring or beneath them even if such activities are vital to the future of that organization. The sorts of areas resisted are diverse but include corporate PR or fundraising in the case of some NGOs or Not-for-profits. Thus, according to the BoardSource 2012 Governance Index, 46% of not-for-profit CEOs gave their boards “D” or “F” grades for their fundraising efforts and fundraising is the lowest ranked of 10 board responsibilities. Consequently, in practical terms that often means managing and funding necessary changes become too ‘political’ and are in the ‘too hard to fix’ file or are locked into particular operations, or specific regions (Smith & Cockburn, 2013, de Stricker, 2014).

Thus, as the EU’s business innovation observatory report indicates with respect to Artificial Intelligence (AI) work especially: “development of AI for big data in Europe has a number of drivers and faces several obstacles. These drivers and obstacles impact both technology companies developing solutions and companies looking to implement AI. Drivers include a highly educated workforce, scalability of developed solutions and public support programmes fostering innovation. Obstacles include the difficulty of attracting funds both for company set up and early financier divestment, high administrative burdens for small companies and unfavourable tax environments” (EU, 2013, p4).

Global leadership models therefore must be continuously reviewed and enhanced to keep pace with these complex, dynamic forcefields. Further, leaders seek a practical and sustainable approach that helps build effective personal leadership, whilst also leveraging organizational capabilities with action plans that take account of the complexity of emergent problems, learning and reciprocal unlearning to harvest technological potential. These include factors such as the professional silos, time pressure, change management, influence and cultural change.

If we accept the premise that a critical success factor for achieving global competitive business advantage today and in the foreseeable future involves networking and collaboration between webs of consumers, individual organizations and/or networks of allied organizations, then today’s business environments demand updated leadership and managerial attitudes towards understanding the tools and

practices at both organizational and network levels, focusing on knowledge sharing, collaborative leadership, and more inclusive managerial procedures and systems (Hyypia & Pekkola, 2011). With relevance particularly to globalized environments, Harris (2011) has drawn attention to the work of Spillane (2006) claiming that this research has sparked renewed interest in distributed leadership practice, focusing particularly on the interactions between leaders, followers and their evolving workplace situation.

Our first and second books were unique in treating current leadership challenges that are not amenable to leadership approaches of the past, recognising complexity in global business exceeded the merely technically complicated and now our newly composed book brings this objective up to date. The first two books attempted to provide an emergent viewpoint derived from the dynamics of interconnected contexts, learning and activities, where the reader is both the systems architect of his/her own leadership (the system) and an optimal, generalized, gender-neutral process through which the reader's style of leadership might be built up in an ongoing manner. It is our intention that this book is also written in an accessible manner that effectively empowers the reader to develop their leadership aptitudes, and sustainably mature their organization and staff for the kinds of challenges they face now and will encounter in the future.

Nevertheless this new book is distinctly separate from our previous books as it builds upon and extends its central thrust, setting out important new approaches to leaders' orientations towards digital technologies, and a much needed comprehensive overview of these various newly emerging elements that are driving the ever increasing complexity in our global environments. This book extends the discussion to encompass impacts in the socio-digital sphere across all business functions and includes reviews of emerging roles, responsibilities, and the redefined rights that accompany them in diverse organization types, sectors, consumers and organizational structures as the millennial generation comes to the fore in the domain of leadership. The book also includes case histories and examples reflecting issues and models in chapters therefore providing a useful reflective reference tool for leaders in any organization to better analyze and review their strategic situation, available decisions options, resources and outcomes, to enhance or construct flexible action plans.

The approach of authors in the new book does not entail any assumptions as to skills or expertise of users, and is adaptable for all organizations, being comprehensible for both technical and non-technical readers, and so enabling all readers to readily apply the book's content to their own evolving situations and emerging roles and responsibilities.

Objectives for this chapter:

- Introduce and review leadership impacts of digital technology

- Discuss the authors' perspective on impacts and issues of digital technology leadership;
- Present concluding remarks and explore emerging trends; and
- Detail the relevant references.

BACKGROUND

Research on leadership in general or what leadership is, what leaders do and what it takes to be a great leader is reportedly the most researched area of human behavior in the social sciences (Dulewicz & Higgs, 2005) dating back to the 19th century. Before the nineteenth century there were commentaries and observations about leaders and leadership; many of the so-called 'Great man' theories that underpinned some of the research. They were, as the name implies mainly biased towards a gender-specific, traits-based perspective, namely that leadership was the sole preserve of great men with inherited traits of leadership (Zaccaro, 2007). Often these traits-based models are aligned with popular perceptions of leaders.

Yukl (2002, 2009, 2010) has suggested 5 broad categories of research on leadership: as trait theories, behavioral models, power-influence, situational and a blended type of integrative models. Bolden et al., (2003) proposed seven theory types: 'Great Man' theories, trait theories, behaviorist theories, situational leadership theories, contingency theory, transactional theory and transformational theory. More recently, a review article lists 29 diverse types of leadership theories (Gardner et al., 2010).

Spicker (2012) has now succinctly summarized this into a set of six principal classes of leadership theories as follows:

- **Leadership as Motivation and Influence:** For example, Yukl (2010, p. 21) suggests that leadership reflects "... the assumption that it involves a process whereby intentional influence is exerted over people to guide, structure and facilitate activities and relationships in a group or organization", and Northhouse (2007, p. 3) asserts that leadership is "a process of influencing the activities of an individual or group in efforts toward accomplishing goals in a given situation".
- **Leadership as a Set of Personal Attributes or Traits:** Leadership may be understood as describing someone who motivates or influences others through for example charisma, emotional intelligence, and on and on!
- **Leadership as a System of Authority:** Leaders 'run things' and are 'in charge' or 'take charge'.
- **Leadership as a Relationship with Subordinates:** Many definitions of leadership assume that leaders have followers, and leadership can be seen as

a relationship where the leader(s) mold(s) the behaviors of the followers in order to influence them to perform in certain ways or produce certain results.

- **Leadership as a Set of Roles:** A leader might act as a pioneer, working in a different kind of way as an example for others to follow.
- **Leadership as Management:** Several authorities assert that leadership is quite different from management, where management is said to be about the status quo and leadership about change (Kotter, 2001).

However, many of these theories and models are often underpinned by, or premised upon traditional, rationalist, economic models that often seem to ignore the effects of complexity by assuming a relatively stable, though complicated global socioeconomic system. Others propose that there is a clear dichotomy between management skills and leadership skills. We propose no such dichotomies are present, recognising that management skills and leadership skills form a continuum and both ideally can exist in the same person but are used for different but interdependent ends (Smith & Cockburn, 2013).

We have therefore outlined an alternative to the traditional academic models in our previous book. Our proposed model attends to complexity and emergence as an endemic feature of global business today yet requiring a manageable approach from those with leadership responsibilities. Our model is both practical and realistic, embodies the academic research consensus supporting transformational leadership styles and is in the form of a simple 4-step model. The model entails leaders learning to cope with complexity using an iterative, gender-free, collaborative methodology (Smith & Cockburn, 2013) that is briefly summarised in the next chapter.

MAIN FOCUS OF THE CHAPTER

The current chapter has opened the book by locating leadership and management of global and local operations within often turbulent and always dynamically intersecting dimensions of complexity evident in an increasingly technology-dominated social and market environment with major 'surprises' such as the current Coronavirus (Covid-19) pandemic which has had major economic as well as health impacts globally at the time of writing. It is also proposed that the "Industrial Internet" of machines talking to other machines, a component of the largely unknown 'second economy' outlined in a McKinsey paper by Arthur (2013) which operates beneath the surface or visible structures and processes of the usual model of the 'first economy' involving production, manufacturing and consumption dynamics is also evolving towards what has been termed as the Fourth Industrial Revolution or IR4.0 (Smith and Pourdehnad, 2018). Although referring to technological co-evolution, it seems

reasonable to infer organizational co-evolution too as a concomitant structural development. The technology-driven networks in the second economy could add \$10 to \$15 trillion to global GDP in the coming years it has been suggested (GE reports, cited in M. van Rijmenam, <http://www.bigdata-startups.com/big-data-trends-2014/>). Much of the second economy involves automated processes such as Big data capture used to inform other technological systems and trigger various responses directed at production, consumption or regulation of these and of ancillary systems to smooth, improve and grow the economic functioning of global business.

Nor is 'Big data', from trawling the Internet solely available to big organisations' marketing or production functions, as there is a plethora of open source tools becoming available to all. Big data analytics have been used in a variety of ways by different organizations globally. These applications range from the advanced deployment of the techniques to relatively simple uses of social media. KLM the Dutch airline has a 'meet and seat' program which enables passengers who wish to do so, to select compatible seat partners based upon their online profile, in order to make travel more interesting. Elsewhere, Australian retailer "Shoes of Prey", have an analytics system allowing them to begin upselling based on the fashion tastes of its clients derived from analysis of individual customer-spend and profitability data they capture (M. van Rijmenam, <http://www.bigdata-startups.com/big-data-trends-2014/>). The Brazilian fashion outlet C&A on the other hand simply uses Facebook 'likes' displayed on coat hangers in their store displays to encourage purchases, Y&R Dubai's marketing campaign for the UAE-based 'Gulf News' employed an adapted coffee cup sleeve that displays headlines tweeted by the paper in the previous hour (<http://www.springwise.com>, 2014). These and other examples of rich and diversely intersecting domains of technology, society and market are increasingly ubiquitous and make the former distinctions between online and offline less tenable.

In short, unless we relapse into a socio-digital ice age, the evolution and integration of the online and offline bridging, using various interface or augmentation technologies and systems and spanning diverse fields or disciplines such as BNIC and GRIN are where the sources of major changes will be spawned. These are often transdisciplinary projects. Diverse applications are being developed integrating technologies from one field into another to produce innovative and beneficial devices such as non-invasive Brain-to-computer interfaces allowing partial or wholly paralysed or injured patients to carry out tasks they otherwise could not achieve and also potentially transforming surgery and medicine. Some research is into varieties of wearable devices and yet others are harnessing Big data to social media and attempting to personalise consumption which, at the same time is transforming business disciplines such as marketing and HR.

This is also the territory the authors of the chapters in this book have begun to navigate and to map. The map is by no means complete and is it is still likely to

change in the course of time as some areas expand and others decline or mutate or as the global economy falters or recovers from Covid-19 and other surprises. Nevertheless, researchers already predict that around one-third of Fortune 500 organizations will have encountered major problems with their business intelligence by 2017 (Vladimir, 2014). So, the message has yet to penetrate to all sectors of the global business community.

Excluding our editors' introductory and short concluding chapters setting the book in context now and looking to some possible future scenarios and research directions, there are 13 other chapters in this book. The 13 chapters are each written by authorities in leadership and/or in a particular digital technology area and address the significance of the developmental impact in that field whether that impact is positive or negative. These include chapters on conceptual and practical models, research and data about Governance, Big data Analytics, digital collaboration technology, personal collaboration privacy, innovation, competitive intelligence, social and developmental networks and strategic use of IT in public, private and Non-Government Organizations (NGOs).

Such topics surely apply amongst global leaders in public and private organizations, including NGOs, hospitals and commerce today. The chapters cover other impacts on leadership in sectors as diverse as healthcare, Fashion Industry, pharmaceuticals, data security, work reorganization, business risks and corporate financial flows as well as social media usage, in functions such as marketing, Human Resources and product design. The question is how best to organize these diverse chapters to reflect the themes of the book?

The arrangement and ordering of the chapters has emerged as the book progressed beyond the initial 'drawing board'; our book proposal and topic list proffered to the publisher for review and consideration. As with leadership and global business complexities and 'life' events intervened and seemed to conspire to make work difficult as in the expression of 'Murphy's law' – anything that can go wrong is likely to do so at some point during the project. Equally we had some good fortune and things turned out well; better than expected in a few cases. Some of the chapter proposals we received were unexpected or 'left field' ones we had not really anticipated and even those covering topics we had anticipated in our discussions, often drew on diverse and interesting ideas, concepts, models, case materials and particular research of the authors with which we have only now become familiar. Others were a mixed bag, and a few had to be rejected. The book compilation process and editing were also much impacted by surprises and extra complexity due to unforeseen eventualities and spirals of complexity too, with both editors' computers crashing, thankfully at different times but with our data having to be retrieved. On another occasion one of the editors became seriously ill and hospitalized (although now recovered). Nevertheless, and perhaps because of these surprises and trials, we have an interesting

and insightful book for the reader to engage with. We offer a number of chapters, which hold both theoretical as well as practical benefits that we believe will enrich the readers' work and study goals.

Following the initial context setting and the chapter outlining and refreshing readers about our model in our previous book, the chapters move from 'broadbrush', contextual discussions and framing chapters outlining the fluid new global business and action landscapes organizations inhabit and vistas leaders see before them to more narrowly focused, detailed analyses and descriptions of particular technologies entering leaders' fields of vision and action. Others add data and outcome discussions drawn from emerging professional and research domains such as Big data Analytics, Social networking media, and Healthcare or focus on particular aspects such as cybercrime and privacy.

Chapter 2 brings the reader up to date with an overview of the leadership models, learning processes and practical applications drawn from the research and consulting work carried out and developed by Peter A.C. Smith and Dr Tom Cockburn over time in the course of research or discussions with our academic and practitioner colleagues or clients in the Center for Dynamic Leadership Models in Global Business. The model outlines a simple, iterative process incorporating learning new, effective and relevant ways of working in the current and future environments as leaders. The latter learning process for leaders may also incorporate some unlearning of inappropriate habits or customary ways of working that are no longer appropriate in the organization or in the business world today. The model is free of gender or cultural biases, simple to apply and humanistic since it involves enhanced communication and openness, captures creative input and empowers 'voice' of actors whilst reducing negative conflicts in teams.

Chapter 3 is by Prof Lokke Moerels on governance in the era of IR4.0 and outlines a range of issues affecting diverse organizations in the EU. A major finding of her research has been that the language for discussing the range of impacts and emerging trends in the field of governance is not yet developed sufficiently well to enable boards and leaders to discuss and build some commonality in order to communicate and sensibly tackle some aspects such as collaboration and thus developing common and agreed vocabularies, frameworks and terminologies are urgently required across many business sectors.

Chapter 4, also by Prof Moerels gives suggestions for achieving the enhanced governance and provides some case analyses to illustrate key points made.

Chapter 5 is by Rahul Saxena and R.Gupta and is titled the *Analytics Asset*. In this chapter the authors outline the analytics landscape to help organizations gain a shared understanding of issues that must be addressed to plan, build and use the Analytics asset. Including an outline of the historical convergence of the techniques and tools or methodologies drawn from the fields of statistics, operations research,

industrial engineering and computer science and he describes the emergence of the discipline of Data analytics. Analytics as a discipline is increasingly important, emerging profession within the evolving landscape forming around the network of the digitally informed global business ecosystem. The authors relate this to the current perceived deficiencies in the levels of leadership awareness or interest as well as the need to inform and build leaders' confidence and skills development to enable them to more astutely explore its potential or exploit this technological domain now and in future.

Chapter 6 is by Prof Javanthi Ranjan and Dr P.M. Jeyanthi, is looking at Big data Analytics in Healthcare and is titled *Application of Analytics to better target physicians*. Professor Ranjan tackles the thorny subject of how Big Pharma garners analytic data on physicians prescribing practices and how this material is used in the marketing of pharmaceutical products. In this chapter Professor Ranjan discusses the differences between hype and reality about big data and places the emerging analytics movement into perspective whilst discussing the opportunities, scale and limitations of the application of the tools of decision-collection and analysis by the analytics professionals with respect to the pharmaceutical and healthcare industry specifically.

Chapter 7 is by A/Prof Kalyan Banerjee and Uma Maheshvari, titled *Leading in the Era of Digital Abundance*. These authors have taken the theme of growing recognition of the potential global abundance and availability of digital and information resources as their core topic, albeit in a context of finite physical resources and issues of environmental degradation. They discuss the emerging skills development drivers and how these task leaders to undertake personal growth to enable their organizational growth as well as simply keeping pace with the sociodigital technology exponential growth rate. These authors outline a specific program they have developed for leaders, drawing conclusions about applicability globally as business and academic thinking turns to explorations of transdisciplinary synergies in the development of products and services for all types of organizations, professions and industry sectors.

Chapter 8 is by Michael Anton Geodeker, titled *Cyber Security: Future IT Security Challenges to tomorrow's leaders and businesses*, and this encompasses empirical research on raising employees' growing concerns about protecting organizations increasingly reliant on ICT, the protection of data and of confidentiality of clients as well as intellectual property from hackers as well as viruses. These and other cyber challenges of cybercrime and cyber warfare are set to rise exponentially as increased uses of transdisciplinary digital technologies spread the areas and domains where we are increasingly dependent ranging from false credentials in E-learning derived from hacking into online learning bodies, through to industrial espionage carried out by accessing staff development files in organizations to see what ways companies are training and developing their engineers, scientists and others as a

means to determine strategic directions, markets targeted and attempts to ‘steal a march’ on rivals to get there first (Innovaro, 2014).

Chapter 9 Sue Milton and is titled *Data Privacy versus Data Security*. This chapter employs case material and the author’s own experience as a CEO to give an overview of how concerns about balancing privacy and security impact on business systems, processes and reputation. The chapter author uses a pair of anonymous case organization descriptions, each one with a different set of priorities, constraints and expectations of Information technology and of the associated costs and benefits, to help elucidate for readers the issues affecting each and the sorts of outcomes that they experience.

Chapter 10, by Dr Peter Johansson, Dr Tomas Backström and Dr Marianne Döös is a development of their 2014 research and is titled *Uncover the Hidden Relationships of Work: A Visualisation Tool to Support Informed Change Decisions*. In their abstract they concisely outline the chapter as based on theorising and analysis from an ongoing research and development project exploring the use of visualisations in task-based development and decision making; specifically, the potential of new types of organisational images that may support understanding about work-integrated learning. Thus, the aim of the chapter is to explore the possibilities of visualising work-integrated competence networks – here referred to as *relatronics* – and contribute to the understanding of how such visualisations can support efforts of organising change when organisational boundary-crossing cooperation is needed for a significant task. “So, as is readily evident to the reader this too is a chapter with both a practical focus on implementation of this methodology within a business environment as well as a research or academic model building description and discussion.

Chapter 11 is by is by Matthew Kolakowski and SAEbrahim and is titled *E-Learning- Emerging Themes and Implementation Principles*. In this chapter the authors describe and discuss the research on digital technology systems applied to learning. As discuss emerging themes and principles of effective e-learning and the subsequent impact on leadership in global business as digital technologies mediums continue to emerge within academia and the workplace. This is an important and continually developing socioeducational and cultural field as MooCs begin to become more accepted in some parts of academe and some are getting credentialized and ICT is effectively mainstreamed now and a part of Educational policy development in many western countries. The currents of streaming and ‘pop up’, ‘just-in-time’, ‘anywhere, anytime’ are reflected in the social fabric of many countries and especially amongst the younger millennial and their younger siblings who have only known the digital era. For these demographics there is no looking back to earlier didactic models and ‘old style’ learning media minus devices or as part of a historical project.

Chapter 12 is by Dr Francisco Leandro and is titled *Educating for “buoyancy”:* *Professional skills for a new generation of digital natives*. This chapter addresses

changes required in the universities practices and teaching to ensure professional development suitable to move forward in IR4.0 and looking ahead to IR5.0 in terms of values, resilience and competence of graduates.

Chapter 13 is by Sampath S. Windsor, Carol Royal and C. C.Windsor and, and is titled *Aiding the Fourth Industrial Revolution in the Developing World, Socio-Cultural Leadership in ICT4D: Learnings from Telecentres in a South Asian Country*. In this chapter the authors describe and discuss their research and have a practical, pragmatic and focused look at how the broader perspectives of other authors are enacted in situ. They use a case analysis of for-profit and not-for-profit telecenters in emerging countries and how these may potentially become an adjunct to sustainability and community development and Corporate Social responsibility. They uncovered fusion of Socio-Cultural Leaders (SCL) that perpetuated CSR synergies within Nenasala telecenters to successfully enhance sustainability, community focus, and competitive advantage against their non-Nenasala, for-profit telecenter counterparts.

Chapter 14 is by Roopinder Oberoi, W. Mswaka, Francisco J. Leandro, M. Snowden and Jamie P. Halsall, is titled *Reimagining Social Innovation and Social Enterprise for Industrial Revolution 4.0: Case Study of India and UK*. This chapter is an exploratory study aiming to understand the social aspects of the Fourth Industrial Revolution and how technological innovation and social innovation can resolve societal and socioeconomic problems with stress on sustainable development. Here, social innovation and social enterprise is viewed as a new amalgam for solving social problems in the era of the Fourth Industrial Revolution. By applying theoretical analysis of the existing literature about the correlation between the Fourth Industrial Revolution and social innovation and social enterprise, the authors aim to describe the opportunities, forms and the challenges unfolding in this new age. UK and China case studies will provide the empirical data which could support social innovators and social enterprise in understanding implications in the fields of application of the Fourth Industrial Revolution and the interplay between them.

Chapter 15 is a short reflective concluding commentary by Peter A.C. Smith and Tom Cockburn and is titled *Epilog: Retrospective and Prospective reflections*. This chapter briefly outlines some of the emerging challenges observed, notable themes and perspectives described and discussed in the book and some ways we see these moving forward in the global business context leaders face in future. We do not have any ‘crystal ball’ and prophesying the future in our complex world is always a fraught endeavor but also a task which leaders attempt each day in their working lives, even with the benefit of Big Data analytics.

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Chapter 2

Reflecting Emerging Digital Technologies in Leadership Models

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ABSTRACT

In this chapter, Smith and Cockburn reaffirm their claim in a previous book that today's global business contexts are volatile, uncertain, complex, and ambiguous (VUCA), and leaders must focus more on complex thinking skills and mindsets than developing behavioral competencies. In so doing, leaders must be familiar with the benefits and drawbacks of emerging digital technologies and use these technologies appropriately. In the previous book, the authors defined flexible and dynamic leadership models that assure success in the above contexts and described learning related processes essential to mastering the ability to adapt at rates consistent with the business complexity leaders now face. In this chapter, they extend their previous research and review newly emerging factors contributing to global business complexity in the era of the Fourth Industrial Revolution (IR4.0) and explain how these elements may be applied by leaders, including CEOs and Boards of Directors, to augment the power of their recommended leadership models.

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INTRODUCTION

According to Friedman (2007) the rate of change today is much different than in the past and this has created a new environment that strategic business leaders are increasingly calling a 'VUCA' environment (Lawrence, 2013). VUCA (Wikipedia, 2013) is an acronym used to describe or reflect on the volatility, uncertainty, complexity and ambiguity of general conditions and situations. The common usage of the term VUCA began in the late 1990s and derives from military vocabulary and has been applied in a wide range of organizational and business situations. In today's VUCA environment, organizations of all kinds are facing unprecedented economic demands that they be successful in their given niches whilst operating in increasingly dynamic business contexts, with many unexpected, surprises and under ever escalating ethical and sustainability constraints (Smith and Cockburn, 2016). The further impact of a host of newly emerging digital technologies and 'surprise' issues such as unforeseen viral pandemics like Covid-19, can be seen as 'asymmetric threats' which may well be the straw that "breaks the camel's back" for many organizations and potentially for national economies (Wolfowitz, Rivera and Ware, 2018). In any event, in face of these complex challenges such as the current pandemic, with many airlines rapidly depleting their reserves as flights are cancelled and national governments in the EU, UK and elsewhere closing entire businesses down for the foreseeable future until the pandemic diminishes as well as climate change; "business as usual" is no longer a viable option, and organizations as well as governments and whole societies must change since complacency equates with extinction.

In other words, leaders must develop new capabilities and resilient systems if they are to successfully steer their communities through the newly emerging era of social change as well as social digital connectivity and global dynamic complexity. As Lawrence (2013) explains in regard to this new VUCA environment, "It is taxing even the most able of leaders who may find their skills growing obsolete as quickly as their organizations change in this volatile, unpredictable landscape. Leadership agility and adaptability are now required skills if organizations are to succeed in this VUCA world." or as Michael Marquardt (2000) foresaw: "Our new century demands new kinds of leadership with new skills. Leadership styles and skills that may have worked in a more stable, predictable environment of the 20th Century will be inadequate in this new era of uncertainty and rapid change, where we can hardly define the problem, much less engineer possible solutions". The widespread push for staff to work from home and self-isolate to avoid spreading the highly contagious Covid-19 infection has given extra impetus to the use of such technology.

In consequence, as organizations reinvent themselves to address such constantly shifting opportunities and constraints, so must new relevant leadership models

emerge to fit the changed landscape the leaders confront, bearing in mind that such leadership models must be culturally and economically sensitive, and thus country sensitive (Bersin, 2012). Clearly it is a matter of urgency that HR and talent management professionals reframe leadership development activities to accommodate the faster-paced VUCA/4th industrial revolutionary world and focus less on behavioral competencies and more on complex thinking abilities and mindsets. As Petrie (2011) asserts “Leadership development should be focused on learning agility, self-awareness, comfort with ambiguity, and strategic thinking” - this is essentially the approach to leadership-development that was described in the book “Dynamic Leadership Models For Global Business: Enhancing Digitally Connected Environments” authored by Smith and Cockburn (2013) and their 2014 book “Impact of emerging digital technologies on Leadership in global business”.

This new leadership development focus is itself made more complex since it is not a one-time event, and the business landscape and available technologies are constantly changing such that leaders may not know at any given moment what manner of organization or context they will have to deal with in the future. In other words, organizations, leaders, innovators, and all the other stakeholders are in a situation where they are co-evolving at an accelerating rate. Leadership is no longer a matter of sailing a calm sea, setting a direction and ensuring it is being followed by an obedient crew - leadership now and for the future is more like trying to survive a tsunami, and is all about having a vision with an uncertain path to its achievement that may only be attempted through flexibility, agility, and adaptability in the collaborative company of fellow stakeholders. In other words, as Cashman (2013) notes: “To succeed in our volatile, complex, ambiguous world, we have no choice but to master our ability to adapt and learn”, or as Biro (2013) concluded: “The demands of a collaboration-based, talent-hungry, global, wired economy are evolving so quickly that success depends on nothing less than continuous learning. Fall behind and you may find yourself disqualified from the race.” and Biro (2013) further asserted that “Companies of all sizes in all industries are trying to meet the new imperative. Learning and development spending was up 12 percent in 2013, the largest jump in almost a decade. The goal is to integrate learning into a company’s culture and processes. There are also training sessions, workshops, conferences, and retreats, but the most successful strategies are those that make learning a continuous process, hardwired into a company’s metabolism.”

In their first book in this series (Smith & Cockburn, 2013), the authors defined flexible and dynamic leadership models that are consistent with development of the above capabilities, and also described learning related processes that are essential to mastering the ability to learn and adapt at rates consistent with the business complexity leaders face. The models provide simple, iterative, and reflective tools for leaders in any organization to better analyze their strategic situation, decisions,

available options, resources and outcomes, and to enhance or construct flexible action plans. These models are based on the understanding that Smith and Cockburn (2013) have developed from their practice that a leader's ongoing experience represents a significant source for development, but that this is often an untapped resource. In order to leverage this resource these authors (ibid) proposed a disciplined, deliberate and systematic process for learning from experience.

In their second book in this series (Smith & Cockburn, 2014), the authors presented an extension of their first book (Smith & Cockburn, 2013) dealing with then newly emerging elements of social digital connectivity and now updated with current dynamics and topics in the fourth industrial revolution, that are contributing to global business complexity, and with which leaders must not only be familiar if they are to be successful, but must also incorporate into their leadership models. In this book chapter, descriptions of the original leadership models were updated consistent with these imperatives, and newly emerging digital technologies plus contributions from other authors in Chapters 3 through 13 which provided further detail on these emerging technologies and their impact on leadership.

In this 2020 updated Chapter 2, the authors first clearly recapitulate and elaborate on details of the proven, flexible, and highly practical leadership process that was detailed in their first book by Smith & Cockburn, (2013). They then show how these models may be augmented to include the impact of the various new and emerging digital technologies including some of the relevant digital technologies for Board leadership in the era of IR4.0. Many of these technologies were not treated in the first and second books (Smith & Cockburn, 2013, 2014), and this new material indicates specifically how leaders may recognize, review, and react to these new factors. The new book is comprised of fifteen chapters, where Chapters 3 through 13 are authored by authorities in the subject matter of a particular chapter. As a whole, and as shown in Figure 1, the book proposes to change the mindset of leaders from command and control, based on the Newtonian view of the world as clockwork, to one of appreciation of successful leadership through influence, learning and agility based on a world characterized by digital networking, complexity, unpredictability, asymmetric threats and emergence.

This 2020 book seeks to contribute significantly to organizational and management knowledge and participation in global affairs of all kinds and help ensure successful outcomes in today's dangerous and unpredictable contexts. The approach does not entail any assumptions as to skills or expertise of users, and is adaptable for all organizations, being comprehensible for both technical and non-technical readers, and so enabling all readers to readily apply the models to their own evolving situations. Further, this book treats current leadership challenges that are not amenable to leadership approaches of the past, and it does so in an accessible manner that effectively empowers the reader to enhance their leadership aptitudes and sustainably

develop their organization and staff for the challenges they face now and in the future. The book is potentially appropriate for all classes of current and aspiring leaders, being gender-neutral, culture-neutral, and economy-neutral, and it will aid in their day-to-day activities, their career progression, and in the development of emergent capabilities relevant to co-evolution with their environments.

Objectives for this Chapter:

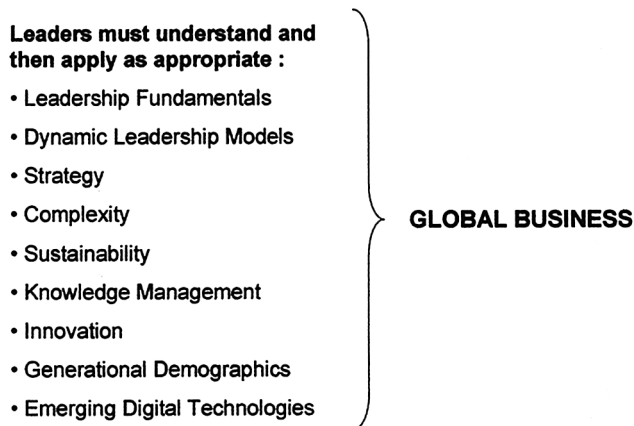
- Review dynamic leadership models recommended in Smith and Cockburn (2013, 2014)
- Discuss how newly emerging digital technologies may be integrated into these models
- Present concluding remarks and explore related emerging trends
- Detail the relevant references

BACKGROUND

Smith and Cockburn (2013, p. 32) state that, in relation to their recommended dynamic leadership models: “To fully equip global leaders nowadays there is a need to build an *enabling* framework across all levels of the organization. We believe that a bold approach is necessary and that *Dynamic Leadership Models for Global Business: Enhancing Digitally Connected Environments* is the result”. Like that great leader Alexander in ancient times, it’s time to unravel the Gordian Knot (2011), and we propose a foundation for understanding and practicing leadership based on proven ways to deal with complexity. This foundation is particularly relevant to dynamic leadership in digitally connected environments where such leadership is critical to addressing the complexity typical of such situations. Please note that the foundation is also independent of whether one leads in engineering, IT, construction, banking, or a myriad of other disciplines, and is gender neutral.” These authors go on to claim that complexity may be very successfully addressed if one’s actions are based on “intuitive decisions that in turn are based on extensive experience” (ibid, p. 34), but add that if one does not have extensive experience, “another way to successfully make progress is by taking small steps in an experimental fashion and learning from what seems to get the results one wants and what doesn’t.” (ibid, p. 34). This is an ‘emergent’ approach that Snowden (2012) terms “probe, sense, respond” (ibid, p. 95).

In adopting this approach, all chapters in this new book (Smith and Cockburn (2014, updated 2020) add practical supportive detail to the approach illustrated in Figure 1 which summarizes the intent of the previous books (Smith & Cockburn, 2013) and of this updated book (Smith & Cockburn, 2020).

Figure 1. A Leader's Mindset For Success In "The Fourth Industrial Revolution" And All VUCA Environments



Smith and Cockburn (2013) devoted chapters to up-to-date research on leadership fundamentals such as strategy, complexity, sustainability, socio-digital technologies, knowledge management, innovation, demographics, team learning, and digitally connected networked environments, with the proviso that these are subjects with which leaders must be familiar if they are to lead successfully in our complex global environment. These authors (ibid, 2013) also detailed integrated processes, termed “Dynamic Leadership Models”, that facilitate this emergence, but they were not prescriptive regarding specific behaviors, competencies etc. In this way, these authors avoided the trap whereby leadership development is based on competency models derived for a past era, for as Myatt (2013) asserts: “When organizations hire, develop, and promote leaders using a competency-based model, they’re unwittingly incubating failure.” Rather Smith and Cockburn (2013) emphasized continuous learning, noting that the close links between leadership and learning were established long ago by scholars in organizational behavior (Schein, 1992; Argyris, 1993), and the links continue to be emphasized world-wide today (Grazier (2005). Further, they explained that the leadership processes they described (Smith and Cockburn, 2013; p. 39-55) were designed to take into account the existing knowledge of an individual and provide a framework to further develop this knowledge, or as appropriate, to relinquish previous knowledge and skills that the individual finds counterproductive e. This latter objective has come to be termed ‘unlearning’ (Becker et al., 2006). Smith and Pourdehnad (2018) also explained in detail further leadership fundamentals that are specifically relevant to the implementation of the Fourth Industrial Revolution.

Smith and Cockburn (2013) and Smith and Pourdehnad (2018) claim that the learning-based leadership approaches they detail are effective and efficient for the

complex environments leaders must safely navigate daily, and that their new system is free of the weaknesses of current leadership programs, delivering significant additional personal and organizational benefits at less cost. Smith and Cockburn (2013, p. 39) state that:

Although leadership learning has been covered in the past, we believe this is the first time that an overarching process has been fully described that successfully addresses the realities of everyday leadership, and at the same time facilitates many dynamic leadership models to be enacted depending on the digitally connected environments at hand.

Leadership Process Cycle

The four-step learning-based leadership approach advocated by Smith and Cockburn (2013) and Smith and Pourdehnad (2018) is described in this sub-section. Here is what this “learning-leadership by doing” might look like:

Follow the four-step incremental leadership process cycle recommended by Smith & Cockburn (2013, p. 39-55), and Smith & Pourdehnad (2018, p.79-83). According to Smith and Cockburn (2013, p. 39-40) also ...

- Face reality
- Continuously reflect alone and with others
- Recognize the strengths you have and build on them
- Start from where you are
- Learn by leading in your particular context
- Learn from successes and failures
- Continue to incrementally improve at your best pace
- Organize in a people-centric way
- Motivate stakeholder participation
- Leverage the wisdom of your learning partners

Step 1

According to Smith and Cockburn (2013, p. 40) and Smith and Pourdehnad (2018, p.81) “The first step is to understand your leadership role – what are you expected to achieve? In sporting terms, this is your scoreboard, and the win, lose, or draw of your leadership will be judged on its results.” Your leadership role may be defined by a variety of people in any given organization but it is critical, according to Smith and Cockburn (2013) that you yourself are very clear on your current leadership role, and furthermore you must constantly review and attempt to change it to better meet

your organization's mission, goals and objectives. These authors strongly encourage leaders to develop and have approved such a personal role if one does not exist.

A generic leadership role framework according to Smith and Cockburn (2013, p. 40) is said to describe the leader's involvement in:

- Defining the organization's mission and identifying the means and outcomes for its achievement
- Developing the plans to actualize the tasks and activities related to the means and outcomes desired
- Leading implementation of the plans, sustaining commitment and ensuring cohesiveness
- Supporting sustainability through openness to change and continuous improvement

Smith and Pourdehnad (2018, p.81) provide a similar framework but one more specifically relevant to the adoption of The Fourth Industrial Revolution.

Step 2

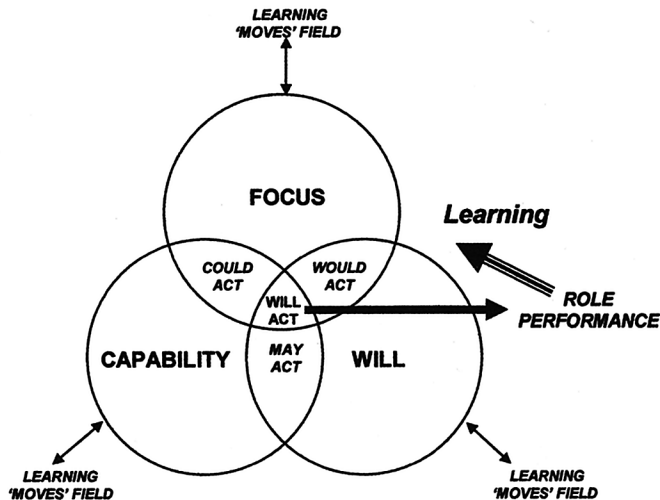
The second step involves analyzing how to successfully perform your role. This is accomplished according to Smith and Cockburn (2013, p. 41) using the performance system model presented in Figure 2

In Figure 2, your leadership role performance is pictured as dependent on three fields (Wheatley, 1992, p. 47-57) termed Focus, Will and Capability. The three fields form a dynamic system, and the performance level you achieve depends on the interactions and interdependencies of the three fields. According to Smith and Cockburn (2013, p.41):

Focus represents a clear definition and understanding of your role performance to be achieved; Focus is associated with questions such as What ..?; How ..?; Who ..?; Where ..?; When ..?; Why ..? The element Will represents your strength of intent to achieve the performance defined in Focus; Will is associated with your attitudes, emotions, beliefs and mindsets. Capability represents the wherewithal to transform into reality the performance defined in Focus; Capability is associated with such diverse areas as your skills, infrastructure, budgets, tools, physical assets etc. A change in any one of these fields may effect a change in the state of one or both of the other fields.

As Figure 2 shows, current performance potential is represented by the degree of overlap of the circles; optimal performance potential is indicated when Focus,

Figure 2. Dynamic Performance System
(Reproduced from Smith & Saint-Onge, 1996)



Will and Capability are all in balance and harmony, which would be demonstrated in the figure if all three circles completely overlapped. Imbalance leads to misdirected and wasted efforts as well as loss of performance. Figure 2, where only two model fields overlap and three fields overlap only slightly, is typical of real-life situations. For example, Smith and Cockburn (2013, p. 42) noted that:

... it is not unusual for a leader to poorly discharge their role because although the leader has a relatively clear understanding of the role performance they are charged to action (strong Focus), the leader has somewhat inadequate interpersonal skills and resources to carry out the actions required (moderate Capability), and no belief in the role's value and so little incentive to carry out the role as given (low Will).

Performance optimization is based on the continual dynamic tuning of the degree of overlap of the three fields. As a leader reflects on the results of their workplace efforts, their learning provides them with the clues regarding how they need to alter their Focus, Will and Capability to attempt to maintain harmony and balance, and thus their optimum role performance; in other words learning and reflection are keys to optimum leadership performance. Smith and Cockburn (2013, p. 42) claim that the necessary learning, and reflection are fostered and greatly facilitated through the kind of collaborative learning associated with the Action Learning approach that these authors discuss in their book (Smith Cockburn, 2013). These authors further claim that a unique benefit of this performance model is its “systemic

equivalence of Will versus Focus and Capability and its personal psychological nature.” As Popper and Mayseless (2007) point out, this is in contrast to typical leadership instruction where the emphasis is on observable variables rather than on the intra-psychic psychological variables that are truly fundamental to the visible expression of leadership.

Step 3

Smith and Cockburn (2013) stated that the third step involves a leader frequently working through a succession of activities in an experiential leadership learning cycle (Smith, 2000; Schewhart, 2012; Kolb 2012; Honey and Mumford, 1992; Deming, 2012); this experiential leadership learning cycle is shown in Figure 3.

In Figure 3, the first three cycle segments refer to any aspect of the leadership role being undertaken. “See the results” and “Think about the results” are segments in which the leader reviews role demands and actual results versus relevant aspects of the elements Focus, Will and Capability described in Step 2. “Carry out the role”, “See the results”, “Think about the results” and “Develop *enablers*” correspond to “probing, sensing and responding” and are consistent with the ‘emergent’ approach described by Snowden (2012) and Smith and Cockburn (2013, p. 95). Reflection, particularly in segments three and four, facilitates the leader deciding on what s/he needs to do to correct the mismatch between role demands and leadership results. Smith and Cockburn (2013, p. 42) point out that:

“When time is extremely short, decisions have to be rapid, and the scope for reflection is extremely limited. In these circumstances, reflection may be seen as a metacognitive process in which the practitioner is alerted to a problem, rapidly reads the situation, decides what to do and proceeds in a state of continuing alertness.”

Smith and Cockburn (2013, p. 43) explain that:

“Enablers are comprised of any understanding, knowledge, activity, capability, attitude, characteristic etc. which enables the leader to carry out his/her leadership role more effectively and better achieve intended results. For example an enabler might be as onerous as undertaking a skill training course or as simple as dropping into a colleague’s office to straighten out a misunderstanding.”

Some typical enablers highlighted by Smith and Cockburn (2013, p. 43) are listed in Figure 4. Segment number one in Figure 2 then re-starts the cycle with the chosen enabler(s) as part of role execution, and so on repetitively, cycle by cycle.

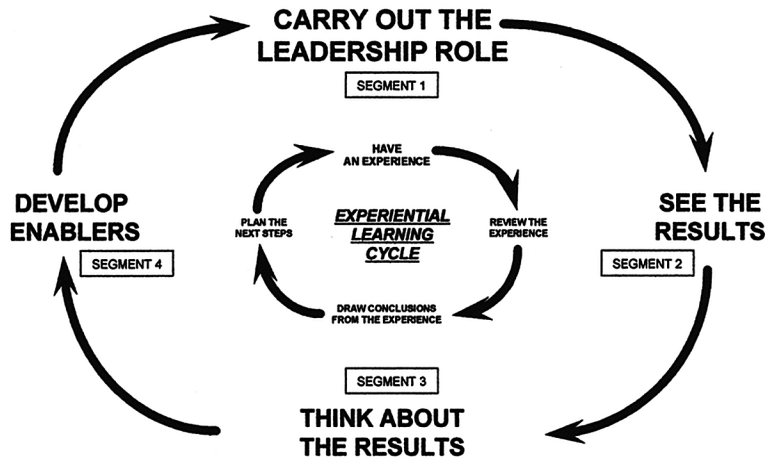
Smith and Cockburn (2013, p. 44) claim that complexity by its nature must be addressed through experimentation, and that Steps 1 through 3 should be treated in this manner, where iteration of the steps provides the experimentation from which the leader must learn and build experience. Yeo (2010) notes that the intrinsic value of reflection is not simply to seek an immediate solution to a problem, but rather it creates new insights into broader and deeper issues that reflection brings into continued questioning. Smith and Cockburn (2013) also recommend that the leader capture these experimental episodes in a reflective journal that may be used in the future to help in selecting enablers and also maintains a database of events.

In Step 2 of the leadership process cycle it was noted that learning and reflection of the performance system model is fostered and greatly facilitated through the kind of collaborative learning associated with action learning (McGill & Brockbank, 2004). In this regard, Smith and Cockburn 2013, p. 45) recommended that from time to time segments three and four in Step 3 be carried out in the company of one or more (no more than five) trusted colleagues in “learning partnerships” as shown in Figure 5. Action learning in an informal setting is a very effective method for developing learning partnerships; the formal activities of an action learning group (set) need not be followed, but the general principles of questioning, reflection, conjecture and activity planning would be utilized in achieving these results. Action learning (McGill & Brockbank, 2004) was originated by Professor Reg Revans in the 1940’s (Revans, 2012) and is used by many notable organizations (Smith, 2001, p. 35) Action learning according to Revans embodies an approach based on comrades in adversity learning from and with each other through discriminating questioning, fresh experience and reflective insight. This seemingly very simple methodology has demonstrated in innumerable cases that its practitioners can affect the complex and often inscrutable processes of natural learning through personal and collaborative reflection. The seven questions listed by Smyth (1991) are also helpful in reflection:

1. What do my practices say about my assumptions, values and beliefs?
2. Where did these ideas come from?
3. What social practices are expressed in these ideas?
4. What is it that causes me to maintain my theories?
5. What views of power do they embody?
6. Whose interests seem to be served by my practices?
7. What is it that acts to constrain my views of what is possible?

Smith and Cockburn (2013) note that simple personal assessment instruments related to the performance model shown in Figure 2 have been used for many years (Tosey & Smith, 1999). Such a personal assessment instrument relevant to the leadership performance discussed here is presented by these authors (ibid, p.

Figure 3. Leadership Learning Cycle
(Reproduced from Smith, 1999)

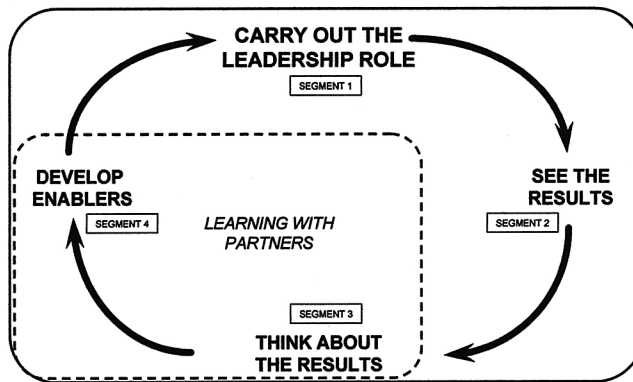


49). In interpreting the assessment results, Smith and Cockburn (2013) encourage leaders to add their own questions to the assessment to help track problem areas or to highlight important aspects of their leadership role. Further these authors caution that it is important to have balance between the three fields rather than have one field significantly better than others e.g. Capability is typically over-developed, and Will is typically under-developed. Smith and Cockburn (2013, p. 47-52) provide further comprehensive research and recommendations regarding the tuning of Focus, Will and Capability.

Figure 4. Some Typical Enablers in General Business Situations
(Smith & Cockburn, 2013)

- Clearly understand and commit to implications of your role
- Collaborate in revising your role as necessary
- Develop an understanding of systems thinking
- Expand business experience and customer know-how
- Build organizational savvy - how/who can get things done
- Increase networking and extend your credibility
- Widen cross-functional relationships
- Value people
- Enhance communication skills
- Familiarize yourself with the chapter-contents of this book

Figure 5. Learning with Partners
(Reproduced from Smith, 1999)



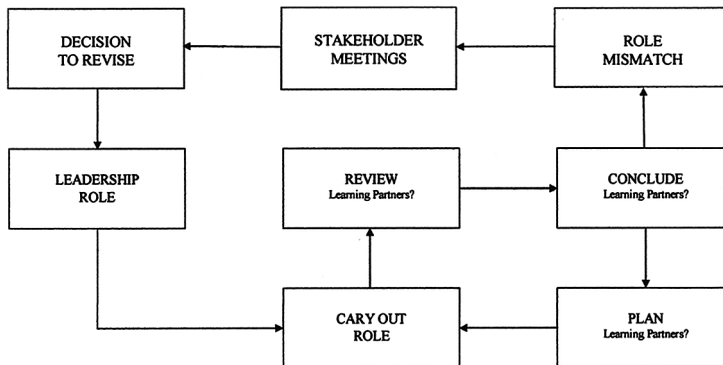
Step 4

Smith and Cockburn (2013) assert that Step 4 is concerned with operationalizing Steps 1 through 3 to obtain the maximum value.

These authors cite Argyris and Schon (Argyris, 1991) who adopted the position that learning that involves the detection and correction of error is ‘single-loop learning’ based on a simple feedback loop, where outcomes cause adjustment of behaviors, like a thermostat. It is generally in operation when goals, beliefs, values, conceptual frameworks, and strategies are taken for granted without critical reflection. In other words it is the *uncritical* acceptance of a leader’s role description in Steps 1 through 3 of the leadership process approach described so far.

Smith and Cockburn (2013, p. 52-53) claim that a higher order of learning is realized when a leader, upon detecting a mismatch between the target leadership role and reality, questions the goal-structures and rules embedded in his or her role description. This process these authors assert, is exemplified when a leader doubts and queries the relevance of his/her leadership role based on practical results and circumstances (s)he perceive in carrying out Steps 1 through 3 of the leadership process approach described previously. According to Argyris and Schon (Argyris, 1991), this is referred to as ‘double-loop learning’. Double-loop learning is more creative, and may lead to alterations in the rules, plans, strategies, or consequences initially related to the problem at hand. Double-loop learning involves critical reflection upon goals, beliefs, values, conceptual frameworks, and strategies. Argyris believed that this way of learning is critical in organizations and particularly to individuals who find themselves in rapidly changing and uncertain contexts - that is in complex situations.

*Figure 6. Steps One through Four of the Leadership Process
(Reproduced from Smith & Cockburn, 2013)*



Pardey (2008) claims that there is little new in terms of leadership ideas, and the challenge of today and the future is to adapt leadership styles to fast changing business environments. Smith and Cockburn (2013) state that the more complex, dynamic, turbulent, and threatening the organization's environment, the more significant double-loop learning must be considered in relation to leadership capability (Van Grinsven & Visser, 2011; Smith, 2012), and since the notion of single- and double-loop learning has stood the test of time, application of this concept to Steps 1 through 3 of the work-based leadership process described previously is important and relevant as shown in Figure 6.

Unfortunately, practical experience described by Smith (2011) indicates that many organizations are operating as if they were involved in 'simple' or 'complicated' contexts, rather than the reality of their current highly complex environments. This has potential implication for leadership where the leaders delude themselves in regard to the complexity of the situation they are dealing with, and the understanding of others. Again, this is a common problem with leaders (Smith & Saint Onge, 1996; Argyris, 1990; 1993). The latter delusion is particularly relevant in many emergency situations where teams must operate under constrained time horizons and with fluid 'experts' joining and leaving the teams at various points. Riley et al. (2008, p. 8), comment:

"...in conventional teams it might be possible that implicit communication is sufficient for team members to effectively communicate with each other. However, in critical teams, our observations show that implicit communication can be ineffective and possibly dangerous for patient safety. For example, we observed many instances in leadership transfer where the leader made certain assumptions that were erroneous."

On the basis of this theory and their own experience, Smith and Cockburn (2013) emphasize the importance of a leader continually evaluating his/her role for relevance given their experience in Steps 1 through 3, and seeking to have it revised as appropriate.

MAIN FOCUS OF THE CHAPTER

Paul Barsch (2013) recounts a story that he attributes to Gillian Tett of the Financial Times who discusses how in western economies 85% of the dollars lent by banks go to supporting existing assets, and not innovation, with only 15% of financial flows going into ‘productive investment’.

This is a phenomenon typical of human nature where, for example, only 15% of a community are natural avid learners of new subject matter, with 80% being learners only when ‘seriously encouraged’, and 5% being ‘couch potatoes’. Smith and Cockburn (2013) make the case that given the complexity inherent in today’s business world, and the necessity for systemic thinking to address this complexity (Gharajedaghi, 2012), leaders in general are

not familiar in any meaningful way with important business and technology topics outside of their own particular discipline. In particular, leaders must be sensitive to the relationship between leadership behaviors and the five culture dimensions described by Hofstede (1980). In today’s varied organizational workforces there will be similarities as well as differences, and leaders must adjust their leadership style to address these variations. The five dimensions of culture that

Hofstede (1980) identifies are Power Distance; Uncertainty; Avoidance; Individualism vs Collectivism; Masculinity vs Femininity; In their efforts to close this gap, Smith and Cockburn (2013) devote a chapter to each of the topics that they claim contribute to business complexity and with which leaders ought to be at least familiar; these topics are leadership fundamentals, strategy, complexity, sustainability, socio-digital technologies, knowledge management, innovation, demographics, and digitally connected and networked environments.

In this book, Smith & Cockburn (2014) assert that the plethora of emerging digital technologies must be added to this list. These technologies include: information organization and representation; information use and analysis; information preservation and access; information environments and socio-cultural concerns; social networking; enterprise social software; innovation/collaboration platforms; cloud computing; grid computing; big data; analytics; risk analysis; dashboards; eLearning; mobile technologies; Artificial Intelligence (AI); distributed AI systems and multi-agent systems; games; simulations; Social Network Analysis and related software; information capture and storage; data mining; potential pitfalls of emerging

digital technologies; information security; and information privacy issues. Clearly a daunting list, especially when combined with the topics detailed by Smith and Cockburn (2013). Smith and Cockburn (2014) assert that only very few domains in business or society remain untouched by emerging digital technologies, and especially social media (Deiser & Newton, 2013). Wikis enable more efficient virtual collaboration in cross-functional projects; internal blogs, discussion boards, and YouTube channels all encourage global conversations and knowledge sharing. This radical change has created a dilemma for senior executives; while the potential for leveraging the power of social media seems immense, the inherent risks create uncertainty and unease. The security concerns raised with respect to this internal (and often private) privileged information are significant and well founded. In addition, as Deiser and Newton (2013) point out:

“...there’s a mismatch between the logic of participatory media and the still-reigning 20th-century model of management and organizations, with its emphasis on linear processes and control. Social media encourages horizontal collaboration and unscripted conversations that travel in random paths across management hierarchies. It thereby short-circuits established power dynamics and traditional lines of communication.”

These authors in their article detail many aspects of a leader’s role that have been redefined in this new digital environment.

Smith and Cockburn (2013) made it clear that they were only recommending ‘familiarity’ with the topics they covered in their 2013 book, and these authors feel that this proviso should apply to a leader’s understanding of emerging digital technologies and their applications. They make the point that expert authorities in these various topics are typically readily available, and the purpose of ‘familiarity’ is to ensure meaningful dialog between the business leader and the topic expert. Too often in the past technical solutions to business problems have resulted in mismatched ‘stitched together’ solutions where each side blames the other for the failure of the initiative in practice. This is a particular problem in regard to emerging digital technologies that are rife with acronyms and where senior staff still show disregard for the benefits of the digital era. For example, Toomey (2013) in discussing a government case “Plain Language about Digital Leadership and Governance of Information Technology” states as follows:

“The patterns are clear. When the IT agenda is controlled by the IT specialists, and the people who run the government agencies are not engaged, things often go wrong - sometimes horribly. None of the investigations that I have seen describe a

significant government IT failure arising from a situation where the business leaders are firmly in control of the IT agenda.”

Toomey cites numerous examples of IT-business mismatches, for example Gershon (2009); Reinecke (2009); National Audit Office (2012); Chesterman (2013); and Joyce (2013).

Smith and Cockburn (2014) emphasize that ‘familiarity’ with emerging digital technologies in the sense outlined above is the aim of their new book - leaders need to be ‘broadly read’ in these topics and take a learning approach to adoption of these technologies where their successes and failures both provide the learning. Research conducted by Korn/Ferry International, and reported by Cashman (2013) from assessment of nearly 1 million executives, demonstrates that as individuals mount the executive ladder or assume Board positions, they need to become increasingly comfortable with uncertainty and sudden change; as Cashman states: “As leaders, they have to have the “integrative capability” to weave together and make sense of apparently unrelated pieces of information and ideas, crafting novel and innovative solutions from them”.

The notion of organizational leadership has traditionally been viewed in a top/down reductionist thinking fashion. At the pinnacle of the organization is the CEO, followed by the other C-Suite incumbents, then senior executives, then middle management and so on and so on. The idea that an organization’s Board of Directors has the ultimate leadership responsibility is either not typically considered, or the role of a CEO has become so dominant that no Chairman wants to fight that leadership battle anymore. This is no trivial matter in regard to who should lead the sustainability initiatives in general, and adoption of the Fourth Industrial Revolution in particular. It’s one thing to report good intentions through a Corporate Social Responsibility report, but another entirely to envision and lead the complex long-term business changes entailed in a Fourth Industrial Revolution strategy, since this is one of the most systemic and challenging change-related journeys on which any organization may embark.

The board of directors in principle is ideally placed to envisage and lead such a demanding journey (Leighton & Thain; 1997), given that it has responsibility for the interests of *all the stakeholders*, not just shareholders, as its mandate. Without the board of directors’ interest, broad experience, vision, knowledge, and leadership, regarding a chosen ‘Fourth Revolutionary’ variant, it is not likely that anyone else in the organization will pay much attention, other than for “window dressing.

Furthermore, even a top management that is committed to the Fourth Industrial Revolution does not last forever, and the responsibility for maintaining a change initiative falls back on the governance structure. If the Board of Directors does not understand the essence of such a pivotal organizational change, the risk is that top

management will be replaced with new managers who have fresh ideas of their own – organizations are replete with change/credibility “black holes” created when change sponsors have moved-on from much hyped initiatives without accomplishing their objectives.

As the authors (Smith & Cockburn) look around at “Fourth Industrial Revolution” initiatives reportedly in progress, they see more and more evidence of the application of the traditional reductionist approaches, whereby responsibility for sustainability is parceled out to individual organizational entities (particularly to the Systems Organization) without regard for the need, as described in Chapter 2, for a new and innovative organizational strategy plus an overarching planning process capable of addressing systemically the unpredictability and dynamic complexity in which today’s organizations operate. All too often a Fourth Industrial Revolutionary initiative, is targeted to a specific narrow aspect of the business; of course such initiatives are important, but typically this is “cherry picking”, and no consideration is given to applying Fourth Industrial Revolutionary principles on a wider basis that could **lead to** optimal restructuring of the organization as a whole, including redesign of its strategy for competitive success in the current and future global economy.

Listening does not mean mastering; it must be clearly understood that, soaking up the latest technological achievements of the Fourth Industrial Revolution e.g. at prominent conferences held by high-ranking professors mostly from Silicon Valley, cannot be rated as a practical educational effort. Such conferences are important, necessary and informative. However, according to Jahns (2017) they are not transformative and moreover, this problem is nothing new. It was true for “old” management competencies such as for the Balanced Scorecard, where volumes were heard and read on the Scorecard topic, but how it worked when adapted to a specific company remained a mystery. What applied to adoption of the Balanced Scorecard, now applies even more powerfully to adoption of a Fourth Industrial Revolutionary transformation; but simply “Knowing” can only lead to disaster! (Jahns, 2017). Jahns (2017) further advises that “a Fourth Industrial Revolutionary transformation must be ‘taken part in, attempted and tested’ and even ‘experienced’ i.e. in the sense of “test driving the future”. As Smith and Pourdehnad (2018) affirmed “The global political, economic and technological environment is a state of upheaval resulting in volatility, uncertainty, complexity and ambiguity (the VUCA world). Global organizations worldwide, of every kind, and in every industry, are now stepping back and questioning their most fundamental assumptions, even as they consider adopting the Fourth Industrial Revolution together with its associated technological complexities.”

“With all this complexity Smith and Pourdehnad (2018) wonder:

- Why are organizations not learning and adopting new planning and implementation processes that are appropriate for dealing with dynamic complexity?”

As Jahns (2017) explains: the educational needs in boards and management are indeed being ignored by many organizations, or “shoved to the side”, and only a few organizations (the best in class) are addressing the issues with the seriousness that is needed, given the typical exponential speed of development: the most successful competence offensives are those that identify the core decision-maker groups: starting first with the Board members, and then the managers: these individuals go through a “Digital Readiness” program which lasts, should it succeed, around six to ten days organized into intervals; first it is carried out through the classical stepwise approach although not by a “face to face” method, but rather by direct application (based on so-called field experiments). In between the intervals, the attendees revisit what they have learned; they then adapt it to their own situations. This approach is very similar to the very successful “PKMS” system described by Smith & McLaughlin (2004).

Jahns (2017) also recommends “Digital Coaches” who act as internal ‘catalysts’, ‘enablers’ and ‘change drivers’ within the organization. This group of people, formed from within the company, ultimately drives the digital change operationally; provides technical and, far more importantly, social and change management support; and forms the hinge between the executive operative level and the digital strategy.

Smith and Cockburn further claim that “Systems must be designed to enhance the performance of decision makers including Board members”, and these authors propose that the superior learning process described earlier in this chapter (based on an experimental learning cycle) is the key to success during actual “in organization” implementation.

The focus of this chapter so far has been on recapitulation and elaboration of details of the proven, flexible, and highly practical leadership process that were detailed in the book by Smith & Cockburn, (2013). In this section the authors will demonstrate how these models may be augmented to include the impact of the various new and emerging digital technologies. Although, in many cases the potential for a given digital technology to impact the particular leadership model is treated in isolation from other potentially promising digital technologies, the leader is cautioned that digital technologies often display the greatest synergy when used in combinations in holistic fashion, and digital technologies should not be segmented without situational consideration (Goldner, 2013). In addition, it should not be inferred that this section in any way represents an exhaustive application of emerging digital technologies to these models; each leader, in the spirit of learning and adaption, must reflect on

the relevance of emerging digital technologies to application of the models in their environment, and augment the models as appropriate.

Leadership Process Cycle

The four-step learning-based leadership approach advocated by Smith and Cockburn (2013) was described previously in this chapter in the sub-section ‘**BACKGROUND**’.

According to Primus (2013): “Driven by clear productivity and cost benefits, IT and business management are embracing and empowering a mobile, distributed workforce – a workforce that views communications and collaboration technology, rather than bricks-and-mortar offices, as their business infrastructure”. This White Paper states that this movement is in response to the need to reduce costs, attract/retain top talent and recruit from around the world by offering the flexibility to work from any location, offer options to local employees who prioritize workplace flexibility, and the need to integrate “independent professionals” into their organizations. As Primus (2013) makes clear, the result is that productivity is significantly enhanced and costs significantly reduced. For example:

Research shows that employees tend to dedicate 60% of the time formerly lost to commuting to additional work activities, and another study shows that 35 per cent of technology professionals....said they would sacrifice up to 10 per cent of their salaries (\$7,900 on average) for full-time telecommuting.

Clearly organizations leaders need to factor this trend into their leadership initiatives, and here is what the learning-leadership by doing recommended by Smith and Cockburn (2013) *additionally* might look like in a digitally-aware environment [based on Murray (2013)]:

- Foster a culture of digital experimentation
- Cultivate digital leadership
- Utilize technology for improved communication, sharing and interaction
- Communicate your own digital learning
- Invigorate team meetings through technology (surveys, desk-sharing etc)
- Model ‘powering down’ to maintain sanity
- Utilize technology by automating for improved efficiency
- Encourage personal learning networks and COP

Step 1

As emphasized earlier in this chapter in the sub-section on BACKGROUND - Leadership Process Cycle - Step 1, according to Smith and Cockburn (2013, p. 40) “The first step is to understand your leadership role – what are you expected to achieve? In sporting terms, this is your scoreboard, and the win, lose, or draw of your leadership will be judged on its results.” This advice holds true as you attempt to introduce emerging digital technologies into your leadership and workplace practices. If your role does not specifically include introduction of emerging digital technologies into your business environment, great care must be exercised to demonstrate that such digital technology as you do introduce can be seen to be linked to achieving elements of your role that are listed. As stressed in the Step 4 sub-section of BACKGROUND - Leadership Process Cycle - Step 4, Smith and Cockburn (2013) emphasize the importance of a leader continually evaluating his/her role for relevance given their experience in Steps 1 through 3, and seeking to have it revised as appropriate, and this holds true particularly when the introduction of emerging digital technologies seems appropriate.

Step 2

As explained earlier, the second step involves continuously learning how to successfully perform your role using the performance system model presented in Figure 2.

In this step mobile phones and tablets have significant potential for enhancing learning and reflection. Maglajlic and Helic (2012) in their research identify a high correlation between communication intensity and learning outcomes. Insightful guidance provided by the Aberdeen Group (2012) includes the use of mobile devices in building leadership capability, plus widespread use of such devices for knowledge sharing and learning. Aberdeen Group’s data showed significant increase in the use of mobile tools for internal learning and communication between 2009 and 2011 with further major growth anticipated. An enhanced learning experience was said to be one of the prime drivers for the use of mobile technology with improved learning administration also being identified according to these authors. As more mobile tools are targeted by organizations to their customers etc. the more an organization’s leaders may learn with and from these important networks. Aberdeen Group (2012) claim that issues around how to stream content and address interactive activities are becoming more important as users become more sophisticated. As in other areas of complexity, mobile technology is coevolving with learners and their needs.

Analytics is another emerging digital technology that may have a place in Step 2 activities. Bersin (2013) defines the word “Analytics” as the systematic discovery

of meaningful patterns in data to support decision-making. In practice (Forbes & McKinsey, 2012) Analytics is typically the process of turning *large quantities* of data into information that is digestible and actionable. It includes tools and processes that analyze large amounts of organizational data, related to finances, employees, transactions, customers, etc. The term includes reporting, Dashboarding (Levy, 2011; IBM, 2013; Dashboards, 2013), predictive analyses and scenario-modeling. Research shows that many companies which have included corporate analytics in their operations have seen a 5 percent to 6 percent increase in performance in comparison with their peers (Forbes & McKinsey, 2012). Bersin (2013) found, in a study of 741 organizations, that:

75 percent of HR leaders agreed that analytics is an important element to their organizations, but 51 percent said they have no plans in place. Another 37 percent reported that they have insufficient resources. In fact, 56 percent said that they have poor skills and only 6 percent rated themselves as highly skilled.

Gaining immediate and appropriate feedback on performance is critical and Dashboards (2013) are becoming more and more highly prized for Business Intelligence (BI) with potential for Step 2 application, although development cost maybe a deterrent. Back in the 1980's, Executive Information Systems (EIS) performed a similar service but today's Dashboards are far more interactive and usable for today's dynamic business requirements. Modern dashboards have the capability to present data and information in summary which makes them very powerful tools for BI, although the question of how to calculate the return on a Dashboard investment can be tricky. However, many of the charts used in older EIS systems were very much like those in use in today's Dashboards since user needs and wants have not changed much over time. What has changed is the availability of more sophisticated technology and more sophistication in the user community. Modern Dashboards meet business needs in a practical and actionable way when they can give quick snapshots of the big picture on one hand while being capable of offering detail on the other. Dashboards are fundamentally intended to provide 'at-a-glance' views of key performance indicators relevant to a particular objective or business process. The most useful dashboards in Step 2 are those designed for analytical purposes that often include context, comparisons, and history, along with subtler performance evaluators.

The spreadsheet is an alternative to the dashboard for certain applications. Spreadsheets are typically used in the form of Microsoft Excel documents. Their advantage is that they are intuitively easy to use and learn, providing detailed numbers, which users can analyze adding their own calculations. Unfortunately, the spreadsheet is often too detailed to give a quick and comprehensive overview of

business data, although given their ease of development, they may provide a useful tool to assist in Step 2 activity.

Scorecards may also be developed for use in this step based on the kind of appraisal set out in Smith and Cockburn (2013, p. 49 & p. 265). Such scorecards, for 'at a glance' visualization of the status of Focus, Will, and Capability, have been used in many practical situations (Tosey & Smith, 1999) and are based on transferring the numerical outcomes from an appraisal onto three vectors each scaled from 0 to 10. The use of scorecards implies the use of surveys for the appraisal. Also, surveys in their own right may be used very profitably in Step 2 to help ascertain how others view the manner in which your role is being discharged and to gauge the effect of enablers. Online surveys are now easy to assemble and may therefore be distributed, collected and analyzed very readily. A primer on survey-design for the Internet is provided at Survey (2013) and many commercial s/w 'do it yourself' systems are available.

Membership in relevant social networks also offers access to potentially useful data in Step 2 with respect to for example Enablers that others have found useful, availability of Focus and Capability enhancement opportunities, and also to gain organizational 'savvy' in all areas of practice. With respect to Capability enhancement in particular it is noteworthy, as Arinze (2012) claims that E-Collaboration has come of age in the last decade, with industry and academia using the latest web-based collaborative software to bring together groups of workers, including those in academia, to work on common tasks.

Step 3

The third step, as explained earlier, involves a leader very frequently cycling through a succession of activities in an experiential leadership learning cycle. This experiential leadership learning cycle is shown in Figure 3. The emphasis in this case is on personal learning and reflection, and comments regarding emerging digital technologies recommended in regard to step 1 above are appropriate in this step.

However, as Figure 4 illustrates, it is recommended from time to time that this learning and reflection be carried out in the company of learning partners. As Smith and Cockburn (2013, p. 35 & p. 46-47) explain at length, action-learning is very well suited to the type of learning and reflection that is fundamental to this step. The extent to which a leader wishes to apply digital technology to broaden the circle of their learning partners or facilitate dialog where these partners are situated at a distance, is an individual matter that the leader must decide. The emergence of ubiquitous digital interconnectivity for social networks has provided a ready means by which public and private conversations may take place across an organization, including very importantly its customers and stakeholders. This is critical to the

widespread sharing and generation of knowledge, and to learning and reflection in general. This widespread digital interconnectivity for social networks has already provided a means for action learning to be carried out at arm's length (VAL) between an action learning group's participants (IFAL, 2013).

Dickenson et al. (2010) report findings from their research exploring VAL as an emerging variety of action learning (AL). These authors note that VAL provides value by bringing together geographically dispersed individuals within and across organizations, and possibly across time, and therefore has potential in both education and commercial contexts. At the beginning of this research there appeared to be little evidence of VAL being used, although face to face was well known and practiced. Although there was considerable interest expressed by educationalists and practitioners in adapting AL to VAL, there was a lack of understanding of how to go about it. However, the research findings revealed more practice than was anticipated and demonstrated that VAL is a distinct variety of AL, characterized by its virtual, non-f2f nature, and that it has its own strengths and weaknesses. Dickinson et al. (2010) provide a 6-form classification of VAL, consider some of the theoretical questions associated with its practice and explore its potential in the light of emerging technologies. These authors conclude that, like AL, VAL is not singular, but takes a variety of forms, each with distinct characteristics, advantages and shortcomings. It is further reported in a study by Plack et al. (2010) that most of the students engaged in VAL were able to demonstrate reflection on complex clinical issues. Some struggles were encountered, and issues were exposed regarding a lack of voice and power that may lead to missed learning opportunities. VAL also facilitates social learning, meaning making, and social reflection in communities of practice [COP] or in broader organizational setting (Wenger, 2000).

Wenger (2000) asserts that:

A community of practice can be viewed as a social learning system. Arising out of learning, it exhibits many characteristics of systems more generally: emergent structure, complex relationships, self-organization, dynamic boundaries, ongoing negotiation of identity and cultural meaning, to mention a few. In a sense it is the simplest social unit that has the characteristics of a social learning system.

However, as Wenger (2001) explains, COP are “focused on a domain of knowledge and over time accumulate expertise in this domain. They develop their shared practice by interacting around problems, solutions, and insights, and building a common store of knowledge”. That is CoP are typically concerned with the development of best practices through the sharing, and recycling of existing ‘accepted’ knowledge (Cavaleri & Seivert, 2005), whereas the kind of learning and reflection related to step three relates to expanding the leader's thinking, knowledge, and boundaries,

and requires a different supporting mindset from that of sharing existing knowledge (Coakes et al., 2011). However Smith (2003, 2009) quotes Wenger (circa 2007) that COP are formed by people who engage in a process of collective learning in a shared domain of human endeavor: a tribe learning to survive, a band of artists seeking new forms of expression, a group of engineers working on similar problems, a clique of pupils defining their identity in the school, a network of surgeons exploring novel techniques, a gathering of first-time managers helping each other cope. In a nutshell: Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly. Clearly, Wenger's sense of COP is consistent with individual learning via social interaction and co-participation, and is ubiquitous in ongoing activity, though often unrecognized as such.

Communities of Innovation (CoInv) are a special case of the more general Communities of Practice (COP), and are proposed as places of safety to provide 'Ba' (Nonaka & Konno, 1998), and for challenging organizational norms and innovating; thus changing organizational practices long term. CoInv are a form of COP that leverage the appropriate capabilities of COP, but are very specifically dedicated to the support of innovation. CoInv are an important new social learning concept that was first introduced by Coakes et al. (2009).

Smith & Cockburn (2016; p. 49-54) discuss a very powerful new approach "developing and leading emergence teams" for identifying and resolving complex business problems, and these authors explore the relevance of emergence teams in the four-step leadership process described so far in this chapter; these authors detail how such a team approach facilitates the reflection and learning that are essential to optimizing leadership performance. In addition, the leader must also decide if COP or CoInv are more appropriate vehicles for learning and reflection in this step. Some practical pointers may be gleaned from work addressing leadership in virtual team environments by Pauleen (2003).

The learning and adoption approach developed by Russell Ackoff (1999) may also prove effective in ensuring that lessons are learned to improve future decision-making; here are the steps in Ackoff's approach:

- **Decide.** Choose a course of action, and make a record of the decision;
- **Act.** Take action or instruct others to do so;
- **Monitor.** Track the implementation, expected outcomes, and the validity of the assumptions on which the expectations are based;
- **Detect.** Identify any significant differences between the performance observed and the expected outcomes and assumptions;
- **Diagnose.** Determine the causes of mistaken expectations and assumptions;

- **Prescribe.** Initiate changes in the system or its environment, based on the diagnoses; prepare a decision record of such action;
- **Evaluate.** Assess the impact of the prescribed changes;
- **Retain.** Collect lessons and make them easily accessible to all those who are authorised to receive them.

Smith and Cockburn (2013) recommend keeping a personal reflective journal that may be used at a later date to help in selecting enablers or for resolving other performance issues. In the past, such a journal was laborious to compile by long-hand and very difficult to search when one wished to locate a particular incident; digitization has revolutionized the keeping of such a journal and also the capability to search it using keywords (tags). There are many commercial digitized “diary” products on the market; one such well-known app is Day One (2013) which is usable via mobile devices and has key word search-ability. Such a digital journal may also be readily backed-up for security purposes by for example Dropbox (2013). Dropbox also facilitates sharing the journal and ensures that the journal is available on all a user’s digital devices.

The question of whether a leader should be using Cloud Computing in relation to any of the dynamic leadership models described in this chapter to a large extent depends on (a) the ready availability of cloud computing to realize the capabilities of the emerging technology being applied to the model, or (b) the policies and capabilities of the IT department of the leader’s organization, or both (a) and (b). There is no shortage of hype regarding cloud computing, but CNBC (2011) provides clarification that cuts through the rhetoric. For example this source claims that “cloud computing can be grasped on its basic level - anytime, anywhere computing - without the user ever having to know much about the technology” and “In simplest terms, cloud computing involves delivering hosted services over the Internet. The *service end* is where the data or software is stored and the *user end* is a single person or company network.” The official definition from the National Institute of Standards and Technology is also provided and reads: “Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.” Although cloud computing offers cost savings and enhanced use of use, as CNBC (2011) goes on to caution, safety is a bit of a touchy issue, and “By using cloud computing, a company opens a door into its data and that door is an attractive target for attacks.”

CONCLUSION AND FUTURE TRENDS

Throughout this chapter, the authors have been discussing how a leader may learn to figure out and achieve his/her role in realizing their organization's vision and strategy and utilize emerging digital technologies as appropriate. Social media at leadership levels was once the exclusive domain of digital gurus; however, Twitter, Facebook, and other tools are gradually becoming everyone's responsibility and "We are seeing an increased demand for social savvy candidates across the business -- from human resources to product to customer service," (Holmes, 2013). It must be noted though, that digital technologies provide both credits and debits. The biggest debit associated with these technologies is digital fatigue (Kenyon, 2013). As Deiser and Newton (2013) point out "The Social media has created an ocean of information. We are drowning in a never-ending flood of e-mails, tweets, Facebook updates, RSS feeds, and more that's often hard to navigate." These authors propose that leaders must become proficient not only in the software itself, but also in using the settings that filter important from unimportant information. Unfortunately, this is only a partial solution, since fundamental to social-media is social interaction, and a leader must decide on whether and when to comment and or reply, and in what fashion to apply the information. This is more time consuming than it might appear, since most of such information requires assessment of its source, authenticity, and credibility. In addition, to remain a legitimate player in this social dialog, there is considerable pressure to respond immediately in this social process of creating meaning. Although leaders from the millennial-generation are more adept at handling such rapid digital-dialog, there remain questions regarding their ability to reflect and make meaning from such exchanges (Barry, 2013), and indeed their growing antagonism to digital media (Grensing-Pophal, 2013). This digital fatigue problem is likely only to grow worse in the future, and ultimately the answer lies with the leader developing appropriate discipline and working guidelines.

Good leaders not only demonstrate a clear Focus, and the required Capability, but they have the Will to follow through and persevere in meeting the challenges presented to them. Clearly this is asking a lot of a leader and the situation is further exacerbated by the significantly increasing and important impact of digitization on all business environments, particularly those related to global business. The emerging skill set and expected capabilities of leaders are both wide ranging and continually evolving at an ever-faster pace. Developing the global business perspective and business strategy for the global business phase of Figure 1 means that "one needs to enhance one's understanding of the social, political, technological and environmental forces that are shaping our existence and our children's' future, including an understanding of the links between us and others throughout the world." (Smith and Cockburn, 2013, p. 258-259). There was a time when this involved onerous undertakings to search

for relevant information in books, journals, magazines, and newspapers through an organization's library or information service. Progress on the Internet has meant that much of the searching and indexing on given topics are now done for us by commercial organizations to which we can subscribe. In addition, search engine capability provides us with quick and easy access to ad hoc information searches as required, and 'clipping' s/w such as Evernote (2013) and 'sharing' s/w such as Dropbox (2013) facilitate our personalizing retention and sharing of information. LinkedIn (2013) through its general postings, networks, and discussion groups also provides an excellent means for professionals to stay up to date on global topics and to pose questions as appropriate. It is reasonable to suppose that such services will become even more user friendly and search question focused in the future. The increasing use of mobile devices will certainly encourage this trend.

All of the leadership activities and undertakings that have been presented so far in this updated chapter will have important relevance during the Fourth Industrial Revolution; however, it is essential that leaders are also familiar at a practical level with the digital technologies that are fundamental to the Revolution (Smith and Pourdehnad, 2018). These technologies are: cloud computing and predictive analytics; the internet of things (IOT); super-computers such as IBM's "Watson" super-computer and other super-computers as they emerge commercially; and digital technology security. Two other potentially very relevant digital technologies with which leaders should be familiar are artificial intelligence (AI), and "Crowdsourcing" (Smith and Pourdehnad, 2018; p.21- 41). There are also significant workforce implications associated with implementation of the Fourth Industrial Revolution (Smith and Pourdehnad, p. 95-101) and leaders will not be able to envisage or carry out their roles without their having familiarity with the relevant workforce implications.

Two other topics that hold much promise for facilitating the development of agile leaders capable of functioning in VUCA environments and the Fourth Industrial Revolution, are games and simulations. The successful application of these technologies to leadership-development is not new (Smith, 1996), but their growing sophistication promises much for the future, and leaders are urged to follow emerging trends and products. Balance (2013) supports this recommendation, noting that corporations and other organizations around the world are recognizing that games promote cognitive reasoning and information retention, and that modern games are advanced, immersive and engaging. Another topic that has particular relevance to the broader topic of leadership learning and development is E-learning both in its synchronous and asynchronous forms. E-learning is a broadly inclusive term that describes educational technology that electronically or technologically supports learning and/or teaching. This again is a topic that has a long history, but it is one where enhancements continue to be made, particularly in regard to mobile delivery. Zhang (2003) provides a broad and detailed, if somewhat dated, overview

of the subject, and. Wikipedia (Elearning, 2013) and Peacock (2012) provide comprehensive current accounts.

Effective and efficient networking and collaboration within and between organizations are Critical Success Factors for achieving global competitive business advantage, and today's business environments demand continuously updated leadership tools and practices reflecting these factors, focusing on relevance particularly to globalized environments (Hypia & Pekkola, 2011). It is concluded that an understanding and adoption of the dynamic leadership models detailed in this chapter together with a broad familiarity with application of the emerging digital technologies highlighted in this book will satisfy the critical success factors criteria, and will be highly beneficial for both the leader and the organization.

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KEY TERMS AND DEFINITIONS

Asymmetric Threats: Are completely unpredictable surprises emerging from nowhere and which have therefore usually not been planned for by organizations. These threats demand rapid development of resilient systems and means to resist the growth of the threat.

Covid-19: Refers to a strain of Corona virus which emerged in 2019 and was the source of a global pandemic and which currently has no vaccine developed to tackle it at the time of writing this book in 2020.

Digital Technologies: Are digital resources that are effectively used to find, analyze, create, communicate, and use information in a digital context. This encompasses the use of web 2.0 tools, digital media tools, programming tools and software applications.

Global Business: Consists of very many companies that operate in several (many) countries and that may use information technology to facilitate the control of operations and performance in each country.

Leadership: Is a process of social influence which sets direction toward a goal and maximizes the efforts of others towards the achievement of the goal.

Organizational Complexity: Is present when there are multiple systems dynamically interacting in unpredictable ways; the outputs of one system are the inputs for another and so on across various scales, from micro levels of individual actors upwards to the macro scale of global business, resulting in the final result being unpredictable and emergent.

Social Digital Connectivity: Refers to the situation in which individuals' professional and private lives are integrated with digital social media platforms like Facebook, YouTube, and Wikipedia, etc., that enable them to make connections by sharing expressive and communicative content in order to enjoy online social lives.

VUCA Environments: Are characterized by volatility, uncertainty, complexity and ambiguity of general conditions and situations.

Chapter 3

The Impact of IR4 on Corporate Governance of Listed Companies

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ABSTRACT

The digital revolution transforms business models and presents new privacy issues and ethical dilemmas. Research by MIT Sloan CISR reports that U.S. listed companies that have a digitally savvy board show substantially better financial performance. What is a digitally savvy board? What are the differences between the old and the new world? What are the new ethical dilemmas and how do you prevent making the same mistakes as big tech? Why does innovation fail so often within the existing structures of established companies? Why does the three lines of defense model for risk management have an inhibitory effect on innovation in practice? The author discusses these questions and provides suggestions for improvement of corporate governance of established companies. In the next chapter, the author provides rules of the road for how established companies can monetize their data including some pitfalls for established companies and discusses a number of ethical dilemmas that companies encounter in practice when implementing new digital technologies and services.

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INTRODUCTION

Friend and foe agree that our society is undergoing a digital revolution that will lead to a transformation of our society as we know it (Moerel, 2014, p. 4). In addition to all economic and social progress and prosperity, every technological revolution also brings along disruption and friction (Brynjolfsson & McAfee, 2014). It is now clear that new digital technologies (and, in particular, *artificial intelligence*, AI) enable many new services that can substantially disrupt existing business models. These new business models, in turn present new privacy issues and ethical dilemmas (Moerel & Prins, 2016, pp. 9-13) (van den Hoven, Miller, & Pegge, 2017, p. 5), and social resistance to the excesses of the new data economy is becoming increasingly visible and urgent. It is a challenge for established companies, to say the least, to both drastically innovate in order to remain future-proof and, at the same time, take social responsibility.¹

The question that now arises is whether our current *corporate governance* regulation requires adjustment in order to be able to navigate these times of transformation. This is not a strange question, as corporate governance is now transcending the boundaries of the roles and interaction between the traditional decision-making bodies of the company (board of directors and general meeting of shareholders) and is increasingly spilling over into compliance, risk management and responsible entrepreneurship (Raaijmakers & Buma, 2019). Note that in this chapter, I do not distinguish between the *one-tier* and *two-tier* board models, but refer to the board as the interaction between non-executive directors and executive directors, whether they formally form one board (*one-tier* system, such as in the UK) or two separate boards (*two-tier* system, such as in The Netherlands), whereby next to the board of directors there is a separate supervisory board.

Relevant here is that under both Dutch and UK corporate governance rules, the board is expected to lead a process of change where it is necessary to bring about a change in corporate culture for *long-term value creation* (Raaijmakers & Buma, 2019, p. 69) (van de Loo & Winter, 2016). Part of the culture of a company is the increasing attention to ethics and to why people act the way they do. To that end, the board must identify good and bad practices and dilemmas that employees encounter in the company, so that they can be trained to strengthen the corporate culture (Raaijmakers & Buma, 2019, p. 69).

In concrete terms, I see that digitisation leads to the following practical questions: Why does innovation at established companies often better succeed if placed outside existing structures? What needs to change in governance to enable innovation within the existing structure? If innovation is better achieved in small and *agile* teams, how does this fit into the *command and control* structure of compliance-driven organisations, in particular in regulated sectors, such as our financial institutions?

How do we find time and attention in the company for innovation if we already have enough trouble in upgrading or replacing existing IT systems (*legacy systems*)? How do we balance the ever-greater investments in digitisation and developing digital services, potentially undermining our own business model, with our short-term (financial) KPIs and reporting? How do we recognise new privacy issues and ethical dilemmas that new digital products and services present, and how do we safeguard an open culture for discussing and addressing these? How do we ensure that the board has sufficient knowledge and experience with new technologies and disruption through new business models? Is it sufficient that one of the directors has this expertise, or do more or even all directors have to *re- en upskill*, as it is called today? Does the board need to set up a *technology committee*? In these times of rapid transformation, shouldn't the board have much more frequent and in-depth discussions about strategy? And ultimately, is a one-tier board model better equipped to deal with digital disruption than a two-tier board model?

Companies with digital savvy boards show 34% higher ROA, 38% higher revenue growth, 34% higher three-year market cap growth and 17% higher profit margin. (MIT Sloan CISR 2019)

All of these very relevant questions, especially where recent research by MIT Sloan CISR (Weill, Apel, Woerner, & Banner, 2019a) (Weill, Apel, Woerner, & Banner, 2019b) reports that U.S. listed companies that have a *digital savvy board* (boards with at least three *digital savvy* board members) show substantially better financial performance (above three the added value was small). Only 24% of the boards qualified as *digital savvy*, whereby certain sectors are lagging behind, while being susceptible to disruption (such as transport and construction). The results are striking, although you can argue that the results reported in this research are *correlations* only (and that, therefore, no causal relationship is demonstrated). For example, it is conceivable that companies with a more open culture would sooner admit diverse board members and that this open culture is the real underlying cause of the better financial performance.

BACKGROUND

Angle of Approach

Let me state first and foremost that my academic work focuses on how to best regulate the friction that new technologies cause in society. Furthermore, my work mainly consists of assisting (mostly U.S.) tech companies with the implementation of

(mostly AI-driven) digital services based on *privacy-by-design* and *ethics-by-design*. The digital services of these newcomers often result in the disruption of existing business models (and they are usually aimed at this). Drawing on my experience with these newcomers – and also the bumps in the road they subsequently encounter and the mistakes they make – I also advise boards of established multinationals on their digital strategy. It is clear that newcomers are often managed differently than established companies, where innovation is achieved in *agile* teams, failures are celebrated – if acknowledged early (*fail fast*) – and growth in *user base* is initially a more important KPI for success than generated revenues. Non-executive directors on boards of newcomers are furthermore more recruited based on how well they can help the company to scale-up (supporting the executive directors with advice and introducing them in their network), more than for their supervisory qualities. This is often the other way around for established companies. The purpose of this publication is to share some of my observations based on working with newcomers that are relevant to boards of established companies.

No Common Language for Discussion Yet

My most important initial observation is that we are still at the beginning of thinking about a new corporate governance that would fit the realities of the new digital world. We are in the transition phase to a new ordering, and, for the time being, we have not yet developed *the language* to have a meaningful discussion in board meetings about the strategic issues that new technologies and the disruption of existing business models entail. In my experience, conversations between board members about the impact of the digital revolution often get *lost in translation*. In philosophical terms, we are still in *Plato's cave*² and need *Wittgenstein's ladder* to get out. The ladder metaphor of Wittgenstein symbolises the phase we are now in, where language is used from the perspective of the old logical order to describe a new logical system.

My propositions serve as elucidations in the following way: anyone who understands me eventually recognizes them as nonsensical, when he has used them – as steps – to climb beyond them. (He must, so to speak, throw away the ladder after he has climbed up it.) He must transcend these propositions, and then he will see the world aright. (Wittgenstein, 1922)

There is a broad consensus that the digital revolution involves a paradigm shift, whereby the principles of and belief in the existing logical order shift to a new set of principles and belief in a fundamentally different logical system. According to Wittgenstein, all language rules have a social aspect, as a result of which the meaning

of language depends on the social context in which it is used (Wittgenstein calls this *Lebensform*). Language only has meaning within a certain logical structure. People from two different systems may both *use* the same language (for example, English), but do not necessarily *speak* the same language (in the sense that they understand each other). In order to understand each other and have a relevant discussion, they will first have to agree on the meaning of certain concepts, the principles that they both deem *true* and the logic that they both find valid to reach conclusions. You can sometimes hear someone very well, yet you cannot understand them at all (in the words of Wittgenstein: *The world is my world*). Humor is an excellent example of this (in the words of Wittgenstein: *Humor is not a mood but a way of looking at the world*).

As long as we have not yet developed the new language for *discussing* (let alone agree on the correctness of) the new principles for the new digital world ordering, we cannot yet reflect on a new governance for *controlling* the new logical system. We are still on the first step of Wittgenstein's ladder. As a consequence, the most I can do here is try to interpret the new developments with concepts from the old order to hopefully arrive at a number of new *common true* starting points for the new system. In a few years' time, we will experience this language – in the terms of Wittgenstein – as nonsensical and hopefully will be able to view and interpret the world with new eyes.

The most feasible approach for now is to see whether there are any bottlenecks in our *current* corporate governance in order to conduct discussions about the new digital reality in boards and initiate change management. That is already a sizeable task. Even without a digital transformation, there is a dominant discourse in boards, whereby the performance of the company is assessed primarily from a financial and control lens, making it difficult to discuss *culture*-related issues in boards due to a lack of *conceptual understanding and language* (van de Loo & Winter, 2017). This lack of conceptual understanding and language will apply *a fortiori* to the discussion of a drastic digital transformation.

When assessing performance based on financial indicators that always cover a preceding period, boards primarily assess the performance of a company from the rear-view mirror. In order for the digital transformation to be successful, boards will first and foremost have to look forward, which is only possible if they delve deeper into strategic issues and get closer to the business than before. The result thereof is that the roles of executive and non-executive directors will have to recalibrate a new mutual relationship, which could initially lead to confrontation, irritation and friction (Winter 2018a, pp. 1-3). I will not discuss the structural issues in current board dynamics that can lead to friction here (Winter 2018a, pp. 1-3). I will limit myself to a number of initial observations where I see that discussions *on digital disruption* in boards often get *lost in translation*. In order not to let these observations

hang in the air, I will further briefly list a number of differences between the old and new worlds that should be part of the conversation in boards. I will not give an overview of the new digital developments and how the negative effects can best be regulated. This I have attempted in a different context, to which I here refer (Moerel, 2014, pp. 9-13) (Moerel & Prins, 2016).

Below I will give many examples by way of illustration, which are often from the financial sector. The reason is that this is a highly regulated sector that has been IT-driven for a long time (which means there are many, often decades-old, *legacy systems*), while, at the same time, all the elements for potential disruption are present. Now that everyone uses financial services themselves (we all have bank accounts, loans, mortgages, insurance and a pension), the examples will stay close to home so everyone is able to relate to them. If this choice comes across as *bank bashing*, then that is not the intention.

MAIN FOCUS OF THE CHAPTER: OBSERVATIONS

Status Quo Bias

In regulated sectors in particular, I observe that established companies are often so entrenched in their compliance-driven institutionalised processes and existing IT systems (*status quo bias*) that it is difficult for them to imagine that, with new technologies, these processes and systems could be substantially organised in a different manner, including with regard to compliance (Boden, 2019). The result is that discussions in boards about the implementation of new technologies are often conducted from a risk perspective, whereas in the new digital age, project risks must primarily be viewed from the following perspective: What is the risk for our business model if we do *not* do this? Specifically in the financial sector, the risk perspective appears to be reinforced by the toolkit developed by the financial supervisory authorities as a result of the previous financial crisis, whereby supervision is mainly focused on problems from the past rather than what will be needed in the future. For example, the transition to new IT systems required for digital innovations is sometimes hampered by the focus of supervisors on *operational resilience* during migration, while I am more concerned about the continuity of these banks if the legacy systems are not phased out swiftly. The *three lines of defense* model for risk management and internal control insisted on by supervisors also has an inhibitory effect on innovation in practice. I elaborate on this below, in section ‘Division Of Duties Hinders Innovation’. All in all, I see that boards sometimes have the idea that far-reaching compliance requirements are a barrier for newcomers, while my observation is that compliance requirements will ultimately not be a barrier for

newcomers, but rather will be the subject of innovation and disruption themselves. I also elaborate on this further in section ‘Division Of Duties Hinders Innovation’.

Digital savvy directors change the risk conversation from evaluating the project risk of particular initiatives to the business model risk of not doing something new. (MIT Sloan CISR 2019)

Product Centric

The focus of established companies is primarily on what they can imagine, and that involves digitizing their existing services and sales and communication channels (Moerel, 2019a, pp. 2.2-2.5). This provides efficiency benefits and usually better customer experiences, but this does not result in new business models and (therefore) also does not protect against disruption by newcomers. Disruption mainly comes from new providers taking the end user as the starting point (*user-centric*). They think of what the end user wants and then offer this as a service (usually for free). If it catches on (and a substantial user base is generated), they come up with a revenue model. Earning models are often indirect, whereby the service is free and revenues are earned from advertisements (*advertising model*). Established parties mainly think from their own products and services (*product-centric*) and then try to be customer-oriented. This is genuinely something else.

It is important to say that disruption of the centuries-old banking model involves much more than just digitizing existing services. As with each of the disruptors that have gone before, it requires an entirely new way of thinking. (Boden, 2019, p. 30)

Example: The Leasing Company

A leasing company offers companies leased cars for their employees and really tries to provide the best services, not only to the companies, but also to employees of those companies (e.g., by providing a handy app to organize fast maintenance services and breakdown assistance). However, the younger generation of employees does not want a leased car at all. They mainly want mobility (how do I get from A to B, both for work and in my private time). They want the freedom to take the train one time (maybe combined with a bike ride) and another time the car is the best option. The traditional lease model is therefore susceptible to disruption if other providers offer employers a combination of all these mobility services. The availability of (shared) cars then becomes part of the total service offering. If the leasing company succeeds in offering this combination service itself, it suddenly does not have just the companies as customers, but in fact has the many individual

employees as customers as well. As a result, many of the existing B2B (*Business to Business*) business models become B2C (*Business to Consumer*). This example can be translated to any sector.

Example: The Pension Sector

In the pension sector, the current focus is primarily on offering pension products, but, depending on the circumstances, it is not a given that this is the right solution for every participant. A *user-centric* model is based on *individual* financial life course guidance, whereby the question is whether a pension product is then part of the mix for each participant. The pension product then becomes one of the potential products in an integrated financial life course plan. The question, therefore, is whether the pension sector is becoming a provider of a component of integrated services provided by others, or if the sector itself is trying to be that integrator? A more correct name here would be C2B (*Consumer to Business*), where the consumers themselves shop for their ideal combination (Accenture, 2019, p. 1 & 22).

If *user-centric* thinking (including about consumer *concerns*) is taken even further for pension products, the following applies. Consumers are concerned about lack of insight into their finances when they retire. The trend of *fintech* is to make this transparent, so that consumers gain more control over their pensions. For example, there are various apps that offer a real-time integrated overview of all pension rights via an online dashboard (instead of consumers having to add up all annual overviews), provide insight into how much should be invested monthly based on current income and age to arrive at the desired pension at the desired retirement age (with different levels being offered), and automatically transfer monthly payments (or receive a prompt to make those payments with a few clicks). Examples of retirement apps are: *Retirement Countdown*, *Retire Logix*, *PensionBee*, *Nutmeg* and *Moneyfarm*.

Non-Transparent Bundling of Services and Cross-Subsidisation Between Services

Business models that are based on *solidarity* between customers or on *cross-subsidisation* between products and services are vulnerable to disruption. Digitisation entails *unbundling*. Insurance is an example of a business model based on solidarity. In principle, everyone pays the same premium for a life insurance policy, and the premium is calculated on the basis of the common denominator. By giving people fitness bands, a person's movement frequency can be measured (Khouri, 2015). This makes it possible to offer a so-called *pay-as-you-live* insurance policy, whereby people with better movement frequency pay less for their insurance. Personalization allows new providers to make cheaper offers to better customers (those who exercise

more). That's how they are able to cherry-pick customers. Those who exercise less will stay with their existing provider. The consequence may be that expensive customers will remain with existing providers.

The online media are an example of disruption due to cross-subsidisation between services (Moerel, 2014, p. 16). Many new online news services are free and are paid for via advertising revenues. As advertisers pay by the *click*, what is published will be determined by what raises advertising income. That is often not high-quality content, but rather the flimsier, popular fare, while hard journalism tends to be more expensive to produce. The digital advertising model has in fact made transparent that traditional newspapers functioned on an invisible system of cross-subsidisation between certain parts of the newspaper. Similar effects can be seen in TV programming, where there is cross-subsidisation between popular movies and documentaries. Now that programs are becoming available on a pay-per-view basis, it is becoming uneconomical to produce expensive documentaries (Deans, 2006).

How do we create high-quality content in a world where advertisers want to pay by the click, and consumers don't want to pay at all? Nisenholtz, 2006 (Deans, 2006)

Example: The Pension Sector

Our pension system is based on solidarity and also contains cross-subsidizing elements, making it vulnerable to new service providers who want to cherry-pick. Consider the solidarity between young and old, compulsory industry-wide pension funds with large differences between companies in the age structure of participants and sick leave and pension funds where new schemes are introduced and the old and usually more expensive schemes are continued and reimbursed from a *pay-as-you-go* premium.

Potential disruption, of course, plays a role in areas where the participants now have, or in the future will have, the freedom to choose whether or not to take out a supplementary pension product with their pension fund. Alternative providers will then make an estimate of the *longevity risk* based on algorithm-driven data analysis. These providers can then offer participants with, for example, an unhealthy lifestyle and a lower life expectancy a lower premium for a supplementary pension or a higher pension payment for the same premium (anticipating a shorter period in which the pension will have to be paid). Before you know it, a pension fund offering its participants an optional supplementary pension will attract participants with a high life expectancy and a high longevity risk, and, as a result, the product will not be viable. The advice here is to apply disruption yourself (to *unbundle* products and make them *smart*) before someone else does it for you.

Uneven Playing Field or Lack of Sympathy?

New services –that are easy to use, tailored to the wishes of the user, and mostly free – generate (initially) a lot of sympathy from users. As a result, it seems that an uneven playing field has been created, whereby established companies (feel that they) are measured against stricter ethical standards than newcomers. A strategy of copying the models of newcomers is often met with resistance. Illustrative of this is where the Dutch-headquartered bank ING started a pilot program where it would provide customers with personalised offers based on analytics of payment data. ING requested consent for the processing of the payment data of the participants and complied with privacy laws. Despite this, the pilot program generated much commotion, and ING stopped the pilot program under pressure from the Dutch Financial Services Authority, the Dutch Data Protection Authority and public opinion (Wokke, 2014). This type of public reaction causes great frustration for established parties trying to innovate and also a certain level of paralysis. Newcomers, incidentally, struggle with a similar dilemma when, after first offering free services (and having generated a lot of sympathy), they want to introduce a revenue model (which erodes sympathy). For newcomers, it is a balancing act to *retain* the sympathy of their users. The difference is that established companies first *have to gain* sympathy for their digital services, which is a trickier sequence (Greenfield, 2012). I elaborate on this further in section ‘The Trust Paradox – How Can You Get To Know Your Customer Without Losing Their Trust?’ in the next chapter “How to Monetize Data Rules of the Road & Ethical Dilemma’s”.

The Expectations of Customers Are Formed by the Outside World

Digital developments are changing customers’ expectations (Boden, 2019, p. 24). The new services are not only digital but also data-driven (*smart*) and designed on the basis of *User Experience* (UX). People are getting used to services tailored to them and now expect this as well. For example, 35% of sales on Amazon and 75% of views on YouTube are generated by their *recommendation engines* (AI-driven predictions) (Solsman, 2018) (MacKenzie, Meyer, & Noble, 2013). The recent PSD2 legislation is giving the financial services sector a helpful hand, whereby the Google’s of this world also will be offering financial products. Citizens will think: “If a foreign company can make a financial service offer that fits my lifestyle and spending pattern exactly and that I can buy with a few *clicks*, why can’t my own bank or insurance company do that? Are they not there for me?” (Accenture, 2019) These are the situations in which people lose their faith in their existing relationships and become more likely to switch providers. According to surveys in the Benelux, up

to 40% of customers and users of Google, Apple, Facebook and Amazon (GAFA) would welcome the possibility of banking via these platforms. The percentages are even higher for investments and insurance (Accenture, 2017) (Banken.nl, 2018). It is a striking contrast that if ING wants to implement personalised offers, this is met with considerable social resistance. Many see in this the double standard discussed above. Contrary to what is generally thought, this phenomenon cannot be reduced to a double standard, but can be explained through ethics. You can anticipate and manage this. I elaborate on this further in section ‘The Trust Paradox – How Can You Get To Know Your Customer Without Losing Their Trust?’ in the next chapter “How to Monetize Data Rules of the Road & Ethical Dilemma’s”.

Division of Duties Hinders Innovation

Innovation requires a culture of openness and transparency, where mistakes can be made, dilemmas can be raised and discussed and joint decisions are made about the design of new services and the risks to be taken.

Supervisory authorities around the globe, typically consider the so-called *three lines of defense model* as best practice for risk management and internal control (European Banking Association’s, 2011) (Institute of Internal Auditors, 2018). This risk management model is based on a strict segregation of duties. The commercial departments are expected to innovate and ensure compliance for new products and services (*first line*). The compliance function checks for irregularities (*second line*). The audit department then reviews, post rollout (*third line*). This model is not fit-for-purpose when it comes to digital innovation. In fact, this division of tasks inhibits innovation. Because new technologies are not fully regulated yet, it is difficult to perform a clear-cut compliance check.

Artificial intelligence (AI) in particular opens up a whole new range of design issues (van den Hoven, Miller, & Pegge, 2017, p. 5) and associated ethical dilemmas (Lotti, 2009-2010) (see, for examples of design issues and ethical dilemmas, section ‘Design Choices And Ethical Dilemmas’ below).

To start with, large amounts of data are required for training AI, mostly from consumers and employees. The European privacy rules, in particular, the European General Data Protection Regulation (EU) 2016/679 (GDPR) require that new technologies which process personal data be developed based on *privacy-by-design*. A *Data Protection Impact Assessment* must also be carried out, taking into account the potential impact for individuals and for society as a whole (e.g., a potential *chilling effect* on the liberties of individuals when using continuous monitoring techniques), i.e. *ethics-by-design* (Article 29 Working Party, 2018, p. 14).

Privacy-by-design and *ethics-by-design* are not about choosing between clear-cut options, in other words, picking between pre-existing options A or B, but about

developing option C to mitigate the negative impact of a new technology on the individual and society (van den Hoven, Miller, & Pegge, 2017, p. 5).

Example: Application AI

We regularly see in the news that the application of self-learning algorithms leads to discriminatory outcomes. For example, Amazon stopped its AI recruitment tool in 2018 because it discriminated against female candidates. The robot was trained on the basis of CV's that the company had received in the past. Because many more men than women work at Amazon, the algorithm quickly developed a preference for male candidates (Dastin, 2018). EU privacy rules require that deploying an algorithm should not lead to discriminatory outcomes. They also require companies applying algorithms for automatic decision-making - for example, automated rejection of a loan application - to provide individuals with meaningful information about the underlying logic and to an explanation of the decision, so they can challenge this decision (Moerel & Storm, 2019). At present, however, advanced forms of AI are still a *black box* - we do not know how algorithms come to their outputs. Innovation is therefore required to prevent discriminatory outcomes and ensure transparency and explanation (Moerel, 2018b). In fact, innovation at major U.S. tech companies currently is geared towards cracking this black box and developing new de-biasing techniques (Gunning, 2016). Various media recently reported that Google had tackled the black box problem with "explainable AI", which is expected to be a major competitive advantage going forward (Kelson, 2019). In this example, innovation is at the *very heart* of ensuring compliance.

As *first line*, the commercial departments are responsible for developing option C. However, in my experience, they are often not capable of doing so in practice. This is also one of the findings of a study on the factors that undermine the smooth operation of the model in practice (Udding, 2016). This leaves the compliance department with no other option but to reject the innovation. In turn, boards of established companies (often encouraged by consultants) are led to think – incorrectly – that the company must be prepared to *colour outside the lines* to be able to innovate, when, in fact, the innovation needs to be directed at how to ensure compliance. Further, they often hold the belief that far-reaching compliance requirements are a barrier for newcomers, while my observation is that compliance requirements are ultimately not a barrier, but rather become the subject of innovation and disruption themselves. An example of this is that by now it has become clear that it is easier for the big tech companies to comply with strict GDPR requirements, resulting in a competitive advantage (Yueh, 2018). In my view, responsible innovation is only possible if the relevant compliance experts *are part of* the innovation team and if teams take joint responsibility for compliance.

My conclusion is that the *three lines of defense model* prescribed by supervisors is, in this form, not suitable for achieving responsible innovation. Years of controls by the compliance function have undermined the self-learning capacity of the business to make contextual assessments and ethical considerations (Winter, 2018b, p. 170). Just like *muscles*, contextual assessments and ethical considerations wither away when not used (Moerel, 2018a). In current over-regulated sectors such as the financial sector, the reflex is now that if there is no rule that prohibits something, then it is allowed. In the words of psychologist Barry Schwartz (Schwartz, 2019) in his famous TED-talk: *Moral skill is chipped away by an overreliance on rules that deprives us from the opportunity to improvise and learn from our improvisations.* In currently highly-regulated sectors such as the financial sector, the reflex is that if there is no rule that prohibits something, that same thing is therefore allowed and does not require *any moral considerations*. (van de Loo & Winter, 2017, p. 6).

More and more rules replace the responsibility we feel for our behavior and its consequences for others with responsibility to comply with the rules. Increasing regulation generates a feeling that anything that is not prohibited is therefore permitted and does no longer require an assessment of the consequences of one's own behavior for others. (van de Loo & Winter, 2017, p. 6)

Because new digital services present us with new ethical dilemmas, the new reality cannot be captured in rules (if that were possible). The business itself, with the help of compliance experts, should therefore develop these practical skills, challenge itself to develop the self-discipline to set the right moral course, and, at the same time, have the discipline to quickly recognize mistakes and stop them. In established companies, failure is often seen as a weakness. By contrast, tech companies see this as a strength, provided it is quickly acknowledged (*fail fast*). Illustrative here is that the CEO of Amazon systematically calls his company the '*best place in the world to fail*' (Mac, 2016). A personal note here is that *celebrating* failure in these tech companies does not mean that poor performance is accepted. In these companies, *celebrating failure* is done by the absolute *best of the best*, in a corporate culture where there is only room for excellence. This is not something that can be copied easily and it requires compliance officers to get out of their comfort zone. Often, the warning with AI is that it will require our workforce to reskill and upskill. For compliance officers, this means they will no longer check for irregularities, but collaborate with the business and think *out-of-the-box* about new technical solutions to ensure compliance. Current compliance departments are not equipped for this. A frequently heard complaint is that if compliance is involved at the start of an innovation project, innovation will not get off the ground. Working with the *Chief Privacy Officers* of U.S. tech companies, my observation is that this position existed

much earlier in the U. S. (while no rule forced them to have this position) and that these officers are very *business and tech savvy* personalities who are more heavily a part of the innovation teams than in Europe, and also correspondingly are better paid. Here, too, the cost goes for the benefit. I conclude by noting that if companies have to adapt, supervisory authorities will have to adapt, too.

Design Choices and Ethical Dilemmas

Many digital services require the processing of personal data for which prior consent of the consumer (*opt-in*) is required under GDPR or for which an objection must be offered (*opt-out*). The online design of opt-ins and opt-outs (in jargon: the *choice architecture*) requires many design decisions in which ethical considerations must be made (Thaler & Sunstein, 2008, p. 3). Because the commercial interests of collecting as much data as possible are large, in practice all tricks available are used to entice website visitors and app users to opt-in (or to make it difficult for them to opt-out). The design thereby exploits the *predictably irrational* behaviour of people so that they make choices that are not in their best interest (Ariely, 2009). In 2018, the Norwegian Consumer Authority published a report on the bag of tricks of the three largest tech companies, see (Norwegian Consumers' Council, 2018). A very simple example is that consumers are more likely to click on a blue button than a gray button, even if the blue one is the least favourable option. Telling is that Google once tested 41 shades of blue to measure *user response* (Holson, 2009). Before you think that *we, as a company, would never do so*, I would like to inform you that almost all established companies deliberately make it difficult for consumers to make their actual choice and seem to have little moral awareness of doing something wrong. If you would deliberately mislead someone in the offline world, everyone would immediately feel that this was unacceptable behavior (van den Hoven, Miller, & Pegge, 2017, p. 25). Part of the explanation for this is that GAFA have deliberately and systematically pushed the limits with their digital services in order to get their users used to certain processing practices (Zuboff, 2019, p. 159). Although GAFA's privacy practices are now under investigation by privacy and anti-trust authorities around the world, we still see that these practices have obscured the view of what is or is not an ethical use of data. Although there are compliance rules, these rules mainly concern a floor that you cannot go under. Compliance does not yet mean that you as a company also take social responsibility and create long-term value. This requires reflection on the mission of a company and how to best fulfill that mission in a digital world. That seems simple and obvious, but it is not. I regularly see elaborate digital strategies that do not contribute (or are even contradictory) to the mission. Innovation is often taken outside the existing framework with the idea

that then only *moonshot* ideas can be developed. However, in the new digital reality, innovation must also be directed to continuing to achieve the mission.

Example: Mission of a Bank

If a bank's mission is to enable people to make conscious choices for a healthy financial future (*financial autonomy*), then, as a board, you will also have to think about what *digital* financial autonomy actually requires. With new digital capabilities, that will at least mean that customers are provided with real-time insight into their finances and pension rights (which also integrates account information and pension rights with other institutions) so that they can manage their personal finances and pensions. As long as you do not offer this type of functionality, you do not give substance to your mission. We see that banks are taking the first steps in this direction, but this is often seen as a fun new digital *gadget* instead of a necessary step towards giving substance to the mission.

By way of illustration, I will provide a number of examples of new ethical dilemmas that arise in AI-driven digital services at the next chapter ("How Can It Be Done?").

Risk of New Missteps

It is sufficient that the executive should have known that mistakes of the kind that occurred were probable (for example, when there are strong incentives to complete the job as fast as possible, the risk that safety may be compromised increases). In certain organizations certain patterns are common enough that we should expect a competent official to anticipate them and to take reasonable precautions to avoid them or at least to minimize their harmful consequences (Thompson, 2017, p. 36)

Because compliance is in the design of AI-driven solutions, important design decisions are made by *data scientists*. Individual design decisions can sometimes be perfectly logical at the *micro level* from the perspective of the data scientists, but can become problematic at the *macro level* in combination with all other microdecisions in the end result. Because so many individuals are involved in the development process, *the problem of many hands* arises, where nobody ultimately has the overview and feels responsible for the complete end result (Thompson, 2017). A problem that established banks have experienced with their *Anti-Money Laundering* compliance, and something many people will have wondered is: how is it possible that we involve so many employees for this and then come to this result? If development of AI-driven solutions and the design decisions involved are left to the innovation teams with *data scientists* (Thaler & Sunstein, 2008), there is a good chance that results will come out that are ultimately not in accordance with the mission and profile of the

company. Tech companies now have extensive experience with such *missteps* by their innovation teams and have their hands full with correcting these and making publicly apologies (Zuboff, 2019, p. 159). It is the task of boards to become aware of where things regularly go wrong with others and to provide direction thereon in their own organisation. Tech companies now do this with their *Corporate AI Principles* and internal ethics boards (Machmeier, 2018) (Pichai, 2018) (Sharron & Serwin, 2018). Some also experiment with independent *ethics review boards* (Thompson, 2017, pp. 46-47). The idea behind setting up an independent ethical review board is that such a board can address the problem of the *many hands* (ironically, therefore, by actually adding more hands). In practice, I see that setting up an external independent ethical review board is not easy to integrate into current corporate governance. What do you do as a company when new critical digital services are labelled insufficiently ethical by such an external board? And, which independent expert wants to be on such a board? Illustrative is that in April 2019, Google announced its intention to set up an independent ethics board, only to cancel it within a week after heavy criticism of the proposed members (Wakefield, 2019).

Risk Assessment From a Business Perspective Is Not Sufficient

Privacy- and ethics-by-design require that the impact of innovations must be assessed on the basis of risks for *individuals* (and therefore society as a whole), and not only in the jurisdiction of the company, but also across borders (van den Hoven, Miller, & Pegge, 2017, p. 7). Established companies assess risks primarily from the perspective of *the company itself*, and on a *jurisdiction-by-jurisdiction* basis. This also requires a change of mindset. My experience is that newcomers find this easier because they usually develop a *global* platform and have a *user-centric* approach, addressing user *concerns* (the perceived negative impact and risks of services from established companies) in the new service.

Example: Concerns of Individuals That They Have No Control Over Their Financial Situation

Established banks are traditionally not very transparent about their earnings model and how the financial system functions exactly, with the idea that full transparency will ultimately only lead to a *race to the bottom*, which is not in their interest. Meanwhile, people who use financial services mainly worry that they have no overview of their overall financial situation and therefore cannot make informed decisions about, for example, their desired pension accrual. Research shows that emotional elements (and, in particular, reduction of anxious feelings) is an important factor for

the *Net Promoter Score* (NPS) and has more impact on such score than functional improvements in services (Bain & Company, 2018b, pp. 4-7). The research reports that almost all established banks score low on the *fear reduction* factor. Newcomers respond to this by offering apps that provide full transparency to their users about their integrated financial situation (regardless of through which bank or insurer their accounts, loans, mortgages and insurance have been taken out), which facilitates the creation of a personal pension plan.

Lack of Recognition Function and Impact AI

AI is often viewed as a smarter version of IT systems, in which a project team with *data scientists* is deployed to train the AI and get it into production. The function of AI, however, is, in its core, not the automation of business processes. The real progress and added value of AI is the ability to make cheaper and better predictions (Goldfarb, 2018) (Agrawal, Gans, & Goldfarb, 2018). If you look at AI through the economic lens of a reduction in the cost of predictions, it suddenly becomes possible to assess where the use of cheaper predictions can make a difference in the business operations. That is sometimes easy to imagine (how can distribution and stock management be optimised?), and sometimes it requires quite some imagination, because the real breakthrough that AI applications bring is actually devising how you can reformulate an existing problem into a prediction issue.

Example: Translation Software and Self-Driving Cars

For example, AI has made a breakthrough in translation software. Before AI, the idea was that for translating a text, the translation rules had to be programmed. Now, the issue has been reformulated into a prediction issue, and the algorithms are trained to predict the most likely translation. The same applies to self-driving cars. Instead of programming the traffic rules, an algorithm is now being trained to predict how a human driver would act in relevant circumstances.

Many companies do not systematically think through in which of its business processes cheaper predictions can play a role (or how some processes can be converted into a prediction) and therefore where AI can make a difference. And when AI is deployed, it is often treated as an IT development and implementation project, for which a project team is set up, which can be dissolved when the project is finished. The expectation is further that after the implementation of AI, fewer employees are needed for a task or that the same number of employees can generate more output. For example, if we can predict how to optimise distribution and inventory management, we need fewer people for that. These are misconceptions. In economic terms, algorithms also have their own *complementary goods*. When the price of coffee

goes down, the demand (and price) for sugar and milk goes up. The complementary goods of algorithms are data and judgements (making trade-offs on how to set up and apply the algorithms) (Agrawal, Gans, & Goldfarb, 2018, p. 15 & 18).

Data. Most companies think that they have lots of data, but practice shows that if an algorithm has to be trained to improve a business function, you require other or more data to train the algorithm properly. Because the circumstances are constantly changing, an algorithm will further have to be continuously updated with the latest data.

Example: The Call Center

Suppose a company wants to optimise the functioning of a call center (less time per caller and better answers). The expectation is that certain problems with products and services can be spotted and solved earlier. Until now, this has been done by having the call center operators write down notes of their conversations with customers and code the issues, but because the operators do not always use the right codes, it is difficult to make good analyses. The available data is therefore insufficient to train an algorithm. To be able to train an algorithm, the call center calls themselves must first be converted into data. This can be done, for example, by converting all conversations via voice recordings into voice data and applying speech and text analytics, so that problems and solutions can be identified. Because the topics about which customers call are constantly changing, the algorithm must be constantly updated with recent call data. Call center operators can then be provided with suggestions for answers in real time while having a conversation. Problems with products and services can also be identified almost in real time.

Judgements. Apart from the design choices and ethical considerations discussed earlier (see section ‘Design Choices And Ethical Dilemmas’), it is ultimately your employees who determine where you can best use predictions, which data you can best use for them and how you can generate them, what to do with the predictions once you have them and whether the people who have to apply the predictions on the floor are able to do so. Proper training and use of algorithms almost always requires re- and up-skilling of employees.

Example: Insure or Not?

A company wants to consider whether it makes sense to take out insurance for certain events. An algorithm can predict the risk of a certain event occurring and the costs involved. You would still have to consider what you will do with those predictions, which also depends on other measures that you can take to prevent

risks. In that case, the predictions of the algorithm are input for an assessment, but are not the assessment itself.

All in all, I see that initial expectations regarding cost savings and efficiency improvements are overestimated by boards and the impact on the organisation is underestimated. This is mainly due to insufficient thought being given to the impact of AI's *complementary goods*. Implementation of AI applications is not a one-off IT project; it usually requires extensive adjustments by the organisation itself with regard to the data to be generated and assessments to be made.

When is AI a board issue? I noted earlier that companies often assess AI applications as an IT project and treat the associated risks as operational risks. This is not sustainable as soon as AI goes beyond increasing the productivity of tasks *to implement* the strategy and can have an impact *on the strategy itself*. The latter is particularly the case if the business model is based on a *trade-off* that can be influenced by uncertain factors, where predictions can be used to decrease the uncertainties, as a result of which the trade-off may tip in the other direction. Another example where deploying AI is a board issue is when applying AI in one part of the company also has an impact on other parts of the organisation, and where the skills required to make the assessments require a different design of the organisational structure (Agrawal, Gans, & Goldfarb, 2018).

Example: The Trade-off of the Amazon Business Model

Like other retailers, Amazon has a *shop-then-ship* business model and not a *ship-then-shop* model. The latter model will generate more sales, but will also incur more costs due to returns. If the cost of returns is too high, the ROI of the traditional *shop-then-ship* model is higher than the ROI of *ship-then-shop*. By using better predictions, the uncertainty can be reduced for both sales (higher) and returns (fewer). As a result of better predictions, the trade-off may turn out in favour of *ship-then-shop*. If Amazon were to implement this model, this would probably also have an impact on other parts of the company; for example, this could make it opportune to vertically integrate deliveries and returns, which are now mostly outsourced to third parties. (This example is from (Agrawal, Gans, & Goldfarb, 2018, pp. 156-157)).

What Is an Open Culture?

My impression, specifically for boards in the Northern European countries, is that they themselves have the conviction that they have an *open culture* (whereby everyone openly gives his or her opinion and a good discussion takes place), and that, as a result, there is a good culture for innovation. *Speaking your mind*, however, is not the same as having an *open mind*. As a rule, the boards of U.S. newcomers

are more open-minded. They listen to insights that are different from their own understanding of reality and ask further questions (which does not mean that they will then do what you say). The reactions of boards from established companies (and, in particular, those in the financial sector) are mainly characterised by ‘yes, **but** ...’, whereby an attempt is made to fit a new insight into what they already know (*confirmation bias*). By applying selective insights into existing knowledge in this way, an overestimation of one’s own digital *savvyness* is created. This results in a strong tendency to confirm the status quo and complicates *out-of-the-box* thinking and a *can do* mentality, which hinders disruptive thinking. Innovation in Northern European countries, therefore, seems to focus primarily on existing services and products. These countries find it more difficult to become disruptive themselves.

Digital Is Not Expertise but Is the Business

Few boards have enough combined digital expertise to have meaningful digital conversations with senior management. (...) The solution isn’t simply to recruit one or two directors from an influential technology company. For one thing, there aren’t enough of them to go around. More to the point, digital is so far-reaching – think e-commerce, mobile, security, the Internet of Things (IoT), and big data – that the knowledge and experience needed goes beyond one or two tech-savvy people. (Sarrazin & Willmott, 2016, p. 2)

The board determines the digital strategy. At established companies, boards are currently insufficiently equipped for this (Weill, Apel, Woerner, & Banner, 2019b, pp. 4-5) (Stephenson & Olson, 2017) (Bonnet, 2014) (Merrill, 2019). Every digital strategy will require change management, and I would even say *transformation* management. Change management is already a disruptive affair under all circumstances, which requires a lot of commitment, perseverance and insight from the leadership (van de Loo & Winter, 2016, pp. 3-5). Not only can the change itself fail, but failure usually also means a decline in the authority of leadership. Transformation challenges are about questioning and adapting long-held views and behavioural patterns (van de Loo & Winter, 2016, p. 4) (Heifetz, Grashow, & Linsky, 2009) (van de Loo, 2010). The inclusion of a digital expert as a member of the board is not sufficient to achieve this (Merrill, 2019, p. 2). Digitisation is not support for the business, but by now has become the business itself. For a digital strategy, all relevant aspects must be considered in combination, including behaviour, culture, risk management, ethics, compliance, strategy execution, decision-making and leadership (van de Loo & Winter, 2016, p. 4). To steer this in the right direction, both executive and non-executive directors must have in-depth knowledge and experience to be able to build up the digital dimension of the company and to monitor its quality. This cannot be left to a newly

appointed (or to-be-appointed) *digital director* or *chief digital officer* or external advisors (Valentine & Stewart, 2015). The MIT Sloan study shows that companies with boards that have at least three *digital savvy* members show significantly better financial results (the value add above three was small) (Weill, Apel, Woerner, & Banner, 2019b, p. 6). A quote from the report (Weill, Apel, Woerner, & Banner, 2019a, p. 1): ‘*As one director commented: A single digital savvy director in the boardroom risks feeling lonely and misunderstood. To effect change at the board level, there must be a critical mass of directors who truly understand*’.

In the words of the introduction: with a minimum of three board members, it is possible to develop a common language and common principles so that a meaningful discussion can take place. The other board members will have to sufficiently master this language and these principles to be able to participate in the discussion in a meaningful way. This means that the *entire board* must commit to digital education. In U.S. companies, we do see that boards set up technology & cybersecurity committees, through which new technologies are assessed from both a risk and an opportunity perspective, including cybersecurity risks (Ferracone, 2019). Research also shows that an increase in the frequency of interaction within boards leads to a better balanced discussion about both the opportunities and risks of new business models (Kark, Puranik, Leatherberry, & McCormack, 2019) (Sarrazin & Willmott, 2016, p. 6). For some companies, cybersecurity is assigned separately to the audit committee, but it is difficult to assess this element separately from new technologies (because cyber risks are intertwined symbiotically) and risks need to be assessed in the entire context of business operations (Ferracone, 2019).

Short-Term KPI and Reporting Cycles

Established companies are often stuck in their traditional short-term reporting cycles and expect investments to generate immediate revenues or savings, while new business models are first aimed at achieving the largest possible user base and only in time introduce a (mostly indirect) earnings model, which requires a longer-term vision. Established companies sometimes overcome this issue by developing digital innovations outside the existing context and, for the time being, not formulating revenue and profit targets. That seems logical, but the real point here is that where business models are going to transform, another way of reporting should be devised to express the value of the new business models (Sarrazin & Willmott, 2016). This is something different than adjusting sales and profit expectations downwards. Furthermore, I am not an expert on remuneration policy, but it seems clear to me that where variable rewards are mainly related to annual profitability for shareholders, digital innovation will suffer. KPIs and remuneration policies should be geared towards successfully introducing innovations that are valued by existing and new customers *for their added value*.

CONCLUSION

History shows that whenever a new technology is introduced, society needs time to adjust. As a consequence, at this time the internet is still driven by the possibilities of technology rather social and legal norms (Moerel, 2014, p. 21). This inevitably leads to social unrest and calls for new rules. An illustrative example here is that in 2010, Mark Zuckerberg (CEO and founder of Facebook) caused quite a stir when he publicly announced that the end of privacy was in sight (Johnson, 2010).

People have really gotten comfortable not only sharing more information and different kinds, but more openly and with more people. That social norm is just something that has evolved over time. M. Zuckerberg, 2010 (Johnson, 2010)

However, in March 2019 (following the Cambridge Analytica data analysis scandal), Zuckerberg requested that the U.S. senate regulate tech companies (Miller, 2019) and further announced a complete overhaul of Facebook's privacy features: *The future is private . . . and that's the next chapter for Facebook* (Hassan, 2019). From *privacy is dead* to *privacy is the future*. My point here is that not only are technical developments moving fast, but also that social standards and customer expectations are evolving and that it will take years before we will have a somewhat clear and predictable new regulatory framework. This requires that boards be well *tuned in* to these developments to determine a digital strategy that does not fall into the same pitfalls as the tech companies. Digital is not a communication channel or a specific expertise; it is, by now, the business itself. It is not possible to manage a company without knowledge of the business.

The new digital possibilities require that the mission of a company is given renewed substance and that innovation is directed to that end (it is not a free playground). New ethical dilemmas must be identified and thought through, and the organisation must be trained accordingly. If change processes and cultural changes are needed to run the business, boards must ensure that these are implemented.

Boards must therefore recognise that their view of what real disruption entails and how innovation can be realised is hampered not only by the *legacy* of their IT systems, but also by the *legacy* of the set-up of the compliance function, the existing dominant language in boards aimed at financial parameters and control, short-term (financial) KPIs and reports, a remuneration policy aimed at profitability for shareholders and a culture in which it is difficult to fail.

This means that there is a fundamental need to think differently about risk and control, as well as about financial translation of the new business models and reporting on them. This requires a different look at the organisation's own strengths and weaknesses, the willingness to take joint responsibility for risks and, at the

same time, the discipline to quickly recognise mistakes and subsequently stop them. This requires a substantial reinforcement of the internal culture, not from a perspective of Corporate Governance Codes to combat irregularities (that quickly goes towards more control and compliance), but rather a focus on self-discipline and a culture of effectively challenging each other. This requires a different structure from the predominant *three lines of defense* compliance model and also a different remuneration policy, whereby the focus is on achieving innovation that actually offers added value for customers.

This can only be accomplished if boards look forward, which is only possible if they delve deeper into the strategic issues. As a result, non-executives directors are getting closer to the business than in the past, instead of assessing (financial) results as a reflection of the business (from the rear-view mirror). The roles of executive and non-executive directors will therefore come closer together and will have to calibrate a new mutual relationship.

With respect to current corporate governance, this means that the traditional profiles of non-executives being mainly former management executives from the old world is currently not *fit for purpose*. Boards will have to develop a strategy to make the board more *digital savvy* (Weill, Apel, Woerner, & Banner, 2019b, p. 3). Room must be made for a relevant number of *digital savvy* board members. Because they probably have less experience in more traditional areas of expertise, more intensive *onboarding* will have to take place, also to guarantee a cultural fit with the board and the company. In the meantime, enough digital knowledge must be present in board meetings (for example, by having digital experts from management or external advisors temporarily join), and training programs must ensure that all members acquire sufficient *digital working knowledge*.

The reflections above do not lead me to the conclusion that a *two-tier board* is unsuitable for coping with the digital transformation. There is also no compelling reason to switch from a two-tier to a one-tier board model. In both types of board models, the big challenge is to focus the dialogue between executives and non-executives on the future. In the rear-view mirror, you will never perceive the future, no matter how you design the corporate governance of companies.

I conclude with the observation that if boards of established companies have to manage and supervise differently, this will also apply to their external supervisory authorities. As long as external supervision does not innovate, it will become particularly difficult to scale up the innovations that have been developed outside the existing context within the existing context.

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KEY TERMS AND DEFINITIONS

Confirmation Bias: An attempt to fit a new insight into what is already known. Confirmation bias is part of the field of *bias* and *heuristics* that guide our mental processes to arrive at quick interpretations and conclusions. For information about the confirmation bias in decision-making, see (Kahneman, 2011).

Digital Savvy: ‘An understanding, tested by experience, of how digital technologies such as social, mobile, analytics, cloud, and the Internet of Things will impact how companies will succeed in the next decade’. Digital savviness is based on an inventory of actual education and work experience as reported in the CVs of board members (Weill et al. 2019b, p. 3).

Net Promoter Score: An index measuring the loyalty of a customer to a company through the question: How likely are you to recommend the service or product to a friend or colleague? The NPS is also a good indicator of profitability. Banks that lead in Net Promoter Score®, which measures the likelihood that a consumer would recommend the bank to others, outperform laggards in net interest income growth (see Bain & Company, 2018b, p. 2).

Paradigm Shift: A revolution in science that leads to a dramatically different image of reality, through a fundamental change in the basic concepts of a scientific discipline. It is usually only in retrospect when the supporters of the old scientific worldview have lost their influence and power that a real conceptual revolution

can be achieved. The concept *paradigm shift* was first coined and described by the U.S. physicist and philosopher T. Kuhn, *The Structure of Scientific Revolutions*, Chicago: UCP 1962.

PSD2: The *Revised Payment Services Directive*, which allows consumers to give fintechs permission to use their payment details for new financial services (also known as *open banking*). Google was one of the first to be licensed under PSD2 (see www.irishtimes.com/business/technology/google-gets-go-ahead-from-central-bank-for-payments-1.3747901).

Status Quo Bias: The phenomenon where people tend to stick to their current situation.

ENDNOTES

¹ Both are important elements in the *best practice* provisions of for example the Dutch and UK Corporate Governance Codes (CGC). See in the Dutch CGC best practice provision 1.1 for the principle that the management board is responsible for the continuity of the company and must focus on long-term value creation for the company. See also best practice provision 1.1.1, which states that the management board should develop a strategy, paying attention to other aspects relevant to the company, such as the environment, social and employee-related matters, the chain in which the company operates, respect for human rights and fighting corruption and bribery. See in the UK CGC best practice provision 1, in particular principle A, which provides that the role of the board is to promote long-term sustainable success of the company; and principle B, which provides that the board should establish the company's purpose, value and strategy and satisfy itself that these and its culture are aligned. See also subprovision 1.1, requiring the board to assess and monitor culture and when not aligned with purpose, values and strategy, to ensure that corrective action is taken.

² The cave allegory (Plato, 2017) is about prisoners chained in a cave, who have a limited view of reality (only able to hear echoes of voices and see shadows from the world outside). The allegory illustrates that people can only see life from their (limited) perspective and that they then assume that this is reality. As a result, their conversations can only be about their perception of this reality. If a prisoner were to break free from the chains and gain experiences in the upper world and then return, these experiences would be incomprehensible to the other prisoners because their language only refers to shadows and echoes.

Chapter 4

How to Monetize Data: Rules of the Road and Ethical Dilemmas

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ABSTRACT

This chapter is a continuation of the preceding chapter, where the author discussed the obstacles encountered by established companies when wishing to transform their business models and provides suggestions for improvement of their corporate governance to better navigate the digital transformation. In this chapter, the author provides practical rules of the road for how established companies can monetize their data including some pitfalls for established companies and discusses a number of ethical dilemmas that companies have encountered in practice when implementing new digital technologies and services.

PROVIDE ADDED VALUE WITH DIGITAL SERVICES AND CUSTOMERS WILL PROVIDE MORE DATA

Despite all obstacles, established companies certainly do not have an impossible starting position compared to the newcomers. They usually have large numbers of established customer relationships with associated customer data and often enjoy the trust of their customers. Training algorithms requires a great deal of high-quality data, something that established companies have a head start on. With the Cambridge Analytica data analysis scandal, many people are now aware that the price tag of new digital business models and personalised offers is usually their privacy. Here are opportunities for established companies. You can use data in a fair way. This requires a different mindset, whereby the higher expectations of consumers vis-à-vis

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established companies are not perceived as an (unjustified) double standard (see section ‘Uneven Playing Field Or Lack Of Sympathy?’ in the preceding chapter “The impact of IR4 on corporate governance of listed companies”), but are embraced as a positive. High expectations mean a high level of confidence, which is a positive distinguishing factor in the competition with newcomers (Accenture, 2017).¹

The most important thing is that customers feel that their data are being used to make the services better *for them*, and not just for companies to earn extra income from them through personalised advertising. Trust, good security and privacy are strong assets online. Research shows that people are willing to share data when personalised *value-added* services are provided in return (Accenture, 2019, p. 32). In contrast, lack of data security and privacy are the main causes of loss of trust (Accenture, 2019, p. 36).

A study by the Dutch Consumers’ Association (Consumentenbond, 2019) shows that consumers are relatively satisfied with their banks, although there are major differences, and the *big three* (Rabobank, ABNAMRO and ING) score the lowest. The main reason for this is the ratio of costs and the fact that customers of these banks feel that the *bank’s self-interest and making a profit are paramount*. This outcome is really the worst possible combination of the old and new worlds and therefore is a recipe for disruption. Rather than capitalising on their existing relationships and their trust, their online services actually undermine their potential competitive advantage. The Dutch online bank Knab stands out in a positive way. It is no coincidence that this online bank was set up outside the established company (Aegon) with a *user-centric* business model. Knab, for example, gives a notification if a better deal is available for its customers (for example, higher interest rates for savings accounts, a better mortgage rate or insurance premium), even if that other product does not belong to Knab itself.

In any event, established companies will have to follow this route. The consent requirements have been tightened under GDPR. Permission must be *given freely*, which means that, for example, access to an online service may not be made dependent on giving permission for profiling for commercial purposes (for example, by including this in the website conditions or privacy policy) (Art. 7(4) GDPR). If permission must really be freely given, then you must make it very attractive for the consumer to give permission. In other words, you will have to offer an *added-value service* that consumers want so much that they give you permission to collect and process their data for it. Large tech companies are constantly inventing new services with the central aim of generating even more data and thus being able to profile customers. This used to be mainly online, but now these companies are focusing on services and *connected products* in the *offline* world to generate data, such as our cars (*connected* and soon *autonomous cars*), our living environments (*smart homes*) and our bodies (*wearables* and *implantables*).

The Trust Paradox – How Can You Get to Know Your Customer Without Losing Their Trust?

Yesterday, Trustworthiness was good enough. Today, only trustability will do. (Peppers & Rogers, 2012)

One of the most important differences between the old and new worlds is increased transparency (Gillin, 2007, p. 14). Where, in the past, a salesman in a physical store could get away with charging different prices to customers (for example, less of a discount for customers entering the store in their business suit), this is quickly discovered online, and *differential pricing* often leads to online outcries (for example, when it becomes clear that airline fares are differentiated based on a customer's type of laptop and search history (e.g. a higher fare if the customer logs on with an expensive laptop directly to the airline site rather than through a discount site). Complaints about this quickly go viral, especially if they are recognisable or are humorous (Peppers & Rogers, 2012, pp. 96-98). The consequence of this increased transparency is that our collective tolerance for unreliable behaviour has decreased online. (Peppers & Rogers, 2012, p. 6 & 24).

Knowing that a customer's interest is not being well served and doing nothing about it is untrustable. Not knowing is incompetent. (Peppers & Rogers, 2012)

In short, it is more difficult to gain customer confidence online. Because customers often have no personal contact, every online indication of *self-interest* is quickly labeled as unreliable. (Zuboff, 2019) describes this strategy in detail and has coined it *surveillance capitalism*. You will therefore have to show active and visible reliable behaviour. You win online trust *by actively watching out for [your] customers' interests, taking action when necessary to protect those interests* (Peppers & Rogers, 2012, p. 21). This requires proactive steps to ensure that customers do not make mistakes in their online order or overlook a service or benefit, e.g. a telecom subscription that would better fit their calling pattern (Peppers & Rogers, 2012, p. 6 & 24). For *knowing* your customer you need to analyse your customer data, to know when a subscription is up for renewal, what type of subscriptions a customer has (mobile, fixed) and the customer's data use patterns, in order to match the best subscription package. But the more customer data a company processes, the more the customers feel they're being watched, which may have a negative impact on trust. So the question is: how do you get to know your customers, without losing their trust? Knab does this smartly by giving existing customers a signal if they miss out on a benefit (even if this means switching to a third-party mortgage).

The Pitfall for Established Parties: ING BANK

In the introduction, I indicated that a strategy of copying elements from the models of newcomers usually has an adverse effect. A striking example is the storm of protests (including from the Dutch Financial Supervisory Authority and the Dutch Data Protection Authority) that arose when, in 2014, ING announced its intention to analyse payment data of its customers for purposes of personalised offers from third parties (Wokke, 2014). The processing in question was privacy compliant (ING requested prior consent from its customers), but encountered considerable social resistance. Under pressure from the supervisory authorities and public opinion, ING stopped the pilot program. In May 2019, there was again controversy when ING announced it would start analysing online payment data for personalised offers, this time for its own products and services only. This time, ING offered its customers an *opt-out* option, which has raised complaints that this is not privacy compliant (Autoriteit Persoonsgegevens, 2019). But even if offering an opt-out option would be privacy compliant, my prediction is that social resistance will continue.

The social resistance can in both cases be explained in light of previously discussed principles. Consumers are very aware of the *trade offs* that newcomers offer. The trade off provided by newcomers is free *user-centric*, data-driven services (benefit), with an *indirect* earnings model of personalised advertisements (privacy invasive). The new services make it worth giving up privacy and having to accept the *nuisance value* of personalised advertisements. Established providers like ING, in this example, try to have their cake and eat it too: they offer *paid* services (the costs of which are constantly increasing), and they also carry out personalised advertisements (impacting privacy), the revenues of which the bank exclusively benefits. The misconception of established parties seems to be that personalised offers provide a value-added service for the user, but this is not how the average consumer experiences online advertising. This perspective only changes if the relevant offers are mostly for products that consumers already buy and for which they then get a discount (such as Knab giving a signal if a service already purchased can be obtained cheaper). In marketing jargon, these are called *thank you* offers. The examples that ING gave with its announcement showed that they mainly intended to make offers for other products (in marketing jargon: *up-sell offers*). The above can also be explained from an ethics standpoint. One of the most important rules of ethics is the *human centric* principle, whereby people should not be used as a means to an end (as an instrument), but should always be considered an end in themselves. If personal data are considered to be extensions of the individual (after all, it is a human right), then the exploitation thereof for the sole benefit of the company is the use of peoples' data as a means to the company's own purpose. Offering an opt-out option (and certainly if it is purposely made difficult to exercise, as in the case of ING) does not

help to remove societal resistance, even if it were legally compliant. With a history of lack of customer trust in the banking sector, this action will be seen as a sign of *self-interest*, and trust will erode further.

The pitfall for existing companies is that they often sit on a mountain of data that are a by-product of their existing services (for example, the payment data of the banks are a by-product of their bank account service). The solution for established companies is to stop thinking that they sit on a gold mine of data that is waiting to be monetised. These are precisely the data that the consumer believes were obtained in the context of a paid service and should therefore not be additionally profited from (as the bank already received a fair compensation). Privacy rules also create a barrier, because data that have been collected in the context of the exercise of an agreement may not be processed for other commercial purposes. In this case, data protection regulation requires that an opt-in must be obtained for profiling for purposes of sending personalised offers. To avoid this, the question that established companies must ask themselves is: which new digital added-value services can we offer, which require data analytics and which will the consumer want so much that they will give us permission to collect and analyse their data.

The Control Paradox – Give Users More Control and You Will Receive More Data

Research shows that if you provide individuals with more control over their information (i.e. increasing their privacy protection), they actually end up providing you with more personal information (decreasing their data protection) (Moerel, 2014, p. 46) (Brandimarte, Acquisti, & Loewenstein, 2014). This is called the *control paradox*. For example, if you provide individuals with access to their profile (i.e. 53, married, likes to hike, two children, etc.) through a *privacy dashboard*, individuals do not delete their profile (because it can still be done tomorrow), but actually correct and supplement this information (I have three children, and I also play tennis!). Another example is that if individuals feel that they have control over their data (just imagine a company actually getting proper data protection compliance in place), they are inclined to entrust more data to such company, which *de facto* leads to less protection. A similar paradox is known in other fields. An example here is the introduction of safety belt legislation. This did not lead to the expected reduction in fatalities, as people felt more secure with their safety belt and drove less carefully (Moerel, 2014, p. 47) (Janssen, 1994).

We see that this paradox is applied by GAFA, for example where Facebook now offers users the option to delete their entire account in one go and where all GAFA users are now offered a *privacy dashboard*. This gives people a sense of control, as a result of which they do not choose to erase their profiles. In any case,

it may be clear that new digital players have set completely different communication expectations, as a result of which users expect active *choice* and *self-service* options in their personal digital environment.

The Pitfall for Established Companies

Here too copying elements from the models of newcomers usually proves counterproductive. Where established companies are going to digitise their processes from an *efficiency* perspective, they often start offering customers self-service options. It saves a lot of time and cost if your customers do things themselves! However, if self-service options are not accompanied by innovations in *user experience* (UX), the move to self-service is perceived by customers as a sign of pursuing *self-interest* by the company (which it is). This is nicely illustrated by the survey of the Dutch Consumers' Association cited above, where lack of confidence in the three major banks is explained by customers as: *prices keep going up while we have to do more and more ourselves!* Here, customers see self-service as a means to cost savings rather than experiencing self-service as a value-added service (Consumentenbond, 2019). As long as digitisation by established companies is seen primarily as an efficiency measure rather than a better UX, it will be difficult to convince their customers that they are keeping up with new times, and all initiatives will be viewed with distrust. It is up to the companies themselves to bring about a change in thinking because only then will their initiatives be viewed by customers as authentic.

EXAMPLES: ETHICAL DILEMMAS

Dilemma 1. The risk department of a financial institution develops an algorithm to predict the likelihood of non-compliance with payment obligations of its customers. Divorce appears to be a large predictive indicator for non-compliance with payment obligations under loans and mortgages. The algorithm can predict the chances of a client getting a divorce based on data on social media. Will you include these data as a factor in decision-making?

Reflection. The privacy rules require transparency about what data you collect and analyse and for which purposes you do so. The transparency requirements are often a reason not include this factor in decision-making, as it is likely to be met with resistance from customers (the result of the analysis will be that the company is more likely to sooner realise that a relationship is going to end than the customer itself). Although the United States does not have direct rules for this, companies in practice apply the *smell test*: what would it feel like if this would appear in the newspaper tomorrow? Do I have a convincing story to explain, or do I really look

bad? If the latter is the case, then secrecy is not an option. Sometimes it is an option to be open with customers, for instance by indicating that you can conduct a risk analysis for payment problems in which all kinds of factors play a role and that, with higher scores, the customer can be given a signal and assistance can be obtained to put things in order.

Dilemma 2. A financial institution has developed an authentication tool that – on the basis of analysis of online behavioural characteristics (interaction patterns with devices, preferences for test use, hand-eye coordination, hand-vibration, pressure exerted on tests) – creates a detailed behavioural profile of account holders, based on which an account holder can be recognised if he logs in to his or her online bank account. If the person logging in shows deviant behavioural characteristics, a further identity check is first carried out (to prevent fraud). The algorithm also appears to be able to predict changes in emotional state of mind (increase or decrease in agitation, concentration, uncertainty) and can therefore be used to monitor risk indicators in the state of mind of flash traders (Levin, 2017). The department's best flash trader shows a sharp rise in risk indicators, but his trading patterns are the same. Do you also use this tool for monitoring? Do you intervene based on the results?

Reflection. Monitoring behavioural characteristics for fraud detection is in the interest of the relevant account holder and can be done in a fully automatic manner. Only if a fraud report comes in (someone logs in to an online banking app that does not have the characteristics of the legitimate account holder) is further investigation needed. This investigation then concerns the fraudster and not the account holder involved. This form of online behaviour monitoring is contained and will not have a relevant negative impact on the account holder concerned. The use of the tool for monitoring the behaviour of flash traders involves the continuous monitoring of an employee in his or her daily activities, whereby action can be taken by a direct supervisor. Research shows that employees who are under constant monitoring experience less autonomy and therefore less job satisfaction (Chirkov, Ryan, & Sheldon, 2011, p. 228). Instead of having the supervisor carry out monitoring, the tool could also be used to give feedback to the flash trader if the risk factors so dictate. With extreme scores, a ping could be sent to HR or a coach to assess whether there is reason for the flash trader to take a break temporarily. This would be in the interest of the employee himself or herself.

Dilemma 3. There is a shortage of a critical prescription drug from a major pharmaceutical company. There are many complaints due to shortages, but in some places, there are excess supplies of the drug. An algorithm is developed to predict demand and to optimise distribution. The algorithm works well; fewer products remain and the number of complaints is drastically reduced. Management is full of praise for better distribution and also an increase in drugs turnover. After a month,

a data scientist discovers that the algorithm avoids distributing the drugs to certain zip codes. What do you do as a data scientist?

Reflection. There must first be an investigation into the cause of the avoidance of certain zip codes. The investigation shows that the zip codes all concern underprivileged neighborhoods. The reason for this is that medication loyalty in these neighborhoods is lower than in better-off neighborhoods. As a result, critical medicines are sometimes not collected from pharmacies. Investigations further show that the explanation for the decrease in complaints is that patients in underprivileged neighborhoods are less likely to complain (*we are not listened to anyway*). The consequence of the redistribution steered by the algorithm is it can lead to newspaper headlines: *pharmaceutical company gives critical drugs to the rich at the expense of the poor*. What is striking here is that the data with which the algorithm is trained does not seem sensitive at first sight (these are not personal data, but hard distribution data from the pharmacies), while applying the algorithm can nevertheless lead to discriminatory outcomes. Another observation is that algorithms often provide insight into certain factors, which, once you know them as a company, can thereafter not be ignored. If it becomes clear that medication loyalty for critical medicines is lower in certain population groups, what societal role does the company have? Should it collaborate with the pharmacies in the neighborhoods concerned to increase medication loyalty in this patient group or redistribute the medicines in order to get the most from the available stock?

Dilemma 4. An algorithm shows that women who are pregnant are substantially more sensitive to life insurance offers. As soon as the pregnancy is over, this sensitivity is gone. As a marketer, are you going to target pregnant women with personalised offers for life insurance?

Reflection. There are different kinds of predictions (Moerel, 2014, p. 11) (Kerr & Earle, 2013, pp. 48-49). *Preferential predictions* predict preferences. *Preemptive predictions* are predictions that are intentionally used to diminish a person's range of future options. Examples include exclusion from insurance or rejecting a loan. This form of forecasting generally has more implications for the position of an individual than when someone receives a commercial offer based on previous preferences. In the latter case, the individual then has the option of whether or not to accept. The dividing line between preferential predictions and preemptive predictions is sometimes difficult to draw, especially when predictions are used for marketing, especially in cases of so-called *influential marketing* or *persuasion profiling*. Although, strictly speaking, these forms of marketing do not take away options from individuals, individuals are influenced in their choices to such an extent (for example, because of their inherent sensitivity to bargains) that it is difficult to speak of preferences and making choices. This form of prediction does not take the perspective of the individual (does he/she actually want this offer?), but takes the

perspective of the company making the offer. The latter uses the personality traits of the individual (e.g. sensitivity to bargains) and often not previous preferences. Although no future options are excluded, this type of marketing may have negative implications for individuals.

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ENDNOTE

- ¹ The study identifies three customer profiles, with different loyalty triggers, from which it can be deduced that the best starting position in competition is for financial service providers who are able to offer innovative digital services while maintaining a high level of customer service and trust (on acting in the interests of customers and protecting privacy). This is confirmed in (Accenture, 2019) (where four customer profiles have now been identified).

Chapter 5

The Analytics Asset

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ABSTRACT

We can treat analytics as a multi-discipline profession because the body of knowledge required for analytics has become extensive, and businesspeople have started to designate teams and departments as being specialists in analytics. An ecosystem of service providers has evolved for this profession, including conferences, degrees, consulting services, certifications, etc. Analytics is best understood as an organizational asset that is used to improve decision making and execution. This chapter outlines the analytics landscape and aims to help organizations gain a shared understanding of issues that must be addressed to plan, build, and use the analytics asset.

A BRIEF HISTORY OF ANALYTICS

The INFORMS definition of Analytics as: “the scientific process of transforming data into insight for making better decisions” is broad. Analytics has come to bear finance, operations, and economy connotations only since late last century. Mid-century references are mainly to Aristotle’s philosophy, and in 1940 the book titled “Brief Course in Analytics” related to geometry (Hill, 1940). Searching Google Scholar for papers with “Analytics” in the title, one appears in The American Economic Review in 1957 (Bator, 1957), and then it starts popping up in other economics journals (Tedford, 1964). It was used in the domain of decision analysis

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when, in the 1970s, Thomas L. Saaty labeled his technique for analyzing complex decisions as the “analytic hierarchy process” (Analytic hierarchy process, n.d.), and in the same decade it started getting used in medical and engineering journals.

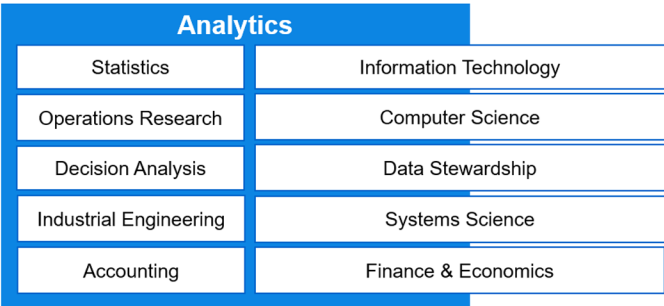
The Systems and Procedures Association of America (SPA), chartered in 1947, gave impetus to industrial engineering and operations research. The members of the association called themselves the “systems men”. The systems men quickly aligned to the use of computers in government and companies. The “management information system” (MIS) concept debuted in 1959 at a conference sponsored by the American Management Association (Haigh, 2001). The MIS concept, a grand design for data-driven management, can be treated as a predecessor for “analytics” for the industrial engineering and operations research communities. By 1968 it was already facing a backlash from being overhyped. In the 1980s, terms such as managerial computing, decision support systems (DSS), or executive information systems (EIS) served to rebrand and de-scope the MIS idea into more feasible applications.

Progress in technology, however, was making the enterprise-wide dreams of MIS feasible. In 1988, IBM researchers published the first paper for an “enterprise data warehouse” (Devlin, 1988), and in the 1990s companies constructed expensive data warehouses (DW). The Data Warehousing Institute (TDWI) was founded in 1995. The “business intelligence” (BI) term was brought into use in the late 1990s as a label for new reporting technologies, and both BI and DW became aligned to the Information Technology discipline.

The return of “artificial intelligence” (AI) is the big change for Analytics today. Along with “machine learning” (ML), an AI technique, it has become a huge part of the Analytics conversation, overshadowing other aspects. AI is associated with the computer science community, and while AI technologies steadily progress and permeate the economy, they are also subject to boom and bust cycles (History of artificial intelligence, n.d.).

Analytics, therefore, is used by different disciplines to deal with analysis and decision support. The “systems men” differentiated into Operations Research, Decision Analysis, Industrial Engineering, Systems Science, and Information Technology (IT). The leading institute for advanced analytics and operations research, INFORMS, traces its roots back to 1952 (Horner, 2002). The American Statistical Association (ASA) was founded in 1839 and statistics is pervasively used in data analyses. In drawing sets based on the stated aims of academic disciplines and the aims of Analytics, we frame Analytics as containing Statistics, Operations Research, Decision Analysis, Industrial Engineering, and Accounting, and overlapping with Finance, Economics, Computer Science, Systems Science, Data Stewardship, and Information Technology.

Figure 1. Analytics includes and overlaps other disciplines



Since tech waves are used to drive markets, the branding labels for Analytics update accordingly. The past decades have seen MIS and DSS drop out of favor while BI, Analytics, AI, and ML rose.

THE ANALYTICS TREND

Improved access to data, better prepared business organizations, and a large knowledgebase of techniques and algorithms has led to increased adoption of analytics.

As IT systems have evolved and become widely used, we have gained unprecedented ease of access to data. Databases are used to track transactions and processes using applications such as e-commerce, enterprise resource planning (ERP), customer relationship management (CRM), logistics, inventory management, human resources, marketing, etc. Government and stock-market data is available for online access. Data gathered by web-crawlers and social media platforms (such as Facebook, Twitter, LinkedIn, etc.) enable us to use even more data to make decisions.

We have learned to expand the areas in which analytics can be applied. Management practice has evolved towards increasing use of business processes and project management methods and become more sophisticated in setting and tracking objectives.

People are better educated, more aware, and less reliant upon one skill or one employer with whom they expect to spend their whole working life, so they may be more change-oriented or less resistant to the changes driven by analytics. As the use of analytics brings greater visibility and accountability and reactions against it are encountered (Schrage, 2013), though, we can draw upon learnings in change management to address them.

Analytics techniques have evolved and variegated to better match the business scenarios in which they apply. You can access thousands of professionals and

academics, and read myriad papers in journals on operations research, statistics, decision analysis, and management science, techniques.

Algorithms have become better at solving complex optimization problems that would slow earlier systems to a crawl. Take the example of CPLEX, a widely used suite of optimization algorithms. A production planning problem that took 29.8 days to solve in 1988 ran in 59 seconds in 2003, more than 43,500 times faster. In 2020, we can expect optimization algorithms to run on request and return results nearly immediately to the requestor.

At present many discussions about analytics capabilities deal with adding AI, managing privacy, and disrupting industries. The trajectory of optimism in this technology continues. The fight against fake news and social media addiction is not tainting the analytics disciplines they use.

New labels such as AI Specialist and Data Engineer are being floated to describe the Analytics talent requirements (LinkedIn, 2019). Data management technologies are being augmented to handle the larger volume and flowrate of data that analytics demands. Data management used to be about SQL databases, data loading, data quality, data warehouses and data marts, statistics, optimization, simulation, dashboards, reports and alerts. To this we now add a slew of new technologies such as Apache Spark, graph databases, in-memory processing, and deep learning.

THREE STAGES OF ANALYTICS

There are three stages for analytics (Saxena & Srinivasan, 2013) in organizations, and each stage includes an interplay between analytics technology and techniques.

In the first stage, organizations use databases, dashboards and reports to get the information needed to help make decisions. The assumption is that the decision-makers know how to use the analytics provided. This stage is heavily data oriented, as decision models can remain implicit in the mind of the decision-maker. IT teams to specify, develop, use, and evolve dashboards, reports, visualization and querying tools. The IT team is often designated as “business intelligence” (BI), “data warehousing” (DW), “Analytics”, or “artificial intelligence” (AI), and can sub-divide into specialists in designing data models, managing metadata, loading data into databases and transforming it, user experience designers, report/dashboard developers, etc. There exists an entire ecosystem of IT tools and services providers to serve these IT teams.

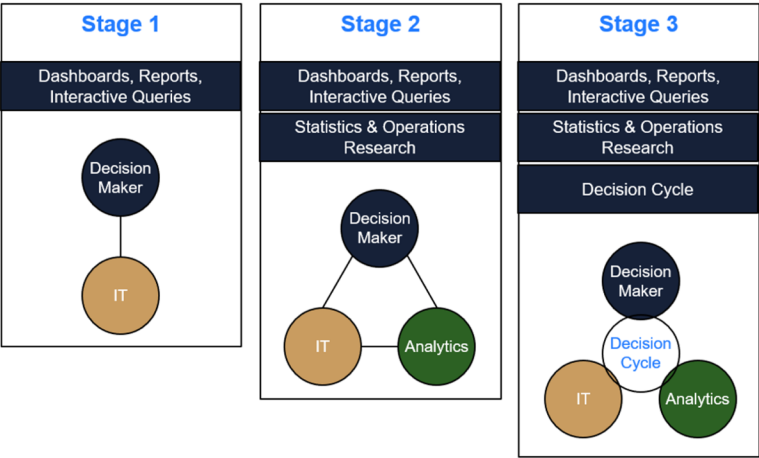
In the second stage, people turn to analytics professionals to help make sense of the data, conduct analyses, generate insights, and to make recommendations. This stage adds model orientation to data orientation, as analytics professionals document models to explain to their clients. Here we encounter the emergence of analytics

The Analytics Asset

professionals who provide a second source of analytics supply for decision makers, other than IT. These analytics professionals may be housed in businesses, IT, or a separate staff function – or in all these locations for large organizations. A new set of systems and processes support the Analytics teams. This has given rise to an Analytics ecosystem that works in parallel with the IT-oriented ecosystem. Analytics teams place a different set of demands on IT to serve their needs, mostly formulated in terms of broad data access – Analytics people want IT to enable them to get the data they need, and then they will perform the analyses they wish. Sometimes IT also provides the analytics infrastructure and supports Analytics applications.

In the third stage, decision-makers, analytics professionals, and IT work together to create, use, and evolve decision cycles for the organization. Decision cycles go from decision-need to outcomes, and help you drive results from analytics – this stage is results oriented. Analytics becomes embedded in organization practices and becomes an asset that can be assessed and continuously improved.

Figure 2. The three stages of analytics
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The stage zero, of using data analysis as a personal tool, is not included in these three stages as it is indistinguishable from the history of making informed and thoughtful decisions that may be treated as a hallmark of human civilization. Each stage adds to the previous stage and generates greater value. All these stages exist in parallel, aligned to decision needs. The presence of specialized Analytics teams in organizations denotes movement out of the first stage. As such teams are

commonplace, we can mark most organizations have progressed beyond the first stage of Analytics.

The use of information technology (IT) in Analytics is foundational. It is incorporated in the Analytics ecosystem, tracing back to the Systems and Procedures Association of America (SPA) in 1947.

In Stage 2, we see people invest heavily to increase their Analytics capabilities. The huge investments flowing into Analytics led to the creation of new providers and ecosystems. The seeds often came from the more quant-oriented businesspeople and the more business-oriented IT teams, re-grouped and re-designated to create “analytics” teams. In the analytics ecosystem we see a host of new entrants as well as a bunch of pre-existing players such as BI technology providers, as well as Statistics and Operations Research professionals. The big question these Stage 2 organizations deal with is how to create and manage an analytics supply capability.

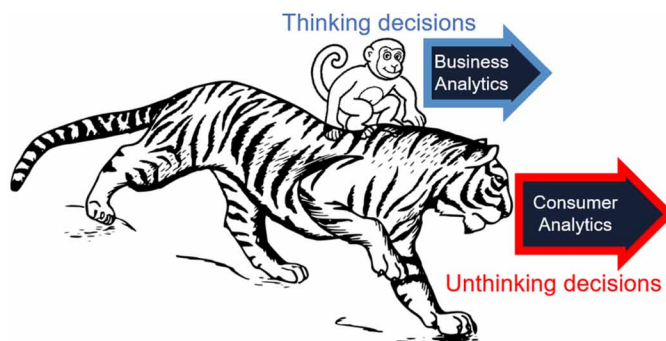
For Stage 3 organizations the big question is how to make the analytics capability drive results. To do this, they designate decision cycles as assets that can be created, used, stored, and evolved like other assets. Dr. Davenport suggested that organizations should take an inventory of decision needs (a decision inventory), determine how they should be made, and institutionalize the decision process (Davenport, 2009a). We will call this the decision cycle. In a different paper also published the same year he describes the use of the experimental method to refine and evolve decision models that has taken root in leading organizations (Davenport, 2009b) such as CapitalOne, Subway, Google and Amazon.

BUSINESS ANALYTICS AND CONSUMER ANALYTICS

Our minds work in two ways, labeled as System 1 and System 2 (Kahneman, 2011). System 1 operates fast, without conscious thought, and feels smooth. System 2 works slowly, and you are aware of devoting attention to think about the situation and the experience of making a choice.

Analytics has already split into two major branches along these lines. Business Analytics intends to drive intelligent decision-making and runs up against competition from biases and unconsciously rooted behaviors. These same biases and unconsciously rooted behaviors are leveraged by Consumer Analytics to unobtrusively drive behaviors. Consumer Analytics has taken flight. Its effectiveness for influencing consumer behavior is making people wake up to questions of manipulation, addiction, and privacy.

Figure 3. Business Analytics and Consumer Analytics



Consumer Analytics

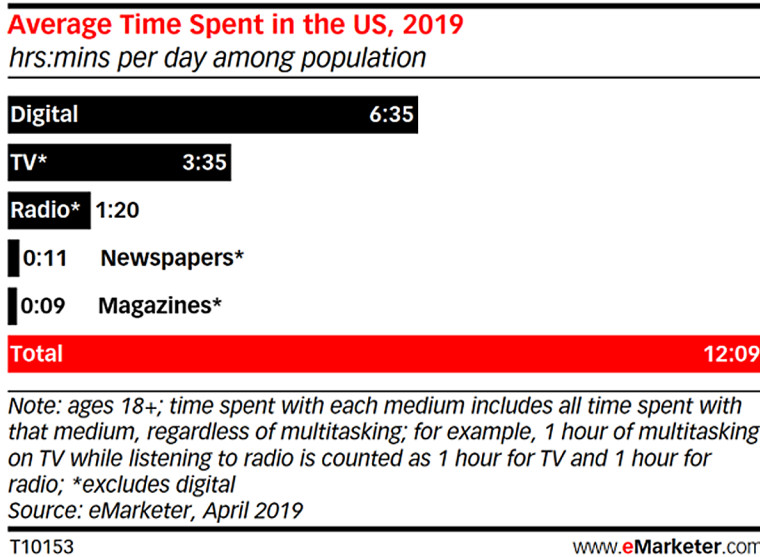
The quest for effective messaging to the public has deep roots, and the discipline has built a body of knowledge for making it work. Back in 1928, Edward Bernays explained how public communication can use learnings from social science and psychological manipulation in his book “Propaganda”. He is celebrated as the “father of public relations”, and he worked for business such as General Electric, Procter & Gamble, American Tobacco Company, for media outlets such as CBS, and politicians such as Calvin Coolidge.

Bernays famously worked on the campaign to promote smoking by women in the US, converting a social taboo to a symbol of emancipation. He helped the cigarette industry to effectively engineer the consent of women to become smokers (Brandt, 1996). He organized a publicity stunt of historic significance when he got debutantes to march in the 1929 New York City Easter parade brandishing their cigarettes as “torches of freedom.”. His ideas were also used by others, famously by Joseph Goebbels of the Third Reich.

Nearly every aspect of our lives has the potential to be touched by consumer analytics. The act of presenting a diamond ring to signify an engagement was, after all, the outcome of a successful advertising campaign by a diamond company. Information enters us from a multitude of channels (laptops, phones, radio, television, movies, billboards, etc.) and can be engineered to influence us, often to drive sales.

The quest for sales via consumer analytics has benefited from the combination of nearly ubiquitous internet access and widespread screen availability. In a 2019 estimate, US adults spent more than 12 hours on digital media every day (Dolliver, 2019). These audiences are analyzed and carved up into segments for marketing to influence attitudes and behavior.

Figure 4. Daily screen time for US adults

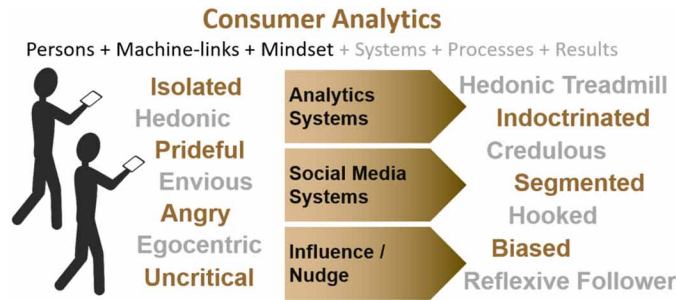


As analytics for consumer engagement becomes increasingly more effective from continual refinement, the rewards for consumer analytics practitioners are reaped in terms of business benefits from increased customer loyalty, higher revenues and better profits. Customers become “fanboys”, passionately engaged with their brand.

The entire consumer marketing industry is now oriented towards more consumer analytics. Apple enjoys a devoted customer base. Facebook, Apple, Amazon, Netflix, and Google are known to effectively analyze consumer behavior to drive revenue. As companies get better at it, the winners create customer bases that are addicted to their brands, services, or products. The change from engagement to addiction is real. You can find journal articles exploring Facebook Addiction Disorder (Brailovskaia J, 2018). The penalty for not deploying an effective consumer analytics capability is to face losses to competitors who poach customers and opportunities.

On the traditional layer of mass media, public relations, advertising, politics, and economics to influence audiences, we have now added the layers of social media systems and analytics systems. These systems provide unprecedented opportunities to influence consumer behavior in ways that are opaque to the consumer. Traditional moderators arising from interpersonal interactions grounding people into other people’s real situations and shared experiences get edged out by individual experiences delivered via personalized screens on your favorite machine (mobile phone, television, etc.), and these experiences can be managed to generate the results that the consumer analytics practitioners desire.

Figure 5. Consumer Analytics
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Consumer Analytics for Political Gain

Politicians and practitioners of state power have long understood the power of influencing the public using effective communication, propaganda, and disinformation. The increasing availability of analytics to influence public opinions, attitudes, activism, and votes is an irresistible lure. The creation of political factions and loyal supporters has a long history, and now includes the use of consumer analytics techniques.

“The conscious and intelligent manipulation of the organized habits and opinions of the masses is an important element in democratic society. Those who manipulate this unseen mechanism of society constitute an invisible government which is the true ruling power of our country. We are governed, our minds are molded, our tastes formed, and our ideas suggested, largely by men we have never heard of.... It is they who pull the wires that control the public mind.” — Edward Bernays (Bernays, 1928)

“The picture of the world that’s presented to the public has only the remotest relation to reality. The truth of the matter is buried under edifice after edifice of lies upon lies. It’s all been a marvelous success from the point of view in deterring the threat of democracy, achieved under conditions of freedom, which is extremely interesting.” — Noam Chomsky, Media Control (Chomsky, 2002)

The disinformation campaigns in political consumer analytics sometimes surface as “Fake News” or misinformation. The effectiveness of fake news to sidetrack real information and to plant the desired attitudes makes it a useful tool. Empathetic stories, shocking facts, and other sugar-coated pills are used to continue keeping your faction loyal and energized, and to sow confusion in opposing factions.

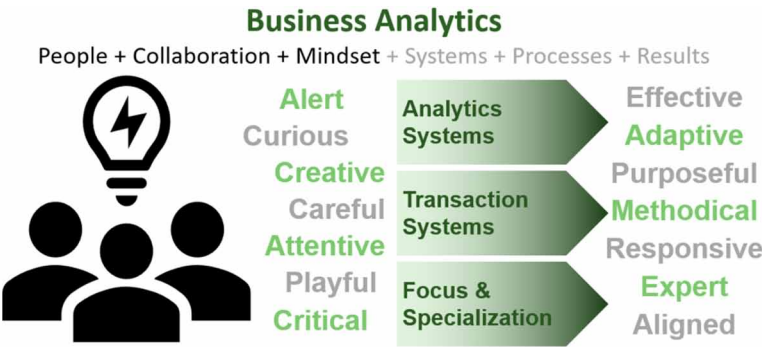
The result of effective consumer analytics to drive political gain confers advantage to its practitioners, leading to an arms race where all parties hoping for relevance and power use it. Analytics and automatons (often called “bots”) are used to craft and promote information streams to consumer segments.

As we write this article, the use of AI is forecasted to make both Analytics and bots more effective AI can generate content, direct it to the right audiences, and run test-and-refine loops with unprecedented scale and accuracy. AI in bots can better seed and promote content in such a way that human conversations are increasingly permeated and directed by analytics practitioners. This includes amplifying a selected view, confusing opposing or competing views, and trolling counterattacks.

Business Analytics

Business analytics is about making better decisions. Good decisions use data analyses and informed advice that leads to the desired results. We can call it organizational intelligence or other terms to connote the idea that good decisions need to be made in non-business contexts too, but for now the term “business analytics” is used and understood as being widely applicable.

Figure 6. Business Analytics
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Focus and specialization are used to enable better decisions. It’s usual for organizations to have teams in divisional and functional structure. Teams enable focus (on a line-of-business or a region) and specialization (in accounting, sales, service, etc.). This is the foundation for intelligence in organizations. On this traditional layer, Transaction Systems automate workflows, such as procurement and accounting. The resulting standardization and control make work consistent and visible. It also makes

workflows editable and provide places to implant additional intelligence. Analytics Systems layer on to collect and analyze data for decision support.

In contrast to consumer analytics, business analytics tries to combat biases and promote rationality in decisions. Such rationality is grounded in enabling people to collaborate effectively, using mindsets, systems and processes that provide the best outcomes. Instead of trying to bypass or diminish the role of critical thinking and thoughtful weighing of options, as consumer analytics does, business analytics tries to accentuate it. As you may expect, it's less fun to use business analytics than to be swept unthinkingly along with the flow of consumer analytics.

The field of business analytics also sees improvements in tools and techniques that make it both affordable and effective. The use of business analytics to set and navigate towards thoughtfully conceived and continually assessed objectives provides organizations with the ability to solve problems and drive human advancement. We may worry, however, that successful organization-wide business analytics can create an intelligent and adaptive entity that can devour its competitors, conquer industries, and outmaneuver regulators.

ETHICS, REGULATION, AND DATA PRIVACY

The increased use of analytics finds society unprepared for the challenge. People originate data and happily give it away to companies and institutions that provide, in return, social networks, exact directions, taxi services, etc. In their dealings with businesses, they are subject to decisions guided by analytics algorithms and everyone is getting used to increasing levels of automation. Many are actively instrumenting, measuring, and sharing their biological parameters in the quest for better health.

If a bank denies them a loan, they generally move on to another bank and not think about why that loan was denied and if the algorithm could be biased. Even if they suspect bias, it's not easy to get redress and so redress is not sought.

Innocuous nudges managed by analytics systems can create firmly held attitudes and beliefs. These beliefs then become resistant to correction, as confirmation and consistency biases kick in. The victims will not complain about getting addicted or manipulated.

It is difficult to imagine, therefore, that the public can resist manipulation and control by analytics algorithms by setting social norms to self-regulate against misuse of this technology. The burden of regulation shifts to institutions.

The people building analytics are expected to understand the ethical issues confronting them, but it's hard to take a stand when your job depends on it. It is possible for their professional institutions to do so. These organizations can use codes of ethics to reduce malicious actors and establish credentialing mechanisms

to decrease the effects of ignorant or unskilled practitioners inadvertently creating bad algorithms. INFORMS, for instance, has published ethics guidelines and launched a credentialing program. These moves are voluntary. The requirement for credentialed analytics professionals and enforcement of ethics guidelines may become mandatory as a defensive move after analytics teams face lawsuits for bad analytics. In the absence of a strong regulatory demand for professional standards of conduct, analytics work will continue to remain loosely linked to professional societies.

Regulators have stepped up to control data privacy, as an extension of traditional rights to privacy that were created to protect personal liberties from government intrusion (Solove, 2006). The European Union's General Data Protection Regulation (GDPR) went into effect in May 2018, and the California Consumer Privacy Act (CCPA) came into effect in January 2020. These laws allow people the rights to access, move, correct, erase, restrict, block sale, etc. for their personal data. These laws create compliance and management overheads for data management organizations but don't directly address the problems in the use of analytics for surveillance, engagement, decision advice, etc. Neither do they control the competitive advantage wielded by analytics heavyweights, leaving that to the anti-competition laws made for an earlier age.

The rise of "fake news" or disinformation campaigns is revealing the limits of regulatory capabilities, as they claim free speech protections and have support from the political factions that benefit from their use. Social media and traditional media businesses caught in the middle cannot afford to offend any side. People turn to fact-checkers only to find that there are shades of truth, for example a set of cherry-picked facts that add up to an unstated misleading whole.

As the effects of analytics become more apparent, regulators will face the problem of how to build a set of facts and well-founded beliefs that can serve as the basis for shared decision making and fact-based opinions. An arms-length relationship between the producers and payers of facts will reduce the ability to change, suppress, or amplify facts. Regulators apply such separation to insulate themselves from the executive arms of the state. Auditors act on behalf of the Board of Directors to assess financial statements produced by the in-house accounting function (Boockholdt, 1983). While institution capture remains a real risk, that too can be observed and mitigated. Societies, states, businesses, and other organizations can learn to house their analytics teams separate from executive functions and under observation by oversight functions. This can start as a "best practice" and become a norm or a rule.

The combination of self-governance by analytics professionals bound to their professional institutions and oversight by the parent organization using external auditors can create the norms and rules that will bind and constrain analytics to work in fact-based and socially beneficial ways.

THE RETURN OF AI

AI or artificial intelligence has re-emerged as a buzzword that subsumes and dominates conversations on analytics. We can think of AI as the discipline that makes intelligent software agents (Russell, 2010). Most of the current fascination with AI is driven by advances in machine learning, computer vision, and natural language processing. The “Artificial Intelligence Index Report” depicts AI as a branch of Computer Science (AI Index Steering Committee, 2019), and also as a general purpose technology with impacts across industries and functions. Applications of AI include Analytics, speech recognition and translation, image recognition, robotics, autonomous driving, medical diagnoses, etc. The problem of defining AI is not directly addressed, and there is no wide consensus on this. AI practitioners are expected to recognize the difference between AI and non-AI tools.

The applications of AI in Analytics and the semantic overlap between intelligence and analytics makes these two fields overlap heavily in the popular perception, the press, industry, and academia. Gartner’s “AI business value forecast” projects that decision support/augmentation and decision automation constitute the largest type of AI by business value-add, and that by 2030 they will account for 63% of the value-add (Gartner, 2019).

AI is an exciting idea, and AI hype has risen before, only to disappoint and collapse into “AI winter” periods when interest and funding for AI reduces (AI winter, n.d.). It fell so far out of favor that in the 2000s its practitioners used other labels for their work, even after IBM’s Deep Blue beat Gary Kasparov in a chess match. Advancements continued, and the term has come back in full force, such that some Analytics practitioners are now seeking to position their disciplines as included in AI.

INFORMS, representing the Operations Research (OR) and Decision Analysis (DA) communities, has released a white paper on its positioning in the AI conversation (INFORMS, 2019). They position AI as providing complementary tools to make OR and DA more effective.

More market-oriented entities simply rebrand Statistics as AI, both to satisfy customers seeking AI knowledge and in acknowledgement of the fact that AI depends on Statistics, OR, etc. for the techniques to develop intelligent software. Thus, Coursera’s AI Taxonomy depicts Linear Regression under Machine Learning, and Kaggle’s State of Machine Learning and Data Science 2019 survey questionnaire includes Linear Regression and Logistic Regression in their list of ML algorithms.

Inclusion of Linear Regression and Logistic Regression in ML and thus in AI makes it overlap heavily with Analytics, and this overlap is exacerbated by including Expert Systems (conflated with decision support systems). Autonomous intelligent agents are conflated with non-AI software. AI overlaps with both analytics and

transaction systems software makes it like “digitization” or “software” in the general usage. The software ecosystem is happy to claim a stake in AI while the going is good. The replacement of older-generation analytical and transaction system software into a set of intelligent agents is being talked up. The AI conversation has started to acknowledge the central role of a “decision factory” in assisting and maximally automating decisions and transactions, and of adding intelligence into transaction management and workflow automation systems. People have not yet taken the clear position that the future of intelligent software agents consists of:

- CoBots (collaborative bots): autonomous intelligent agents (bots) that can collaborate with other bots,
- working seamlessly together in a CoBot System.

We think that AI (defined as intelligent software agents) will permeate and transform IT, and that Analytics teams will use the AI-infused IT to add scale, scope, effectiveness, and efficiency. The INFORMS white paper on AI provides support for this view: intelligent software helps any discipline that can make use of these new tools. OR, DA, and other constituents of Analytics continue to have relevance in the aspects that they’re focused on.

DATA SCIENCE AND ANALYTICS

The “Data Science” label has sometimes been conflated with Analytics. Data Science is stated to be an interdisciplinary field for the analysis of structured and unstructured data using specialized algorithms and software such as data mining, machine learning, image processing, natural language processing, large-scale data visualization, etc. to gain insights, make predictions, and enable decisions.

This definition of Data Science has already run up against AI that provides the tools and techniques for machine learning, image processing, natural language processing, etc. The debut of the “AI Specialist” job title at the top of the emerging jobs report for the Machine Learning, Deep Learning, and Natural Language Processing skillset (LinkedIn, 2019) is a call for Data Scientists to differentiate themselves. Studying the actual role of Data Scientists, we find that the role is already decomposing into constituent techniques, and it is likely that Data Science may end up as a professional specialization either under Statistics as a job description for people who train and maintain Machine Learning (ML) algorithms or under Decision Analysis as a job description for people who rapidly visualize and analyze data.

Given the ill-defined and changing nature of what Data Science represents, its overlap with Analytics and AI, and the fact that sophisticated algorithms and

software technologies are innovated and used in all the sciences, it is not useful to define Data Science but to watch for what it evolves into.

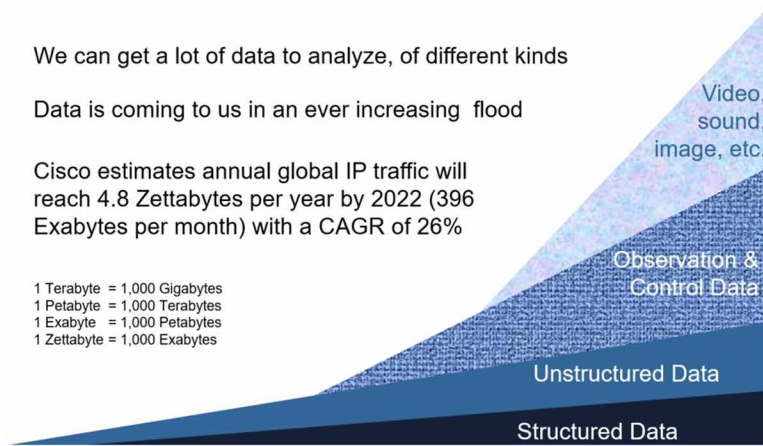
THE DATA CYCLE: FROM DATA TO INSIGHTS

Information Technology (IT) is used to acquire, process, store, access, and disseminate data. From the days of MIS, Information Technology (IT) has been the foundational enabler for Analytics. The role of IT in Analytics is to build and run the Data Cycle.

Analytics is now being applied to different kinds of data:

- Structured data in relational databases is the staple for analytics. This data is used in transactions such as placing an order, making a payment, updating a sales opportunity, or transferring funds. As more and more transactions are automated, each kind of transaction lends itself to analytics, and combinations of sets of transactions enable analytics across transactions that yield new insights.
- Unstructured data is of the kind characterized by books, documents, research papers, patent filings, HTML pages (such as those used in websites, blogs, etc.), newsgroups, Twitter postings, etc. Unstructured data also occurs as comments associated with structured (transaction) data, for example a customer support case is a transaction that generally includes free-text (unstructured data) that records the customer issue, as well as subsequent commentaries put in by employees who handled the case; or a product catalogs contain free-text descriptions of each product in addition to structured data about the product identifier, price, etc. Log files generated by computer equipment is another variant in this category, as such data is generated by an algorithm and so contains inherent structure, but it looks like unstructured text.
- Observations and control data come from sensors and controllers. This kind of data is critical for running oil refineries, chemical plants, factory-floor infrastructure, the electric grid, hospital equipment, etc. In many cases the data and related control algorithms have implications for safety, security, and health. Specialized technologies are used for managing this data, and it was used by engineers, laboratory technicians, and other specialized professionals. Increasingly, nowadays, this kind of data is also being used for business analytics and starts to have importance for business leaders. The “Internet of Things” has become the brand for this category of data which includes data from Supervisory Control and Data Acquisition (SCADA), bar-code readers, Radio-frequency identification (RFID), Global Positioning System (GPS),

Figure 7. Increasing data volume in greater variety
(Cisco, 2019)



Simple Network Management Protocol (SNMP) monitors, accelerometers, motion sensors, etc.

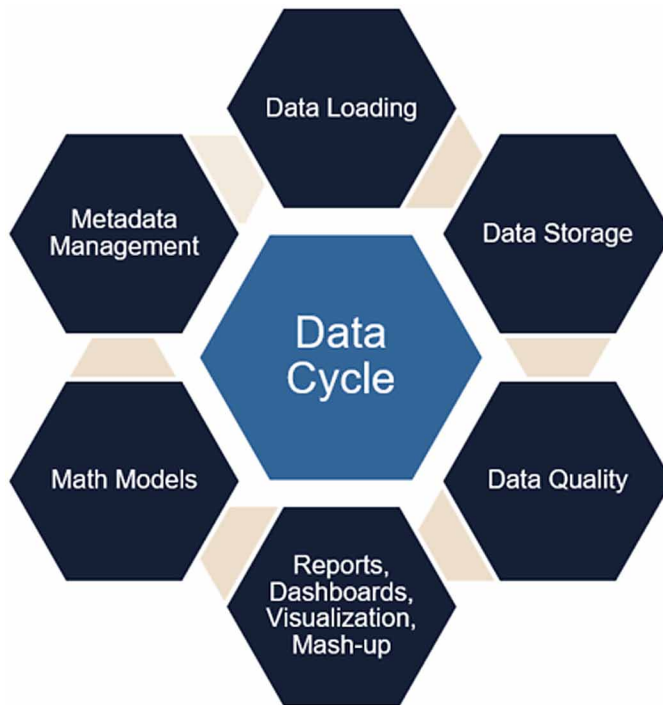
- Video, sound, and images also lend themselves to analytics. Triangulation of the sound of a gunshot is used to locate snipers, and video feeds can get automatically tagged by a motion detection algorithm and prioritized for review by security personnel. As the analytics techniques to process such data evolves, it will also become more important for business analytics. Games already contribute to internet data traffic and may become used for analytics both as data sources and as immersive environments for conducting analytics. Other data includes MRI scans, other biometric imagery, genomics data, proteomics data, 3D image files, engineering design files, satellite observations, etc.

The data cycle that has six functions that transform data to insights. This categorization adds math models as a function that the data cycle needs to support, but otherwise can be viewed as a simplification of other such models, for example the ten functions in the DAMA Data Management Body of Knowledge or reference architectures published by various vendors and analysts.

1. Data loading functionality is required to move data from its source and into the analytics environment. A commonly used pattern for these systems was to “extract, transform, and load” (ETL) data: i.e., to extract data from where it resides, transform it to match the format demanded by the analytics system where it needs to go into, and then to load it into the analytics system. Variants

Figure 8. The data cycle

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of the pattern include “extract, load, and transform” (ELT) and the insertion of data-stages that can serve different needs from the same data flow.

2. Data storage functions are performed by database and file-management systems. Data is stored in relational databases that support the Structured Query Language (SQL), new databases that don’t use SQL (called NoSQL databases), flat files, etc.
3. Data quality management looms large in importance for analytics. A big part of the time and effort that goes into analytics is spent on assessing and improving data quality, and many of the defects in analytics trace back to defective data quality. Data quality is not just about fidelity to data sources, it also depends on how sensitive your algorithms are to variations in data quality regardless of where the quality was impaired.
4. Visualization and dashboards, query, filter, and search functions are provided by tools that process the data into cubes, tables, reports, charts and graphs. In many cases the label of “business intelligence” (BI) systems is applied to this category. A range of end-user interaction is permitted, from read-only to interactive querying. Such tools enable users to roll-up (consolidate) data,

drill-down, filter (slice and dice), and visualize data along any combination of dimensions such as geography, customer segment, product, etc.

5. Math modeling systems support analytics techniques such as statistics and optimization. These systems can run in the “inline” mode, where the algorithms must execute to provide timely guidance to the business process they support, for example to assess the credit-worthiness of an order as it is being placed by the customer, or in an “offline” mode where the credit-worthiness check occurs as a separate step after the customer places the order and the sales team can contact the customer if the check fails. As analytics systems become faster and able to process larger volumes of data, it becomes possible to deploy more math models in the inline mode of operation.
6. Metadata or master data management functions are used to manage hierarchies (such as who reports to whom, or how a precinct’s data rolls up to the district), and reference data such as customers, suppliers, products, employees, materials, etc. Master data or reference data is used across functions for different purposes, and metadata is the “data about data” that can assess if the data looks right and follows the business rules such as hierarchical arrangement, uniqueness (identify suspected duplicates), ranges (e.g., employee age), etc. Since analytics is data built upon data, metadata and master data management takes on a key role. Analytics processes use, validate, update and create metadata.

The technology underpinning these analytics systems functions has evolved to support greater scale, richer functionality, faster processing, and deeper interconnections. These are often lumped into the “Big Data” category that consists of several different threads of technology evolution towards handling ever larger volumes of data.

In addition to supporting big data, the current technology can support:

- Fast data: high rates of data flows into the analytics systems,
- Big analyses: complex analytical models, and
- Decision cycles: the use of decision models and test-and-learn processes.

As exemplified by the Apache projects, the leadership of these new technologies is often in the hands of open source and free software projects.

THE DECISION MODEL

A decision model provides the method to frame a decision, state the objectives, define what information is required to make the decision, and how that information

is to be processed to provide options and advice. A simple decision model can be used to figure out which box of salt to buy, given two options. Confirm that both boxes have the same amount of salt, of the same kind. Then choose the cheaper box. A more complex model may be used to compare white t-shirts, where the criteria can include price and brand. In general, decision models include criteria, options, recommendations, and scenarios.

A decision model can score the options and provide a recommendation, provide a method for the decision-maker to play with the model and assess the range of possibilities, provide procedures for getting to the decision individually or as a team, or any combination of these.

For use in Analytics, decision models are implemented as algorithms that provide solutions for a specific decision. To create the algorithm, the problem needs to be clearly defined and modeled – we can call this a decision model specification or requirement. The algorithm is then developed, tested, and deployed such that it meets the specification and provides useful solutions for the decision. The process may be iterative, as a unimplementable or insoluble specification can lead to changes in the specification.

In the absence of a decision model, the role of Analytics is limited to informing the decision maker, under the assumption that each decision maker knows how to make the decision based on the information provided, and perfectly converts that incoming information into a mental decision model of criteria, options, recommendations, and scenarios. As you may expect, the reality is that different people have different mental models, and the same person may process the same data with different results because of extraneous issues such as how hungry he is or how much time he has, the gender of the requestor, etc. In the absence of decision models, organizations face the cost of inconsistent decision making (Kahneman, 2016). The more insidious effects are that the secret of making good decisions remains inside the wetware of individuals and teams, thus subject to loss, impossible to replicate, and unavailable for systematic improvement. Implicit decision models need to be made explicit – written down and shared. With explicit decision models, decisions become consistent, collaboration based on decision models becomes transparent and accessible, decisions remain aligned to their design, and the decision model becomes subject to constructive criticism and adaptation.

TEST AND LEARN

The systematic criticism and adaptation of a decision model is labeled the “test and learn” process. Each time a decision is made, we can check if the results were aligned

with the objectives. It is a data-intensive and time-consuming process, but the effects are to scientifically and continually refine the decision model and keep it effective.

A/B testing is an example of the “test and learn” process being used in a case where decision model A is tested against decision model B. In general, A is the model that is currently used (or Champion) and B is a new model (or Challenger). For instance, the color of the “buy now” button may be currently green, and the challenger is blue. An A/B test, run as a randomized experiment for several cases, will reveal which color leads to higher rates of buying.

Design of Experiments (DOE) is the method used when two or more input factors influence the test. DOE is used to evaluate the effects of multiple input factors. In this way, we can identify interactions between inputs we’d miss when experimenting with one factor at a time. The statistical methods used for DOE were worked out by R. A. Fisher early last century.

A/B testing and DOE software is widely available and used, especially in marketing and manufacturing.

THE DECISION CYCLE: FROM INSIGHTS TO RESULTS

Decision cycles provide the capability for Analytics teams to link the insights from data analysis to the decision and execution processes in the organization, providing a systematic way to go from insights to results. It also enables the systematic assessment of decision models to enable aligned, adaptive and responsive behavior across the organization.

The decision cycle has six components:

1. Decision Models, the algorithms used to make decisions. This is needed to convert implicit decision models to explicit models.
2. Analysis to Advice, the decision-support advice for a specific instance of a specific decision. This is needed to provide updated advice in every instance.
3. Advice to Decision, to track how the advice resulted in a decision. This is needed to track and close the advice-to-decision gap.
4. Decision to Execution, to track how decisions resulted in actions. This is needed to track and close the decision-to-action gap.
5. Execution to Outcome, to track how actions resulted in outcomes. This is needed to track and close the action-to-outcome gap.
6. Decision Inventory, to track how which decisions have models, and how the models align. This is needed to track and close gaps in models – to find places where decision models don’t exist, where decisions are misaligned between

Figure 9. The decision cycle

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different models. We may also call this set of decision models a “decision factory” (Iansiti, 2020).

To use analytics to make better decisions, you need to use decision cycles with explicitly specified decision models that are continually assessed and evolved in a feedback loop. Decision models are open for inspection and continuous improvement, as compared to implicit or “gut-feel” decision making that is known to be rife with biases (Hammond, 2006). Decision cycles track from need to outcomes, so we can learn from the feedback loop and use it to improve, adapt and evolve. The decision cycle applies to the full spectrum of decisions needs: from strategic decision-making to tightly constrained day-to-day operational decisions, and to everything in between. This is because in its lightest-weight implementation you can identify a business need in the inventory and use the decision model to record when and where the decision is taken, by whom, how it was executed, and what were the results.

Conversely, the lack of explicit decision cycles inhibits the creation and usage of analytics. When decision cycles don’t leave an easily accessible record, even organizations with good analytics teams don’t have data needed for learning and

improving the process of decision making. The demand for analytics becomes limited without decision cycles because decision-makers start to question the relevance and value of analytics deliverables that lack connection to decision support and business results.

The decision cycle can be compared to other methods such as the “OODA loop” (for observe, orient, decide, and act) of Colonel John Boyd, “Plan, Do, Check, Act” or the Shewhart cycle popularized by Dr. W. Edwards Deming, and DMAIC (define, measure, analyze, improve, control) used in Six Sigma. The decision cycle has a decision inventory, a set of decision needs that anchors the cycle to the business need. Decision models, analytics deliverables, decision instances, execution, and outcomes are implicitly needed in all these cycles and are explicitly called out in the decision cycle.

ANALYTICS FOR COMPETITIVE ADVANTAGE

We can think of analytics as the combination of the data cycle and the decision cycle. The data cycle produces insights from data, the decision cycle converts insights to results. Analytics generates improved performance by both decision-advantage and execution-advantage.

Decision advantage comes from using explicit decision models to frame, deliberate, and make decisions. Explicit models and visible decision cycles make it possible for people to collaborate because everyone can see the decision emerging and changing based on the criteria, weightages, scenarios, and options under discussion. An explicit decision model is also an external entity, existing outside the mind of any one person, and so less subject to individual emotions and biases. Group biases can be managed using decision processes that control for factors such as groupthink, group radicalizations, etc. In many cases the explicit decision models are data-driven, hence grounded in facts. In other cases, especially those encountered in game theory, it can be enough to use heuristics to guide the decision process.

Execution advantage stems from the ability to monitor and manage the execution of decisions, using the decision models and extending them to check the values of the internal and environment variables. It enables managers to drive adoption of the decisions, and also to continually check how the adoption is affecting the expected outcomes. These outcomes are to be traced to the creation of business value, directly or indirectly. Thus, the execution advantage becomes an “actuator” for the decision advantage, by connecting decisions to value creation.

The experience of people involved in analytics is, however, a mixed bag: in many cases projects fail. Gartner research found that “between 70% to 80% of corporate

business intelligence projects fail” (Goodwin, 2011), and Gartner has warned that 85% of AI projects will produce erroneous outcomes (Gartner, 2018).

To ensure that analytics investments yield results, leaders must examine the decision cycle. Do we provide decision-makers with the analytics they need for their decisions? After the delivery of analytics to the decision-makers, do people adopt the recommendations? After the decision is made, is it executed? If executed, does it lead to the expected results?

MANAGING VARIETY

The creation of a viable competitive advantage from analytics requires that you wrestle with three kinds of variety:

1. The variety of **data issues** and errors embedded in the data that you ingest into your analytics,
2. The variety of **insights** that people generate, using a range of skills and techniques, and
3. The variety of **business contexts** in which the insights are used to make and execute decisions.

Faced with such variety, some professionals prescribe standardization, some leaders fall for the “single source of truth” dogma, and others just tolerate the chaos because of the nuggets of value that periodically surface from the churn.

For it is a churn – analytics must provide a way to navigate the turbulent waters of business, and so analytics models must reflect it. The challenge is to create an understandable view to enable effective navigation.

First let us address the dead-end paths, so we can avoid them.

1. Standardization, or the fallacy of perfect design. This path starts with a big effort to fully understand the business. The project team is exhorted to model the business perfectly, for now and for the future: to be omniscient, all-understanding, and prophetic. This grand model is built, reviewed, and implemented as the “standard model” upon which all business decisions must run. The good ones yield some benefit in selected business areas, and all of them cede areas where the model is insufficient and people either ignore or home-brew their analytics.
2. The “single source of truth” dogma may avoid the grand design but asserts that one brand of analytics must be used by everyone. This is useful to avoid the paralysis caused by dueling analysts and draws its strength from the pragmatic

notion that defective analytics must be avoided. Along that path, sadly, lies the notion of infallibility – a human weakness that leads towards making the single sources of truth itself defective. To complicate matters is the notion of “known defects” in the analytics deliverable, which establishes the concept that the slightly defective source-of-truth is good enough for the business purpose it serves ... and often that purpose is not clearly bounded. To avoid this infection of defects, it is always important to continually assure that what you regarded as true remains usably true for its purpose.

3. Tolerating the chaos has the benefit of low expectations, and the downside of sub-par results because the organization detects the toleration and interprets it as a lack of commitment or belief in using analytics. Heroic efforts or “diving catches” are seen, but it’s a lot harder to create heroic one-off value from analytics because it generally demands steely determination in driving execution. Such determination is usually not correlated with chaos-tolerating hands-off policies.

The path forward comes from aligning the decision model to the business scenario. The decision models for the scenario determine the purpose and point to the value. Feed the best insights into the scenario and assure data quality to the level demanded by the scenario. The method to create the asset reverses the issues of the dead-end paths:

1. Commit to building the decision model from the base of the current situation, even if it is chaotic. This demands the leadership commitment to transition from inconsistent decision-making habits to consistent decision-making informed by analytics. Put this commitment to the test in selected scenarios, each of which creates an analytics asset that has potential value. Use it to realize the value and drive forward on the successes. Leaders need to be able to understand the concepts of risk and uncertainty, and use analytics to improve their navigation, e.g., by improving the win-rate for opportunities – it can’t be 100% but it can get better with analytics.
2. Understand that “all models are wrong, but some are useful”, and use it to find and monetize additional opportunities for analytics while avoiding any pretense of infallibility by continually checking. Check the business scenario – has anything changed that will demand that the analytics model changes? Check the data for issues and revalidate the models. Proactively quarantine infected models to avoid mixing good models with bad ones. Assure that the analytics assets in use are fit for the purpose of their use.
3. Allow the enterprise design to emerge as a visualization of the decision cycle. Welcome home-brew analytics and add them to the picture, make it easy for

value to be recognized, incorporated into the enterprise asset, monitored and monetized. An emergent design will reflect chaos, upon which a “navigation” design can be overlaid, much as a map-grid and route-maps can overlay a topographical map. This enables leaders to chart their paths while recognizing the valleys and ridges in their way. It provides the benefit of informing strategic deliberations with the well-founded realities embodied in the decision cycles.

The path to analytics requires you to navigate the requisite variety posed by the business environment with determination and care. It does not place superhuman demands on you.

THE ANALYTICS TRANSFORMATION

The culture of analytics creates a learning loop, as you learn from the outcomes of each decision cycle. It starts with the creation of the decision inventory, which you can use to direct efforts, monitor progress, and assess results. The ability to monitor and manage a decision cycle must be coupled with an ongoing commitment to drive learning by experimentation. The subjects of experiment are the decision algorithms, so that results get tied to algorithms instead of people and teams. Instead of the sole responsibility for decision quality resting on decision-makers, the use and evolution of decision processes and decision models helps to improve decision quality driven by the adoption of Analytics.

It's not easy to create and sustain your organization culture to use analytics. Instead of decision by position, the culture would demand decision by objective rationale. The benefits are attractive: less waste, better results. The path is thorny:

1. **Data Supply Chain.** When you set out to build your analytics capability, you must feed data to it on an ongoing basis. Here you discover that your systems providers aren't used to sharing data. Setting up and operating the data supply chain is not just about the new capability staffing, methods, and technology. It's also about ensuring that it works smoothly with data providers.
2. **Data Stewardship.** After data arrives and analyses start, data issues will surface because of the unexpected ways in which the source systems are configured or used. Backdated records, incorrect journal entries, and other issues will appear. You'll need a data stewardship capability for ongoing monitoring and control of data quality, to institute a culture of data accuracy and to ensure that data quality is maintained. Cyberattacks and data thefts can target the analytics system to steal data, disrupt data flows, or insidiously subvert data quality.

3. **Data Analyses.** Reports from your new Analytics capability will show variances in metrics against your current reports. Even when they're supposedly driven from the same data, you'll find yourself face to face with the truism that all management metrics get doctored over time ... and the fact that your subordinate may have a better view of the metric. The differences can be unsettling, and tempers can flare. Calmly navigate to the best practice, either as a change to the report algorithm or as a change to how the organization defines the metric.
4. **Decision Modeling.** Converting "expertise" or "tribal knowledge" into specific decision algorithms is unnatural for non-algorithmic thinkers. The process is fraught with error and miscommunication. People may not like their hard-won experience being converted into a simple statistical rule. Optimization experts may not understand the need for incremental moves to the optimal. An understanding of control systems will lend an appreciation for damped responses as opposed to overshoot, to calibrate responsiveness versus oscillation. Reducing decision hand-offs must be traded-off against having checks and balances. Biases and misinformation may get embedded inside decision algorithms and require special efforts to locate and remove.
5. **Decision Support.** Analysis will shine an uncomfortable light on the accepted practices in your organization's decision making. Adopt "truth and reconciliation", grant amnesty for past issues and patient support for improvement. Train people to start using decision algorithms. Align incentives towards systematic use of decision cycles. Locate, communicate, and celebrate successes.
6. **Opportunities to Results.** The volume of opportunities to change revealed by building and analyzing the decision inventory can feel overwhelming. You'll find unserved needs, partial coverage, ineffective decision models, multiple competing decision models, unused decision models, etc. Create a roadmap and solve it. Build the capability to manage with Analytics in each selected area so that over time the entire organization can react smoothly to Analytics signals. This is the creation of organizational agility and that depends on each area getting out from managing by inertia to continuous improvement.

Analytics is sure to give your leadership a workout.

CONCLUSION

Analytics enables businesses to navigate rationally from idea to execution. With analytics you find better ideas, analyze them effectively, take better decisions, and execute faster. Business has always been complex – analytics provides a way to

illuminate it, select a path, and navigate the complexity. The usage of analytics should, therefore, be supported by leaders – you must evaluate your analytics capability and start to build the analytics asset.

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Chapter 6

Big Data Analytics in the Healthcare Industry

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ABSTRACT

In the contemporary e-era, big data plays a major role across the manufacturing and production industries, service and consultancy industries, and of course, information technology, and it heightens the influence on healthcare industries too. More and bigger data is becoming accessible publicly like Google Trends, Cancer Genome Atlas data portal, etc. Hence, developing big data analytics tools and techniques is the need of the hour in healthcare and pharma. The problem of the healthcare industry generates with the lack of information that is available for decision-making. The volume of data available is no doubt too big, but the integration of data from different players becomes a very tedious task. The aim of this report is to provide a detailed comparative study of pharmaceutical industry from Indian and global perspectives and also to provide the applications of big data analytics in the healthcare industry and indicate the limitations and way forward.

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INTRODUCTION OF BIG DATA

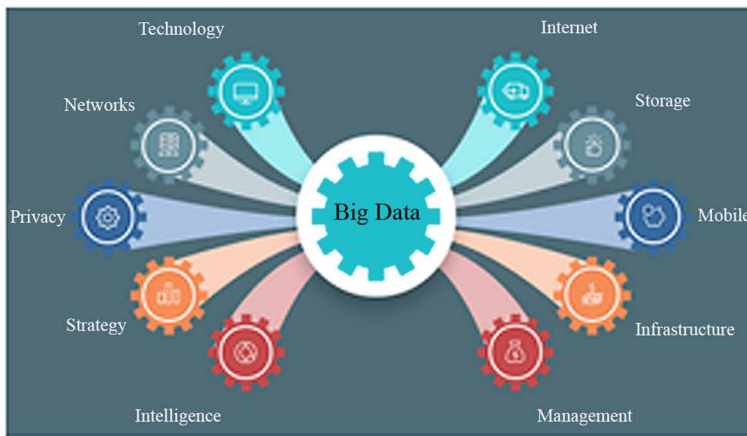
Big data is the cornerstone of analytics irrespective of sectors. It creates lots of attention to very large and diversified data sets; it may include unstructured data & semi-structured data from different sources. Analysis of Big data permits us to make better and timely decisions. Big Data fulfills the Business Intelligence to inherit the functions of effective decisions & timely decisions with “Single version of the truth” (Prem, M.J. and Karnan, M., 2013). There is high ambiguity over transparency, compliance, and apprehensions regarding big data in the pharmaceutical industry, and hence the players need to ensure strong coordination between commercial and Research & Development entities, spring up analytical rigor and develop critical hypotheses that need to be tested systematically. Else big data might lead to incorrect conclusions that may have detrimental effects on a product or an entire portfolio (Mahajan, 2010). The Business Intelligence market growth in the pharmaceutical industry will be driven by factors like the need to develop an effective and transparent information infrastructure, identification of the latest sales forecasts and customer trends, attainment of cost efficiency, and increase in outsourcing.

Big data analytics applications of the health care industry have provided a lot of life-saving outcomes. In the context of the Health care industry, the current world has a threat of the consistent increment of disease and Big data analytics can help to derive insights on the systematic pattern of the disease which is collected the massive information from the patients and rest of the world. It evaluates the practitioner’s performance. Along with the seismic shift away from volume-based care to value-based care, the implementation of health care analytics provides new methods to evaluate the performance and effectiveness of health care practitioners. With ongoing performance evaluations, along with health data related to patient wellness, Big data analytics can be utilized to provide ongoing feedback on health care practitioners. It is the best method to predict the risk factors across the diseases. This cross-functional method will be a disruptive factor in the health care sectors. The average human lifespan is increasing along with the world population, which starts with the new challenges for health professionals. Two decades ago, gathering huge amounts of data for medical purpose has been a costly and time-consuming process. Nevertheless, current emerging technologies such as Big data analytics serves the purpose. As a McKinsey report states, “After more than 20 years of steady increases, healthcare expenses now represent 17.6 percent of GDP nearly \$600 billion more than the expected benchmark for a nation of the United States’s size and wealth.” One of the biggest obstacles are in the way to use big data in health care industry is “medical data”, how this medical data is blown out across many different sources governed by various states, hospitals, and administrative departments and Integration of these data sources would feasible to develop a new

infrastructure where all data providers collaborate with each other. This chapter aims to provide insights into different data centers and how they are mitigating the problem and provide the solution to the next level using Big Data analytics.

The New York Stock Exchange (NYSE) generates the data per day of about one terabyte. The statistic of Social media such as Facebook generated that 500+terabytes of new data get ingested into the databases every day. Big data is mainly engendered in terms of sharing comments & message exchanges, photos, and video uploads, etc. A single Jet engine can generate 10+ terabytes of data in 30 minutes of flight time. With many thousand flights per day, the generation of data reaches up to many Petabytes.

Figure 1. The Importance of Big Data

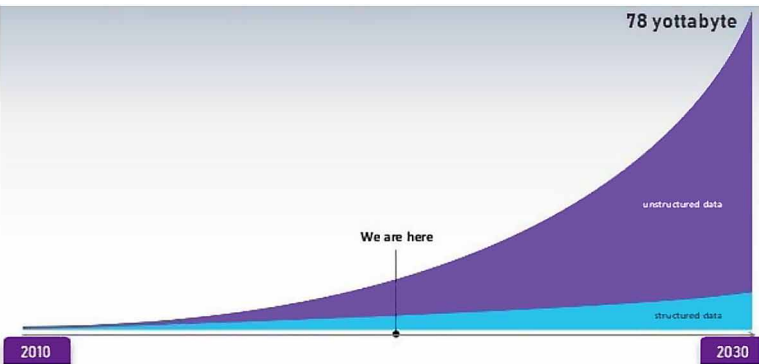


BACKGROUND: BIG DATA ANALYTICS IN HEALTHCARE INDUSTRY

A few decades ago, the flow of information in the healthcare industry was relatively simple with minimal usage of technology. Nowadays, technology has become much more advanced, and the flow of information has become more complicated. Today, data mining and big data analytics are being used to manage inventories, develop new drugs, manage patient's records, cost of medicines, and administer clinical trials. The methodologies involved in the data extraction and information retrieval process are the same as other sectors, but the usage and relevance of that data have changed to suit the needs of hospitals, pharmacy companies, healthcare organizations, medical research labs, and drug trial clinics. Unfortunately, data collection methods have improved, but the techniques used to process it are still lagging behind (Ranjan, 2007).

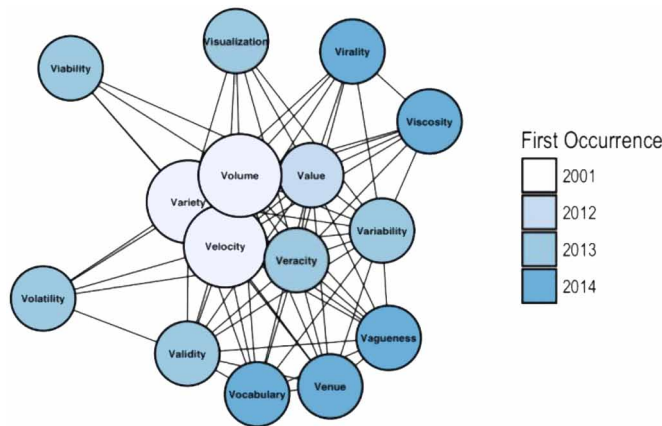
Big Data Analytics in the Healthcare Industry

Figure 2. Data Growth over the years



As of now, and we now operate in an ever more sophisticated world of analytics. To keep up with the times, we present our updated 2017 list in Table 1.

Figure 3. Statistics of 15 V's of Big Data
Source: <https://www.kdnuggets.com/2017/04/42-vs-big-data-data-science.html>



Role of Big Data in Healthcare Sector

Big data is being actively used in the healthcare sector these days to change the way decisions are made. It is changing the entire healthcare ecosystem by providing cost-effective measures, better resources and measurable value around the globe. As per the KPMG (2012) report, 70% of the healthcare data is generated in Europe and North America and by 2015, the world is expected to generate 20 exabytes of

Table 1. The importance of 42 V's of Big Data and Data Science in healthcare sectors.

# of V's	V's	Description
1	Vagueness	Health care data due to its unstructured-ness is often vague.
2	Validity	Historic healthcare data, though it may be needed for analysis for predictive modeling, the validity is more relevant.
3	Valor	The bolder the data, the bolder the unearthing of hidden facts in healthcare.
4	Value	Any analytics tools should pave the way for meaningful value
5	Vane	Vane of data means vane of decision making
6	Vanilla	Simply makes more value in health and health care industry
7	Vantage	Healthcare data is futuristic and has to be vintage.
8	Variability	The more data variable the more valor.
9	Variety	Variety leads to more data-curiosity.
10	Varifocal	Healthcare Data lens allows seeing infinite number of near, intermediate, and far vision in healthcare.
11	Varmint	Health care data gets bigger, so can software bugs!
12	Varnish	How end-users interact with our work that matters and provides the refinement counts.
13	Vastness	With the advent of the internet of things, the “bigness” of health care data is accelerating.
14	Vaticination	Predictive analytics provides the ability to forecast and easy to diagnose in the health care sectors.
15	Vault	With many data science applications based on large and often sensitive health care data sets, data security is increasingly important to avoid the vulnerability
16	Veer	With the rise of agile data science, the Health care industry is able to navigate the customer's needs and change directions quickly when called upon.
17	Veil	Data science provides the capability to peer behind the curtain of health care sectors and examine the effects of dormant variables in the data.
18	Velocity	Not only is the volume of data ever-increasing, but the rate of data generation (from the internet of things, social media, etc.) is increasing as well as per the health care industry data increasing.
19	Venue	Data science work takes place in different locations and under different arrangements: Locally, on customer workstations, and in the cloud.
20	Veracity	Reproducibility of Data in health care is essential for accurate analysis.
21	Verdict	As an increasing number of people are affected by health care industry decision models', Veracity and Validity become ever more important.
22	Versed	In the health care industry, Data scientists often need to know a critical amount about a great many things: mathematics, statistics, programming, databases, etc. to predict and forecast the medicines for the disease.
23	Version Control	Expiry of Version is more important in Health care sectors like medicine expiry.
24	Vet	Health care data allows the Data Scientist to vet our assumptions, augmenting intuition with evidence.

continues on following page

Big Data Analytics in the Healthcare Industry

Table 1. Continued

# of V's	V's	Description
25	Vexed	Some of the excitement around data in the health care industry is based on its potential to shed light on large, complicated problems.
26	Viability	Difficult to build robust models in health care sectors, and it's harder still to build systems that will be viable in invention due to new diseases.
27	Vibrant	A thriving health care community is vital, and it provides insights, ideas, and support in all of our accomplishments of the country too.
28	Virtual	Big data — the food that fuels of different dimensions of health care sectors.
29	Viral	How does data spread among other users and applications across different issues of health care sectors?
30	Virtuosity	If medical researchers need to know a little about many things, health care sectors should also grow to know a lot about one thing.
31	Viscosity	Related to Velocity; how difficult is the medical data to work with?
32	Visibility	Medical Data from the health care industry provides visibility into complex big data problems.
33	Visualization	Often the only way patients interact with specific segmentation of disease models to understand easily.
34	Vivify	Health care sector data has the potential to animate all manner of decision making and business processes, from advertising to fraud detection and anomalies.
35	Vocabulary	Health care Data science provides a vocabulary for addressing a variety of problems/diseases. Different modeling approaches tackle different problem domains, and different validation techniques harden these approaches in different applications.
36	Vogue	Due to the consistent transition of “Machine Learning” which becomes “Artificial Intelligence”, which becomes...? What will be the next level growth of the Health care industry?
37	Voice	Different sectors of health care Data provides the ability to speak with knowledge (though not all knowledge, of course) on a diverse range of topics to sustain in the medical field.
38	Volatility	Especially in Health care systems, Every medical practitioner has to understand and prepare for data volatility. Data that should “never” be missing suddenly disappears, numbers suddenly contain characters!
39	Volume	More medical scientists use data-collecting devices as more devices become internet-enabled. The volume of data is increasing at an incredible rate.
40	Voodoo	Data science and big data aren't voodooed, but how can the health care sectors convince feasible information seekers of data science's value to deliver results with real-world impact? Since the world is watching.
41	Voyage	Due to the upcoming diseases/problems, every medical scientist and doctors always keep learning and tackles the problems that health care data provides.
42	Vulpine	Finally, the health care industry strives to provide the best solution for upcoming problems/diseases like to be a fox, entertain.

Source: <https://www.kdnuggets.com/2017/04/42-vs-big-data-data-science.html>

healthcare data. Big data market in the healthcare sector has become so massive that in 2010, it contributed to 7% of the global GDP and reduced around 8% of the healthcare global expenditure by providing better solutions. The below figure shows various initiatives and developments that are taken by various agencies around the world, to revamp the healthcare sector using big data.

Chapter objectives include:

- Distinguishing propaganda about Big Data Analytics from fact and application
- Discussing specific application to the Healthcare Industry
- Indicate the limitations and opportunities

MAIN FOCUS OF THE CHAPTER

Impact of Big Data Analytics on the Healthcare Industry

The impact of big data from the patient's point of view can be divided into 5 value-based components, where this value is derived from the total cost applied and the impact or outcome it has on the life of patients. These value-based components are also called pathways, as they provide guidance for further improvement along each of these pathways. The pathways are:

1. **Right Living:** Patients can now take control of their own lives by monitoring their health, and making decisions towards a healthier lifestyle. They can read the results of data mining and plan their proper diet and exercise regime that will enable them to remain healthy (Groves, 2013)
2. **Right, Care:** According to this path, all the healthcare points will have the same data about the patients, from a common database, that will help them in coordinating efforts to help the patients in the same manner, and ensure that no glitches occur, like duplication of effort and wrong strategies (Groves, 2013).
3. **Right Provider:** This pathway defines that patients should always be treated by the right professional, a person who is best suited to the task required for that particular patient. It ensures that patients are given attention to the level required, and by the person with the best track record (Groves, 2013).
4. **Right Value:** This pathway ensures that the right value is added to the system without compromising on quality and efficiency. It helps to eliminate fraud in the system and allows for the outcome related compensation measures that give an incentive to healthcare providers to provide the best possible services (Groves, 2013).

5. **Right Innovation:** This pathway addresses the stakeholders to continuously nurture innovation in this field by encouraging R&D and trials by their researchers. It maintains that only through innovation can the organizations hold a competitive advantage and they must use the data mining results for continuous improvement (Groves, 2013).

Applications of Big Data Analytics in the Healthcare Industry

There are numerous applications of Big data analytics in the healthcare industry. They can be general applications such as customer relationship management, healthcare effectiveness or medical specific applications such as disease detection, predictive medicines, personalized treatment, etc. In this report, we will describe some of the more important applications in this industry:

- **Customer Relationship Management:** Customer Relationship Management is not just restricted to banks, retail outlets, hotels, and food chains, but it is also being extended to the healthcare industry these days. There are numerous contact points in healthcare organizations such as call centers, billing points, welcome desks, physician's offices, etc (Rygielski, 2002). There are four stages in the relationship between a customer and the business, known as the customer lifecycle. These stages define the role of CRM at each step and help companies improve their relationship at every stage. Data mining in CRM helps both on the input side as well as on the output side. On the input side, it provides an understanding of the customer database and on the output side; it provides techniques for finding interesting results from that database. Data mining also helps healthcare organizations to change their interactions with the customers over a period of time. For example, customers getting into the retirement stage of their lives will have changing needs, and data mining models will detect that change along with the customers with similar behavior patterns (Rygielski, 2002). Customer Relationship Management can be modeled through data mining techniques to target individual customers for long-lasting relationships built on specific applications developed for them for their convenience. CRM can be used to predict what medicines the patient will buy or which doctor has attended a particular patient the most or whether he will comply with the prescriptions. The use of data mining to build CRM models can help healthcare organizations to improve their service, reduce their waiting times and provide better information to patients (Chye Koh, 2005). Pharmaceutical companies can utilize healthcare CRM to their advantage by deciding which customer base to target for their latest drugs, to decide which physicians to choose for clinical trials and to predict

the future demand of drugs according to the genetic makeup of customers and past ailments (Chye Koh, 2005).

Big data provides many opportunities by engaging players involved in the healthcare system. It provides the same set of solutions but with more accuracy, privacy, consistency, and facility. Alternative solutions are also provided which can benefit through better and faster planning, cost-effectiveness, better research, quality service, and effective optimization. External data is processed using various tools to improve the quality of the internal processes. All external stakeholders, such as the National Health Information Network (NHIN), come together and share the information on the common platform to integrate the data within the healthcare system. All forms of big data in terms of volume, velocity, and variety are used in healthcare. Large volumes of data from different stakeholders are taken together which comes in different forms – structured and unstructured and is then processed at a very fast pace to provide better treatment options for the patients and customers.

However, scientists and analysts who process healthcare big data are facing certain challenges. The problem generates with the lack of information that is available for decision-making. The volume of data available is no doubt too big but the integration of data from different players becomes a very tedious task. Firstly, the data is present with each party in different forms and then there are concerns like privacy and propriety that hinders the analysts to process the data easily. Another challenge arises with the security of the data when personal data is shared with different resources freely, so security threats and chances of fraud become high. However, countries have placed different acts and a law to curb this issue, one such act is the Health Insurance Portability and Accountability Act (HIPAA). Lastly, the challenge comes in defining the standards to generate accurate data used for processing and the entire decisions have to be taken in particular timelines (Cognizant, 2012).

RESEARCH METHODOLOGY

The research approach is qualitative in nature as a basic idea was gaining information from officials and staff of customer-centric organizations regarding big data implementation in healthcare. The research methodology adopted is based on an in-depth study of big data in healthcare and its growing significance in the business world. The application of big data in healthcare helps firms to gain insights into healthcare preferences, healthcare experiences, healthcare products and their patterns on users', etc. The real data analysis was not done and neither any specific industry was targeted for finding principles that need to be considered as the aim was to understand big data impact in healthcare. The research approach is based on

discussions with officials and staff and is not confined to numbers. The research was not confined to single healthcare or Technology firms or type of organization as stress was to formulate the challenges and role of big data in healthcare. This study is exploratory so that the reader becomes familiar with the basic idea of big data with respect to the healthcare industry. As the research plans to generate new understanding and principles on the basis of the formulated questionnaires, in the future, it is primarily exploratory research.

IMPACT OF BIG DATA ON THE HEALTHCARE SYSTEM

McKinsey & Company (2013) developed a value-based model that discusses how big data has changed the paradigm by making a big impact in five different ways.

1. Right Living – Well-being of consumers is taken care of by helping them to make informed decisions about their lifestyles.
2. Right Care – Right set of treatment and care is provided using data backed by complete evidence and outcomes to ensure customer safety.
3. Right Provider – Matching the right set of care providers with the patient is also done to deliver prescribed clinical impact.
4. Right Value – Cost-effective measures are designed to enhance healthcare value by generating continuous sustainable approaches.
5. Right Innovation – Adequate resources are provided for advance innovation and R&D to discover new ways and safety measures for healthcare development.

Table 2.

Year	Annual Number of Google Searches	Average Searches Per Day
2012	1,873,910,000,000	5,134,000,000
2011	1,722,071,000,000	4,717,000,000
2010	1,324,670,000,000	3,627,000,000
2009	953,700,000,000	2,610,000,000
2008	637,200,000,000	1,745,000,000
2007	438,000,000,000	1,200,000,000
2000	22,000,000,000	60,000,000
1998	3,600,000 <i>*Googles official first year</i>	9,800

Adopted from (Google Official History, 2013)

Google Flu Trends

The Google search engine encounters a huge volume of search queries in a variety of formats every day, which we term as the BIG DATA nowadays. To get a hang of the sheer volume of data incoming at Google search engines from all over the world (refer Table 2).

For a long time, Google has been analyzing search query data to find out popular trends and patterns over the Internet. These trends were unique in the sense they were derived from data generated all over the globe and hence were truly representative of what is trending online globally, what is the fancy of the global population right now instead of just one country. In 2008, Google decided to explore further into the promising world of Big Data Analytics to wield more powerful and socially useful information from the huge mountain of search query data available to them. The problem they decided to focus on was the outbreak of infectious diseases like influenza which are potentially alarming and dangerous for mankind because of two reasons, One, epidemics of such seasonal influenza are responsible for millions of deaths around the world and second, often doctors encounter the birth of a new strain of influenza virus against which there is no prior immunity, making the disease ten times worse and deadly. This gave birth to a new platform or web service called Google Flu trends whose main objective is to accurately model real-world phenomena using patterns in search queries (GoogleBlog, 2008).

Google found out that certain aggregated search queries tend to be very commonly used during the flu season. Their algorithm clearly distinguishes between search terms for flu which are general queries for gathering information on the subject, and specific queries, which are used by people experiencing Influenza-like illness (ILI) (Google trends, 2013). Next, what has been observed during research was that there is a close relationship between the frequencies of these search queries and the number of people experiencing flu-like symptoms over a span of years. By counting the number and frequency of such search queries, Google Flu Trends could estimate how much flu is circulating in different countries and regions around the world.

When you have a large Internet user base in a particular region, the general observation is that people try to first gather information about any illness or symptoms they might be experiencing online. When they have sufficient evidence regarding the same they visit the doctor. The majority of the people visiting the clinic have first gathered information regarding the illness or symptom online. There is a lag between this online search and doctor's visit which Google Trend uses to its advantage is that it can estimate the prevalence of diseases during the first interaction that people have with the Google search engine, quite some time before they actually visit the doctor. Hence, Google utilized health-care seeking behavior by people in the form of queries on its online search engine.

Benefits From Google Flu Trends

The model developed by Google for tracking/monitoring flu activity around the globe gives estimates, which are closely matched to the traditional flu activity indicators (government records, etc.). This is a very cost-effective method for estimating flu activity in an area of interest, yielding a significant level of accuracy and hence can be used in real life by health care stakeholders. It utilizes the concept of collective intelligence to harness its huge data source in real-time (GoogleOrg, 2013)

Traditional flu surveillance systems take 1-2 weeks to collect and release surveillance data but Google search queries can be automatically counted very quickly. Data collection is easier and time-saving unlike traditional systems of recording. Google Flu Trends can predict regional outbreaks of the flu up to 10 days before the Centre's report them for Disease Control and Prevention (CDC) (Wikipedia, 2013) (Ginsberg, et.al, 2009).

Because of its faster detection, Google Flu Trends acts as an early-warning system for outbreaks of influenza which is crucial for such infectious diseases where time is of the essence, due to the nature of challenges posed by such diseases as mentioned at the beginning of the discussion. Early detection of a disease outbreak can reduce the number of people affected hence reducing the mortality rate substantially. The official response to a flu pandemic, such as vaccine distribution and timing, can now be greatly enhanced with such an early warning. Health care resources like doctors, medicines, equipment, etc. which are always scarce in number in times of epidemics can now be put to more efficient and targeted use than ever before, resulting in hundreds of lives being saved.

Challenges

Google Flu Trends experiences a few challenges as any other Big Data analytics system like combing through the mess of Big Data to produce meaningful results. Particularly in the case of analyzing search queries, it is crucial to identify the context in which the query was submitted to distinguish between relevant (actual flu incidence) and irrelevant data (e.g. gathering information on flu for a school project). Smarter algorithms have to be built to overcome this challenge on a daily basis. Another challenge is the sampling bias resulting from ongoing culture for the usage of the Internet. For example, data generated from Twitter accounts is skewed in the sense that Twitter is majorly used by younger age demographics of the population. Hence, it cannot be a true representative of the entire population and leads to missing points in the data chart for all ages besides those which use Twitter (e.g. elderly, children). Here too, underlying algorithms need to be adjusted to overcome this weakness. (HBR, 2013). What analysts have to make sure in the

end is that the interpretations from the data should actually fit with what we know and expect about the world.

Google Flu Trends - Potential Applications in India and Abroad

1. Widespread global usage of online search engines may enable models to eventually be developed in international settings, which can be of great use to international health bodies like WHO to monitor health issues around the globe and gather resources to fight such outbreaks in a successful manner. Leveraging help from other countries to tackle such outbreaks would require less time than before.
2. Google Flu trends can be extended to include Dengue trends (Beta version running) / Malaria trends especially in tropical countries like India.
3. Eradication of HIV and female feticide are two most burning social issues in India. Due to the stigma attached and the secrecy maintained by the victims, it is almost impossible to identify the suffering before it is too late. Using Google Flu Trends model we can identify regions/areas experiencing high activities of HIV like symptoms or females contemplating female feticide and hence Government intervention/targeted welfare programs can be built/disseminated in such areas for better awareness and saving lives.

New technologies in medicine also raise a lot of ethical questions. There will be future cases in personalized medicine, in which we can clearly say yes or no and also therapies that we have to exclude based on what we have interpreted from Big Data. For all the hardship of such a diagnosis – a terminally ill patient could be certain of his future treatment, also be spared of much suffering. Another major challenge is to determine to what extent the data you have is relevant. In the case of a seriously debilitating disease like cancer, there are tens of variables that may be presented to you and you will have to choose which of them are relevant. The privacy is another major hurdle that there is on the way to a more networked system of cancer data. The more centralized data available, then unauthorized access would be devastating in which, for example, the information could be tapped by the criminals.

PENETRATION OF BIG DATA ANALYTICS IN PHARMACEUTICAL INDUSTRY

The adoption of Big Data in healthcare can change the delivery of healthcare and also impact pharmaceutical research and drug development. In the current scenario, healthcare companies around the world have started using big data analytics for

analyzing the claims and clinical data they have about patients to derive conclusions on the risk exposure to patients and the choice of prescribed drug subsequently. This analysis can be taken a level up and could be extrapolated to arrive at conclusions on personalized medicine and customized care. Big Data on healthcare and the insights yielded can help pharmaceutical companies with marketing strategies, commercial pointers to guide R&D decision making process, real-time data to gain better access to healthcare outcomes that will benefit in the improving the development strategies, identify unmet medical needs and limitations of prevailing therapies and providing an evidence-based value proposition and in improving lifecycle value and enhancing asset maximization. But the power of data lies in the way it is used. There is high ambiguity over transparency, compliance, and apprehensions regarding big data in the pharmaceutical industry, and hence the players need to ensure strong coordination between commercial and Research & Development entities, spring up analytical rigor and develop critical hypotheses that need to be tested systematically. Else big data might lead to incorrect conclusions that may have detrimental effects on a product or an entire portfolio (Mahajan, 2010). The Business Intelligence market growth in the pharmaceutical industry will be driven by factors like the need to develop an effective and transparent information infrastructure, identification of the latest sales forecasts and customer trends, attainment of cost efficiency, and increase in outsourcing. The data-intensive nature of the pharmaceutical industry makes BI deployment more challenging than other industries. Adoption of Business Intelligence is a challenge due to various reasons like the availability of data at different time periods, the frequent changes in legislation and the continuously growing consolidation in the pharmaceutical industry (Mahajan, 2010). Besides achieving operational excellence, pharmaceutical companies are investing in BI tools for implementation in technical areas, such as improving research and drug development, clinical performance, resource management, sales force tracking, and regulatory compliance reporting. Another lucrative use of Business Intelligence tools is in the decision making process for launching new products and services in the existing markets. Pharmaceutical companies are more likely to invest significantly in an operational reporting BI tool in order to fortify their marketing and sales function (Mahajan, 2010)

COMPARATIVE STUDY OF PHARMACEUTICAL INDUSTRY FROM INDIAN AND GLOBAL PERSPECTIVE

Indian Perspective

Ranbaxy Laboratories holds huge data repositories procured from various sources both internal and external. Internally, the sources of data were the various applications

within the organization dispersed over multiple offshoots of the organization and also the base of the environment- the ERP system. The company could collate the data but couldn't provide an integrated view of the entire data within the organization to its users. This significantly delayed accessing information, report generation and subsequently the decision-making process (computer.financialexpress.com, 2003). Ranbaxy considered making SAP as its centralized database but since SAP was a transaction system and couldn't be substituted as a warehouse, they did not implement it. Ranbaxy required a data warehouse coupled with a powerful extraction tool that would dig into heterogeneous data sources to find historical data. Hence, Ranbaxy implemented both data warehousing and data mining solutions in early 2002. Initially, the solution was implemented only for its marketing division in India and subsequently rolled out to all the marketing offices. It further implemented in the manufacturing division as well. (computer.financialexpress.com, 2003). The data warehouse had over 100GB of critical data, out of the 1 TB of data residing in Ranbaxy's data repository, which was relevant for its business intelligence activities. The data was extracted from SAP and other sources using ETL and the presentation layer was dealt with by Business Intelligence tools. The extraction of data from SAP was done by tools tailored specifically for the SAP environment. ETL was used to retrieve legacy data from MIS operations and data from the SQL database. Post extraction, the data was cleansed to provide a unified version for data across multiple systems. (computer.financialexpress.com, 2003).

The extracted data is translated into data useful for strategic decision making through query and reporting functionality. Information from multiple sources, including SAP, spanning through the organization is consolidated into data mart which is in turn used for reporting and analysis. Business Intelligence tools are used for reports generation and analysis from data marts. The formats of these reports can be customized with respect to the users and distributed accordingly. Either the relevant data is given to the users on-demand or the company can decide what kind of information to give to respective users (computer.financialexpress.com, 2003).

Advantages

- The time taken to create an ad-hoc report for strategic analysis is significantly lesser after the implementation of data warehouse architecture.
- ETL has alleviated the process of collating data from multiple sources and obtaining relevant information.
- Easy access to critical information (computer.financialexpress.com, 2003).
- Big Data Analytics has enabled the organization to analyze existing data and also predict accordingly.

- Customized reports can be generated including a comparative analysis with historical Data
- Making better and faster decisions; its very crucial in Health care sectors.
- Using Predictive analytics, health care companies are cutting down the cost of health care and reducing medication errors.
- Electronic health records support in collecting the demographic, clinical data, diagnoses of the medical conditions.
- Improve operational efficiency.

Global Perspective

Pfizer is investing its efforts to get more information from existing clinical trial data. The company is implementing sophisticated data mining techniques to improve the design of new trials, in order to understand possible new uses for existing drugs in a different perspective and to help examine how drugs are being used after they have been approved. Companies seldom examine the data from past clinical trials. Typically, pharmaceutical companies work on a set of trials as a part of a new drug application and generate a report on the drug's efficacy and safety. All the information with respect to the trial is saved and not studied until additional analysis is called for by regulatory agencies (Bio-IT World, 2008). Diverging from the conventional methodology, Pfizer has taken up additional analysis of clinical trial data using data mining techniques to look for unknown or specific patterns. The information gained from the secondary analysis is utilized to design new studies. The information gleaned from data mining can be used to determine a sample size while designing a new trial (Bio-IT World. 2008). For instance, if a company wants to test a drug, which has been approved in one country, in a different country, the company would have to do a study proving that the drug worked within the population of that particular country. This can be used in a scenario to test if an approved drug can be used for other purposes in a subgroup within the trial population. It can also be used for deeper analysis so as to minimize risks associated with a drug. Data mining techniques can be used to study drug interaction or safety-related issues that impact a particular population (Bio-IT World. 2008).

FUTURE OF BIG DATA IN PHARMACEUTICAL AND HEALTH CARE

Big data in pharma is one of the fastest-growing industries, is now termed as “Big Pharma”. Since the data is complex, the industry has an absolute need for big data and has a lot of applications. Global trends and technology advancements have

made big data more than necessary for future growth. Particularly in India, global investments for outsourcing, external research, and manufacturing have been pushing more applications of big data. Also, in the past ten years, India has accumulated immense data digitally which can now be directly used for analytics, something which was not practiced earlier by Indian companies.

The heat map above geographically summarizes Big Data opportunities in India in the coming years. Offshoring and product manufacturing shows huge potential and growth opportunities. With innovation in big data analysis techniques, a new revolutionized era can come into the healthcare industry in India.

Global vis-a-vis Indian context for big data can be examined based on different parameters which are summarised in the following table.

Issues for a big data revolution in healthcare include:

1. Integration of data
2. Mind-set of organizations in the pharmaceutical industry is of that risk-averse, and unless they see a future ideal value addition, they are reluctant to invest
3. Practitioners are used to their own independent method of treatment
4. Particularly with India, denial of patent protection is keeping likes of Novartis, Bayer, Roche at bay
5. Misuse of data-driven revolutions by some organizations to maximize their own value in healthcare.
6. Technology and Analytics- There is a serious dearth of bioscientists, and an estimated 200,000 shortage of big data analysts in the USA in addition to the shortage of 660000 biostatisticians, health professionals. India can produce only 12,000 professionals in the next three years for the same.

Hence to overcome these issues, the Integration of data between different sources of the organization and between different organizations is needed. From the heat map for opportunities in India that has been analyzed, outsourcing and manufacturing products are the business opportunities for big data.

Limitations of Big Data Analytics in Healthcare Industry

Although big data analytics has been a great boon to the healthcare industry, there are some serious

Limitations to the use of big data in this industry:

1. The input data used for data mining techniques are not available in the same format throughout healthcare organizations. Hospitals, pharmacy companies, medical research centers have data in different settings and systems. There is a

need for a common data warehouse to be built for data sharing in this industry, but it is a costly affair and cannot be afforded by every organization [3].

2. Another important issue is related to the quality of the data. Data obtained from various sources is often erroneous, corrupted, inconsistent or non-standardized. It takes huge efforts to convert that data into usable form or to extract meaningful information (Chye Koh, 2005).
3. There are legal and ethical considerations with the data being collected and processed. Patients are generally not comfortable about sharing their private information with organizations as they fear it might be misused. There is global apprehension about issues regarding the privacy of an individual and the ethical side of the intruding personal life of patients. These problems have to be tackled before organizations can effectively use databases for data mining.
4. There are concerns among experts of big data about the quality of information obtained after processing large volumes of medical data, in which there are numerous variables and constraints. They argue that it will expose fluctuations in the result due to randomly “fishing” the data in the hope of finding patterns and relationships (Chye Koh, 2005)
5. Data mining and big data techniques can only be applied by a person knowledgeable in this field. There is a significant dearth of experts from the big data industry and it costs organizations a lot to hire such individuals (Chye Koh, 2005).
6. It requires a substantial investment on the part of companies to acquire resources, hire personnel, train personnel and buy the technology. Also, big data companies selling their products to medical organizations and individual physicians have to convince them of the superiority associated with using big data analytics. The world at large is still not ready to accept big data analytics on a large scale.

CONCLUSION

The applications of Big data analytics in healthcare are numerous, its benefits plenty. The penetration of big data in healthcare is still at a very nascent stage, with many organizations apprehensive about adopting and installing it into their daily routine. There are success stories of data mining in healthcare, but these stories are far and few. To adopt this technology on a global scale, some measures need to be taken. Data needs to be better captured before it can be processed. The organizations need to standardize the format of storing data across all healthcare facilities, be it pharmaceutical companies, hospitals, research centers or medical insurance organizations (Chye Koh, 2005). Also, most of the data that is recorded

is not quantitative data but maybe textual or visual. So text mining techniques and digital image diagnosis need to be adopted by medical institutions before all data can be processed. Data from social websites can be harnessed to generate interesting health patterns and behavior.

There is no nobler cause than saving lives. And what better way to accomplish it in the digital age than big data analytics. Using Big Data Analytics to ensure the right living, right care, right provider, right value and right innovation is at the heart of this application. More and bigger data is becoming accessible publicly like Google Trends, Cancer Genome Atlas data portal, etc. hence developing Big Data analytics tools and techniques is the need of the hour in healthcare and pharma. More innovative and sophisticated the analysis more will be the benefit to society and business. India, renowned globally for providing service solutions and being the favorite outsourcing hub, should identify this burgeoning opportunity before it is too late.

In the future, all the healthcare constituents- pharmaceutical companies, hospitals, medical organizations, research centers and labs, physicians and government-run medical facilities will be impacted by the revolution in big data analytics in this industry. Organizations with a growing need to cut costs and sustain comparative advantage will accept this new trend and will be able to provide immediate benefit to patients and end-users (Hamilton, 2012). The costs of obtaining information about patients will break financial barriers; personalized medicine will be accessible to the common man and data from unconventional sources such as social media will be utilized to predict and solve medical problems of patients. The big data issue is so vast that no individual organization or person can solve it alone. It needs a coordinated effort on part of the whole healthcare community to sustain this big data momentum and to transfer its benefits to the world (Costa. 2012). Using Big Data Analytics, It leads the Information can be converted to knowledge.

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KEY TERMS AND DEFINITIONS

Big Data: Is defined as the processing of massive amounts of data that collect over time that are difficult to analyze and handle using common database management tools. The data are very unstructured and analyzed for marketing trends in business as well as in the fields of manufacturing, medicine, and science.

Data Analytics: Is defined as the collecting and analyzing data associated with customers, business processes, market economics or practical experience in which the collected data is categorized, stored and analyzed to study purchasing trends and patterns and the final patterns facilitate decision making.

Google Flu: Is from Google and it provides many estimates of influenza activity for more than 25 countries. By aggregating Google search queries, it attempts to make accurate predictions about flu activity.

Healthcare Analytics: Is defined on massive collection of data related to various healthcare domains, defensive medicine, billing, and fee-for-service, culminating in the mass adoption of EMRs and data proliferation towards improving clinical efficiency, quality of care, affordability, and fee-for-value - culminating in a new age of healthcare analytics.

Chapter 7

Creating the Catapult Effect for the Talent in the Era of Digital Abundance

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ABSTRACT

Leading in the era of digital abundance is a contest terrain as leaders grapple with the challenges of leading and working with the millennial generation at business and society at large. The emerging digital ecosystems emit strong signals for a transformation in leadership models and styles. Drawing on empirical and theoretical work on the movement in the generations of people, especially the workforce in the economic and social world, it is evident that new leadership models need to be explored in alignment to the digital era. This chapter attempts to evolve a framework of leadership for the digital era. The framework has been used further as an illustration through an initiative designed and implemented for mid-level leaders. The chapter strongly recommends a revisit to leadership concepts and development in the era of digital abundance.

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INTRODUCTION

The emerging world is characterized by complex changes in lifestyle, aspirations, business culture, and use of technology. These are creating discontinuities from the past to the present and to the future. Organizations refer to them as problems of a generation gap and failure of current policies amongst the new millennium workforce. Culture and practices are questioned for relevance and use, without providing alternatives to the future. Aligning people and influencing them, to achieve specific goals are becoming extremely difficult in the interactive, chaotic & complex world. Complexity is increasing because of information abundance. The increased availability of information is causing multiple interpretations of the reality. The speed at which the information is gathered, processed or analyzed does not really lead to a better understanding of the problem. Invariably it creates confusion leading to inaction. People take positions based on their beliefs and interests. There is blurring of right and wrongs. There is a lack of understanding in connecting thoughts to actions to reasons. The role of leadership needs to be renegotiated in the emerging era of abundance. This chapter argues that the emerging digital era is completely different from the experiences of the leaders in the past decades. Further it builds a framework based on three pillars. They are: (a) leadership thoughts, (b) influence and actions and (c) driving results in the digital era. The chapter is presented in three parts:

- The first part provides characteristics of the emerging digital era and compares with the pre-digital eras.
- In the second part we propose a leadership framework to define the leaders of the era of digital abundance.
- The third part provides an illustration of an organizational Initiative using the developed leadership framework to identify the drivers of leadership in the digital era.

Finally, the authors argue and advocate an integrated holistic Initiative towards leadership effort and effectiveness based on assessment and reflection.

BACKGROUND

The Digital Era has been defined and conceptualized by studies done in the context of understanding the generational gaps and reflecting on the future trends (Lallana & Uy, 2013).

Authors have connected the related issues of digital era not only to the generational gap issues but also on the influence of technology in terms of simplicity and speed. Cisco in a whitepaper on Transitioning to Workforce 2020, has elaborated how organizations are reorganizing the business models to reach the new expectations of their workforce and customers.

“The Digital Era is characterized by technology which increases the speed and breadth of knowledge turnover within the economy and society.” – IGI Global (Social and Economic Transformation in Digital Era 2012). The influence of technology has rewritten the way business is done. According to Berman, (2011), “to succeed in a Digital Transformation Era, leading companies focus on two complementary activities: reshaping customer value propositions and transforming their operations using digital technologies for greater customer interaction and collaboration.” Any Business or Industry that does not embrace the nodes of technology and understand the new digitally connected customers will not be considered to be in the game! They may perish without evidence of their existence. The Indian Postal Department is a good example. Today with the evolution of fast reaching Short Messaging Services (SMS) and Email services, erstwhile emergency mediums of communication such as Trunk calls or Telegrams are completely erased. The Postman who delivered letters at our doorstep was once a very anxiously expected guest for many households, especially in the remote villages. But today this “Guest of Ours” is slowly getting out of our memory. The mobile phones are more effective in connecting people across geographies. Digital era demands both connecting to the customers and being more adaptable to the changing influence of innovation and technology.

Another example can be the music, media and entertainment Industry. According to a study by Berman and et al (2009) the music industry was one of the first to feel the brunt of the digital revolution. With the standardized mp3 format for digitized music and the availability of broadband connections for Internet distribution, the reality of industry disruption became apparent to all. Traditional music companies were expected to lose more than 35 percent of value between 2003 and 2012, with total revenues for the period expected to drop from US\$12 billion to \$8 billion. But at the same time, other parts of the music ecosystem – more closely attuned to the customer experienced significant growth. This includes consumer electronics companies that make digital music players, concert promoters and producers of other live events.

Leadership that avoids the hard decisions about digital transformation are likely to suffer a fate similar to that of the Indian postal department or traditional music companies. Leadership that stayed closer to their customers, digital transformation could create significant new opportunities. Many welcome the digital era and enjoy the abundance opportunities. However there are many who find it difficult to cope with technology as well as the attitudes.

At the individual level connectivity seems to be an important factor in the digital era. Individuals acquire knowledge, share ideas and learn through connecting with others. These connections are more virtual than face to face. This is also referred to as part of the “Net-Generation”. They expect always getting connected and being aware through the digital media. Learning environment and organizational culture get redefined around the needs of the members of the Net-Generations. Engaging, “connected” employees and creating a digital eco-system becomes the basic responsibility of the leadership in the emerging era. It is apparent that such a leadership agenda is not restricted to one or other kind of organization or industry. Hence the emerging leadership is independent of the industry context but more influenced by connectivity, speed, content and enabling user friendly interfaces. Successful leadership in the emerging digital era is characterized by several of the attributes as discussed. They are being close to the customers, achieving digital transformation and taking hard decisions, evolving an appropriate eco-system of connectivity and integrating goals of the organization to the individual styles of living and learning styles. To decode the emerging trends of leading workforce, it is reasonable to examine a comparison of the different Eras shown in Table 1.

This table illustratively compares these three styles of leadership with respect to philosophy, influence, control, communication, participation, technology engagement and business approach. It can be seen that traditional leadership as given in Figure 1 is followership driven, influence is based on a directive or Dictatorial approach. Further control is established through hierarchical chain of command systems, dealing with mostly co-located teams. Face to face communication is preferred and tends to be one way communication in a closed environment. Participation and collaboration is mostly top driven. People have limited access to technology and contracts are negotiated as win-lose rather than win-win.

The leadership model of the Technological era is more differentiated based on the roles, responsibilities combining with hierarchical arrangements. Intranets work as back bone of the organization with protocols of access to information and decision making. Members have a choice and a preference to accept or reject the given task. Leadership is more inclusive and consensus-driven eventually leading to compromises. Control lies both with the leader as well as in work teams to achieve the required flexibility and collegiality. Two way communication is achieved through face to face as well as indirect mediums. Participation and collaboration depends upon the

Creating the Catapult Effect for the Talent in the Era of Digital Abundance

Table 1. A comparison of leadership across pre-digital era, technological era and emerging digital era

Factors	Traditional Leadership model in the Pre-digital Era	Leadership model in technological Era	Leadership Model in Emerging Digital Era
Philosophy	Followership oriented	Subscription led	Empowerment driven
Leadership influence	Directive Dictatorial	Consensus aimed	Influence focused
Control	Defined span of control Hierarchical systems Co-located teams	Quasi controlled Semi-hierarchical Distributed teams	Collaborative & flat structures Dispersed teams
Communication	One-way communication Closed Face to Face	Two way Communication Indirect mediums	Democratic Open and transparent Virtual - Online
Participation & collaboration	Top down	Open door policy 'Reachability'	Explorative Feedback Driven
Technology engagement	Limited access	Assistive	Addictive 24/7 presence
Business approach	Contract driven Negotiating	Engaging	Collaborative Transparent Connected

reachability and availability of the leaders. Technology is seen more as assistive and enabling. Leaders try to achieve the organizational goals through workforce engagement which goes beyond traditional motivational practices.

Leadership model in the emerging digital era is driven by the philosophy of empowerment, trust and collaboration. Leaders influence behaviors to build appropriate enabling work culture. Collaborative and flat structures support control functions in the context of geographically distributed team functions. Communication tends to be virtual, open, transparent and democratic. Members of the organization can escalate and seek solutions “on-line” to achieve their required speed and efficiency.

Figure 1. The Tradition Leadership model of the Pre - digital Era

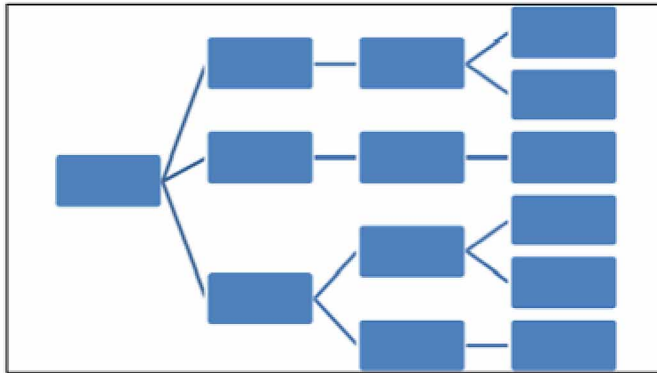
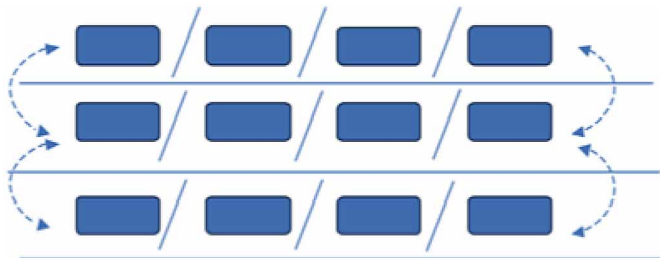


Figure 2. The Leadership model of Technological era.

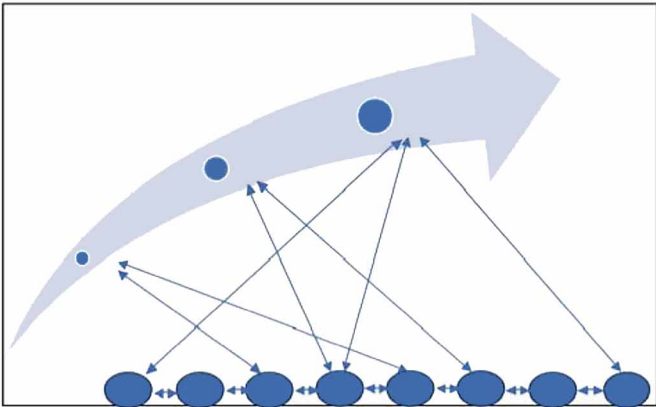


The principle of influence is evolved around achieving participation and collaboration through explorative discussions and having right conversations at different levels, feedback is used for development and improvement of performance. Technology is not a choice but becomes addictive and enabling. In other words, presence of technology is felt throughout the day, weeks and months. 24/7 is a simple expression of the addictive life styles of the employee and of the organization where they mediate communication and presence through digital era technology. Business approach is more characterized by being collaborative, transparent and connectedness between the employees, customers and other key stakeholders.

EXPLORATION OF THE FRAMEWORK FOR TALENT DEVELOPMENT INITIATIVES

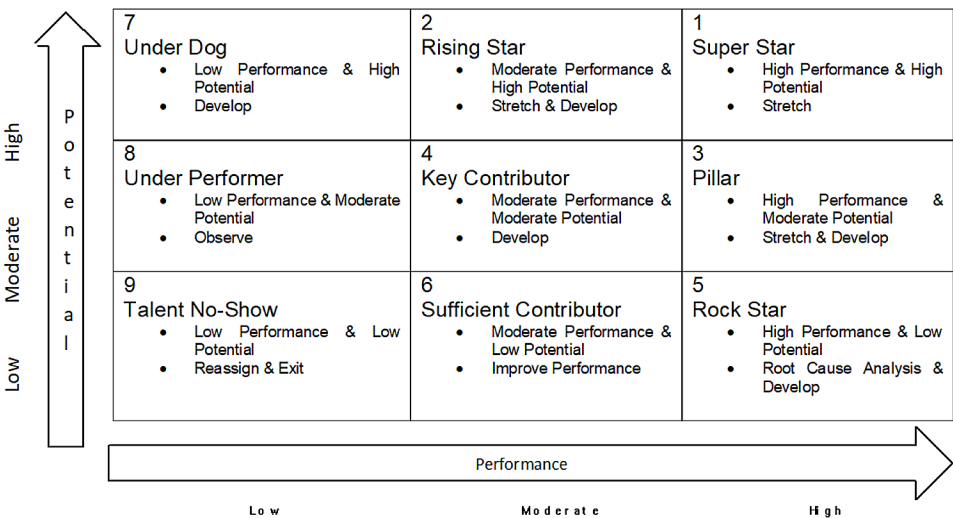
Most of the well aware organizations are in touch with this reality. They study their current workforce and are aware of the fact that though a majority of their future

Figure 3. The Leadership model of Emerging Digital era.



workforce will be the Millennials, they have a fair representation of workforce from the Baby Boomers and GenX. Simultaneously, feedback is usually sought time and again from their customers & employees, on how they would like Organizations to gear up to fit the digital era. Moreover the Annual employee survey serves as an important input to understand the need to groom leaders to lead the new mixed generation of workforce as one of the key focus areas.

Figure 4. The 9 Box Talent Grid.



Here is an attempt to explore the popular Talent Development Tool - The 9 Box Talent Grid to understand the spread of the talent and put together a well thought out action plan to build the pipeline of leadership talent.

Talent Measurement Criteria – Performance and Potential

The two elements most commonly employed as criteria in this talent measurement tool are performance and potential.

The measurement of performance is traditionally assessed often through performance appraisals; however the measurement of potential, on the other hand, is less traditional and creative approaches are explored for this purpose.

The Performance criteria has three levels – Poor, Moderate and High. Simply put, on a scale of 5, Performance rating of 0 to 2 can be considered Poor, a rating of 3 to 5 as Moderate and any rating above 3 as High. This is the generic rating tabs used in Performance Appraisal Ratings.

The Potential criteria has three levels – Low, Moderate and High. As mentioned earlier, unlike Performance, measuring Potential takes more inputs to gauge.

The Global Leadership Assessment Dossier (GLAD) discussed later in this chapter throws more insights, on assessing behavioral aspects of measuring Potential.

Now to elaborate on each of the 9 boxes:

The first slice is about the top 3 boxes –

- **Super Star (High Performance and High Potential)** – Talent that exhibits consistent high performance in their current role and showcases high potential for future roles are to be placed in this box. The Outstanding talent is usually placed in this box. Super stars are all about upward growth and promotions so they need to be stretched with tall order goals and provided with the necessary development opportunities.
- **Rising Star (Moderate Performance and High Potential)** - Talent that exhibits moderate performance in their current role and showcase high potential for future roles are to be placed in this box. The talent in the pipeline is usually placed in this box, hence there is a high need to stretch and develop them on progressive goals.
- **Pillar (High Performance and Moderate Potential)** - Talent that exhibits consistent high performance in their current role and showcase moderate potential for future roles are to be placed in this box. To upgrade the potential quotient from moderate to high, this talent needs to be diagnosed of the gaps and provided with stretched goals and development opportunities.

The next set is about Boxes 4, 5 and 6

- **Key Contributor (Moderate Performance and Moderate Potential)** - Talent that exhibits moderate performance in their current role and showcases moderate potential for future roles are placed in this box. The Consistent mediocre performing Talent usually placed in this box needs focused development opportunities.
- **Rock Star – (High Performance and Low Potential)** - Talent that exhibits consistent high performance in current role and shows low potential for future roles are to be placed in this box. The talent placed here are experts in their area of specialization only. Rock Stars are all about stability (hence the ‘rock’ in their name). So, they are the ones who need exposure into newer areas of development.
- **Sufficient Contributor - (Moderate Performance and Low Potential)** - Talent that exhibits moderate performance in their current role and showcase low potential for future roles are to be placed in this box. The talent placed here are exhibit reasonable performance as expected however there is a need to assess and improve the standard of performance by several notches.

The last set of boxes – 7, 8 and 9

- **Under Dog (Low Performance and High Potential)** - Talent that exhibits low performance in their current role and showcases high potential for future roles are to be placed in this box. The talent placed here need a relook at the current assigned roles and the possible mismatches in role and work conditions such as territory, domain, etc., and be provided the right opportunities for development.
- **Under Performer - (Moderate Performance and Moderate Potential)** - Talent that exhibits moderate performance in their current role and showcase moderate potential for future roles are to be placed in this box. The talent placed need a key observation and appropriate action.
- **Talent No-Show - (Low Performance and Low Potential)** - Talent that exhibits consistent low performance in their current role and showcase low potential for future roles are to be placed in this box. The talent placed in this box needs to be monitored and reassigned to suitable role / project, else work out an exit plan.

Application of the 9 Box Talent Grid

The following areas could be a few areas for application, however exploration into other areas should not be ruled out:

1. Succession Planning
2. Workforce Planning
3. Competence Mapping
4. Career Development

While the onus lies on the Business Leaders to maintain a healthy pipeline of talent through strategic initiatives such as succession planning, workforce planning, Competence mapping and career development, it does require the robust support and guidance of Organizational and Talent Development (OTD) partners to pursue this long term Organization Goal. Talent Review Boards (TRBs) using the 9 Box Talent Grid are the most sought out approach to map the spread of talent and to churn out Talent Development Plans to suit the challenging Industry / Market conditions.

Performance Appraisal serves as a critical input to assess Performance, while employing the 9 Box Talent Grid. The Performance assessment provides the spread of talent across the 3 levels – Low, Moderate and High in the current roles assigned to the talent. This step is critical, hence to achieve a fair gauging of the performance, pre-steps of goal setting and periodic review of performance become inevitable. Hence a robust on-line Performance Management System like Oracle's Fusion Performance Management System is the need of the hour.

While Performance Assessment can be done using the Appraisal process as the primary source, assessing Potential for future roles / opportunities need a far more elaborative approach. It is a given that measuring talent's future potential does come easy. Hence the need to apply a different thinking hat to achieve this tumultuous task.

In this chapter we recommend using the Global Leadership Assessment Dossier (GLAD) as an attempt to measure Potential for future roles / opportunities and place them on the 3 levels – Low, Moderate and High.

GLOBAL LEADERSHIP ASSESSMENT DOSSIER (GLAD) - THE PROPOSED FRAMEWORK

The proposed framework was developed based on three methods, one was to collate notes from appraisal discussions on key leadership traits that were rated high by the managers. The second was to discuss with the managers and elicit inputs on expected

leadership qualities. The third to integrate the concepts given by the thought leaders in the area of leadership.

Towards this objective of building a leadership framework a dedicated study was taken up by Mindtree. Mindtree Limited is a global information technology solutions company with revenues of over USD 1 billion and 17000+ experts working to engineer meaningful technology solutions to help businesses and societies flourish.

The Mindtree Study:

- **Leadership traits from Performance Appraisal Records-** The notes collected from 10 years, in all about 800 records were reviewed to get synthesize of what attributes are valued in leaders. This was further revised with face-to-face discussion with the managers of Mindtree.
- **Discussion with the managers** – A series of discussions were held with several managers from mid-level to senior level to explicitly seek views on what leadership attributes they value and expect in a leader. To encourage participation a contest was rolled out and that fetched about 150 leadership traits for debate and discussion. The popular choices were voted and rewards were announced. These discussions revealed 6 attributes of a successful leader. They are: the leader is **Confident**, builds **Relationships**, is **Engaged**, is **Dependable**, **Adaptable**, and is **Interesting**. However these themes related to Leadership looked simple but raised many questions. Such questions included: What is meant by Confidence? Is it possible to measure how Confident one is? How good am I in Synthesis? Am I interesting? How interesting? How can you tell if I am good at telling stories?

And when these were answered, they led to more questions: How can I improve my Confidence? What do I need to do to better my Synthesizing abilities? How can I be more interesting? I am creative but no one agrees; what do I need to do?

While we pondered to address these questions, it was felt useful to examine what eminent thinkers had to say on these 6 identified leadership attributes. Hence an attempt was made to review the relevant literature.

- **Review of Relevant Literature** – a review of relevant concepts helped identify several attributes of effective leadership. They are:

Howard Gardner (1983), in his Five Minds for the Future, says this decade's leaders must have **expertise** (technical/domain/whatever), can **synthesize** (i.e. put things together, understand patterns, systems thinking, construct a story from unconnected clues like Sherlock Holmes), are **creative**, **respect others** (open to others' views,

listen to others, empathize, build networks), and are **ethical** (can be trusted, keep commitment, dependable, can build relationships, people love working with them.)

Daniel Pink (2005) says that the right-brained will rule the world and skills like Design, Fine Arts or Story Telling are critical.

Joel Barker's (1990) definition of a leader. "A leader is someone you opt to follow to a place you would not go by yourself". The Barker definition emphasizes on a leader being chosen by followers rather than the other way round.

Leadership in the emerging digital era is an attempt to influence in a heterogeneous, complex and dynamic environment. Baird and et al (2011), suggests that customers will increasingly guide organizations to less complex approaches to meet their needs. This symbiotic approach – leveraging the customer's input – is at the heart of new social business designs that drive innovative market approaches and better strategic service.

There are studies that distinguish different generations of employees. According to Workforce Central Florida, WCF (1996) the four generations in the workplace are Traditionalists (born before 1945), Baby Boomers (born between 1946 – 1964), Generation X (born between 1965 -1980) & Millennials (Born between 1981 – 1999). With the emerging workforce and customers comprising of the mixed generation with a majority of Millennials, so organizations are expected to relook at their HR practices. Prensky, Marc (2006) opines that these "Digital Natives" because they are the first generation to grow up in the digital age, the Millennials are highly connected and extremely technology- savvy. Where the Boomers grew up with Time or Newsweek on the coffee table, Millennials grew up with Wired or Fast Company. Before Facebook and Twitter burst on the scene, Millennials were connecting with friends over MySpace and AOL Instant Messenger. This generation sees social networking as the norm, not something new. They expect the workplace to be every bit as connected and social as the rest of the world around them. On the other side the workforce from the other generations are trying not to miss the bus! Hence Businesses that embrace social connections inside and outside the organization will be well-positioned to engage this mixed bag of workforce and customers. Leaders need to recognize that enterprise social business is not a trend on a distant horizon but is a present-day reality. In order to do business with the mixed generation of workforce and the customers, organizations must have a strategy that is focused on the way these generations connects with their peers and the rest of the world.

Apart from the above, as a next step of progression the framework was reviewed with other relevant concepts by bringing in a collaborative discussion with external experts who were actively involved in leadership skills development. (the identity of the external partners consulted is not revealed for the purpose of confidentiality). The external partners were engaged to review the framework based on the following four criteria: Clarity of the **definition** of the attributes, **measurement**, **control** and

improvement. These independent reviews helped in validating the 6 identified attributes of the leaders in the digital era.

SIX ATTRIBUTES OF THE LEADERS IN THE DIGITAL ERA

We have discussed that abundance of information, limitation of time, and immediate response expectations are features that characterize the paradox of the digital era. Also, while we have an abundance of information, it's difficult to know which information is authentic (and lots of incorrect data are floating). Besides, information gets updated every moment, and we cannot wait to find all the data; we must take decisions faced with incomplete data. We also have plenty of connections, but very few friends who can provide us custom advice – besides, our friends and networks, too, are stressed by too many tasks to achieve in too little time, so they will find little quality time for the thinking needed to advise us.

On the other hand, news spreads instantaneously and any mistake in decision making can be known to the world, and unlikely actors will respond before the leader has time to react or retract.

In a world of such challenges, the first attribute of an effective leader is **Confidence**. The leader must be confident to take decisions in the absence of all information. A leader will be able to take such risks when she has the ability to learn continuously and from diverse sources, the ability to quickly assimilate data, and to synthesize apparently unrelated information and form one's own point of view. Such a leader will take stands when needed, remain comfortable in ambiguous situations that are characteristic of systems in transition. When one is an agile decision maker, mistakes must happen – the leader needs the sharpness to identify mistakes and willingness to accept them, take responsibility and confidence to even change course when needed.

In an uncertain universe where decision making is tough, and taking others along even more difficult, all effective leaders must **build relationships** – such relationships that can be relied upon in critical moments. Relationships are built on trust, and trust is not built in a day. Effective leaders invest in trust, support others in their moments of need, keep confidences, and share openly. They are seen as authentic and trustworthy. They have the confidence to provide right feedback and know how to receive feedback, their Johari windows will show a large open Arena, and smaller quadrants for 'façade' or 'blind spot'. Consequently, they can rely on others to achieve their objectives, and others can rely on them. This brings us to the next attribute of the effective leader.

The effective leader is **dependable**. Dependable implies she is the go-to person when I need something to get done. That suggests the first trait of the dependable leader – she needs to be available, and accessible. There are many hard working

professionals but the most effective ones exhibit patterns in how they work and they spend their time. The dependable person remains customer-focused and results focused. The dependable person is also process focused, and seldom gives you surprises. Their success is very often repeatable, and can also be learnt by others. Such leaders will question a lot, and questioning is their way to understand hidden and not so obvious realities, to find new ways to do things, to discover unstated opinion or agenda, as also to convey their own views and thinking. Their questioning helps them get to depth of issues and uncover potential pitfalls – this trait makes their decisions and actions dependable. You can also expect them to dissent in time, as their process orientation, results focus and critical questioning lead them to the right decisions at the right time.

A leader of the digital era needs to be **Adaptable**, this implies she is flexible. Flexible implies the leader knows her strengths, constraints, and priorities – such self-awareness means the leader knows her own mind, so she knows which trade-offs to make, and which ones she is unwilling to even negotiate. Such a person has clear values and personal vision, and is usually innovative, willing to find or accept any solution that fits within the broad vision. Adaptable leaders are also quick learners and ever willing to try new ways of meeting their objectives. Such focus on the goal and flexibility on the path make them out of the box problem solvers.

In an era of short attention span, and transactional interactions, the effective leaders stand out as **engaged** leaders. They are deeply connected with the context and environment in which they are working. They are engaged with the people they work with, their customers and their customers' businesses, with their organization and its associated goals and problems. They are not just focused on their own goals but they are curious, engaged and make an impact to their organizations' long term goals as well. Where possible, they get engaged in their customers' strategic directions as well. Such traits lead them to focus on developing people. They understand their goals are too big for them to solve themselves, so they are open to involving more people, and they know they have to prepare others for the same. They take ownership for outcomes, and usually they are known for their passion. Their presence is inspiring and people are more energetic and productive when engaged with such leaders.

The short attention span era also demands **interesting** leaders. One can be expert in a domain and highly results focused and dependable, yet this person may not be able to attract followers. Being interesting is a critical facet of leading people. Interesting people usually have diverse interests and display ability to share and communicate in a range of topics. They are also optimistic about the future and about their environment (who wants to spend time with a source of negative energy?). They have diverse friends, not limited to their company or even their profession. They have a positive view of their own future, are inspired and inspire others. They are seen in informal meetings, learn from multiple situations, and in the current context, love to blog.

Figure 5. These 6 attributes and 24 traits as a 6X4 Matrix.

Confidence • Takes risks • Takes stands when necessary • Brings clarity in ambiguous situations • Owns failures	Relationships • Helps others when approached • Provides feedback • Responsive to Feedback • Leverages on network to get work done	Adaptability • Flexibility • Knows personal constraints • Quick to Learn • Out of the box problem solver
Dependability • Available • Customer and Results Focused • Process focused – no unpleasant surprises • Questions	Engagement • Takes ownership of outcomes • Focused on Developing People • Passionate about impacting orgn goals, direction • Long attention span	Interesting • Creative and Lateral Thinker • Diverse interests with diverse others • Optimistic, personal view of the future • High aspiration, high inspiration

RATING THE LEADER ON ATTRIBUTES

How do we rate the leader on each attribute? These traits get rated based on a series of questions asked about the leader. The questions evolved from responses in appraisal reviews and other leadership development initiatives as discussed earlier. We will explain this with an example.

A leader is rated at Level zero when the sentences labeled Level 0 describe the leader. A zero rating indicates the leader has no maturity on this trait; Level 1 indicates the leader practices this trait, these are shown against Level 1. If all sentences labeled L1 are appropriate for the leader, only then we look for L2. When rated at Level 2, the team feels the impact of this leadership trait and benefits from it; the leader is also pro-active and conscious about developing this trait. At Level 3, the leader is not just visibly good at this trait but also actively shares information and develops others at this. The leader is probably also an organization role model on this. At Level 4, the leader creates an organization culture around this trait, and there must be a number of leaders in that organization who have grown into Levels 2 and 3 at this.

Table 2. The trait “Owns failures” as an example.

L0	Getting him to accept a problem is a frustrating experience
L0	Problem is always created by someone else, when things go wrong
L0	Difficult to do Root Cause Analysis (RCA) if he/she goes wrong with his/her tasks
L0	Team members are usually hesitant to discuss openly when the chips are down.
L1	Accepts Mistakes
L1	Accountable for outcomes
L1	Does not see need to defend, when someone criticizes
L2	Recognizes mistakes ahead of time, and takes corrective actions
L2	Learns from mistakes
L2	Does not make same mistake repeatedly
L2	Seldom looks for Top management endorsement
L3	Publishes mistakes, encourages discussions on those
L3	Builds new theories from old mistakes
L3	Exploring nature
L3	Actively learns from choices he made, and consequences of such choices
L3	View of the world beyond his own objectives
L4	Created a culture of discussing mistakes openly, and learning from those

Table 3. The four level rating scale assigned to the traits.

0	Less than desired (absence of the trait)
1	Good at this trait (visibility/impact limited to self)
2	Consciously and visibly practices this trait, and team feels the impact
3	Role Model, creating organization wide impact
4	Created a culture - trait survives the Leader

From this description of the ratings it is clear that most good leaders will probably be rated at level 1 and level 2 in most of the traits, and at 3 or 4 in only some of the traits. There will probably be no one who can be level 3 in all traits, and that’s perfectly all right. We need to be at peace with the fact that real leaders are not

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“all perfect”, and are probably outstanding in only a few traits, while meeting the necessary requirements at others.

The strength of this rating system is its transparency – and that lends it to being a development tool and not just an assessment tool. If a leader is at Level 1 on some trait, the leader understands exactly why she is at level 1, and what is needed to get to Level 2. To illustrate this further, let us look at how we can assess a Creative and lateral thinker, before we close the discussion on rating.

Table 4. The trait Creative and lateral thinker to understand the rating method.

L0	Rather uni-dimensional in thinking, or approach to problems
L1	Creative
L1	Looks at many different ways of doing things
L1	Open to diverse opinion and perspectives
L2	Can express in pictures
L2	Makes attention grabbing presentations
L2	Excellent questioning skills to understand unspoken needs
L2	Good at Storytelling and use of metaphor
L2	Good in at least one of the arts - Music, Drawing, Painting, Theatre, Digital Arts
L2	Good at synthesizing knowledge from unconnected bits of information
L2	Ability to conceptualize
L3	Can synthesize diverse or complex bits of information, bringing clarity
L3	Can design solutions from scratch
L3	Anticipates implicit needs of customers and stakeholders
L3	Can read patterns
L3	Connects across contexts
L3	Lateral Thinking
L3	Can use metaphors to explain a point
L4	Implemented attractive solutions that appeal to Left or Right Brained audience alike
L4	Creative in offering radically different and practical solutions
L4	Known to find different ways of implementation that improved productivity or effectiveness

Notice that GLAD focuses on visible behavior, and impact – that makes it objective to rate, and easy to develop or mentor on some traits. This is a critical difference with most other assessment tools where one receives a report without clarity on why one has been so labeled. The transparent nature of this tool makes it

developmental and growth oriented. Further users of this framework will feel more objective about assessing the talents' potential for future roles / opportunities and its impact focused on fair gauging of talent for the future organization's roles and succession planning. Unlike other tools, the openness of this tool thus makes it a living and dynamic tool. It will not just change and grow with time, but can also be tuned for different organization contexts. So the tool, too, has the traits of the leaders it is meant to assess. (For an insight into the complete assessment, authors can be contacted).

The main focus of the chapter is to illustrate using the 9 Box Talent Grid and the GLAD frameworks for a broad spectrum of Organizational & Talent Development initiatives. This application aids to understand the context of leadership, the changing expectations of the customer and accordingly build capabilities to deal with challenges emerging from the techno-savvy Mixed bag of Workforces and deliver the results for the customers.

FUTURE RESEARCH DIRECTIONS AND CONCLUSION

The present frameworks were adopted / developed in an emerging business context where Organizations have to deal with changing employee context and demanding customers for a proactive Organization and Talent Development, this demanded a clearly different approach, so an application of the (Box Talent Grid and Global Leader Attributes Dossier had to be adopted / developed and executed. The chapter has highlighted the application of well researched frameworks to orchestrate Organization and Talent Development initiatives. Champions like Organization & Talent Development (OTD) and Learning & Development Consultants within the Organizations are required to continuously educate Business Leaders to engage in such meaningful sensing and pave a well thought out path to nurture their talent and become future ready organizations. The future researches should focus on the repeatability of such initiatives not just within the organization but across collaborative partners. It is also suggested that assessment is not an easy process, hence this needs to be developed by supportive culture to increase employee engagement and participation.

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Chapter 8

Cyber Security: Cyber Risk Challenges for Future Leaders and Businesses

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ABSTRACT

New attacks and methods seen today indicate an emerging trend and dependency on reverse-engineered technology that was used in the past by espionage and intelligence agencies and their tactics as well as use of modern technology to obtain information and data that is turned into usable intelligence. One of the many disturbing consequences of this is that we are faced with attackers that are versed in stealth, deception, planting false information, and increased training in newer attack technologies that classical tools can no longer reliably find. In addition, advanced attack and deception skills now use OSINT (open source intelligence) data collection tactics that have moved entire attack chains into the espionage and surveillance realm.

INTRODUCTION

This chapter focuses on reviewing the current literature, trends and best practice information to determine what cyber security challenges tomorrow's business leaders face and which skills will be needed to protect enterprises from criminal hackers and cyber warfare, as well as espionage in the future. Cyber espionage and warfare have led to an increase in cybercrime (through reverse engineering of attacking technology and infection methods). The need has arisen for executive managers to

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have a basic understanding of digital or cyber security so that both aspects of the business are integrated into a more efficient team and better overall security posture. Answering this question seems very obvious in lieu of what has happened recently in regards to the NSA and the intelligence community through Mr. Snowden's leaked information. Discussions about dark budgets and secret spy programs that include the recording of all-encompassing data collection that includes phone records, emails and Internet traffic concern many businesses. If this chapter had been written a few years ago, many would not have even read it because the rift between cyber security departments and the rest of the business were so big that the value of what cyber security departments do was questioned and viewed as an unrealistic return on investment. Additionally, some business executives believed an unjustified perception that only a little security is needed because nothing will happen. On one hand, there are a security team and its initiatives of checking and creating policies that aim at protecting the enterprise from disruptions and cybercrime, and on the other side are business departments that are expected to be in budget and highlight the value of projects in regards to how these helps create more revenue for the company. Other business functions of an organization understanding and recognizing how cyber security is a vital business function have, however, been an issue and a challenge for many CISOs (Chief Information Security Officer) and Security Officers in the past. Business managers in the past did not understand cyber or digital security as a vital business function, nor did they understand what exactly needed to be reported when a breach occurred (Salmon & Collins, 2013). Today we see how complex a topic cyber security is and how this protects revenue, and helps to add more revenue by helping to introduce new technologies to maintain technical advantages in markets while still protecting company production and process secrets from cyber criminals. Factors that lead to misunderstandings in the past was a false sense that minimal security was needed because nothing happened, this was wrong because many hacked companies only found out much later that hackers or cyber criminals broke into systems and stole data. Security Officers were wrong when they expected the business to spend money on new products without justifying why those products and solutions were needed in a language that business executives understood. The implementation of security solutions also could be measured by metrics and revenue or reduced costs so that advantages to the business were clearer.

Currently, newspaper articles from the Guardian, the New York Times as well as other prevalent and well-known newspapers recently highlighted the NSA's (National Security Agency) global espionage data collection program in detail. Information could be read about how data was being collected (also in which countries) of any and all communications from network traffic as well as telephone calls and social media transactions, being captured, analyzed and assessed or passed on to various other departments for action. Whistleblowers are a very good example of how risks

of information leaks (whether ethical or not) from insiders (contractors, partners or even employees) are still a big threat to all as well as the impact of that risk is very real and prevalent. Many have seen current covert espionage activities (and the way that data was collected) as one of the biggest infringements on the global community's use of the Internet for normal communications. Businesses and citizens agree that these actions of espionage could be seen as a violation of their human rights, not to mention the national sovereignty of those nations being spied on (Dinniss, 2012). In this maelstrom of emotions, accusations as well as fantastic claims, a bigger and even more important problem comes to light. The insider is a huge threat and poses a higher risk factor in cybercrime.

Cyber or digital security is vital to international business because it helps to protect businesses from the threat of losing competitive advantages and information of its business practices to competitors due to unauthorized access or unintentional Data theft. Security helps protect businesses from disruptions due to cybercrime, espionage and criminal hackers by implementing the systems, mechanisms and awareness needed to detect, log and deter cyber criminals or criminal hackers from attacking the enterprise. It (the security team) takes away criminal hackers' competitive advantage with various types of attacks (both internal and external) by implementing systems to detect them and stop them. Since cyber-attacks and threats have picked up, many security teams have started to notice what reduced security budgets actually mean when no new solutions, time or resources are available to protect a company's vital assets. Business leaders have also started to understand what security's value is and why attacks and the value of protection are only understood after an attack happened. If anything, the NSA's program has shown that the types of attacks used, was largely underestimated and are leading to an increase in a country sponsored criminal hacker outbreak as well as faster malware and virus development.

Security specialists and business leaders are asking how an external contractor (in the case of how the NSA's spying program was discovered or leaked) was able to access information that was highly classified or at the very least, top-secret. The revelation of how this information was released to the public, whether right or wrong has shown us all that the threat of insider (or unintentional) hackers resulting in breaches to be very real. Just as in international business a government agency also is required by law to protect their data and how sensitive information is disclosed to the public or any other parties. What the current revelations of the NSA's spying program have shown us is that even the highest and most secure echelons of government have exactly the same issues than any other business has, insider threats (or unintentional data breaches) that result in lost or stolen information (Knapp, Marshall, Rainer & Ford, 2007) and (Sharrock, 2013a). International businesses must protect their customers and discuss with their employees how to use and work with sensitive data needed by the business to make even the simplest of business transactions in

E-Business correctly and without harming others (Salmon & Collins, 2013) and (Bandyopadhyay, 2012).

Reports and detailed analysis from IBM, HP, Gartner, and Forrester point to the risks of data and information security discrepancies (as well as the lack of controls internally) that lead to data theft by identifying risks that are internal and external to the business. In 2011 KPMG published its study of over 348 fraud investigations and published those results in “Profile of a Fraudster”. In this report by KPMG Switzerland, a detailed analysis was made to identify the characteristics of a typical fraudster (based on 348 investigations in 69 countries). Interestingly one of the many characteristics was that fraudsters tended to be employees of the company they attacked, and most of those fraudsters were at company for 10 years.

The latest revelations of insider cybercriminals have shown that all types of businesses including the higher echelons of the intelligence community are just as vulnerable to inside risks as any other business (Clark & Knake, 2010). Once we get past or forget about the fantastic claims and hype of newspaper articles, very important questions remain about how the information came out into the open? If we look at some of the detail we find that A contractor named Edward Snowden (external company) who was not even a direct employee of the NSA, managed to get very sensitive information by breaking into systems that he had no right to access or rights to use (Sharrock, 2013). After obtaining unauthorized access to them, he siphoned off all relevant information of top secret (or higher levels) that were then given to the press. Although the information about controversial systems was interesting and important to know about, the way in which it was passed on was a nightmare for both government and international businesses alike because it shows us what the results are when key stakeholders of a business or agency do not have the right skills to assess when the overall security posture is deficient (Dautlich & McKiernan, 2013). If we analyze this current situation, and transpose it to international business we can only imagine how many businesses today have had the same types of breaches that we may not even know about. So, the big question remains how can international business protect itself from this type of event happening, and what skills are needed to find or detect suspicious actions by either unintentional cyber criminals or intentional hackers stealing company secrets and sensitive data?

International business is inherently linked with technology; some would even argue that it was always linked together (and we didn’t notice that until now). With new technologies we have new ways of gaining additional insight from data that we previously collected in the past for financial statistics, accounting reports and customers’ purchasing habits. As we see new data (as a product of that analysis) that information becomes a part of many business decisions that modern and Internet connected international businesses makes to stay competitive and relevant to their customers. Data is the basis for how business makes (as Drucker said) life or death

decisions of the business and its employees. As we gain more insight and need for additional data, so we have the ability to make better decisions or leads us to knowledge (Makori, 2009). As new data and data collecting systems are created and needed so do the risks increase and the need to protect it.

Business and security departments have traditionally been disconnected so (Zadelhoff, Lovejoy and Jarvis, 2013) because of the different language, metrics and challenges that they faced (Business concentrated on markets, security focused on cyber threats). Today the reality of security threats that businesses face has grown exponentially and quickly so that key business functions must be able to communicate with each other quickly and efficiently while still remaining secure. When engaging in international business executives made the decision to use technology, staff and other resources to their advantage in a highly competitive market at the speed of light. The high competitiveness of those markets we engage in today means that new types of cybercrime differ from those of yesterday, and years past. Changes in the technology today's companies' use has dramatically influenced how modern businesses use IT-infrastructure in business transactions. E-business and e-commerce put additional pressure on the security departments who have to monitor connections to different systems inside and outside the company which has and must continue to evolve into a more business-like function in how it secures and reports about how and with which technological solutions it secures those systems from cybercrime.

Since we live in an interconnected world using the Internet, we have also gotten access to millions of customers and partners that we could not reach traditionally. Being connected to the world has both advantages and disadvantages this is where an important core business function comes into focus. Cyber or digital security has evolved into one of the most important core business processes of any company today, because of its uniqueness as a technological function yet business process security has slowly evolved by adapting to this reality. Key executives in other business functions must learn to understand and speak the same language so that both the business and security understand each other and can protect it from internal, as well as external threats.

Implementing and using cost effective web-based B2B networks that use internet technology points to the importance of digital security according to (Bandyopadhyay, 2012). Those web-based or Internet based networks and computer infrastructures are the basis for many business-to-business transactions in e-commerce and e-business as they connect different networks together to form a whole. Overall security and design of Internet-based connected networks is of strategic importance because it also impacts other businesses that connect using the same network. Furthermore, the need for consistent security is more important in B2B connected partners as these are all at risk if a breach is made in one of the participant's private networks or computers. Security teams must, therefore, make sure that each respective network

is secure and must also take precautions to ensure that other partners and vendors within this secure network also have high security standards. The internet and its cheap yet insecure way of connecting various systems, partners, vendors and customers cheaply and efficiently is one of the highest risks to criminal hacking or cybercrime. Security is a key aspect of coping with the dynamic nature of technology and increasing the risk of compromise through network partners in a B2B network that were compromised as a result of their lax security practices.

Many training programs and degree programs have focused on laying the foundation for leadership and critical aspects of international business (Fay, 2011). Unfortunately, many have not addressed how vital and important the (Cyber or Digital) security function is to business processes, as well as revenue-generating technology needed in business today. Today's connected E-Business society progresses with new technology, though we still face fundamental questions of what is the value of (cyber or digital) security, and why can't we see the value of security departments and the products that they manage, install and configure to protect the enterprise? Some additional developments are new cyber laws and regulations that are starting to highlight the regulatory advantages of having a business focused security team that can speak in business terms and is also accepted by other executives as vital to their operations (White, Mediavilla and Shah, 2011).

Executives and Security leaders need to be well versed in and understand new topics such as OSINT (Open Source Intelligence) and disinformation as well as fake information and modified media. OSINT based attacks that also leverage social engineering are one of the most difficult types of attacks to defend against as well as detect. Today's leaders must not only understand how OSINT is relevant to business security, they must also have a working knowledge of how this is used in everyday applications such as websites, social media, emails and other services that every company now relies on for new and existing business as well as all communications inside and outside of the company. Understanding the tools used in gaining access to confidential data without touching any systems is one of the most important ways in which executives can stop future attacks from happened and also measure their overall risk to potential attacks even happening in the future (Bazzell, 2018). Troubling since 2018 is the increasing use of disinformation on various social media platforms that use modified videos and audio files than can be created using sound-bites from previous files. The application that surfaced in 2018 (FakeApp) can be used to replace working videos with the face of the attacker's choice to create "new" evidence of something even though that person was never in the video or said anything in a supplied audio file using (deep fake) type attacks. These attacks are completely changing how we need to defend against false or fake planted data and information that has the potential to be used for blackmail (Zucconi, 2018).

Attack numbers suggest that small and medium businesses are more of a target than ever before. In more recent articles and statistics various security researchers are seeing more widespread use of social media and OSINT as sources for social engineering attacks (Passeri, 2020). Attacks are increasingly listed and look more like cybercrime (85.4%) and look less like Cyber Warfare 3.2% or Cyber Espionage (11.5%). But a closer look at the attack vectors using social media indicate that this number may be misleading because of the wide-spread use of proxy-attackers and cybercriminal syndicates that are hired to work for a nation-state. Some of the attack techniques that were used include fake social media and network accounts as well as account hijacking and the associated Credential Stuffing. More than 60% of small businesses go out of business 6 months after a cyber-attack according to the US National Cyber Security Alliance. Only 14% of small businesses are even prepared to defend themselves against attacks and more than 43% of cyber-attacks directly target small and medium sized businesses (Steinberg, 2019).

LITERATURE REVIEW

In order to explain and discuss the topic of needed skills that business leaders will need in international business, it is important to first look at and critically review what the research literature has to say about digital security and how it is used (and needed) by international businesses. Other aspects of journals and books inform business leaders of which security or cyber (Digital) skills are needed to understand how to safely conduct business. Reviews of current literature in this section processes multiple journal articles as well as books and other literature on cyber warfare, espionage, cyber security skills and knowledge as well as security awareness and the value that an IT Security teams gives to an enterprise. Reviews show how it (Digital or Cyber Security skills of business leaders) impacts international business positively as long as costs correlate to the business value of protecting assets (Eisenga, Jones & Rodriguez, 2012).

Digital security's ability to connect with the business has traditionally been an issue, which has been stated in IBM's Chief Information Security Officer assessment. This assessment states that security departments and business executives have had issues and challenges in the past when talking about and approving security projects. Many of the issues that security executives have faced in the past were the fact that security departments in the business initially spoke a different language. Business executives are used to justifying projects based on return on investment (ROI) as well as a total cost of ownership (TCO), and could not understand the value that security departments were bringing into the business as a whole. This asynchronous informational relationship has changed in recent years, now so that senior security

directors must discuss how security adds value to the business by aligning security initiatives such as awareness campaigns, security policy, security strategy and new security technology into existing business processes (Hunter, 2013). Some of the more important findings of this assessment, explain how senior security managers are striving to explain existing and new security initiatives in simple business terms and highlighted value to the company. We are now starting to see a security department that is finally getting accepted as a core business department because it secures the data and information that business processes need in order to fulfill contracts and or produce products that generate revenue. IBM's chief information security officer assessment also points out that some of the biggest challenges faced by security departments and businesses in general are that criminal or cyber criminals and their attacks lead to the loss of a brand or reputation of the company, an increase in down time, financial losses and when systems fail to pass compliant products with resulting compliance violations the stipulated stiff fines. International businesses that engage in e-business also see mobile or smartphones as well as one of the biggest risks to overall security besides internal cybercriminal activity. Mobile devices that are paramount to the business entity connected international business must be secured and locked down against cybercrime because these new platforms are being used more and more for international business transactions. In lieu of ever-changing technologies, the need has also been seen to create and communicate unified policies, procedures and processes that employees know and understand how to use securely and correctly. As the security department is recognized as a core business function, security executives now find they must communicate and measure how security adds business value by measuring metrics and reporting these to the board and other senior business managers. One important metric is registering risks in a comprehensive risk management analysis report. These risks are discovered and reported in a risk mitigation plan which then tracks back to weighted security initiatives that the department implements based on risk impact and severity. Research indicated by (Zadelhoff, Lovejoy & Jarvis, 2013) has taken the assessment data and highlights three areas that security executives should define and understand in order to be successful with other parts of the business, these are: Business Practices (the role, security strategy, business relations and trust), Technology (investments in advanced technology, mobile security and sharing relevant information) and Measurements of the economic impact of risks, reputational risks and explaining metrics).

How security departments can explain and align themselves with the rest of business is explained by (Balaouras & Rose, 2012) in that when security leaders speak in the same language as the rest of business, managers and executives are less reluctant to approve budget for new initiatives that secure business transactions and protect sensitive data as well as reduce the damages an enterprise can have as a result of breaches or failed audits (if laws apply). New laws and regulations are

also imposed on small and medium businesses according to (Moyle, 2013) many smaller businesses believe that they are exempt from regulations and standards PCI's (Payment Card Industry) DSS (Data Security Standard). Digital security and skills needed by business leaders also means that they must understand what PCI-DSS means if you're not compliant as well as what this means to revenue if customers find out you're not compliant (Strohm, Engleman & Michaels, 2013). Information security and the laws that regulate access to sensitive data is also another law and regulation area that security teams help to implement and manage. Data exchange is also evolving as more people use social media platforms both inside and outside of the business to communicate (White, Mendez Mediavilla & Shah, 2011). Customers tend to not buy as much (if at all) from businesses that use online forms, social media and other internet-based technologies to collect information from customers that purchase from a website. Here again (information privacy) is another core business security area that when not managed does result in reduced revenues.

Cyber security is slowly evolving into more of a business function now because of new initiatives that push protecting data and informational assets away from just IT teams into the boardroom according to (Hunter, 2013). Cybercrime and the damages as a result of data breaches is starting new thinking and showing that businesses are increasingly under attack. A recent report by KPMG stated that data or information stolen by criminal hacks have increased from 8% in 2010 to over 52% in 2012. Laws and regulations from the UK and USA are also pushing the need to minimize risk by getting cyber insurance. Although this type of insurance is new, many are not implementing it because of very high premiums and the nature of some risks not being covered.

Intelligence as a means for risk assessment and control is becoming more prevalent in all types of businesses and corporations as new groups of interests or "Sovereigns" seek to impact the global economy and leverage attacks on the eEconomy. Warner explains that throughout the years Surveillance and Intelligence entities have changed their strategies and modernized technologies used to gain access via clandestine information collection techniques. The proliferation of espionage and cyberwarfare weapons through breaches and reverse-engineering attacked targets that are disseminated by various cybercrime syndicates and groups has led to many difficulties in defending critical systems and IT-Systems. Gone are the days of predictable attacks and tools used to breach systems confidentiality, integrity and availability. We now live in a state of constant cyber war and aggression.

Cyber (Digital) Security as a Critical Business Process

In the past security teams have had difficulties in communicating the value of security and how the department ensures that business transactions on an Internet

connected business are made more secure by the mechanisms, procedures and processes introduced. One of the most prevalent reasons why the security team has so much difficulty explaining what it does how it does and why does it, is because the security teams and business teams speak a different language. Since 2010 Forrester and Gartner have published various different articles on how to help the CISO (Chief Information Security Officer) align him or herself to the rest of the business by speaking in common terms that the board and other managers can understand.

Cyber security grows in importance because modern businesses have learned to rely on a secure infrastructure needed to do e-business and e-commerce with partners and the market. Security investment research by (Hkhoma & Dang, 2013) explains that e-commerce (electronic commerce) connects customers and businesses globally, hosting and processing business transactions of funds for services and products that a business sell. Since the technology evolves at such a fast pace, many SMBs (Small to medium businesses) are left to find ways in which to secure business transactions against fraud and criminal hackers. New research by (Srinivasan & Barker, 2012) explains that the digital security initiatives need to be more business focused and use ROSI (Return on Security Investments). ROSI justifies to business executives that this core and vital business role (security) must grow and cope with increasing cyber-threats amidst rapidly changing computer technology. As new technology is introduced into a business, so grows the importance and need for new and dynamic security cyber defense technologies and solutions adopted by businesses. Here, business leaders need to understand the vital function of a dynamic cyber security team, solutions and policies that seek to protect customers and the business transactions themselves from cyber criminals. The same research suggests that reports from IBM, as well as Ernst and Young, confirm that security gaps in businesses are continuously created by the rapid development of new technologies. New and rapid (secured) technology implementation through a cyber security team and project code reviews can help adapt new technology implementation while still remaining secure.

In today's current cyber threat landscape, we see that security officers struggle when discussing or explaining how the security department helps protect the business from cyber-attacks and espionage with existing technology (Balaouras & Andrew, 2012). Research from Gartner and Forester states that part of the problem was that security officers could not explain in business terms what security's value was (because of a difference in language and understanding of roles). In various publications of both (Gartner and Forester) a need was established that security solutions and processes explained in business terms was needed for board members and senior management to understand that security:

- Is a critical business process

- Classifying Risks is one of the most important steps in securing the enterprise as this forces the business to think about what its assets really are
- Protect intellectual property and sensitive data from theft
- Ensures minimal disruptions to other business processes by reducing downtime or stopping attacks on critical infrastructure needed for business transactions
- Helps make sure that security initiatives are tracked like other business projects thereby reducing financial wastage on products that do not add real value to the business

As discussed by (Bandyopadhyay, 2012) businesses concentrate on building a digital network infrastructure that is cost effective (by using the internet to connect) thereby fulfilling the needs of business partners, vendors and markets engaged in E- Business and E-Commerce transactions. Wide usage of the Internet as a means of creating cheaper and more effective B2B networks means that the security needs of business (Laws, regulations and requirements) for a secure infrastructure that protects vital and cost-effective digital infrastructure from disruptions, as well as the information, contained. In aligning these types of initiatives with secure design and communication across networked partners, security can be increased and potential attacks; disruptions and intrusions can be held to a minimum (provided that all partners have high security standards).

CYBER SECURITY: FUTURE IT-SECURITY CHALLENGES FOR TOMORROW'S LEADERS AND BUSINESSES

Communicating Security Risks to the Business (and Executive Board)

How and why strategic functions fail is discussed by (Cecere, 2011). In his research one of the key areas focused on various business functions including security and it-governance failing as business functions. Many issues of cyber security professionals were that they simply spoke a different language than the rest of the business. This difference in how technology and solutions mapped to reducing risks to data and information as well as protecting against disruptions was not understood. Aligning the business and security functions in companies increased project acceptance and added business value by including security teams into existing projects that were not being tracked previously. The value was eventually understood in regards to how the security team helped to lower risks and reducing spend on audits through better

documentation and proactive security project teams that helped to reduce exposure and breach costs when incidents did happen.

Building secure infrastructures that use and collect customers' data and how this data is to be protected by laws and regulations is the subject of research by (Srinivasan & Barker, 2012) who states that according to Forester research we have seen more than \$250 billion growth in e-business. In 2013, that number is \$230 billion, which suggests that security adds additional value and helps to push e-business transactions and revenue by securing and communicating that security to the customer base. Companies that do not engage in e-business are clearly at a disadvantage. However, more than 60% of customers are reluctant to purchase via online stores because of their doubts about information security. If the company uses its security programs and teams to build security, it can reduce the risk that many customers will not use e-business systems. As networked IT systems are more widely used, they will need to adhere to certain compliance and governance regulations. Communicating the risks (of failed audits and non-compliance of regulations penalties) and reducing those risks is one of the core functions of security. It is vital that security communicates with internal and external partners via websites, emails, documents and policy in how it protects them within rules, regulations and laws (like data privacy for example). Some risks include weak passwords; old unused accounts that have not been deleted of past employees and contractors, as well as a lack of unauthorized access monitoring systems. These risks may be mitigated by mechanisms but also enforced via a policy that is communicated to all employees, partners and also customers.

The Employee as an Unintentional Cyber Criminal

When we look at current events, it is not too hard to figure out or guess what one of the biggest internal threats or risks to the company said differently, it is the employees and or external consultants or contractors that work on projects and systems of the company. Employees and consultants can turn rogue or accidentally cause data leakage or cyber criminality based on carelessness or negligence, which is one of the biggest threats according to various reports and analysis from KPMG, PWC, Gartner and Forester. These reports (although) they focus more on fraud also show that some of the biggest hacks or cyber criminality cases were traced back to employees. If we superimpose recent events by the NSA and The Guardian newspaper reporting about controversial spy data collection practices, many may forget how we found out about these programs in the first place. Now we know that even the highest governmental programs have the same weaknesses as "normal" businesses. Data security and access have been hot topics for a few years when we look at other reports such as that of Verizon, HP, IBM and others. These point to

the need of securing access to critical and often sensitive data. In the middle of all this we have employees, contractors and partners that have access to that data.

As pointed out by (Gatehouse, 2013) most leaders today have been saying that the biggest threat to them is internal colleagues. Internal threats are even higher than any other cyber security threat currently known such as country-sponsored hacking, cyber warfare as well as cyber espionage. A survey taken by IT Governance's Boardroom Cyber Watch in 2013 indicated that over 53% of company executives believed that the biggest risk to data and information security in the enterprise was through mistakes or carelessness in working with sensitive or business relevant data by its own employees. Identifying internal contractors or employees as the biggest threats inside the company is also suggestion by other reports from other security vendors because many unintentionally happened. Unintentional cybercriminal activity means that employees who have access to sensitive data and information of an enterprise can inadvertently lead to a hacked system or data compromise. An important factor to that helps to reduce human error-based cyber criminality is educating the enterprises users to what is the appropriate handling of data in transit as well as using emails and mobile devices securely. Another aspect of the survey also suggested that 27% of respondents believed that cybercriminal induced hacking was the primary threat to them. Only 8% of respondents to the Boardroom Cyber Watch 2013 believed that cyber espionage was the biggest threat to them.

Many companies it is suggested (CBROnline, 2013) view internal threats such as contractors or employees as the biggest threat to their overall company security (according to the same survey). Although many of the respondents responded that they knew of security initiatives such as the ISO (International Organization of Standards) 27001, they did, in fact, not implement them in their enterprise. Adapting and implementing better security by being compliant to the ISO security framework (for example), as well as other security certifications and norms, would help to increase the overall security posture of enterprises because of risk assessment, as well as risk tracking and mitigation plans. Another aspect of security best practices in general is identifying which risks can be exploited using what technology. Contributing factors to the lack of an overall security posture in enterprises is compounded by the fact that many executive leaders do not understand the security department's function or have an overview of current cyber threats.

As explained by (Sharrock, 2013b) the state department (even after Wikileaks) still did not manage to patch vulnerabilities in its accessing systems that used sensitive data that it knew were insecure. Wikileaks (also based on the insider threat vector) showed the world what can happen to sensitive (in this case top secret) data of internal systems if these are not secured against unauthorized access. Bradley Manning (a soldier that was disillusioned) accessed various state department top-secret cables even though his access was not that high. He (Manning) copied

thousands of documents without raising any alarms or flags as to his unauthorized access. Only after the data was taken offsite and uploaded to the Wikileaks server and published, did the government realize what had happened. Tellingly some of the issues that the state department faced are also similar to that of businesses this being, weak passwords, password security (papers with passwords under keyboards). Interestingly before Manning stole data, many warning signs of failed audits and rogue accounts of suspicious people were not alert enough to reassess the overall security posture of state department systems against unauthorized access. Had these warning signs in regards to failed audits alerted the security team to lock down certain systems and implement a logging system that reported on abnormal usage of computers to data, then Wikileaks and the NSA's data leaks would never have happened. There is something we can learn in business and digital security from these two (related) events. When alerts happen, and security is aligned with the business, then appropriate steps should (or would have) been taken to ensure that data and information were not taken from secure networks and areas. At the time of this chapter's writing, those systems have still not been secured enough to avoid another incident from happening, hopefully businesses will not make the same mistake, as security and data security breaches could and sometimes do lead to such high fines and lost trust from customers that may ultimately lead to bankruptcy.

As cyber threats and the threat landscape changes more rapidly due to cyber war and espionage attacks that are analyzed and understood, this leads to an increased importance of using and understanding cyber security and negating the risks of insider threats. Cyber criminals will use newer technology of complex malware and viruses, as well as their attack vectors, in the near future (through reverse engineering). In the case of breaches, some internal employees and contractors will help these attacks happen by misusing systems and creating breaches through social engineering attacks and inadvertently hacking systems. By using insecure workarounds of existing security policies, because they are too hard to follow or create difficulties in normal business operations, the risks increase. Avoiding difficult security policies ensuring that all understand are not only part of a good security awareness program, but also create more secure implementation that follows business processes instead of making them more difficult. Forester again confirmed that in a recent study that insiders were one of the top reasons for data breaches with 36% based on inadvertent misuse of data (Melancon, 2013).

Employee Security Awareness and Security Awareness Campaigns

Another important aspect when looking at past failures is of the business not informing its employees about security (its importance) and how policies help to

protect them. Information about what security does would be considered marketing and communication as the research from (Balaouras & Rose, 2012) points out. If the security team wants to influence and secure budget, it needs to adapt to how business communicates and also measures how successful it is. A core piece of that communication with employees is an awareness campaign that explains the security policy, mechanisms and what is appropriate and what is not. Newsletters and indoctrination trainings reinforce this campaign for all new employees that join the company and also allow the security team to publicize what it does and how it adds value through that training and response teams and methods to incidents when they happen. Another tool that can and should be used is quarterly and specific events emails. To round up communications a wiki or website with security tips, tricks and directions on how to do things securely would help increase overall security posture and scores when doing internal audits. Security awareness programs are also for external partners, as these must adhere to the same standards otherwise any internal company security initiatives cannot protect the enterprise because of workarounds that are pushed through for external consultants (that lead to breaches similar to Wikileaks and the NSA Prism incidents).

Cyber Warfare

As pointed out by (White, Mediavilla & Shah, 2011) cyber warfare and laws are slowly addressing the issues of how cyber espionage and war are affecting international business. Additionally, research (Bandyopadhyay, 2012) also points out as well that the critical infrastructure is needed to sell and develop products in this globally connected world market, while still remaining secure and protected from at least the easiest of hack attacks and data theft. Recent attacks show that the global society has undergone a transformation with technology that is used to attack, disrupt or spy on businesses as well citizens (Jefferey, 2012) and (O'Harrow, 2013). An interesting point made by these books is that the information revolution has led to changes that impact not only international business but also society and governmental leadership throughout the globe (Levy, 2010).

Cyber warfare is related to cybercrime and espionage in that technology is used to disrupt other countries vital systems which lead to those attacks and attack vectors being reverse-engineered and analyzed by cyber criminals so that they can use them as well for other targets.

Cyber warfare not only consists of national units, but also includes companies that engage within nationally approved boundaries making those, therefore, legal cyber war activities according to (Andress & Winterfeld, 2011). There are also corporations and other parties such as cyber terrorists that engage in attacks on other corporations as well as national and vital infrastructure within an attacked country.

Since sustained attacks lead to additional attackers, cyber warfare must also be seen as a factor that is of interest to international businesses as it combines military as well as non-military units. Furthermore, since cyber war also leads to more detailed and sophisticated attacks, it would be safe to assume that many of the attacks and technologies also spill over into cybercrime and cyber terrorism. Cyber warfare, espionage (as part of that war) as well as the terrorism that results in the attacked nations can and does disrupt business, in this aspect business leaders need to know that they have to protect themselves from retaliatory attacks after hostile activities have commenced (Dinniss, 2012).

Since more sophisticated attacks are very real (some attacks include for instance the Syrian Electronic Army) security teams, policies and solutions need to protect businesses from the spillage of military cyber engagements into the business world. Time will tell just how difficult and challenging these attacks will be for smaller and midsized businesses. Business leaders need to understand the real threat and the consequences of criminal or cyber war hacker groups such as the SEA (Syrian Electronic Army).

Digital or Cyber Espionage in International Business

Cyber espionage has only recently become a mainstream discussion topic for small and medium business after information was leaked of widespread international criminal cooperation on a far larger scale than was ever assumed before. These covert programs threatened (and still do to an extent) to destabilize many areas of international businesses because of the natural state of sensitive data in e-business transactions as well as how these companies must secure their development results or competitive advantages they have to generate revenue. Protecting that data (data and information security and privacy) from a government hacking goliath with seemingly unlimited (financial) resources and people engaged in sustained cyber espionage shows how delicate business transactions are in painful detail by highlighting the risks of data and information theft. Espionage on such a grand scale causes disruption to corporations through destabilizing trust in the Internet and e-Commerce infrastructures such as cloud computing and security software. Information of built-in backdoors that help programs like Prism and other government sponsored cybercrime and espionage initiatives that can access anyone's data without justification causes concern. Concern of programs such as Prism is not about newspaper stories in general but highlights the importance of understanding (as a business) that insecure systems lead to disruptions due to the reduced trust and potential theft of customer data, information and trade secrets from cyber criminals. These cyber criminals reverse-engineer those same espionage attack vectors and systems for criminal usage. Examples of how data can be taken are explained by

(Mimoso, 2013) in that the use of widespread email systems such as Google (and others), leading to the exposure of accounts, emails, data and metadata through special mining tools that can also be used for industrial espionage, law enforcement, and cyber criminals with the right access.

Although Cyber espionage can be considered a separate topic, it usually follows or precedes another cyber related action from a nation such as cyber warfare and also cyberterrorism (Andress & Winterfeld, 2011). Just as other national sponsored cyber actions disrupt business through attacks, so does espionage when it targets other companies or civilian areas instead of military targets. Utilities companies such as electricity, water and other vital resources are sometimes privately owned; in those cases (when attacked) a direct impact can be observed to (international) business. These attacks, however, do not stop there; they also happen to other companies that work near or in support of the defense industry. As described in the intro, business transactions frequently use Internet based networks that connect partners, customers and vendors. Attacks can easily spill over into one, many or all participants of a specific network if the attack is well planned and other partners do not have a high security standard. In these cases, suggestions point to a segmented and multi-layered security approach and design because traditional firewall technology and solutions have failed against more consistent and complex attacks (Stout, 2013).

Solutions and Recommendations

Today's threat landscape has evolved into and now includes point-and-click software that allows criminal hackers as well as unintentional internal hackers to break into systems and acquire data, sensitive information and disrupt systems. Understanding that this is possible enables a business leader to enact a developmental systems review of the new threat landscape, he or she can help bridge the gap between business and cyber security into one business that can react quickly. As Cyber and Digital Security savvy Business leaders start to understand what security officers and departments do, they will understand how security minimizes risks by implementing risk mitigation plans, secure e-business applications and secure e-commerce infrastructures. Leaders also see how Security teams help implement needed programs, projects and technology into the business more efficiently and without disruptions into other parts of the business as an urgent development project.

- Business and Security team sync (establish what language, metrics and value is expected from both)
- Business Executive coaching if security is too technical (explain value in business terms)

Cyber Security

- Executive Buy-In – Security is about Business continuity and minimizing disruptions as well as protecting revenue by implementing new technology rapidly and more securely
- Awareness campaign – Educating Users on appropriate Internet, Email, Data and IT Device usage securely is key.
- Simple Security Policy and implementation - Keep it easy to understand and business focused starting with the basics (Email, Internet usage, data security, complex passwords, data encryption, Anti-Virus / Personal Firewalls, proactive security teams and data access monitoring systems).
- Proactive security team methodology with an ethical hacking mentality as well as incident response team
- Business focus of security department by using business metrics to show value
- Using existing security documents as a starting point such as the Cabinet office's Cyber Security Strategy or US National Institute of Standards and Technology 800 series (SP 800-53)

The eight areas and initiatives above will help both smaller, as well as larger businesses, increase their security posture. In creating a baseline of normal activity, security teams can integrate themselves as a proactive security shield that uses technology and resources to deter and detect attacks before major damage is done. Some refer to integrating humans into this security approach as a human firewall as traditional security solutions will not be as effective with evolving cyber threats of the future (Stout, 2013).

In detail, this means that the threat vectors need to be understood by leaders that are not security officers or administrators. If we look at common areas that are vulnerable to any business we see the following areas start to emerge that need to be “locked down” and secured with methods, solutions and processes as well as the awareness that risks to assets can be exploited (Goedeker, 2011).

1. Systems and hardware
2. Business / Applications
3. Processes
4. Office / Buildings
5. Data
6. Network
7. Partners
8. Customers
9. Enemies

These nine areas need to be understood by every manager or senior leader as they lead to risks that can be exploited and also used as vectors in a hacker's attack. In addition to these vectors (that bring unique ways to be exploited) we also need to understand the way in which hacks (in this case criminal hackers or C-HACKS) attack their respective targets. The steps that hackers take (albeit simplified) are:

1. Reason for the attack or hacking
2. Intel / Recon
3. Scanning / Target Prep of attack surface
4. The actual attacks (either burst or sustained and longer term) and getting access
5. Maintaining access to resources (further attacking systems until the final systems are breached or "rooted". After Systems are rooted (admin access) these then are prepared with anti-forensics trails to lead to false positives (that also are used to alert the attacker that someone is on his/her trail.
6. End Goal, attainment of reason for attack. This goal can be, money, recognition or disruption depending on step 1 (the reason).

Both lists above will give the executive or business leader some basic understanding of what a cybercriminal or cyber spy will try to do or attack to get to data or information. Having this understanding will help businesses protect themselves with better value for money security systems and technology for the future's complex attacks that traditional Antivirus and firewalls cannot detect or deter.

Taking these areas into account, it is easier for business leaders to understand security officers and IT security staff and the need for security solutions because drivers of security are known and understood. These drivers (albeit not exhaustive) are:

1. Internal Audits (for prepping for external audits that prove compliance of laws and regulations)
2. External Audits (for proving compliance of laws and regulations)
3. Bad Feeling or premonition (that an event may have happened based on suspicious business events such as spontaneously lost contracts)
4. Hacking incident (an actual break in that has resulted in damage or disruption to systems or lost data.
5. New Software (When new applications are introduced into a company or working business system, there is always a risk of backdoors or build in exploits that a programmer or hacker may have planted inside the code to allow access into another user's data or systems).
6. New Processes (When a new way of processing data or information is created to cope with revenue generating tasks, sometimes there are certain vulnerabilities that ensue due to the missing checks and balances. In this case it is important

to make sure that new processes do not side step or ignore security procedures in an effort to cut corners).

All aspects that are listed above help business leaders and security personnel and staff understand each other as well as highlighting the business value (and necessity) of building security into processes, applications, systems and procedures of a business. When business leaders understand these basic facts then both business and IT Security can understand and speak a similar language that helps avoid some of the more common and disruptive misunderstandings of the past. An optimized and secure business is vital to the global economy and, therefore, requires certain basic security principles to be understood by leaders.

FUTURE RESEARCH DIRECTIONS

In this chapter, it is clear to see that cyber espionage and warfare have a big impact on the trust and perception of security that customers have, when using online or e-business systems in general. It also highlights the needs of business to have secure systems and security teams to protect vital systems, data and information. As more information is released from government sponsored cybercrime so does the amount and types of cyber-attacks and their complexity increase. Research into mapping the direct increase of business risks due to cybercrime, espionage, and warfare might show that these types of programs and technology actually increase cyber threats as used attack vectors from (government cyber war units) then get reverse engineered to become tomorrow's cybercriminal hacks. The existing workloads of security companies and their limited resources to combat these new and more complex attacks might shed some light on why traditional approaches and current systems need to evolve and use human integrated anti-hacker systems that are capable of learning (dynamically) what new attack vectors are out there. These systems then turn these attacks and utilized technology into intelligence so that security teams have a fighting chance to protect the company's digital assets from theft and breaches. This chapter is meant to start to push research into possible legislation that limits or at least regulates how cyber war is done and discuss the economic impact and damage of cyber espionage and warfare on international business. These discussions relate to the increase in cybercrime and more complex and undetectable cyber-attacks to businesses in the future as new tools are created for cyber war and espionage that shift the focus of traditional security teams to a more proactive security posture.

The scope of this chapter is to increase awareness of how and why cyber war and espionage increases the complexity of malware, virus and spyware-based attacks (and its recognition) in general and how it impacts international businesses

specifically. New espionage based cyber-attacks are inherently reverse engineered by cyber criminals and reused for cybercrime, this can be seen as a new trend. Reused spyware inherently leads to more insecurities in systems and more risks to businesses that were not mainstream previously and they lead to more complex attacks. Newer attacks utilize so called side channels that cannot be detected reliably by traditional Antivirus, firewalls and other mainstream security technology without the human factor that utilizes the same types of methods as hackers do. Suggested Masters, PhD and general papers and studies that will help increase awareness and security of international business and analyze the economic and social costs of cyber espionage and warfare are:

1. Political cost of espionage cyber technology and attacks that hurt international business
2. Legislation that bans the use (or limits the types of cyber-attacks) on civilian infrastructure like utilities and “life or living critical” based critical infrastructure.
3. Economic damage based on cyber war and espionage on e-Business and Internet based economies.
4. New detection and defense technology that recognizes, detects, classifies and blocks newer and more complex virus, malware and side-channel attacks
5. The need for proactive security teams that use grey hat or ethical hacking methodologies to protect business networks against attacks

The areas listed above are just some of the many areas that need to be researched in order to establish and protect an open platform such as the Internet, and so (in turn) the global (virtual) economy so that it can grow and enable international business rather than hinder it. Furthermore, a secure and protected Internet can also remain free from cyber war or espionage-based attacks because these attacks harm international businesses and the global (virtual) economy.

In addition to the topics listed above, more research must be invested into how the wide spread use of hybrid warfare tactics and disinformation techniques further destabilize the eEconomy and global economy. In 2019 we saw the start of new types of fake information and disinformation programs by who we believe are Russian, Chinese and other nation-states moving towards more advanced and cheaper cyber warfare technology into a dangerous and chaotic system that threatens to destabilize the entire world because we no longer have reliable sources of information and news. Questions arise out of disinformation and disruptions as to their viability as methods to secure sovereigns interests at the cost of destabilizing the entire global economy. A burn-your-bridges, mentality that countries like Russia, China, Iran and others use raises questions as to how a collapsing global economy via cyber warfare can be in anyone’s interest if there no longer is an advantage. This is a pivotal question

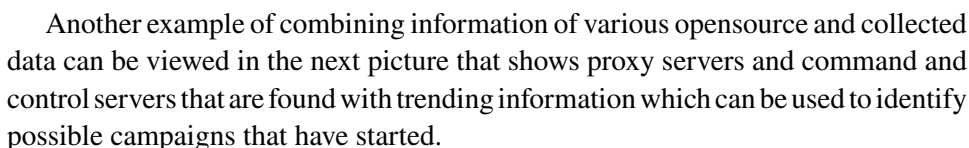
that each country and their intelligence community must ask themselves if we are to survive and thrive as a species. Cyber warfare technology is now capable of infecting real and physical damage to any nation and people. New attacks no longer make any difference to civilians and combatants, this move can be disastrous if and when attacks lead to wide-spread famine, death and destruction.

THREAT AND RISK INTELLIGENCE

Many different solutions that started to appear in 2016 started to move away from classical firewalls and IDS (Intrusion Detection Systems) and IPS (Intrusion Prevention Systems). As these solutions evolved they became advanced versions of a mixture of systems (firewalls, IDS, IPS and Log Management). These systems were crosses of SIEM (Security Information Event Monitoring) systems that collected data from various sources and started to combine them in ways that let bigger companies view threats or rather attacks. While these systems did make it easier to collect data and logs from various sources they did not in fact contribute to identifying threats before these were exploited, rather they displayed more detailed information of attacks that either happened or were happening. Many security professionals are at odds with Threat Intelligence because there are no clear indicators that it really works (McDaniels, 2018). Threat intelligence has two main areas that are used extensively these are feeds (sources of data streams) and platforms (systems that integrate multiple feeds and data streams together). These two different types of threat intelligence pull in data but the challenge is that data can be huge making it almost impossible for an analyst to understand what is actually happening. This is where Risk Intelligence and Cyber Risk Intelligence are different. In one way they can use feeds similar to threat intelligence but they are different in that these feeds are standardized into a format that gives real-time data to an analyst without the details of all that data which would otherwise confuse them. Another way in which Risk Intelligence is different is that it integrates the Intelligence Life-cycle into its data collection and display which gives the analyst the power to adjust what she or he wants to look at and collect. Cyber Risk Intelligence platforms can also show some of the strategic vulnerabilities (based on risk management principles) such as the business environment and technical environment (Foreman, 2019).

An example of the Cyber Analyst Dashboard is shown in Figure 1.

Figure 1 shows where new threats are emerging and can be viewed to see which countries are more at risk than others. By clicking on the dots, you can drill down into the location of where these threats are.



CYNALSIS[™] uses data collected from CyberNSight and the NVD to assess how and where IT-Assets are at risk of exploitable threats. In this way we are looking at predicting possible threats before these are actually exploited. The result is more proactive detection and deterrence of possible attacks before these are executed by an attacker.

Regardless of Risk or Threat Intelligence feeds, platforms or systems an emphasis is on data collection, standardization and usage in the intelligence lifecycle for detailed analysis offloaded from the platform and deliverable to the analyst or confidential analysis and production of intelligence to internal intelligence digesters. Due to the sensitive nature of collecting and evaluating intelligence, excluding the platform owner from knowing what an analyst is actually looking for is vital to neutral

Cyber Security

Figure 2. CyberNSight: Proxy and C&C Server Trending information.

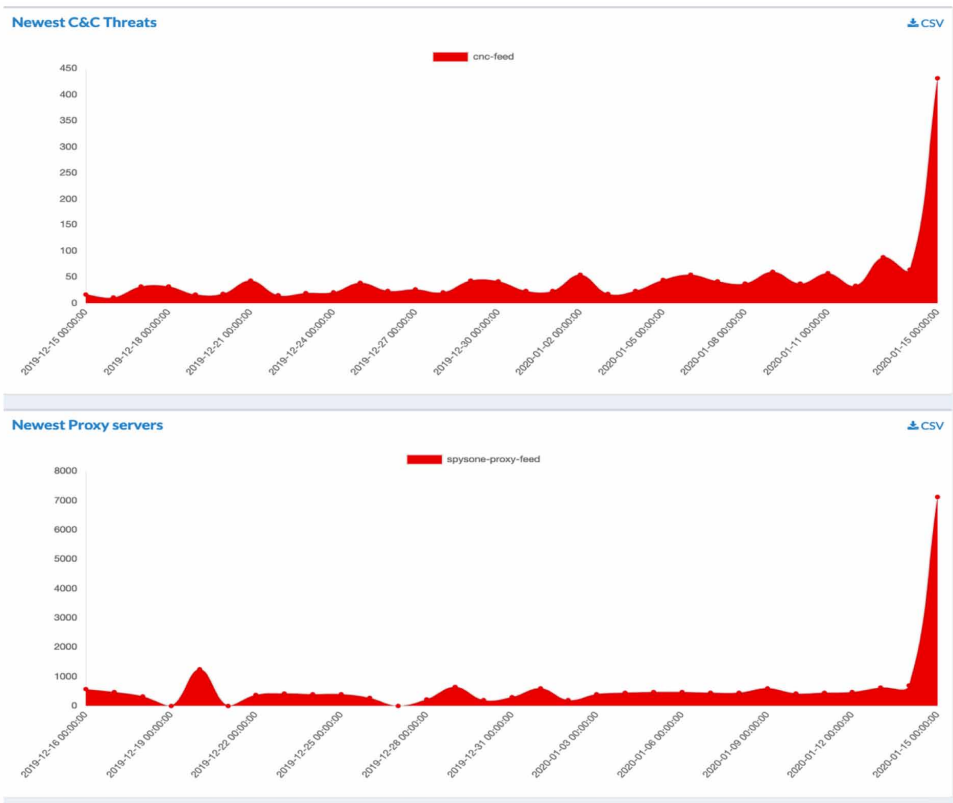
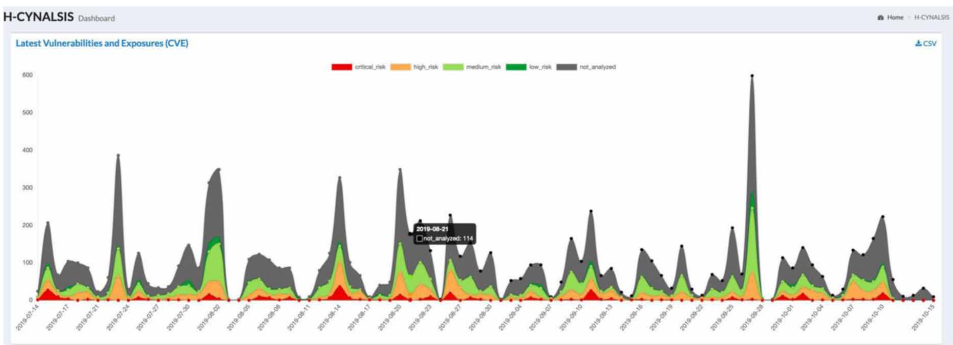


Figure 3. CyberNSight: Using the NVD for correlating possible risks to an infrastructure



collection. This ensures that no deliberate filtering or tampering of analysis data or information is possible which would distort results of data gathering.

In order to evaluate any threat or risk intelligence version it is important to understand how and using what processes and phases intelligence is collected and processed. Learning about and understanding the intelligence lifecycle helps us understand where the differences in data gathering and interpretation are and what ramifications these differences have between interpreting threats and risk data. There are 5 main steps in the Intelligence Life-cycle and one governing phase that provides a closed loop of feedback and updates. The Phases are listed below.

1. Planning and Direction
2. Collection
3. Processing and Exploitation
4. Analysis and Production
5. Dissemination and Integration
6. (Ongoing) Evaluation and Feedback

In phase 1, a decision maker decides on the mission or objective of intelligence. In this case the basis of what types of intelligence and data as well as information that is to be collected is first discussed and assessed. After the mission or objective is known and communicated then we move on to phase 2 collection, here an intelligence plan is created that seeks to fulfill the requirements set out in phase 1. In phase 3 the collection plan is used to gather actual types of data sorting these into types such as OSINT, SIGINT (Signals Intelligence), HUMINT (human intelligence), IMINT (imagery intelligence) and ELINT (electronic intelligence) and turn collected data into raw intelligence. In phase 4 collected data is standardized and also compared with multiple sources of data to find patterns and the significance of any new or additional data. In phase 5 processed and finished intelligence is then sent to decision makers throughout the organization and put into a report. Lastly in phase 6 we have the feedback cycle that is continuous and used to tweak and improve data collection and interpretation based on decision makers and experience of collected and processed intelligence throughout the organization.

DEFENSIVE MEASURES IN 2020 AND BEYOND

Every company and executive today must know, learn and understand the risks that are associated with new attacks that leverage OSINT, Hybrid Warfare and IoT (Internet of Things) vulnerabilities. Many technologies today use detection avoidance and soft tools that completely side track most traditional security measures we have

been taught in the past. When looking at today's security and defense market many solutions talk about "Threat Intelligence", many of these systems use intelligence to gain acceptance and use this language to imply that they are intelligence. Companies must assess any security solution and company with caution, in many cases big names in no way guarantee defense results that protect a company from some of the more successful and espionage-based attacks that use surveillance and OSINT. Any assessment of security solutions should consider how, where and what types of data and information is collected and how it is evaluated (if at all) so that the intelligence digester can come to their own conclusions. Issues that many companies have is the abundance of many data feeds but no real intelligence value and standards as to how that data is collected and more importantly why. Data must always have a reason and also provide some type of intelligence value. This data also has to recognize that threats and risks are linked to each other and across multiple levels. As data is collected we see how the Multi-Layered Threat and Risk Methodology™ validates that layers influence each other as they evolve (Goedeker, 2020). Handling threats and risks as separate ignores the fact that they are all influenced by the environment and each other. If you mitigate one risk, it will also influence similar risks and the threats that can be exploited.

1. Understand you ARE a target, regardless of size, geo and market. The smaller your company the more likely an attack will take you out of business
2. Have a working understanding of how espionage and surveillance technology is used in newer attacks
3. Have a working understanding of OSINT, how it is collected and how you can delete superfluous data and information from online sources such as social media and websites
4. Using the Intelligence Life-Cycle in determining what information to collect and what solutions use this method of data, information and intelligence gathering
5. Using Vulnerability Management in all security relevant defense and offense scans and threat as well as risk mitigation
6. Creating and modifying Patch Management to be faster and more efficient at patching systems quickly
7. Using ITIL Core Processes to lock down and solidify secure operations of any size infrastructure (CMDB, Asset Management, Help Desk, Incident and Problem Management, Patch and Configuration Management, etc)
8. Implement and use Risk Management as well as Risk Assessments to identify and mitigate your top risks
9. Understand the difference between Threat Intelligence and Cyber Risk Intelligence

10. Understand, implement and use the Hakdefnet Multi-Layered Threat and Risk Methodology TM
11. Understand, implement and use the Hakdefnet Use-Case Based Security Defense Method TM
12. Use *the CRISK Framework* (<https://hakdefnet.org/2019/03/25/crisk-framework/>)
13. Using the Cyber Analyst Dashboard CyberNSightTM <https://hakdefnet.org/products-services/cybersight/>

Incorporating the measures above will substantially improve security and secure operations and protect the enterprise better than using previously taught and implemented threat management-based systems alone. As new threats emerge (and they always do) using a standardized approach based on best practices and security standards that are repeatable and measurable will lead to a stabilized operation, one that locks down core processes that increase security of IT-Assets and produces more advantages than not having these in place. NIST (National Institute of Standards and Technology) published SP800-154 (Guide to Data-Centric System Threat Modeling) in April 2016. In this standard NIST discusses how threat modeling is a form of risk assessment, as does standard ISO/IEC 62443 (Guideline Industrial Security). Using risk management as a mitigating factor to unknown attackers enables the security leader and teams to start recognizing and managing the risks they actually face as a fact of doing business in a given environment. This concept (Risk based approach) to security teams and analysis seems to yield the highest gains rather than more traditional forms of security approaches that focus on forgone conclusions (historical attacks or ongoing attacks). Any risk-based security approach should include a foundational and stable form of vulnerability assessment and management which connects scans, assessments, code reviews and processes as well as policies with overall business health and stability. Lastly integrating the Intelligence Life-cycle as a core part of security will enable executives and security leadership to actually measure the value of collected data as it applies to standards of data collection and neutral interpretation.

CONCLUSION

Despite all the media coverage and publicity of the US and UK (as well as other countries) about spying on the Internet traffic and data passing through it, there are more important risks that need to be recognized and addressed by business leaders in the future. If anything, the way in which secret information was leaked by recent events such as Bradley Manning (Wikileaks) and the NSA (Prism) has shown that insider threats are one of the top reasons why data breaches occur. As new types

of attack vectors are known from espionage and cyber warfare attacks, these will be used to develop new and more dynamic cyber threats to both businesses and governments. New and dynamic threat vectors will put more pressure on security teams to protect business assets and also explain how they are protecting the enterprise from this evolving threat. Business leaders that understand that virus, malware and cyber threats are becoming harder to detect, will understand that new and dynamic security systems with proactive security teams is the only way to capture suspicious activities that are different that the normal baseline of traffic and data accesses.

Aligning the security function into the business and establishing reports with information systems that report security posture and value to new technology will help security teams to add value to business by securing the technological advantage. Awareness campaigns that teach internal and external employees and partners about acceptable usage of network and e-business infrastructure are key in adding value because they make the security policy clear as well as inform and prepare staff and partners from social engineering and other cyber threats. These programs also reduce the risk of social engineering attacks and other cyber threats from being successful. Lastly reporting how security solutions protect the business will prove security's value, incidents that were detected and damage minimized (or blocked) must be communicated to both employees and executive manage by emails, newsletters and dashboards that focus on clear and agreed upon business metrics. The more marketing is done by security, the business can understand its value, not using scare tactics and showing proactively how it helps via communication will define successful cyber and digital security teams and business leaders in the future.

Creating an awareness campaign that explains and implements a simple security policy and has executive buy-in has more success at being used and implemented throughout the company. Also, employees that are aware of social engineering and other cyber threats can help the company to detect these and stop them. As business understands new and evolving cyber threat landscape, it also understands that through communication and proactive security, it will be able to protect its technological advantage against more complex and dynamic threats as they appear by recognizing cyber security as a vital and core business function.

The new types of threats that businesses face in all sizes dictate that they need to have a basic understanding of security concepts, threat vectors and also methodologies and tactics such as red and blue teams that use ethical hacking techniques to secure applications, data and applications from hackers or spies. Due to the rise in new malware and spyware that cyber espionage has (unfortunately) introduced into mainstream cybercrime, directors and business leaders must understand that security (now more than ever) is vital to keeping data and company secrets protected from prying eyes. This rise in new and more complex threats that use side channels (different and unexpected ways to side track security mechanisms that were not intended to be

used as such). Circumvents older types of security mechanisms such as firewalls, Antivirus, Personal Firewalls and other applications controls and patched operating systems as methods of attack. The future of security and its unique challenges on all forms and sizes of businesses is indeed daunting when leaders do not understand why and how security is important to them.

In addition to a basic understanding of security concepts, the next generation of executives and security leadership need to adopt a never-ending security learning relationship. Every business venture requires in depth analysis of all relevant threats that have a high likelihood of happening or influencing entering a business or market. As we adapt new methods of security defense (OSINT, Multilayered Threat and Risk Methodology and Risk Management based security) we will be more prepared for the unknowns that previously seemed to elude us or at best were undetectable. Enabling automated threat and cyber risk analysis and detection platforms like CyberNSight will help companies in the future to address unknown and hidden activities of various cyber attackers that use hidden services in the Darknet faster and easier than previously with point-to-point tools or manual collection.

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KEY TERMS AND DEFINITIONS

Cyber Crime: The use of classical hacker tools to break into systems with the intent to install botnets that start attacks or steal data. These attacks are typically carried out by crime groups with the goal of making money.

Cyber Espionage: Using digital hacker tools to spy on people, companies or countries via governmental sponsored or trained hackers.

Cyber Warfare: Using digital hacking tools and viruses with military units that are specially educated and trained to use them in an effort to disrupt or destroy another country's or nation's infrastructure.

GCHQ: Government Communications Head Quarters, the NSA of the United Kingdom (UK).

HVT: High value target, meant to depict a target that is of high value to be exploited or spied on.

ISO: International Organization for Standardization.

NSA: National Security Agency.

SMB: Small and medium businesses.

Chapter 9

Data Privacy vs. Data Security

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ABSTRACT

The proliferation of data exposure via social media implies privacy and security are a lost cause. Regulation counters this through personal data usage compliance. Organizations must also keep non-personal data safe from competitors, criminals, and nation states. The chapter introduces leaders to the two data governance fundamentals: data privacy and data security. The chapter argues that data security cannot be achieved until data privacy issues have been addressed. Simply put, data privacy is fundamental to any data usage policy and data security to the data access policy. The fundamentals are then discussed more broadly, covering data and information management, cyber security, governance, and innovations in IT service provisioning. The chapter clarifies the complementary fundamentals and how they reduce data abuse. The link between privacy and security also demystifies the high resource costs in implementing and maintaining security practices and explains why leaders must provide strong IT leadership to ensure IT investment is defined and implemented wisely.

INTRODUCTION

Data is the bedrock for Artificial Intelligence (AI), Machine Learning (ML) and the Internet of Things (IoT). Many businesses take advantage of the significantly different data capabilities they offer from those available through traditional technologies (Patel, K., & Lincoln, M. 2019, p.6). The coming of 5G on mobile networks means that more and more data can be created and consumed ever more quickly. We have the 21st century gold rush.

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In the past, data was not seen as valuable asset. Now able to analyze unstructured and structured data, much of it personal, places data at the heart of understanding every potential customer to create tailored products and services. As the research company, Forrester (2011), states, it is “the age of the customer... Empowered by technology, customers have more leverage and higher expectations than ever before.”

Data abuse, in combination with public opinion and the related data privacy laws, such as the European Union’s General Data Protection Regulation (GDPR), means that organizations must demonstrate a duty of care over the personally identifiable data they hold to avoid fines. These requirements apply equally well to all valuable data. Data privacy and data security are core to sound data management.

What does this mean in practice? Knowing the net asset worth is important but insufficient for optimizing assets. Knowing where and how they are held, and who can access them is equally important. This is as true for data as for tangible assets, such as artwork.

A valuable painting in a gallery will have security designed around it. The value and accessibility of each painting owned is fully considered, leading to a mix of homogenous and bespoke protection. The painting’s presence, absence or damage are easy to detect. We need to set up an equivalent approach for our data.

Data is extensive and diverse forming the basis of, as well as being integral to, key decision-making, financial numbers, corporate monitoring and, ultimately, a store of wealth known as intellectual property. The combination of reach and diversity, supported by complex computer systems providing high volume storage facilities and high-speed data transfers, pose many technological and security challenges that must be solved to ensure the benefits arising from data are achieved. Data’s net worth requires an equivalent understanding to the way artwork is valued.

The research for the chapter’s content is based on the work from Gartner, Forrester and ISACA, who are leaders in the Information Technology (IT) security industry. Both make the science from the IT industry accessible for practical implementation by IT technical and non-technical business leaders. A broader range of literature was researched to establish the detail and are referenced at the end of the chapter.

From this research, the chapter establishes the type of understanding leaders must have to assess their data’s net worth and thus the level of protection needed. The key points covered in this chapter are:

- Broader business engagement in IT.
- Different and complementary aspects of data privacy and data security.
- Understanding the data lifecycle and how that influences privacy and security.
- A review of what is meant by ‘access rights’ and ‘CIA’ relating to ‘confidentiality’, ‘integrity’ and ‘availability’.

Data Privacy vs. Data Security

- How the latest innovations in information technology are making decisions around IT more complex.
- Identifying the governance aspects.
- Solutions and recommendations.

As the chapter unfolds, it becomes clear that managing and protecting data is a fundamental governance requirement and as much a board issue as are strategy and finance. At the end of the chapter, thought is given to future trends.

There is an ongoing case study to identify concerns, to ‘contrast and compare’ between two different approaches and show how the leadership mindset influences decision-making.

BUSINESS ENGAGEMENT IN CONTROLLING IT PRIVACY AND SECURITY

The desired aim is to protect data whilst making it accessible without compromise. The more flexible access is, the greater the protection needed, demanding more complex security.

It is also a truism that it is no longer ‘if’ but ‘when’ our data will be breached, so controlling data well is no longer an option. Business has moved from no overt recognition of security costs during the 1990 - 2000s (Rose, n.d.) to huge investment in technology and security. Research predicted that, for 2019, IT spend would reach \$3.74 trillion, with the amount allocated to security being in excess of \$124 billion (Gartner, 2019).

The traditional model, based on hosting technology and data completely within the organization’s physical perimeters, is obsolete. Easy access to Cloud Computing has transferred many in-house hosted computer services to 3rd party providers. The advantage of Cloud Computing is its relative cheapness, robustness and ability to scale. Everything is offered as a service, such as application software (SaaS), infrastructure (IaaS), identity management (IDaaS), platforms (PaaS) and, more recently, security (SECaaS) and disaster recovery (DRaaS).

As more computing shifts to the Cloud, the greater the range of control-related services needed to complement Cloud provision, so organizations now must partner with service providers to address security issues. Whilst everything organizations use is available on a rental basis, making the service provider inherently responsible for securing the technology, the one thing that remains an organizational responsibility is the data. This shift from direct control to shared control makes it difficult to judge correct levels of access to data stored, in effect, on someone else’s computer, and how to check that they remain appropriate. Large or small, organizations, including

their service providers, must consider being at risk from resource limitations and human error as well under attack 24X7 from external and internal adversaries.

Monthly data breaches, 670 million records exposed in December 2019 (Irwin, 2020), attest to how desirable data is and how disruptive breaches are to affected organizations, customers and supply chains. Traveler is the latest high-profile company to be caught by a malware attack on New Year's Eve 2019 with significant adverse effects felt across its customers and supply chain. Yet the investment levels needed for enforcing sound practices are often only understood after the breach because, only then, is there something specific to focus on from what were a multitude of theoretical threats and a correspondingly variety of potential solutions.

Even though leaders find it hard to assess the investment needed to protect data, it does not mean they have underestimated the desirability of their data to others. Research, back in 2012 by PricewaterhouseCoopers (PWC) in their report on 'Fighting Economic Crime in the Financial Services sector' (PricewaterhouseCoopers LLP, 2012), identified data's importance to both the legitimate owners of data and non-benign parties. Since then, the increase in data exposure across all sectors continues to grow. Whilst exact numbers are difficult to assess, it is estimated that 44.1 billion records were compromised in 2019 (White, A., 2019).

Even with this understanding, data protection fails. Why is this? Often it is because the level of detail needed to secure data would never come to a board's attention until after a significant security breach. The daily tasks required to apply, validate and test compliance with privacy and security policies are carried out by people at the lower echelons of the organization, obscuring the fact that data management is a corporate governance matter relating to the protection of shareholder assets and a duty of care to stakeholders. Boards and staff alike should be able to evaluate corporate behavior against key questions. What level of privacy and security is required? What level of compliance is expected? What is the impact if privacy and security policies fail? How do we ensure the organization's culture and ethos encourages the right sort of behavior whilst mitigating the wrong sort? How are we protected from social engineering, human error and insider attacks? Is 'tone at the top' able to lead on stated corporate values?

Drivers exist to improve business leaders' knowledge of, and response to, data privacy and security. Since 2014, the United Kingdom (UK) government's National Cyber Security Centre has been encouraging organizations to address the basic, technical, security risks with its Cyber Essentials toolkits (NCSC, 2019). As technical protection improves, breaches rely increasingly on social engineering to access sensitive data. The security company, Norton, provides a social engineering equivalent on its website (Norton, n.d.). New or enhanced personal data protection legislation in many jurisdictions also places data privacy and security on the board agenda.

Data Privacy vs. Data Security

Most data privacy legislation is based on the OECD's principles, updated in July 2013 to cover the e-economy and cross-border flows of personal information (Organisation for Economic Co-operation and Development, 2013). The principles are reproduced here, with the chapter's author paraphrasing each of the definitions for brevity. Full explanation of the principles can be found on the OECD's website:

1. *Collection Limitation*: obtain personal data lawfully and, when appropriate, with knowledge or consent of the data subject.
2. *Data Quality*: ensure personal data are relevant, accurate, complete and up to date in line with the purposes for which they are to be used.
3. *Purpose Specification*: specify the purposes for which personal data are collected.
4. *Use Limitation*: only disclose personal data for purposes described in 3 unless the data subject consents or by the authority of law.
5. *Security Safeguards*: implement reasonable security safeguards to prevent loss or unauthorized access, destruction, use, modification or disclosure of data.
6. *Openness*: be open about developments, practices and policies with respect to personal data, including the means by which the existence and nature of personal data is established.
7. *Individual Participation*: individuals have the right to know in an intelligible format if data exists relating to them, to challenge why it exists and, subject to successful challenge, have the data erased, rectified, completed or amended.
8. *Accountability*: data controllers should be accountable for complying with all principles.

All of this requires the right controls, supported by the right governance framework. Getting either of these wrong means loss of business, reputation and license-to-operate. The challenges have been there pre computers but the demands of today's global economy, the pace of innovation, the speed to market, the continuing pace of change in IT and the constant attack from anonymous, hard-to-trace hackers and cyber-criminals, reinforce the fact that data management is a full-time occupation.

It is now time to introduce the first part of a case study on two different approaches taken by two organizations. The first organization illustrates the case of a firm that wants to 'Get IT Right', the second that needs to 'Economize on IT'. Both firms are of similar size and both provide consultancy services, specializing in economic research and analysis. The case study is in five parts, taking us through the choices on how to manage data.

Table 1.

Role	% of Role	% of Total Staff
IT specialist	100	20%
Local IT support	100	15%
IT assurance	100	2%
Board	60	1%
C-suite	70	2%
Core Business	80	40%
Services, excluding IT	80	20%

Case Study: Background

The services offered by both firms are: bespoke economic research and analysis as requested by the client; quarterly reporting to fee-paying clients; and free information publicly available on the website. In the case of bespoke work, clients receive reports by mail or soft copy equivalents via email. Quarterly reports are available on a discrete part of the website and readers notified by email with the appropriate link. Publicly available information is on the public website pages. Over the years, operational costs have increased, although staffing numbers have steadily fallen, and more line managers were stating that the increases were down to supporting their IT systems.

Case Study, Part 1: Establishing the Mindset

Two years ago, as part of the strategic planning process, both firms' boards wanted to know how many of its staff were involved in IT as IT and data management costs seemed high relative to other 'premises, plant & equipment' required to deliver their services. They both found out, to their surprise, that 100% of their staff were involved in some way, although not necessarily for 100% of the time. The boards had not recognized how pervasive IT had become: whether you were a researcher, an HR specialist or the premises manager, the jobs relied on IT. The breakdown for both organizations was broadly the same, as per Table 1.

Fundamentally, they were both an IT service and a consultancy service provider using the former to achieve the latter. The firms relied on high levels of IT expertise, skill, training and professional attitude to meet the demands of supplying, maintaining, using and developing IT. Over and above all of those was the effort required to meet legislative requirements and, over and above that, was all the protection – security – needed to prevent outage and misuse. Everyone was either a producer or user of IT.

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‘Get IT Right’ recognized that all their output relied on IT regardless of job or position. The data ultimately provided the products and services sold, whilst the hardware and software components provided the manipulation, storage and transportation of the data. Conclusion: they needed to embrace being an IT service provider and make sure their strategic focus embraced IT as part of the overall corporate strategy.

‘Economize on IT’ also recognized that their output relied on IT but did not recognize they were an IT service. IT was a tool and, with their systems bedded down, there was an expectation that operational costs would reduce. If costs were not reducing, then there must be inefficiencies, as suggested by having similar staff numbers in fulltime IT roles as core business. Conclusion: there were operational inefficiencies.

The conclusions of both firms are equally logical. The difference is that ‘Get IT Right’ sees IT as a strategic partner whilst ‘Economize on IT’ sees IT as an operational cost. The mindset of both firms is now very different and will take them down different decision-making paths.

DIFFERENT AND COMPLEMENTARY ASPECTS OF DATA PRIVACY AND DATA SECURITY

Data privacy and security are now high priorities on the board agenda because data is recognized as intrinsically valuable. Breaches are daily headline news – “Travelex being held to ransom by hackers” (BBC News Business, 2020). It could be anyone next. Ignorance, prior to data being lost or stolen, is no defense in the eyes of the public and, increasingly, in law too. It is not only people who must have the correct data access rights, but also other computers, software and IT components (referred to as ‘machines’ in this chapter) that analyze, update, create and distribute data automatically through the supply chain.

Leaders set the ‘tone at the top’. From a list of common leadership failings, two have been key threats to security. The first is apathy about the effect of a security breach, the second is hypocrisy over how corporate policy does not apply to them. Both appear to be reducing. According to Allianz (2020), their survey found that, “In 2020, cyber incidents (39% of responses) ranks as the most important business risk in the Allianz Risk Barometer. Compare this with 2013, when it finished 15th with just 6% of responses.”. To quote the company Sileo (n.d.), which helps individuals and firms protect data, it “is not an easy topic, but running an organization isn’t an easy task. Leaders that guide their corporations to develop a privacy strategy that avoids these security sins will achieve a long-term competitive advantage in the marketplace.”

Moving away from the IT perspective for a moment, and just focusing on record-keeping, firms have always had a duty of care for keeping information safe, not just for data privacy reasons but for sound business ones. Businesses want to make the best-informed decisions they can, and accurate, available information, is key. BTO Solicitors (2018) provide a useful reminder of directors' duties under UK's Companies 2006 Act, sections 171 – 177. These include duties towards the company's business relationship with stakeholders, managing the impact of operations on the community and environment, and maintaining a reputation of high standards of business and conduct. Specifically, in Section 174, directors must exercise reasonable care and diligence with the general knowledge, skill and experience reasonably expected of a person carrying out the functions of a company director. Technology advancements require an interpretational shift that encompasses 21st century needs. According to management consultants, IMG (2019), "Every director should have a general understanding of cybersecurity risk and what it means for directors' oversight responsibilities", which covers the exercising of care over how data should be used and protected. It means understanding that ***data privacy is being free from unwanted and unnecessary intrusion, achieved through data security as the means by which data is protected from harm, theft and attack.*** Combining both means knowing when to prevent who or what from doing one or more of view, print, modify, move, transport, add or delete data.

Privacy becomes an indicator of how publicly available the data should be (data usage). Security mitigates against breaches to those privacy boundaries (data access). Provisioning the correct access levels requires organizations first to define the type of usage and level of privacy required, then build the complementary security.

Several things need to be considered, such as inherent sensitivity and type of data. Leaders must consider four steps for defining security that takes privacy into account:

1. Understanding the data lifecycle components.
2. Matching security to the lifecycle.
3. The role of data privacy.
4. How data privacy and security work together.

For example, data in published accounts are publicly visible but cannot be modified. During preparation, they must remain inaccessible to the public but accessible to relevant people within the organization. The percentage of people authorized to change, versus the number of people who can access, the data is miniscule in the former case and significant in the latter: the former is secure from change but not private, the latter is private but not secured against change.

Understanding the Components of the Data Lifecycle

The word ‘data’ is the generic term for all information held digitally. By breaking this generic definition into separate components, we establish the lifecycle. We have the raw material (*base data*) from which we obtain *information* to gain understanding and obtain *knowledge* with which to take decisions that lead to products and services, so adding to the firm’s *intellectual property*. At some point, data is no longer relevant (*obsolete data*) and should be removed. It is all data but its use is different depending where it is in its lifecycle.

Case Study, Part 2: Influence of the Mindset

How would the two corporate mindsets react?

‘Get IT Right’ approaches this strategically by reviewing all its data, identifying what is core business, time critical, commercially sensitivity and personal. Enhanced understanding improves business continuity planning ensuring that, in the case of a disaster, the data necessary to carry out core and critical functions are accessible. The same information also increases understanding of current policies, processes and systems for better decision-making in future IT investment. Conclusion: full board engagement for a holistic view of data management to improve corporate data governance.

‘Economize on IT’ expects each department to understand its data, with the board seeking assurance that policy and compliance requirements are being met. Whilst each department carries out a sound review, the overall approach is ‘silo-managed’, with focus on the needs of the department, not the firm. Conclusion: board engagement is likely to be limited to a check by the board’s Audit and Risk Committee that the departments have carried out their review.

Matching Security to the Data Lifecycle

Starting with a simplistic view, security over data at each stage of the lifecycle will vary. *Base data* will not mean much in its raw state so is of lower value and needing less protection relative to data that has been analyzed and turned into useful *information* whilst *intellectual property* is very valuable, needing a lot of protection. A security policy defines who or what can see, input, change, delete, analyze, move, print and transport the data at any stage over different time horizons. To do this, some questions need to be answered: who or what can use the data? What computers and devices can transport and store data? How and when should data be accessed?

In reality, some data is inherently more sensitive than others. For example, organizational-specific financial numbers, personal data and scientific results will need better protection compared to anonymous statistical data.

The mapping for any particular set of data could look similar to Table 2.

We have the beginnings of a complex matrix for securing our data, which leads us on neatly to data privacy.

Table 2.

Data category	Staff salaries								
Data owner	HR Director								
Access		view	input	change	delete	analyze	move	print	transport
	HR Manager	Y	Y	Y	Y	Y	N	Y	N
	Relevant staff member, whose details they are	Y	N	N	N	N	N	Y	N
	Automated File Transfer Facility to Payroll Bureau	N	N	N	N	N	N	N	Y
Default Sensitivity	High. Classify as ‘Staff Confidential’								
When sensitivity changes	Never								
Destruction policy	The later date of 3 years after leaving or whatever legislation requires								

The Role of Data Privacy

Privacy is extremely important. We expect our personal data to be used in ways that do not compromise us. That expectation provides a moral dimension, setting out the guiding principles for the ethical practices of how, when, by whom or what, personal data can be used. The Institute of Business Ethics (2020) wants organizations to recognise that they hold “data relating to customers and suppliers, which could be accessed by hackers if not secured appropriately. Organisations have a duty of care

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and a responsibility to their stakeholders whose data they hold, to protect them from harm”.

Hence why the UK, along with many countries, has implemented data protection, enshrined in law. The Data Protection Act 2018 is the UK’s implementation of the European Union’s General Data Protection Regulation (GDPR), demanding a high level of security for protecting personal data.

The OECD’s principles should be applied to all, not just personally identifiable, data. We should know what data we are collecting (*Collection Limitation Principle*) and why (*Purpose Specification Principle*). We must check that the source of the data is valid (*Data Quality Principle and Individual Participation Principle*), we are using it correctly (*Use Limitation Principle and Security Safeguards Principle*) and can demonstrate provenance and application (*Openness Principle and Accountability Principle*). We can then define the level of privacy required for each data set.

How Data Privacy and Security Work Together

Data privacy is about data usage. The level of privacy required defines the necessary data accuracy and precision needed (data integrity), and then identifies who or what can use, see, change, share, act upon and remove it, providing the foundations for our security policy. To have the right ethical approach to our data management, we should check how appropriate our data-related policies are vis à vis privacy:

- Is the data we have really for us to use?
- Are we holding it with the required degree of accuracy and precision?
- Are we able to make the right decisions from the data we have?

Our answers will justify why we hold the data and help us define the privacy levels policies for each stage of the lifecycle, including retention and destruction policies.

Data security complements usage by granting the right level of access to the data. Using the privacy levels identified, the data security policy identifies the access required for each circumstance to ensure the accuracy, precision and restrictions required, and establishes retention and destruction policies.

The policies work together by defining the privacy level first for each data set, and then defining the level of security required based on its inherent sensitivity, timing and stage in the lifecycle. Only when all of this has been done should the individual user and machine access rights be defined, and only then can the correct technical solutions to implement and manage security be identified.

Case Study, Part 3: Knowledge Management

One year on and the amount of data is prolific. Several cloud services are being used, with AI and ML capability embedded, analyzing data obtained from search engines and website traffic. There is a proliferation of laptops and smart phones. These co-exist with legacy technology.

‘Economize on IT’ has lowered costs by reducing the number of fulltime IT specialists on its payroll, using contractors on a ‘needs only’ basis. This was a consequence of moving data to the Cloud and deferring modernization across legacy infrastructure for another three years. There are no plans to take advantage of data analytics or to assess the relevance of existing privacy and security policies to cloud storage. Whatever is achieved is seen as being better than before. The return on investment (ROI) from previous projects will be achieved by the postponement and newer IT innovations will stabilize and mature. It is assumed that, in the intervening period, technology will become cheaper as well as cyber threats being better understood, making future strategic decision-making easier.

This would make sense if IT innovation ceased. The reality is that business requirements move more slowly now than technology innovation. The gap widens each year, making the move to ‘state of the art’ more difficult the further behind legacy systems fall. This firm’s ability, to understand and manage its data and obtain good management information, is reliant on ad hoc analysis that is as good as the person scrutinizing the data. Legacy spreadsheets are still widely used. Conclusion: data is a low priority in corporate thinking.

‘Get IT Right’ has undertaken a complete review of its IT strategy, now focusing on answering two key questions: what will improve our business? And what will make our business better than the competition? Data is used to answer these questions and allows the firm to define an integrated IT and business strategic plan with a complementary investment budget.

This approach allows ‘Get IT Right’ to keep up with innovation. It does not mean the firm embraces everything but it allows corporate knowledge to keep up with IT developments. Conclusion: data is high on the agenda of corporate thinking.

A REVIEW OF ACCESS RIGHTS AND DATA’S CIA

The main activity resulting from the data security policy is defining access rights to individuals and machines such that the data can be trusted. This is commonly described as ‘CIA’ relating to ‘confidentiality’, ‘integrity’ and ‘availability’.

Confidentiality is the basis of trust. Data confidentiality is the belief that the data will only be accessed by organizations, people and machines that need the

data to perform business activities for the benefit of the people associated with the data. Confidentiality implies that data is restricted to tightly controlled group. Unfortunately, it is easy for access rights to grow, as illustrated by these examples.

Example 1, access to our medical records: we expect our medical records to be available to us and relevant medical personnel, doctors, nurses, pharmacists and administrators. The number is insignificant when compared to the size of the global population. As personnel move on to be replaced by others, the number of people who have accessed our records increases. It is also likely that these people have transferred our records to various machines that are accessible by others, increasing the number of people with access our records. The original need was small, but the passage of time has increased the numbers. The controls in place to avoid abuse of confidentiality are based partly on human nature, partly on personal ethics. Most people will have had fragmented access and have no interest in remembering a multitude of records to exploit their privileged knowledge. Tangible policies, such as confidentiality agreements signed by those working with such records, and ‘joiner and leaver’ policies convey the importance of not breaking confidences.

Example 2, storing medical records: each patient’s individual data will be stored on a number of databases on different machines to ensure timely access and provide resilience. Individual’s records can be aggregated with complementary data to provide comprehensive understanding of medical conditions, assist in future research and allow cross-sharing of knowledge to promote improved healthcare. In a world of AI, ML and IoT, it is impossible to know who or what has access to information relative to any individual patient record. We can only hope that confidentiality will not be breached. To get some sense of the scale of data, according to the World Economic Forum (2019), data is expected to reach 44 zettabytes (that is 1,000,000,000,000,000,000,000 bytes) by 2020.

Data integrity is the belief in what the data represents. All data needs to have a degree of accuracy proportional to its use and stage in its lifecycle, but imprecise data can still have integrity so long as people know it is imprecise. For example, statistical data from the UK’s Office for National Statistics will be subject to revisions. Everyone knows this so people, factor imprecision into any analyses performed. At the other extreme, data relating to financial transactions must always be accurate and precise to the level of decimal places agreed, especially in organizations participating in payment and settlement instructions.

The final element is availability. Data must always be available to the right people and machines in the right way at the right time. The proliferation of websites and online-shopping has extended users to being potentially everyone. Access rights, increasingly known as identity management, will help ensure the right people and machines access data appropriate to their role. ‘At the right time’ is about the IT system’s performance, its inherent speed and resilience, working in combination with

robust and relevant access rights. If any aspect is inappropriate, the consequence is some form of access denial or loss of data integrity.

Data volumes and CIA complexity has made data storage and management a service business of industrial proportions. The services offered rely on economies of scale to provide cost-effective, flexible and scalable storage and identity management. Many of these services are provided via the Cloud, a virtual environment created by machines and 3rd parties, who undertake to provide everything the client organization requires without the headaches of day-to-day management. That is the upside. The downside is clients have little idea about, or control over, the actual management. All is hidden from the client organization except for what the provider chooses to reveal. To achieve economies of scale, service providers will have many clients co-existing side-by-side within their own virtual environment. That requires bullet-proof levels of CIA from the provider to assure creep or leakage across virtual environments are prevented, and a lot of trust from the client that this will happen. Martucci, L. A. et al, (n.d. p5), refers to the trust needed, stating that the “ecosystem is highly distributed and customers possess only a limited and abstract view of it.” Can a leader of the client organization really understand the control environment of the service provider and demonstrably confirm to stakeholders that protection over data is adequate?

These entwined technical and management responsibilities have turned organizations into IT businesses alongside their core businesses. IT is no longer a ‘service to business’. IT is now the ‘foundation business’ on which to deliver ‘core business’. The latter will not happen unless the former succeeds. Outsourcing IT to 3rd parties, choosing to use the ‘Cloud’ and simplifying access management place time-intensive management and costly controls in the hands of experts. It is attractive to boards because it responds to their high-level security policy requirements whilst neatly avoiding the complex detail required to deliver the service. It is a sophisticated step beyond traditional outsourcing. In theory, it is a ‘win/win’ situation, allowing experts to manage the technology, freeing the organization to concentrate on core activities. The skill is to find the right provider and sign the right contract to ensure leaders can demonstrably confirm protection is adequate and working:

A board wishes to engage an identity management services (IDaaS) provider. The provider’s sales and technical staff provide a lot of information but board evaluation is impossible without understanding data privacy, security and access management, the core pillars of the service being sought. Commercial providers offering IDaaS will build an access management service, allowing people to access parts of the IT system and data they have permission for, typically through one, single sign-on. The idea is to provide ease of use combined with high levels of security that can be managed flexibly. There are six things leaders must do ahead of discussion and certainly prior to signing contracts:

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1. Defining all the requirements is the homework essential to finding the best solution. This is true whether the organization retains or outsources identify management.
2. Understand what you already have, and why. Carry on using whatever existing good access management policies and practices you already. Ask what these are from your IT security experts and your IT auditors.
3. Avoid replicating information about user access rights as this increases the chances of data exposure through not removing or updating access rights when the rights change or cease.
4. Make sure staff and IT specialists see the move to outsourced IDaaS as an opportunity to improve access management, therefore improve data privacy and security, rather than a criticism for what was there before.
5. Talk to specialist brokers. They will provide you with a variety of the IDaaS products.
6. Check that open standards are used by the provider. These standards are available to all providers, allowing you to mix and match or move to another provider without risk of incompatibility.

Case Study, Part 4: Swim in Preference to Sink

Both boards were very aware of ‘cyber threats’ and the need to comply with the data privacy legislation. Both boards sought assurance via their chief information officers, IT specialists and IT auditors. Even so, both boards had difficulty in determining the relevance their current security and usage policies. Was, for example, 95% compliance good or bad? Was there 100% monitoring or just across critical systems? Did that matter or could one weakness allow a cyber breach to happen? Was the financial cost of policing current policies offering value for money? What were the priorities: focus on ‘today’ or focus on researching future security requirements?

‘Get IT Right’ decided that the board needed a dedicated meeting to discuss data security and privacy issues. Instead of looking at company business top/down, as it usually did, it would spend time looking at it bottom/up by understanding what data it had, needed, used and shared. It would also identify data that would be of interest to competitors, thieves and nation states. The board requested from its Chief Information Officer a data audit to answer the ‘what’ (what it had), ‘where’ (where it came from, was stored and went), ‘how’ (how it was used) and its attractiveness (why people would want to damage or steal it). The board’s strategic scrutiny had broadened and deepened their collective understanding of how data was used, transported and held by the organization. Key milestones were identified, some being specific actions, others outcome-related:

1. Meet with the regulatory body for personal data privacy, to bring corporate understanding up to date on personal data protection.
2. Obtain corporate consensus on the privacy and security required for all data.
3. Compile a list of corporate requirements for data and access management.
4. Commission internal experts to provide two reports, one defining the pros, cons and costs for an in-house solution, the other mapping out an out-sourced solution.
5. Invite cloud service providers to debate the pros, cons and costs of 3rd party solutions. The knowledge obtained from the internal reviews would ensure 'Get IT Right' were prepared and could have intelligent conversations with providers.
6. Define and agree the solution based on the information from 3), 4) and 5).
7. Ensure the solution is flexible enough, through relevant stress testing, for future adaptability, for 'business as usual' and 'crisis' times.
8. Have appropriate, verifiable controls in place to demonstrate pro-active risk management and relevant protection over data, systems and processes.

'Get IT Right' achieved a relevant, sustainable and forward-looking data management process covering 'business as normal' and 'crisis' times.

The board of 'Economize on IT' had no more than a nodding acquaintance of the IT innovations, opportunities and issues. Financials were still the most important agenda item, with strategy and IT a poor second and third priority. The mantra was 'if something could make or save money, go for it, if not, don't do it'. As a result, cuts continued in IT investment and maintenance and the board were unaware of the complexity behind good data management. Over time, existing policies became irrelevant, practices obsolete and data management fragmented. Efficiencies were eroding effectiveness. Signing-off on the effectiveness of corporate controls over data, systems and processes was more 'tick box' than fact but the board was not in a position to recognize this.

The day came when flooding caused a complete electrical outage for both firms.

At 'Economize on IT', core data was suddenly lost because basic practices, such as data backups, were inconsistent across the organization. Some was in the Cloud, some held locally, some held personally, and some individual but critical spreadsheets not backed up at all. Suddenly, people were unable work except for the ad hoc few. The unexpected outage led to a complete legacy system reload with default, rather than authorized, access rights being granted to staff. There was no mechanism for coordinating and consolidating data from the various backups, causing more inconsistency. As a result, data was corrupted, leaked or deleted.

'CIA' had been lost and there was slow guidance from the board on how to manage the situation in the absence of reliable information. The board was unable

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to assess the cause, effect and consequences of the data loss and corruption. Even notifying clients of what had happened was difficult as contact data had also been lost. Conclusion: potentially unrecoverable, reputational damage to the firm and client exposure to identity theft and fraud.

At 'Get IT Right', the sudden outage was far less severe because of an explicit agreement with the Cloud provider on retention, backup and recovery. All data and access rights were available and working. Relevant but little guidance was needed from the board other than to seek assurance the organization was up and running and all data was safe. Clients were contacted immediately. Conclusion: enhanced trust that the organization is in control and working in the best interests of clients. The board's more knowledgeable involvement in IT had made governance agile. There had been a strategic shift towards 24X7 IT and business resilience, making leadership more dynamic and more cooperative in its supply-line relationships to minimize disruptive affects. Communication with all stakeholders was more informative and useful, retaining supplier and client trust.

THE GOVERNANCE ASPECTS

Governance is about corporate behavior and relationships by the individuals within the firm and across the supply chain. Board behavior sets the tone: culture; values; what is judged important; what is rewarded; what is chastised. Leadership applies those elements to shape strategy, business objectives and success criteria that managers then take on as part of their day-to-day responsibilities. This is not new. What is new is the need to do this for the organization's IT services as much as for core products and services. The Cloud, AI, ML and IoT takes 'CIA' to a new level in corporate governance.

The IT profession has always recognized that governance of IT must be integral to corporate governance. ISACA, a world leader in IT governance, has developed over many years a framework to help businesses use IT and information effectively. The most recent release of the framework, COBIT2019® (ISACA International, 2019), emphasizes that IT and information management must be fully integrated in business processes, so must be evaluated, refined and managed center-stage, not as a bit player to business.

Many nations have corporate governance codes but nearly all ignore IT within fiduciary duties. At best, recognition is by default, subsumed within the principles that encourage sound boardroom behavior, including meeting board obligations. The main concepts are of taking responsibility for decisions, managing risk, being accountable to stakeholders, and providing a level of transparency and disclosure that is timely, complete and makes sense to the intended audience. Codes have not been

applied seriously enough across all aspects of corporate activity because, historically, codes have focused on organizations' financial responsibilities. Corporate conduct and operational risk, including IT, is only implicit.

An exception is South Africa, a leader in aligning corporate with IT governance. The code of corporate governance (Institute of Directors in Southern Africa, 2016, p 63) states under Principle 12 that "The governing body should exercise ongoing oversight of the management of information." The relevant requirements are to "sustain and enhance the organisation's intellectual capital", ensure IT "architecture supports confidentiality, integrity and availability of information", that there is "protection of privacy of personal information" and there is "continual monitoring of security of information".

South Africa's approach makes sense. IT governance and sound security are no longer optional. Increased cybercrime increases expectations of boards to invest better in both. The UK Government has undertaken a review of cyber security incentives in its call for evidence "Cyber Security Incentives and Regulation Review 2020" (Department for Digital, Culture, Media and Sport, 2019, p 1) to help business leaders understand that "Having the right cyber security measures in place helps organisations protect their business, their data and their customers".

With IT on the board agenda, leaders must understand the intricacies involved in managing data to achieve sustainable business. Picking the right solution requires knowing what is needed in a business sense before the technical solutions are chosen. Clarity over the trade-offs between the level of control and trust residing with 3rd parties and within the organization is essential. Relationship-, contract- and service quality management become vital. Well known researchers, like Gartner and Forrester, provide interesting reports on the data management market but the value of their findings will be limited according to the level of boardroom understanding.

Some Solutions and Recommendations

This chapter has identified and explained the data management challenges. The clear recommendation is that boards improve their technical understanding regardless of any regulatory requirement to do so. Here are some suggestions on how to begin:

- Know your data and why others – thieves, competitors, nation states – might find it valuable to steal or destroy.
- Evaluate board understanding of data privacy and data security. Understand where data is held, how it used and how its lifecycle influences the different types of privacy and security needed, depending on the intrinsic value and how public the information is.

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- Do not underestimate the investment needed to define, implement and maintain the right security policy. To ensure the policy remains relevant and is being complied with, make sure appropriate compliance checks and independent reviews, using qualified IT auditors, are carried out.
- Build a strategic plan that discusses IT, data and its protection as part of, not as an ‘add-on’ to, achieving strategic objectives.
- Lead by example. If something is not appropriate for you, do not ignore the policy but ask why it is inappropriate. Others in the organization may feel the same, so maybe the policy needs to change. Doing nothing is not an option because if you are breaching the policy, the chances are that others are too. They certainly will do so if you are found out: it weakens both moral and ethical behavior within the firm, undermining corporate governance.
- Consider IT as a profit-maximizer, not a cost center. It is pervasive and contributes significantly to products and services.
- Provide IT with a seat on the board, to address knowledge gaps and give IT equal weight with other cross-organizational resources. Many organizations have Finance and HR on the board, why not IT too? IT is, after all, the organization’s largest enabler, one of the largest investment areas and, given the volumes of data it processes, a substitute for staff. Most importantly, it is a key risk mitigant when used wisely but a key risk-maker if not.
- Consider the supply chain. Look beyond the internal, to how IT interacts with and influences wider stakeholders. By understanding IT better, leaders can engage better with suppliers and customers. Conversations over how IT influences business and the supply chain will give rise to complementary solutions that make doing business more resilient.
- Make business continuity a strategic objective, not an operational afterthought. Business continuity planning has been at the tail end of IT and business operational planning but with a complex data and technical inter-dependencies, and anonymous hackers located anywhere and everywhere, business continuity is a 24X7 activity.
- Realize that the weakest link into your organization will be in areas of least value to you. Organizations realistically only invest in strong protection and recovery for their most important assets. Less important systems and data will be less closely managed, therefore easier to infiltrate. Once in, it will just be a question of time before the hacker gets to the more valuable assets.

Case Study, Part 5: Learning the Best From Both Approaches

To survive the loss and corruption of its data, ‘Economize on IT’ was forced to do the very thing it had avoided for so long, to develop a strategic approach to its data

management: the data review; design and implementation of a new data privacy and security policies; IT investment. The unintentional benefit from the crisis was that the board now had something tangible on which to pin strategic thinking. The board became efficient and effective in addressing the issues caused by the crisis, although the focus was narrow, with the solutions suitable for that one scenario. It was a sound 'stop gap', meeting operational needs, but not an optimum solution. The firm still had not developed a strategic approach to IT.

'Get IT Right' flourished, having obtained several clients from its rival, 'Economize on IT'. Business was able to adapt to market and environmental conditions quickly because of the level of integration between data, business and IT management.

A year after the power outage, 'Economize on IT' is surviving but now realizes it needs help in meeting the increasing demands of data management. As revenues have fallen, its own ability to invest or find investment is increasingly difficult. The board has decided to approach 'Get IT Right' on a possible merger.

'Economize on IT' identified its attractions:

- Same business sector.
- Small, modern firm.
- Skilled staff.
- Niche but loyal client base.
- Departments that really know their operations.
- Focused, efficient and effective.
- In need of investment for future sustainability.

'Get IT Right' reviewed its own position. Its focus on strategic alignment had worked well but there was a blurring of strategic and operational responsibilities. Day-to-day decisions were too often being addressed by the board, rather than management. 'Get IT Right' could absorb 'Economize on IT' and benefit from strengthening operational capability and optimizing strengths gained by having:

- An integrated business, IT and investment strategy.
- Sound data management.
- Excellent grasp of data privacy and security issues.
- An expanding client base.
- Skilled staff.
- High effectiveness.

Conclusion: many leaders learn the hard way how important data management is and few are lucky to have a second chance. Regardless of how good or bad the situation is, leaders rely on trustworthy data.

FUTURE TRENDS

Data privacy and security will remain a huge concern because of IT's increasing role in daily life and data's continuing attraction to criminals. Consequently, hackers will remain incentivized to improve their skills and sell their services to others. 'Cyber-crime as a Service' offerings already exist (Khandelwal, S., 2017).

Boards will continue to find data privacy and security difficult to address. Deloitte's 2019 survey (p.9) found that "only 4% of respondents say cybersecurity is on the agenda once a month". When asked in the survey (p.8) from seven specific issues, what was the most challenging, data management complexities narrowly came out on top at 16%, with the lowest challenge being inadequate governance across the organization, at 12%. The fast-moving technology makes it difficult to prioritize.

Stronger regulation is likely. The UK government has, in 2019, consulted on legislation over IoT security. Explicit clarity over boards' responsibilities for IT will become necessary, maybe including obligations akin to South Africa's code into all corporate governance codes.

Business leaders will need to demonstrate they are taking responsibility for all data management issues seriously to preserve customer loyalty. That will require board training on IT and data management so that boards can scrutinize IT operations and outcomes on a par with financial statements, even when IT and data management are outsourced.

CONCLUSION

Security over data remains complex and difficult to manage. Whilst we will continue to struggle with the management issues, we can at least make sure our intentions are correct by defining privacy first, *the data usage dimension*. The security around the data, *the data access dimension*, will then reflect the level of privacy required at each stage of the data's existence and identify when the data can be destroyed.

Data privacy and security are part of data management, and the objectives of data management are to ensure data is fit for purpose and it fulfills 'CIA' expectations by having the appropriate access rights attributed to users over the data in terms of confidentiality, integrity and availability. But this will only work if the level of privacy has been defined, so that the security can be made to match. It is a simple, two-step process but complicated by the sheer volume of data, the lifecycle of the data and the level of knowledge and professionalism needed to ensure data management works.

Finally, consider who leads. IT is the prime component of technical solutions. Whilst it enables business, it is also a driver. But it is a driver that must be under 'dual control': IT professionals, whether individual or 3rd parties, 'deliver' but

Business ‘owns’. Business, therefore, must monitor what IT is doing to make sure it remains fit for purpose. If IT becomes misaligned with the business, productivity and quality will be adversely affected, the organization losing reputation. Ownership of IT does, therefore, lie with leaders, so leaders must take on the responsibility for defining what is (un)acceptable IT and data management.

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KEY TERMS AND DEFINITIONS

5G: The next generation of mobile networks.

Artificial Intelligence (AI): Machines that work and react like humans using computer programs known as algorithms. Algorithms must remain current for AI to work properly, so they rely on machine learning to update them with changes in the worldwide economy and society.

CIA: Stands for 'confidentiality', 'integrity', and 'availability', and describes the desired attributes for data to be trustworthy, accurate, and accessible to only those who have permission to use it.

Cloud: The virtual world in which information technology tools and services are available for hire, use and storage via the internet, Wi-Fi and physical attributes ranging from IT components to data storage.

Cyber: A prefix often associated with the vulnerabilities to, and control over, the flow of data across internet. Frequently occurring terms are 'cyber-threats' and 'cyber-security'.

Data: Both a generic and specific term to describe information now typically stored on computers. It is used generically when the structure and subject matter is unknown. It is used specifically when ascribed to a defined data set, such as 'statistical data'. The term. Often referred to as Big Data or Data Lakes, these describing large volumes and varieties of data, increasing daily by volume and subject matter. Data is both structured, where the data must conform to certain rules, such as financial transactions, and free flowing, where no or little structure is required, such as the information shared via social media. See also 'data lifecycle'.

Data Abuse: The misuse of data, normally with malicious intention, causing harm or unfair gain through breaching ‘CIA’ or good governance practices.

Data Commissioner: Typically, an independent authority that exists to protect information rights in the public interest, promoting openness by public bodies and data privacy for individuals. In the United Kingdom, the role is known as the ‘Information Commissioner’.

Data Lifecycle: An illustrative phrase describing the many manifestations of data from its raw, unanalyzed state, such as survey data, to intellectual property, such as blueprints. Time plays a role, too, making what was once highly prized information, such as the opening ceremony program of the 2012 London Olympic Games, now obsolete.

European Commission: The executive arm of the European Union, formulating policy and drafting most community legislation.

European Union: An economic and political alliance of various European nations. There are 27 nations at the time of publication.

Forrester: A leading research and advisory company. See <https://go.forrester.com/>.

Gartner: A leading information technology research and advisory company. See <https://www.gartner.com/>.

Governance: The tangible and intangible way firms behave and relate with stakeholders. Many nations have codified the behavior and accountability expected of directors to provide equitable treatment all stakeholders.

Identity Management: Ways of defining and controlling access rights to data, applications and operating systems. The term is frequently associated with 3rd party tools and services. Their value is in providing effective and efficient control to solve a fundamental but complex need.

Internet of Things (IoT): A network of physical objects that have, like cell phones and laptops, internet connectivity enabling automatic communication between them and any other machine connected to the internet without human intervention.

ISACA: Provider of practical guidance, benchmarks and other effective tools for all enterprises that use information systems. See <https://www.isaca.org/>.

Knowledge: Having understanding, based on information and experience, to make sound assessments and decisions.

Knowledge Management: The methods and underlying policies for sharing information effectively so that the sum of the skills, experience and entrepreneurial attributes of all stakeholders is greater than the sum of the individual parts. If done well, each stakeholder also benefits, thus increasing the ‘sum of the individual parts’ that go on to increase the ‘sum of the whole’ in a virtuous circle.

Machine Learning (ML): A computer program having the capability to learn and adapt to new data without human assistance.

Morals and Ethics: Ideas or opinions driven by a desire to be good = morals. Rules that define allowable actions or correct behaviour = ethics. Definition adapted from Dictionary.com. See <https://www.dictionary.com/e/moral-vs-ethical/>.

Social Engineering: Manipulating people to reveal confidential information that will usually be used in criminal activities.

Virtual Environments: Several entities sharing, independently of each other, a physical location or equipment. For example, a physical database is divided into separate, logical entities, each independent of the others. It enables different organizations to share the same infrastructure, creating economies of scale that are cheaper to use than every organization having their own physical location or equipment.

Chapter 10

Uncover the Hidden Relationships of Work: A Visualisation Tool to Support Informed Change Decisions

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ABSTRACT

This chapter aims to explore the possibilities of visualising work-integrated competence networks—here referred to as relatonics—and contribute to the understanding of how to support efforts of organising change. The competence-generating processes of an organisation are problematic in that they are largely hidden in the midst of everyday practice. If not receiving adequate attention, there is the risk of conducting too frequent, disruptive, and unhealthy reorganisations. This strengthens the reason why visualisations of relatonics are of value. The demarcation line between what is hidden, and what is not, is relocated through the use of visualisations of relatonics. A conclusion is that images representing relatonics can be utilised to support informed change decisions.

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INTRODUCTION

The issue of how to understand and lead change in organisations has frequently been addressed both in practice and in research literature (e.g. Beer et al., 1990; By, 2005; Kotter, 1996; Seo et al., 2004). Organisational changes are usually done with the intention to improve some aspects of the organisation, for instance to make the organisation better at performing its core tasks. Such changes can be crucial for the ability to compete in the market, but previous research indicates that a major part of organisational change efforts does not bring the intended improvements (Balogun, 2006; Beer et al., 1990; Brunsson, 2006). There are identified problems both with too frequent and disruptive reorganisations (Brunsson, 2006; Döös, 2007) and with implementing everyday incremental change (Beer et al., 2005). The outcome of organisational changes may actually be the opposite and lead to decreased organisational performance. How come? An explanation put forward here is that people's ability to adequately conduct the core tasks of an organisation is highly dependent on the many times hidden relationships of work, the *relatonics* (Backström & Döös, 2008; Döös, 2007). Since these relationships of work are hidden, it is easy to overlook them when conducting organisational changes, e.g., restructuring the organisation by moving people to a new department. An unintended consequence of change may thus be that the established *relatonics* are disrupted. This is a problem, because beyond individually gained knowledge and skills, people's competence at work is carried in the competence-bearing relationships that form *relatonics*. *Relatonics* emerge around certain core tasks and disrupted *relatonics* lead to decreased competence to perform the work task (Backström & Döös, 2008; Döös, 2007).

Against this background, we argue that uncovering the hidden relationships of work is critical for managers to be able to make informed decisions of what kind of change to impose on their organisation. This chapter suggests visualisation of *relatonics* as a pre-step before making decisions about or starting an organisational change effort; a pre-step intended to understand the already existing competencies of the organisation and its *relatonics*. The demarcation line between what is hidden, and what is not, may be relocated through the use of visualisations of *relatonics*.

Furthermore, a basic assumption in this chapter is that people – managers and staff – act according to their understanding and conceptions of the world (Hmelo et al., 2000; Sandberg & Targama, 2007). This implies that providing new visualisations and images of organisation may aid decisions and actions and improve ways of working. Conceptions of the world are grounded in understanding and largely dependent on experiences, and in certain images coupled to one's understanding. The importance of images has been acknowledged in, for example, organisational ethnography (Cornelissen et al., 2008; Hatch & Yanow, 2008; Ybema et al., 2009). The main

focus of earlier research was to verbalise, i.e., to capture images in words, either in metaphors or in articulation, whereby knowledge is made more explicit or usable to others. For example, Weick et al. (2005) describe the “image of sensemaking” as an “activity that talks events and organizations into existence” (p. 413).

The most frequently used way to represent an organisation is the *organisational chart*, or *organisational diagram* (Mintzberg & Van der Heyden, 1999). This standard image depicts the formal structure and lines of decision-making in an organisation and invites to dealing with change through restructuring reorganisations (Döös, 2007). The organisational chart leaves aside the informal structures of interaction in the processes of work, i.e., the *relatonics* remain hidden. This becomes problematic when it comes to reality’s ill-structured and complicated problems (Kitchener & King, 1990), which, for adequate problem-solving, require the involvement of multiple competences. In such cases, cooperation can suffer from being limited to a single organisational unit or a single organisation. Rather, it often requires both intra- and inter-organisational learning networks (Lubatkin et al., 2001).

The emergence of digital technology has brought with it new possibilities of visualising and creating new images of what goes on in and between organisations. Attention during the last decade has also been paid to visual images and representations when it comes to analysing their contribution to organisational change and development. Cross et al. (2010; Cross et al., 2013) and also Gubbins and Dooley (2010) represent this trend with their work on images based on network analyses of information technology functions in large organisations. Partly relating to this is Forsén et al.’s creation of interactive visualisations that enable identification of colleagues with the appropriate knowledge and expertise throughout an organisation (Forsén et al., 2010). It is interesting to note the potential of today’s technology to explore the issues addressed by Mintzberg and Van der Heyden (1999), who were pioneers in creating images representing how companies really work. They identified and drew four organigraphs on grounds of principle for managerial work: *set*, *chain*, *hub* and *web*.

This chapter is based on theorising and analysis from a research and development project exploring the use of visualisations in task-based development; specifically, the potential of new types of organisational images that may support understanding of work-integrated competence. Thus, the aim is to explore the possibilities of visualising *relatonics* (Backström & Döös, 2008) – and contribute to the understanding of how to support efforts of organising change, especially when organisational boundary-crossing cooperation is needed for a significant task. Two research questions are addressed:

- RQ1: How can work-integrated competence networks (*relatonics*) be visualised through the use of social network analysis?

- RQ2: How can such visualisations of relationalities support change and informed change decisions?

Next, an introduction is given to organisational change and managerial leadership, and to social network analysis as a method for visualisations of work-integrated competence networks (relationalities). Thereafter, follow a theory section that defines relationalities, and the methods section. Then example visualisations are presented. Finally, the chapter closes with discussion and conclusions.

BACKGROUND

Organisational Change and Managerial Leadership

Scholars have used a varying terminology to categorise different kinds of organisational change (Dunphy & Stace, 1988; Seo et al., 2004). It is common a) to differentiate between *small-scale* change (e.g. incremental, continuous) and *revolutionary* change (transformational, discontinuous) and b) to differentiate between change that is *emergent* (Weick & Quinn, 1999) and change that is *planned* or *managed* (Levy, 1986). According to Levy planned change refers to how “internal and external experts can help the organization cope with difficulties and plan and implement changes” (p. 5). Managed change, in contrast, refers to the way in which managers can design and implement changes.

As mentioned above, both small-scale and revolutionary changes in organisations are genuinely hard to achieve so that the change is sustainable and gives the intended result (Balogun, 2006; Beer et al., 1990; Brunsson, 2006). Instead, unintended consequences are since long recognised (see Jian, 2007) and attempts to solve existing problems often result in new problems and tensions (Seo et al., 2004). This paper does not suggest that there is a one best way to achieve organisational change (Burnes, 1996; By, 2005). Rather, we argue that the kind of information about an organisation that is looked for when leading change will most likely vary according to how change is understood.

Furthermore, a revolutionary or discontinuous change involves a break with the existing state of affairs and constitutes a second-order change (Bartunek & Moch, 1987; Levy, 1986). In contrast to first-order changes, that imply small-scale modifications within the existing frames, a second-order change means that the governing values that exist in an organisation have to be changed. Thus, a new theory-in-use (Argyris, 1990) has to be established in the organisation meaning that its members must act on the basis of new understanding.

Human organisations contain both designed, formal structures that establish the rules and routines necessary for effectiveness, and emergent structures created by an organisation's informal, everyday work relations (Capra, 2002). The designed structures are thought to provide stability¹, whereas the emergent structures provide novelty and flexibility by being “adaptive, capable of changing and evolving” (p. 106). Managers and leaders need to understand the interplay between the two (Backström, 2013; Capra, 2002; Cross et al., 2010).

To deal with change efforts is an important and challenging managerial task and managerial work today demands abilities to assess complex situations both in the managers' own organisation and in the outside world. In favour of managers' work situation and of the activity of organisations the research literature is increasingly describing leadership as collective (Denis et al., 2012; Empson & Alvehus, 2019). The interest in distributed leadership is part of this (Alvehus, 2019; Bolden, 2011; Thorpe et al., 2011) and points to a spread of responsibility and power to those not in management positions (Jones, 2014; Spillane, 2005). Seeing leadership as emerging informally, we can, identify its existence as a situations where direction, co-orientation and action space are created (Crevani et al., 2010). Leadership can be seen as an emergent event, an outcome of relational interactions among people (Lichtenstein et al., 2006). Thus, it is not a role-based action of specific individuals, but an activity emerging in interactions.

A planned organisational change has to be implemented and embedded in the everyday work of the organisation (May & Finch, 2009). This means a process of emergence over time in the interactions between people organisation while they are working. A relatonic is the network of interactions used to perform a work task, and thus also the network where new practices, concepts, legitimations etcetera emerge. Also the relatonic is emerging in the relatonic. Thus, as long as the still existing parts of established relatonic decide which ones interact with which ones, a new relatonic will have problems to emerge. Thus, there is a need for managers to uncover the hidden relations of work to be able to support the development of a new relatonic.

Social Network Analysis in Studies of Organisational Change

Networks are originally thought of as open informal structures and, as Barnes (1954) stated, the members of a network do not necessarily know who all other members are – the network ends where the interactions end. Thus, applying the same kind of thinking to an organisation thereby means that the task organisation – in this chapter portrayed as relatonic images – ends where the interactions end.

Social network analysis contains a series of ways of gathering data with a focus on individuals' interactions and structures in networks of relations (Wasserman & Faust, 1994), as well as theories to understand the dynamics of networks and

how to interpret network patterns (Borgatti et al., 2009). This is in contrast to data analysis that focuses on the characteristics and attributes of individuals. Network analysis in the social sciences has been widely used in several areas (Borgatti et al., 2009; Prell, 2012).

A simplification often used in network analysis is to imagine that there is a flow of, for example, information in the network of relations, and that the structure of the network influences this flow. For example, there are often individuals – ‘brokers’ – that are more central to the network than others. Much of the flow of information goes through the brokers, and they are thus very important to the functioning of the network (Allen & Cohen, 1969; Rizova, 2006). This structure can be effective, but also problematic; for example, if the broker gets overloaded with information and, as a result, the others receive delayed, filtered and/or distorted information from the broker (Leenders et al., 2003), this results in decisions and actions based on bad information.

When describing the structure of a network, it is common to use ideal structure types as Mintzberg and Van der Heyden’s (1999) web organigraph, and also to look for parts of the network with a different density of relations between individuals, e.g., groups, and parts with high/low density – ‘holes’ without relations or where only a few relations act as a bridge between sub-networks. The concepts of ‘strong’ and respectively ‘weak’ ties are often used. A strong tie between two persons means that people who are in contact with one of them often are in contact with the other as well, which means there is a number of different ways for the same information to reach both of them (Granovetter, 1973, p. 1362). Strong ties are, for instance, important to be able to understand and make use of complicated new information (Leenders & Gabbay, 1999; Reagans & McEvily, 2003; Sorenson et al., 2006). On the other side, weak ties, where, for instance, two persons constitute the only bridge for information between two sub-groups, are a source of non-redundant information and differing perspectives (Granovetter, 1973, p. 1362).

The network patterns of relations are important as they link micro and macro activities (Granovetter, 1983). The significance of work-integrated competence networks, relationality, most likely depends on the character of the work tasks. Work tasks characterised by given means and ends often need fewer strong ties across boundaries, contrary to work tasks with fewer given means and ends, where strong ties and inter-organisational alliances provide opportunities for reciprocal learning (Lubatkin et al., 2001) are more likely to be beneficial. However, Perry-Smith’s (2006) conclusion from an empirical study indicates that weak ties can be more beneficial for creativity, due to the fact that weak ties tend to provide more non-redundant and varied perspectives than what emerge from social groups with strong ties.

A field of study concerning knowledge management and how to use social network analysis to improve knowledge creation and transfer has emerged (Cross et al., 2002).

For example, network analysis has been used as a tool to aid the senior managers' selection of leaders (who seems central to the trust and respect of a network?) or team members (how do we put together a team that is maximally connected throughout the organisation?). Another use concerns mergers and acquisitions – a frequent occurrence in contemporary working life – where social network analysis points to the importance of the fact that it is not only two cultures merging, but also two separate networks (ibid.). Social network analysis has also been used as a tool for organisational change Cross et al. (2010). Through analysing employee networks, they provided opportunities for leaders to discover how high-performing individuals and teams connect to each other. For example: "...improving collaboration efficiently meant finding ways to connect 'peripheral connectors' – that is, individuals who linked two or three other members to the rest of the team" (Cross et al., 2010, p. 86).

In Cross et al.'s (2002, p. 7-8) work on knowledge-based networks, four dimensions are identified as important for a relationship to be effective in terms of knowledge creation and use: 1) knowing what someone knows, 2) gaining timely access to that person, 3) creating viable knowledge through cognitive engagement, and 4) learning from a safe relationship. A conclusion drawn by Cross et al. (2010) is that managers need to be able to balance both formal and informal structures.

DEFINING RELATONICS – IN THEORY AND PRACTICAL USE

In this paper, we focus on work-integrated competence networks embedded in the ongoing performance of work tasks – what we refer to as *relatronics* (Backström & Döös, 2008). Competence and *relatonic* are therefore two central concepts to be explained in this section, and their origins briefly presented with the help of organisational pedagogics and constructivist learning theory. In addition, the complexity theory of human interaction dynamics (HID) is applied.

The concept *relatonic* denotes the network of inter-personal competence-bearing relationships used when working with an important task of an organisation. *Relatonic* is an organising structure at collective level both enabling and constraining how the work task is performed. Through focusing the competence aspect of relationships (Döös, 2007), the *relatonic* concept contributes to further our understanding of the organising processes at work, and as such the concept adds to the field of organisational theory. A *relatonic* is a structure of relationships that emerges in interactions around a work task. This structure is socially constructed and reconstructed by the collective of people who participate in the performance of the task. And the *relatonic* enables and constrains how work tasks are performed, by the individual members of the collective (Hazy & Backström, 2013). A key determinant differentiating *relatronics* from social network structures in general is that the former focuses on the work-

integrated competence networks that emerge in relation to a certain work task, and, therefore, comprise a resource used when performing a task. This means that in any organisation there are multiple *relatonics*.

Organisational pedagogics (Döös, 2007; Granberg & Ohlsson, 2011) is the theoretical lens that has framed our understanding of work-integrated learning as the experiential process (Kolb & Kolb, 2010; Kolb, 1984) that continually generates *competence*. Competence is a situation and context dependent ability to apply experience in specific contexts that call for action, such as problem-solving at work (Döös & Wilhelmson, 2011). Competence is not only an individual phenomenon – it also exists in the relationships between people through cooperative processes conceptualised as competence-bearing relationships (Döös, 2007). Drawing on Bolden et al. (2011) and Dixon (2000), we suggest that competence is based on three main premises: 1) it is an emergent, task-related quality of an individual, team or network of interacting people; 2) there is openness to the boundaries of competence (both within and beyond the formal organisational structure); and 3) there is diversity, in that crucial competence is spread out across the many, not the few. The competence generating processes, i.e. the work-integrated learning processes are problematic in that they are largely hidden in the midst of everyday practice and, therefore, do not receive adequate attention. This strengthens the reason why visualisations of *relatonics* are of value.

A *relatonic* involves three strata (cf. Danermark et al., 2002) – the individual, the collective and the context. The individual stratum concerns the individuals' competencies and the collective stratum organises the interactions between the individuals and the individuals' socially constructed and reconstructed *relatonic*. The third stratum is the complex ecosystem that constitutes the context of the *relatonics*. The context includes for example distribution of tasks, instructions on how to perform the tasks, and administrative and technical systems of the organisations included in the performance of the work tasks. In addition, there are the managers who have influence over the task execution without being directly involved in its performance. To introduce development, managers can either change the context, or they can interact with members face-to-face to impact their interactions with each other and thus the reconstruction of the *relatonics*. By doing so they act as endogenous change agents, or institutional entrepreneurs (Battilana, 2006), by influencing which organising structures that emerge in the organisation. In this perspective *relatonic* is a central feature of an organisation. It is a structure that organises how work is performed. Further, it focuses individuals both inside and outside the performance of the work task and is a mapping of their social network of interactions influencing the organising cultural, institutional and relational structures of the organisation (Backström et al., 2011).

Using Relatonics in Practice

In practice, a relatonic can be thought of as a competence-bearing network. Such competence networks most often remain unnoticed. This implies a challenge in how to understand, steer and support the emergence and change of relatonics. A specific relatonic may crisscross between several intra-organisational units as well as external partner organisations.

The empirical material discussed in this chapter is based on a research and development project exploring visualisations as a tool for organisational change and development. In the municipality featured in the project, as in many other Swedish municipalities, there was an ongoing struggle with increased expenditure and social costs due to high youth unemployment. Youth unemployment can be described as an ill-structured problem with few given means and ends (Kitchener & King, 1990). Also, when working with youth unemployment, there are several stakeholders who need to be involved and who, by law, have different responsibilities. The senior management of the municipality initiated several efforts to change how work was organised by addressing the problem of youth unemployment from a more holistic perspective. Thus, they launched an *Employment Project* to work with this task, here named as “getting young people into work”. A core part of the project was a small project team working with coordination and job coaching.

An ambition of the municipal senior management was to organise the task of getting young people into work through boundary-crossing – not only working across unit boundaries in the municipality itself, but across to units in other organisations, especially the local employment office². However, the existing organisational structure and the image that represents it – the organisational chart – were described by leaders and managers as problematic, because of the influence both on how the work task was understood and on how resources were allocated. An additional problem that was identified by our research team was that the work task was defined and labelled differently within each organisational part, and was managed as if it belonged only to single organisational parts, thus resulting in sub-optimisation and a lack of coordination. This made collaboration in the task more difficult.

METHODS

The empirical material consists of relatonics analyses of the task of ‘getting young people into work’ in a small Swedish municipality, a couple of interviews with the senior management, and meetings with key people where network images were presented. The visualisations of relatonics was created by using the software NetDraw (Borgatti, 2002), based on a Multi-Dimensional Scaling (MDS) technique

(Hanneman & Riddle, 2005). MDS is a family of techniques that is used for information visualisation to assign locations to nodes in multi-dimensional space (in the case of the drawing, a 2-dimensional space) such that nodes that are, so-to-say, more similar are placed closer together. The algorithm used uses iterative fitting to locate the points in such a way as to put those with smallest path lengths to one another closest in the graph. This approach can often locate points very close together, and make for a graph that is hard to read. In the visualisations, we also selected the optional “node repulsion” criterion that creates separation between objects that would otherwise be located very close to one another.

Relatronics Surveys and the Work-Integrated Competence Network

The relatronics analyses were done on the basis of a web-based survey covering three main areas (see Table 1): Question 1 (Q1) frequency in interaction, question 2 (Q2) topic of interaction, and question 3 (Q3) experienced benefit of the interaction. The answers to Q1 provide a list of names of people with whom the informant interacts. These lists from all informants are used to generate the social network. Answers to Q2 and Q3 address certain qualities of the specific relationships (Prell, 2012).

Table 1. Questions in the relatronics survey.

No.	Questions	Response Alternatives
Q1	Which persons or functions are you in contact with, one way or the other, in the work task of getting young people into work?	Daily, weekly, monthly, rarely
Q2	For what reason have you been in contact with X concerning the work task of getting young people into work?	Routine task, problem-related task, goal-oriented planning, strategic planning
Q3	How much benefit have you had of person X in the work task of getting young people into work?	Rating between 1 (not at all) and 7 (very much)

In our efforts to draw the map of relatronics concerning the task of ‘getting young people into work’, three main steps were taken: 1) A senior manager – responsible for the newly started employment project in the municipality – identified three other key individuals in the task, two of whom worked within the municipality (one team leader in the employment project and one manager at the social welfare office). The third key individual worked at the local employment office³. 2) Interviews were done with all four key individuals to map their network of people for the task. The interviews resulted in a roster consisting of 62 individuals. 3) A web-based

questionnaire, using the roster, was distributed to the entire network. Additionally, when answering the questionnaire the respondents had the possibility of adding new people (with whom they interacted in the task).

The questionnaire was distributed (close to the project start, here referred to as T1), resulting in a response rate of 81% and was followed some six months later (T2) by a second identical questionnaire. For the second questionnaire, the list of names was edited due to the fact that some people had turned out not to be relevant to the network. Also, a few people were added, including people that had changed job descriptions and who now potentially could be part of the network. The second questionnaire was distributed to a total of 59 respondents, resulting in a response rate of 75%. In comparison to most response rates these are remarkably high. An interpretation is that this both reflects an interest among the participants to take part in development of the work task at hand, and also when having answered the questionnaire, a readiness to later receive and discuss the images presented.

VISUALISING A CRISSCROSSING RELATONIC

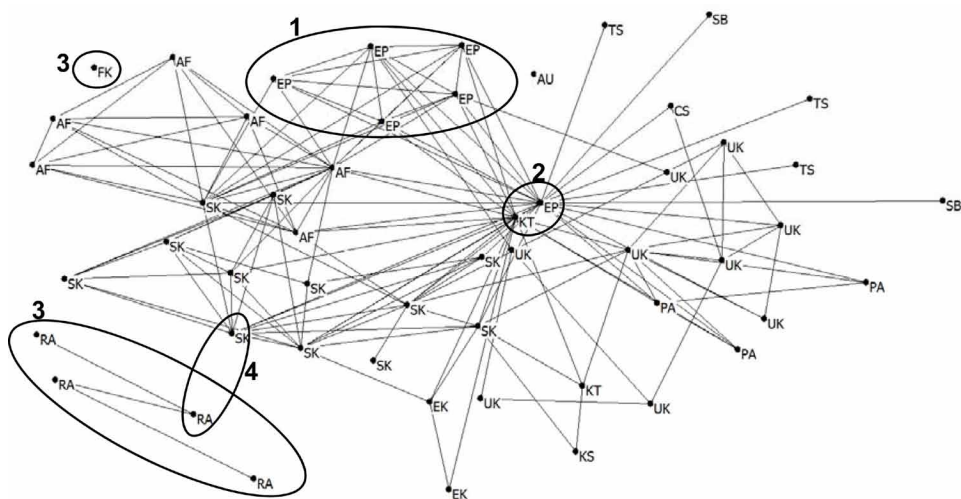
In this section, we present empirical illustrations of how relatronics may be visualised through the use of social network analysis (based on Q1 above), and provide some insights on what qualities such images may possess. Through visualising the relatronics of the task of ‘getting young people into work’, additional images of the organisation emerged; images deviating from the standard image of the organisational chart, and revealing a relatively distributed work-integrated competence network, i.e., a relatonic crisscrossing municipality units, as well as external organisations. A challenge, then, is how to manage and lead such cross-unit connectivity, and avoid sub-optimisation. Images of work-integrated competence networks offer glimpses of the work in/of an organisation that are otherwise rare. Three images will now be presented. First, the whole relatonic of the task (figure 1), including members from several municipal units and other organisations, and second, two images visualising a change concerning the project-team’s network at the start of the project and half a year later (figures 2 and 3).

What qualities, then, do the images encompass that can be useful in the organising of work and the planning of future change? Four types of zones of interest are encircled and numbered in figure 1. The reason that these zones are interesting is their potential to:

1. identify social groups and dedicated teams across the organisation – here, the project-team is identified;
2. identify key individuals – here, two central individuals are seen;

Uncover the Hidden Relationships of Work

Figure 1. The relational network of the work task 'getting young people into work' close to the project's start, and showing the four identified areas of use. The lines indicate that people are in contact at least on a weekly basis in relation to the task. The nodes represent people in different functions and with different labels signifying organisational belonging (the label EP refers to the project-team)⁴.



3. identify non-connected units or individuals – here, one unconnected node and one unconnected organisational unit are shown; and
4. identify potential peripheral connectors – two individuals seem to be close enough to possibly bridge.

To further illustrate what qualities the images can bring forth, we use the network images of the project-team (the encircled nodes in figure 1 marked with a 1). Thus, it is the relationships of the project-team, identified in figure 1, that are further explored in figures 2 and 3. These images represent the network of the project-team at the project start (T1), in comparison with half a year later (T2). At the project start, the project-team was characterised by strong ties within the team – an important configuration to be a dedicated team. However, the members, except the project-team leader, had a limited number of relationships, and had weak ties to people outside the team. An interesting observation, six months later (T2), was the fact that the core team of the project, i.e. the project-team, had kept its strong ties within its team, and had also incorporated two new members into the project-team. Further, the project-team members had seen a large increase in weak ties. The mixture of strong and weak ties is important, since weak ties increase the likelihood of being exposed to new non-redundant information, and the strong ties within the

Figure 2. The relationships of the project team close to its start (T1), with the team-leader encircled. The lines indicate that people are in contact at least on a monthly basis in relation to the task. Nodes without lines are less frequent relationships, except from the ones listed in the upper left corner which are non-connected nodes (the label EP refers to the project-team).

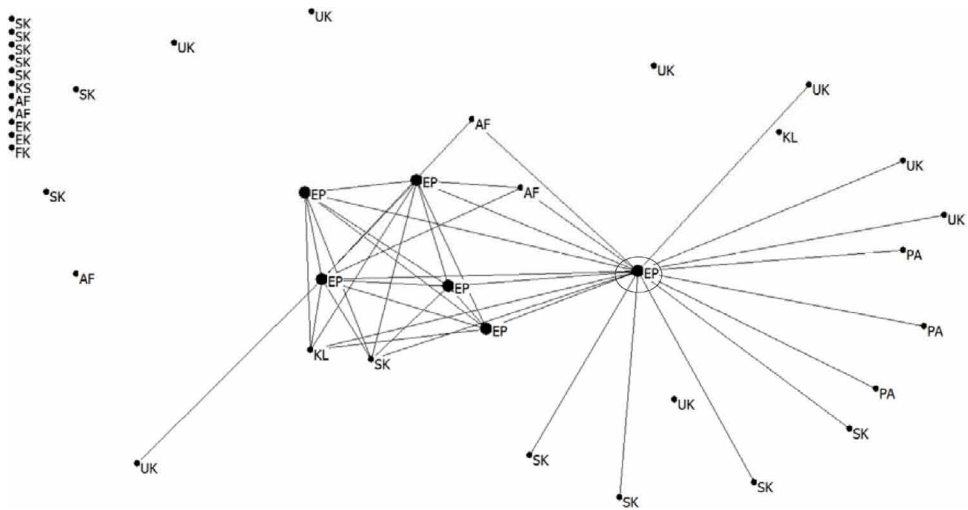
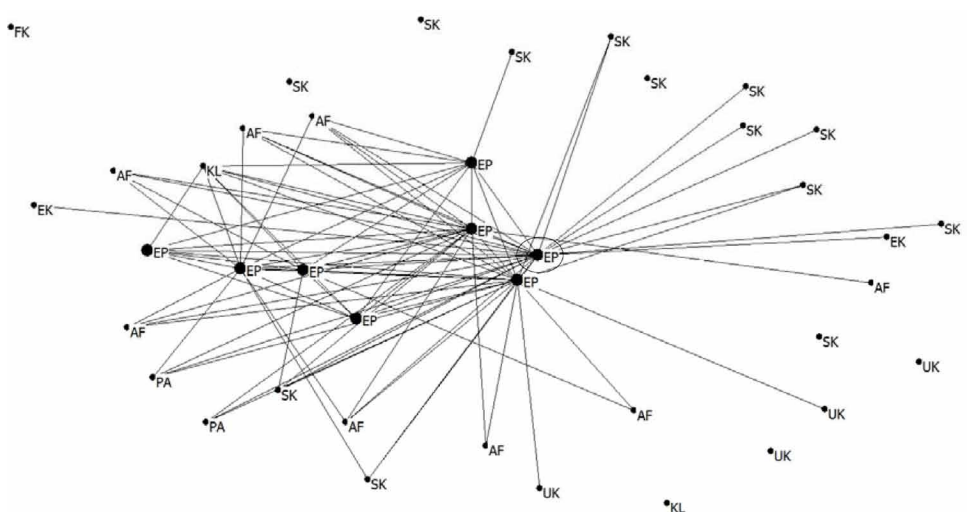


Figure 3. The relationships of the project-team half a year later (T2), with the team-leader encircled. The lines indicate that people are in contact at least on a monthly basis in relation to the task. Nodes without lines are less frequent relationships, except from the one listed in the upper left corner which is a non-connected node (the label EP refers to the project-team).



core team create a joint action space for sharing, and therefore a favourable position for creating shared knowledge.

Through the images, it also becomes possible to identify key individuals, i.e., people of decisive and central importance. Thus, social network analysis can make individuals with a high degree of centrality visible, e.g., individuals that act as connectors and brokers between units or organisations. Early in the project, the project-team leader accounted for the major part of relationships outside the project-team (figure 2). In figure 1, this is also seen by her not being included in the circle that marks the project-team. The reason for this is that she had begun to cover several structural holes in the network, since she interacted extensively with people from several other organisational units outside her own. Being in the midst of the information flow gave her a strategic advantage, and could bring in valuable non-redundant information to the project-team. Yet, one may also say that the project-team was vulnerable since, in its current structure (figure 2), the project-team leader acted as the single link to other units and organisations. In the long run, this arrangement entailed a risk of overload and of creating a bottleneck that would risk harming the performance of the work task. However, in our interviews with the project-team leader, she stated that she intentionally worked towards involving more people in the task. The success of this ambition is visually represented in the difference between figures 2 and 3. When looking into the changes in the density of the network, there has clearly been a considerable growth in the total number of relationships. At project start (T1), there were 76 ties (figure 2), compared to six months later (T2), when there were 191 ties (figure 3) – almost two and a half times larger. With less centrality, the project-team leader had made herself more dispensable. Even though she still had a large number of relationships, it was the case that other members of the project-team also possessed the competence and carried out the task.

Finally, the images make it easy to identify non-connected units or individuals – an issue that is otherwise hard to capture and which, therefore, often gets neglected. There can be several reasons for being non-connected or peripheral in a specific task, but our point here is that the images can be used to initiate reflection and discussion about who or what functions should or should not be connected to the task; the following reflection from the project-team leader illustrates that point:

We need to work on this, we want to embed them [The Social Insurance Agency]. It is, ultimately, extremely important. ... And also the County Council. They have an open psychiatric clinic and these are the kinds of things to which we need to have good communication links. None of the youths we are working with, is only relevant in one business, so it is important that we establish contacts with the Social Insurance Agency and the County Council.

In the above quotation, she identifies The Social Insurance Agency as an organisation with which they need to be in contact for the task, but obviously were not at that time – a so-called non-connected unit. Also, when looking at the network, the project leader starts to reflect on the fact that there are other important collaboration partners that are missing, not being a part of the network as it is today. From this, it is possible to conclude that the images say not only something about the existing network, but also something about what is not a part of the network and point out what needs to be developed. Through putting a decisive task at the centre and initiating discussions on whom or what functions need to be connected, issues related to competence are implicitly addressed.

A number of network images were presented to people in this network, which made it possible for us to note what the images invite to. In a meeting, where the images portrayed the current network situation, a lot of conversations and reflection took place. Apart from stimulating joint reflection, it became evident that people made different interpretations and explanations of what they saw. With the images shown on a large screen, people got to their feet and pointed at parts of the network where they saw something to discuss. In addition, reflection started about how the network could and should look in the future; there was variation in interpretations and arguments that surfaced.

DISCUSSION AND CONCLUSION

Organisations constantly struggle to find the most appropriate structures for continuous work-integrated competence and satisfactory task performance. A challenge of managing the dynamic complexity with multiple stakeholders is how to get an overview of the real flow of work going on in and across organisational units – a work flow that most likely goes beyond the formal lines of decision-making and organisational structures. Thus, boundary-spanning, work-integrated competence networks are here regarded as a crucial resource in dealing professionally with complicated tasks involving multiple stakeholders.

The concept of *relatonic* has emerged out of extensive empirical studies, and its main contribution lies within the fields of organisational theory and organisational pedagogics. In previous published work the authors have laid out the foundation for the concept of *relatonic* (Backström & Döös, 2008), and, the present chapter adds to previous work through exploring the possibilities of visualising *relatonics*, and, contribute to the understanding of how such visualisations can support efforts of organising change, e.g. when organisational boundary-crossing cooperation is needed for a significant task. In the previous section RQ1 was addressed in showing how work-integrated competence networks (*relatonics*) can be visualised through the

use of social network analysis. Thereby, some of the issues that such images bring forth were addressed and we now turn to discuss how the visualisation of relationalities may support change and informed change decisions. It might be probable that the visualisations mainly support small scale, incremental change aided by planned emergence. In relation to revolutionary change we argue a contribution through the potential of preventing too frequent disruptive reorganisations to take place. This would be likely both because the visualisations invite to other types of change efforts, e.g. through connecting people through new distributions of work tasks, and because to be able to see how competence is carried in relationships means seeing value that the organisation would prefer not to lose.

The kind of images presented here can be utilised to identify areas with a developmental need and, in this way, can be a resource to make more knowledgeable change interventions and enable a relationality to emerge in certain directions. Regarding the distributed and relational qualities of competence (Backström & Döös, 2008; Bolden et al., 2011; Dixon, 1994), and also understanding work-integrated learning as the experiential process (Kolb & Kolb, 2010; Kolb, 1984) that continually develops competence, the images have the potential to support people's sensemaking and thereby change their conceptions. When managers, other change agents and staff can all have access to new images, they also have the potential to ask new questions and discuss new kinds of interventions.

In visualising relationalities, this chapter has pointed to the possibilities of identifying task-relevant information in the form of network images that display interaction data. The example images (figures 1-3) both display qualities of a certain network structure and show changes over time. In addition, the images can be related to one another, thus elaborating in detail the relationships of a certain dedicated team within the overall network. As researchers, i.e. agents outside the relationality and also outside the work task of a certain relationality, a possible contribution lies in asking people in the network about how they would like to change or stabilise the visualised relationships between individuals and organisational parts. This would, using Levy's (1986) terminology, be understood as a planned change which would help the members of organisations involved to change the interaction, thus, aiding in the future emergence of the competence network, the relationality. In addition, we have seen cases of managed change (Levy, 1986) as school principals on their own constructed and used similar visualisations. Our questionnaires were used as point of departure to investigate multiple relationalities in some section of their own schools. For example, the principals found out that the work tasks of two different relationalities – one concerning pupils' health and the other pedagogic development – were too separate. Having identified this problem meant that they could start supporting a change (Döös et al., 2015a).

The images of figures 1-3 in this paper, when shown to the people involved, supported discussion and the asking of useful questions. This kind of visualisation is made possible through digital technology, which has the capability of handling a lot of information and transforming it into understandable images. Viewing the reality of relationships within the work task through these network images enabled changes in people's conceptions, since the normally invisible relationships were not hidden any longer. When confronted with such information, it becomes inviting to comment and try to understand both what the images represent and what could be changed for the better. The demarcation line between what is hidden, and what is not, is relocated through the use of visualisations of relatronics.

The theoretical lens of organisational pedagogics (Döös, 2007; Granberg & Ohlsson, 2011) has, in the work on which this chapter is based, primarily been used to define work-integrated competence and relatronics, as well as to identify the value of competence-bearing relationships in important tasks. On this foundation, and with inspiration from previous social network analysis studies (Cross et al., 2002, 2010), it seemed reasonable to try to display otherwise hidden work processes so that they may be discussed. It has long been a problem to visualise relevant information about how competence is enacted. When it comes to relationships of importance to task execution, the network image tunes-in well with the suggested competence premises of being an emergent task quality, having open boundaries beyond formal structures, and being spread out and circulating among the many (cf. Bolden et al., 2011; Dixon, 2000).

Drawing on contemporary understanding of distributed leadership (Bolden, 2011; Thorpe et al., 2011), distribution here seems facilitated through two mechanisms. Firstly, the data provided, i.e., the input to the images, come from the people involved themselves – the ones interacting in the network structure are the ones who have purposely contributed information about their contacts in the specific task. This is in contrast to images that are produced through reusing e.g. people's mail conversations generated in order to execute work tasks. Data differs from the traditional organisation chart, which simply gives the picture of a people-empty structure decided by management. Secondly, the images present the same information to everyone, so shortcomings and potentials are equally accessed. This produces questions from the people involved, including the leaders who, in this case, become members of the network community (cf. Bolden et al., 2011) and not its superiors. Once this has happened, a new direction, co-orientation and the creation of an action space (Crevani et al., 2010) may be discussed by all involved, thus contributing jointly to forming the next steps of change.

Images of relatronics provide rich pictures of organisation and, for some of the interviewees, gave a strong feeling of both recognition and amazement. It is important to be aware that interpretations of what the images represent are dependent

on interpreters' experience of using images as representations of reality. Still, the images seem to stimulate reflections on how work is organised, and seem especially relevant in times of ongoing organisational change. The images can confirm senior managers' mental images of existing patterns of interaction and collaboration, as well as challenge their preconceptions about such patterns, e.g., by making hidden collaboration patterns visible; thus, possible to intervene in.

To conclude, the fact that social structures, like *relatonics*, cannot be fully controlled, might be considered a challenge by some managers. However, network images do afford opportunities to understand the possibilities of intervening, for example, through appointing people to shared tasks, which means that there are possibilities to facilitate the emergence of changed structure (Döös et al., 2015b). Through such use, some unnecessary, even harmful, transformative change efforts and restructuring may be avoided. Moreover, we suggest that visualisations of task important *relatonics* can be used as a pre-change step. If managers and leaders would have knowledge, about the vital competence-bearing relations that show in visualisations of *relatonics*, this would facilitate informed decisions and actions. This could result in fewer unhealthy reorganisations and a greater number of cases where managers and leaders decide to support emergence.

FUTURE RESEARCH DIRECTIONS

By using computer software like Ucinet6 and NetDraw, managers, as well as staff, could in principle create their own network images of tasks in their own organisations – real images based on real or imagined data. However, this is hardly realistic in most organisations – despite the school principal example given above – at least until both the data input and interpretations of the image outputs are easily handled and facilitated. In the case used in this chapter, a rather fuzzy organisational reality is visualised, which provided an overview that is otherwise hard to get. The network analysis may also be used on a smaller scale to reveal potential gaps in interaction between key functions in an organisation. Future research will also look into other new ways of visualising *relatonics*, keeping an eye on the potential here identified using task-related non-hierarchic representations.

This chapter gives empirical indications of the value of *relatonics* visualisations in modern organisations. One key step in the development of a future tool for practitioners is to make it easier and less resource-demanding to produce such visualisations. One group of questions concerns the data necessary to collect to be able to produce a good enough understanding of the *relatonics*. For example: which data do you need? Is it enough to ask whom you interact with while working with the specified task, or do you have to ask also about the quality of the interaction?

How much data do you need? Is it enough to ask a few key informants, or do you have to ask everyone in the relatonic? Another issue is to design integrated software that is able to manage the collected information and produce the visualisations in a user-friendly way.

A relatonic is an organising structure that emerges out of interactions between individuals in a specific context of tasks, available colleagues, constraints etc. It is thus possible to understand how the structure of today's relatronics came to be, if you have historical data about interactions and context. Consequently, it is also, in principle, possible to give prognoses for the relatronics of tomorrow for different changes in context.

There are at least two techniques that could be used for a relatronics simulation tool. One way is to start with individuals and their interactions and use agent-based models (ABM). The goal of ABM is to simulate the collective behaviour of agents. Agents obey simple rules and can learn from experiences. Changes emerge iteratively at various stages. Different, simple rules of agents, their interaction with each other, and the context leads to the emergence of different collective behaviour, in this case relatronics. The other way is to start at the system level, with the relatronics. Human interaction dynamics (HID) is an analytical framework developed using information theory and mathematical models (Hazy & Backström, 2013). Structures at the collective level, like relatronics, are described as categories. Drawing support from the category theory of mathematics, deductive logic can be used to predict the emergence of organising structures.

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KEY TERMS AND DEFINITIONS

Competence: Basically competence is defined as a situation and context appropriate ability to act (Döös, 2007). We suggest that competence is based on three main premises: a) it is an emergent task-related quality of an individual, team or network of interacting people; b) there is openness to the boundaries of competence (both within and beyond the formal organisation structure); and c) diversity in crucial competence is spread out and circulate across the many, not the few.

Competence-Bearing Relationship: Competence is not only an individual phenomenon, it also exists in relationships between people through cooperative processes conceptualised as competence-bearing relationships (Döös, 2007).

Distributed Leadership: Distributed leadership indicates that leadership is viewed as an activity that is spread out between the members of a group or organisation (Bolden, 2011). Leadership may be seen as emerging informally (Lichtenstein et al., 2006) and its existence may be identified as the situations in the work of a team where direction, co-orientation and action space are created (Crevani et al., 2010).

Human Interaction Dynamics (HID): HID is based on information theory and its focus is to understand how interactions between individuals give rise to structures at a collective level, and how these structures influence the behavior of the individuals (Hazy & Backström, 2013).

Learning Learning: Is here thought of as the experiential process (Kolb & Kolb, 2010; Kolb, 1984) that generates competence. Learning among the members of an organisation take place as integrated with the execution of work tasks, which points to the fact that work tasks, problems and situations at work afford on-going opportunities for the development of competence.

Organigraph: Mintzberg and Van der Heyden (1999) identified and drew four organigraphs on grounds of principle for managerial work: set, chain, hub and web, and with an interest to depict how companies really work. The idea was to reflect the ways people organise themselves at work. They stated that organigraphs are more than pictures; they are maps that give overview. “Unlike the org chart with its strict rules of arrangement, an organigraph requires managers to create a customized picture of their company, something that involves imagination and an open mind” (p. 90).

Relatonic: Work-integrated competence networks embedded in the on-going carrying out of work tasks, what we refer to as relatronics (Backström & Döös, 2008). A key determinant differentiating relatronics from social structures in general, is the fact that relatronics emerges in relation to a certain work task, and comprises the competence bearing relationships one is using to perform the task; thus, there are multiple relatronics in an organisation. A relatonic may crisscross between several organisational units and, also, cross the boundary of the organisation to include external partner organisations.

ENDNOTES

- ¹ In reality, however, this can be questioned in times of extensive reorganisation (e.g., Brunsson, 2006).
- ² The local employment office is not part of the municipality organisation. The employment service in Sweden is Government-owned (national level) and has local offices in municipalities.
- ³ This key individual being part of the network points to an example of inter-organisational collaboration.
- ⁴ In the original images of the project colours are used to represent organisational belonging. Colour is a quality that enhances the understanding and interpretation of the images.

Chapter 11

E-Learning: Emerging Themes and Implementation Principles

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ABSTRACT

The e-learning environment has changed at an unprecedented pace since 2014. As corporate and higher education learning environments continue to immerse themselves in e-learning, what themes and implementation principles will follow? E-learning instructional practices that allow learners to be engaged in instantaneous global collaboration have fundamentally changed higher education and leadership development. This chapter will discuss how the Sharable Content Object Reference Model (SCORM) delivers a positive impact on learners and enhances organizational outcomes. Furthermore, this chapter will offer updates on e-learning pedagogy, as well as how these mediums potentially interconnect with future e-learning technologies.

INTRODUCTION

The combination of technology and learner communication drives the design of effective e-learning platforms. For clarity, e-learning is “the utilization of learning, communication, and digital technologies” to deliver technology-facilitated, hybrid,

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and technology-driven courses in higher education and corporate settings (Lim, Ripley, & O'Steen, 2009). Technology-facilitated e-learning uses electronic content delivery only as supplemental material to face-to-face classroom interaction. In contrast, hybrid programs incorporate electronic content delivery in 75% or more of the total course material and teaching time. The e-learning method that is growing the most in both higher education and corporate leadership development is technology-driven mediums. Technology-driven e-learning is where course material is delivered almost exclusively online with little to no face-to-face interaction. As each of these three e-learning models has rapidly spread across corporate leadership development and higher education, consistency in quality, content delivery, and impact on organizational outcomes have varied considerably (Anton et al., 2019).

SCORM's initial development aimed to "provide useful data and content structure to construct efficient, cost-effective, and usable" e-learning platforms. Widely used examples of Learning Management Systems (LMS) that utilize SCORM include edX, Moodle, Blackboard, and Canvas. Currently, SCORM remains the benchmark for developing and implementing e-learning systems in higher education and organizational leadership development settings across the globe. Each LMS mentioned has taken on the issues of quality, content delivery, and learner outcomes in different ways. For example, edX has partnered with 140 academic institutions to offer over 2,500 courses taught with technology-driven e-learning.

Furthermore, edX creates full customizable organizational learning programs for corporations across the globe. As an open-source, not-for-profit learning environment, edX has over 20 million learners enrolled in programs and coursework globally. The innovative research and pedagogy edX employs demonstrates how far SCORM has come since 2010. The flexibility that SCORM offers LMS developers creates an information-rich, technology-based learning environment for higher education and global corporations of all sizes and financial means. From the most prestigious academic and corporate institutions to smaller entities can now employ or source LMS systems that meet their diverse educational needs. This chapter aims to introduce the reader to SCORM's background, recent academic and corporate developments, and provide evidence-based implementation principles.

BACKGROUND

The proliferation of e-learning across prestigious academic and corporate institutions has resulted in an explosion in LMS development. E-learning has transformed from simple combinations of networked servers and educational content to globally available, on-demand networked systems that serve millions of learners simultaneously. This transformation of e-learning allows the learner access to

instructors and subject matter experts (SME's) that otherwise would be impossible. SCORM's application in LMS development affords instructors to construct learning modules that increase student understanding of course material. LMS's also serves a critical role in evaluating student comprehension of course content and areas of opportunity where material mastery is lacking (Jayakumar et al., 2013). This process allows e-learning to become "an effective learning process by combining digital content, learning support services, and skills students can readily apply" (Jayakumar et al., 2013).

Institutions of higher education began offering blended or fully online courses since the late 1990s (Park, 2009). Since the late 1990s, almost every institution of higher education, including Ivy League schools now have e-learning offerings for a diverse range of adult learners. Although e-learning is a departure from the traditional pedagogy of the face-to-face classroom environment, it has enabled access for millions of adult learners and increased economic mobility across the globe (Anton et al., 2019). While e-learning has several challenges, its development, and maturation has made technology-driven educational offerings attractive and cost-effective to students. As broadband connectivity (≥ 25 Megabytes Per Second) increases in developing and rural areas globally, e-learning options will continue to draw high volumes of users and subsequent benefactors.

Through iteration and refinement, e-learning has evolved. As with any new technology-enabled system, there tends to be a high degree of energy and monetary expense at inception. The rapid expansion of e-learning is due to open-source environments, which have contributed to improving education quality, LMS flexibility, and integration capabilities (Cabrero, 2012). The endeavor for efficiency in e-learning has resulted in the continued development of sophisticated, learner-centered LMS environments built utilizing SCORM. While the combination of digital mediums, content curation, and learner management varies significantly by LMS, SCORM remains the backbone of technology development.

Recent developments in LMS creation has allowed e-learning to proliferate in global business environments. Whereas computer-based training (CBT) was the standard for many government and non-governmental organizations in the late 1990s and early 2000s, technology-driven e-learning has since replaced it. The reason behind technology-driven e-learning's rapid ascension in global business environments is framework maturation. As the LMS framework matured, corporations realized that technology-driven e-learning was a worthwhile investment in the future of employee and organizational development. The need to maintain pace with the increasing speed of technological advancements helped serve as an additional forcing function for this adoption.

To understand the implementation of LMS and technology-driven e-learning on a large non-academic scale, we examine the Department of Defense (DOD),

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specifically the United States Army (US Army). Before 2010, the US Army extensively utilized CBT for Soldier personal and professional development. Training ranged from annual safety tasks, personal responsibility while on vacation and achieving promotion points to advance professionally. Delivery often was accomplished through scripted CBT programs that produced training materials then quizzes to determine mastery. Since 2012, however, the US Army has adopted a more dynamic technology-driven e-learning approach via several LMS (Blackboard, Skillsoft) that has resulted in decreased costs, improved learner outcomes, and participation in self-directed learning. As the DOD and US Army continue to conduct global operations, technology-driven e-learning will be the primary source of on-demand, meaningful training.

THE ERNST & YOUNG INTELLINEX INITIATIVE CASE STUDY

Ernst & Young is a leading business advisory firm employing 77,000 people worldwide. The Americas as a whole is the firm's most extensive base, comprised of 31,000 employees, and the United Kingdom, with 8,200 personnel, is second. There are significant practices in the major European countries as well as in Australia and the Pacific Rim. Clients are predominately receiving advisory/audit and tax, corporate advisory, and information systems services.

Intellinex is the e-learning venture of Ernst & Young. It was established within the firm in May 2000 to take advantage of emerging market opportunities. At the time, e-learning was the most critical application of connectivity. The resulting product, LEAP (Learning Environment to Accelerate Performance), has been promoted internally within the firm and made available to clients. Over time Ernst & Young/Intellinex have created a comprehensive learning system with multiple components. Such systems and any visit to a conference or exhibition will reveal no shortage of competitors, present a considerable challenge to training and delivery.

Early work on learning systems within Ernst & Young took place in the 1990s. An intriguing question arose: How would subject matter experts design training if they had this responsibility? This question is particularly compelling within Ernst & Young because much of the internal training relates to highly technical advisory and tax matters on which specialists have much of the expertise. Sharing knowledge across the organization could generate considerable business advantages, but these specialists do not necessarily have skills in-classroom training. Initial success led to rapid product development. Accelerated product development supported Intellinex's e-learning system to support external client's efforts in addressing the knowledge transfer aspects of broader business initiatives.

From these beginnings, the use of e-learning at Ernst & Young has developed into a global initiative. Externally, Intellinex has a client list that includes organizations as diverse as Dow Chemical, Glaxo Smith Kline, Cisco Systems, and JP Morgan Chase. Cisco Systems is a particularly interesting example because it is using Intellinex services and technology to manage the creation and delivery of learning to Cisco channel partners around the world.

Products and Systems

Intellinex emphasizes the comprehensive nature of its e-learning services (and a commitment to tailoring them to its clients' needs). Performance consulting support (Intellinex's preferred team) is essential for effective implementation and to maximize benefits from the system. The major components of Intellinex's product range and services include:

- A learning management system (LMS) offers organizations the facility to deliver content to the learner using the corporate intranet or the Internet. It also provides tracking, recording, and reporting information on usage. Over time this will evolve into a personal development and competence management system.
- Two significant learning channels are available. First, stand-alone Web-based modules accessed at the individual's PC and, second, a connected classroom featuring technology-based and instructor-led features allowing synchronous learning.
- A learning development system allows non-programmers (and non-trainers) to author content (to write and develop using specially designed tools and templates). Over time this has become part of a broader learning content management system. In this way, the authoring tool is part of the "cycle of content."
- Off-the-shelf content developed both by Intellinex, and other suppliers delivered in the form of short learning modules.

Other services concern the technology platform. There is a range of alternatives for hosting the LMS, depending on the client's technology architecture.

Some Important Issues

Intellinex has the advantage of a large internal population that has acted as a laboratory for product development. The initial focus is product mix with two content delivery channels that allow users to participate in technology-driven and hybrid e-learning.

E-Learning

Although satellite broadcasts proved cost-prohibitive to deliver technology-driven e-learning after early iterations, this model started to gain traction. Hybrid models employed by Intellinex focused on soft-skills training, which afforded instructors face-to-face interaction with learners as needed. As Intellinex created an LMS to deliver technology-driven and hybrid learning programs, it started to become a competitive advantage in its organizational development space.

Intellinex's belief that LMSs are becoming a commodity in organizational development is reasonable. As Intellinex's develop specific technology-driven content, areas of opportunity will surface as e-learning pedagogy continues to mature. While instructional design and delivery are current challenges, the value-add of e-learning is worth it. As the prevailing model assumption that a classroom instructor is required to add value subsides, technology-driven content and models will grow in the organizational development space. As the technology-driven e-learning delivery model grows in popularity, content must be able to engage learners and improve current organizational development outcomes.

Case Study 1: The Ernst & Young Intellinex Initiative, "The E-Learning Revolution, How Technology Is Driving a New Training Paradigm." Used with the written permission of Martyn Sloman.

SCORM E-LEARNING FRAMEWORK

SCORM serves as the method for providing a standards-based framework for the development of digital software and infrastructure for e-learning. Recently, e-learning has become more prevalent, with SCORM serving as the benchmark for developing e-learning systems in academic and professional organizations. While the development of e-learning material was previously an expensive and complicated process, SCORM can mitigate these risks (Arman, 2009). While technology inherently brings change within an organization or business unit, active leadership, and instructor feedback during the development process can mitigate negative perceptions of e-learning (Arman, 2009). Specifically, ensuring that data and critical features that instructors and end-users interact with are accounted for and programmed into the LMS is crucial (Maxwell, 2013). Many LMS implementation setbacks are minimized by integrating end-user feedback and adhering to SCORM's technical and programming standards. As Machine Learning (ML), Artificial Intelligence (AI), and Application Program Interfaces (APIs) add further complexity to the delivery of e-learning, the deployment and evolution of SCORM will ensure the learning experience retains quality. The development and integration of ML, AI, and APIs will create a

more agile e-learning environment that will have to evolve rapidly to meet learner requirements (Poltrack et al., 2012).

As with the adaptation of SCORM to program and build LMSs in academia and industry, technology tends to change and improve communication across systems. SCORM conformance has become a priority as institutions across academia and industry have multiple systems that demand seamless communication and integration for knowledge sharing (Maxwell, 2013). These features of SCORM have benefited developers, and end-users as access, affordability, and quality of technology-facilitated, hybrid, and technology-driven e-learning has increased considerably. While LMSs deliver the actual course material, SCORM is the digital backbone that has afforded stakeholders increased access, affordability, and learning outcomes. The impact modernization of SCORM and LMSs has had on corporate and academic e-learning since 2005 is immense. To understand what SCORM means to LMS development and interoperability, the summary below sums it up best:

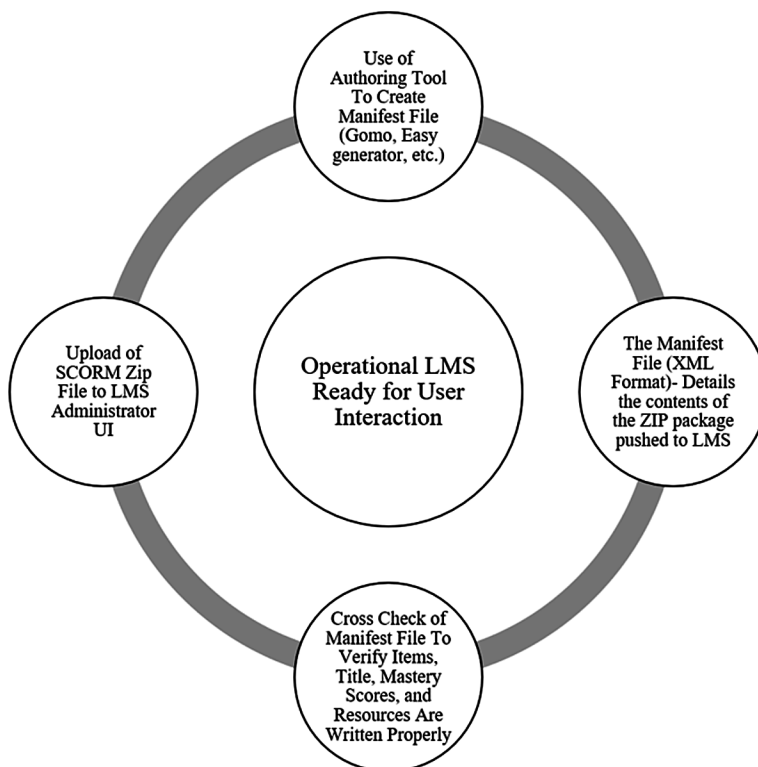
When plugging a device into your computer, it often goes into the Universal Serial Bus (USB) port. The USB port serves as a standard specification for hardware makers. Without the USB port, each product would likely have a proprietary connection plug. SCORM is e-learning's USB port between technical specifications and how LMSs deliver the end product to the learner.

E-LEARNING DEVELOPMENTS

SCORM's ability to tailor content curation, instructional methods, and interoperability have experienced significant progress since 2009. These abilities also make SCORM resilient to technology evolution without having to complete frequent and costly redesigns. SCORM's resilience, content curation strengths, and interoperability with a diverse range of LMSs afford academic and corporate learning entities significantly flexibility. To fully understand this process, the figure below details how SCORM leads to a functional LMS.

The abbreviated SCORM cycle demonstrates a step-by-step process similar to the creation of web-based programs. Authoring tools (Gomo, Easy Generator) create SCORM compliant course content. Next, the authoring tool and careful review of design specifications create a comprehensive and dynamic manifest file that serves as a code-based operations manual for the LMS. Items serve as SCORM modules that include content titles, mastery scores (For quizzes, assignments, and discussions), and resources that allow learners to engage in e-learning activities. Application of these steps creates an environment where programming and content development cross-checks reduce unnecessary errors, costs, and organizational implementation

Figure 1. Abbreviated SCORM Cycle



burden (Rustici, 2009). The creation of targeted plans, learning outcomes, and end-user design input allows SCORM to aid in the development of efficient LMSs.

SCORM provides resiliency safeguards against industry fluctuations and the pace of technology advancement. Adherence to this consideration allows SCORM to remain the industry standard in LMS development and to continue creating useful academic and organizational e-learning tools. As technology-driven e-learning continues to spread through academia and industry, durable and socially responsible LMSs will continue having a SCORM backbone (Lim, 2013). This ability allows full transferability of instructional components developed in one location and even with different authoring tools as long as they are SCORM compliant (Rustici, 2009). E-learning's overall goal is granting learners access to affordable and meaningful course content that is not otherwise available. Millions of consumers now have access to dynamic and relevant content developed with SCORM delivered on technology-driven platforms like Coursera and edX.

E-learning has witnessed significant changes in pedagogical approaches since 2014. Changes in the e-learning environment have allowed learners access to a

myriad of content and affordable learning options (Haythornthwaite et al., 2016). This increase in e-learning content and access possibilities have drawn attention to an array of interacting elements: the variety of technologies; collective practice of teachers, learners, and educational institutions; questions of academic rigor; technological readiness of stakeholders, and identity of the instructor/learner relationship (Haythornthwaite et al., 2016). As this array of elements interact in a global e-learning environment, distinct pedagogy challenges arise. The engagement of the agentic learner in technology-driven e-learning settings is the pedagogical challenge discussed in this chapter. Agentic learners are pro-active in self-development that provides personal meaning and increases knowledge (Billett, 2009). Before 2009, agentic learners had limited options for meaningfully engaging e-learning. Fast forward to 2020, agentic learners that desire to engage in self-development on e-learning platforms now have an abundance of options from the best academic and corporate institutions in the world.

To complicate the engagement of agentic e-learners further, enter human agency theory. Human agency refers to the capability to influence one's functioning and the course of events by one's actions (Bandura, 2006). The previous line might seem out of context for a chapter covering e-learning; however, the learner not SCORM compliant LMS developers dictate a preference for which technology-driven content they chose to consume. The learner decides which courses, certifications, or even degrees they consume via technology-driven e-learning. Learners are neither autonomous agents nor simply mechanical conveyors (Bandura, 1989). Therefore, the development of impactful e-learning LMSs and learner content must consider human affect and cognition.

To gauge learner affect and cognition, SCORM compliant LMSs developers and e-learning institutions need a validated assessment tool. The recommended assessment to measure learner affect and cognition is a 24-item instrument developed by Lee et al. The instrument utilizes a five-point Likert scale that assesses six factors: Psychological motivation (6 items), peer collaboration (5 items), cognitive problem solving (5 items), interaction with instructors (2 items), community support (3 items), and learning management (4 items) (Lee et al., 2019).

MAIN FOCUS OF THE CHAPTER

Learning Beyond Face-to-Face Interaction

Fluidity has been a longstanding burden for face-to-face learning as it restricted learners to one location. As technology breakthroughs occurred in corporate and academic institutions, the concept of technology-facilitated learning was born.

Table 1. Factors and Items in Student Engagement in the E-Learning Environment

Factors	Items
Psychological Motivation (6)	Online classes enhance my interest in learning. I am motivated to study when I take an online class. Online classes are very useful to me. It is very interesting to take online classes. After taking an online lesson, I look forward to the next one. I am satisfied with the online class I am taking.
Peer Collaboration (5)	I study the lesson content with other students. I try to solve difficult problems with other students when I encounter them. I work with other students on online projects or assignments. I ask other students for help when I can't understand a concept taught in my online class. I try to answer the questions that other students ask.
Cognitive Problem Solving (5)	I can derive new interpretations and ideas from the knowledge I have learned in my online class. I can deeply analyze thoughts, experiences, and theories about the knowledge I have learned in my online class. I can judge the value of the information related to the knowledge I learned in my online classes. I tend to apply the knowledge I have learned in online classes to real problems or new situations. I try to approach the subject of my online class with a new perspective.
Interactions With Instructors (2)	I communicate with the instructor privately for extra help. I often ask the instructor about the contents of the lesson.
Community Support (3)	I feel a connection with the students who are in my online class. I feel a sense of belonging to the online class community. I frequently interact with other students in my online classes.
Learning Management (4)	I study related learning content by myself after the online lesson. I remove all distracting environmental factors when taking online classes. I manage my learning using the online system. When I take an online course, I plan a learning schedule.

(Adopted from Lee et al., 2019).

Technology allowed large audiences to receive instruction simultaneously and reduced costs for the learner and institution. The complexity of engaging e-learners is high; however, the benefits of quality content curation and delivery far outweighs that risk. Lectures, assignments, tests, and competency measurement are now developed and delivered in dynamic and collaborative environments like Coursera and edX. While face-to-face interaction will always have a place in corporate and academic pedagogy, technology-driven e-learning adoption will continue to increase. Previously, corporate training centers were often centralized locations that required significant expense. With the refinement of technology-driven e-learning, that same training is now available at the employee's home office.

E-learning's position in global institutions has witnessed a sea change since 2010. To realize how far technology-driven e-learning has come, look no further than the University of Pennsylvania (Penn). Penn is an Ivy League institution located in Philadelphia, founded in 1740 and is known worldwide for rigorous academics and student learning outcomes. Before 2010, no Ivy League institution offered entirely online undergraduate or graduate degrees. Penn now offers undergraduate and graduate degrees in a technology-driven e-learning environment. Penn's outward demonstration believing that e-learning can deliver Ivy League rigor and student outcomes should serve as global encouragement for institutions deciding if technology-driven learning is right for them.

The "content-practice-assessment" methodology is more accessible than ever for global institutions that want to use technology-driven e-learning (Nikolopoulos et al., 2012). This methodology benefits e-learning pedagogy and affords instructors a natural user interaction approach for face-to-face and technology-driven environments. As technological advances have occurred, SCORM compliant LMSs are now often designed around the content-practice-assessment model. When the intersection of technology and pedagogy meet, e-learning can distribute and train to the most robust skill requirements. This intersection allows for decentralization and cost control, both of which are of interest to corporate and academic institutions.

Technology-driven e-learning is not an attempt to liberate face-to-face environments, but rather provide academic and corporate institutions a wide range of educational platforms to engage learners. Learners having on-demand access to e-learning content is now a mutually beneficial proposition. As technologies like machine learning, AI, and virtual reality become affordable to implement on large scales, e-learning will become the dominant educational platform.

E-Learning Implementation Considerations

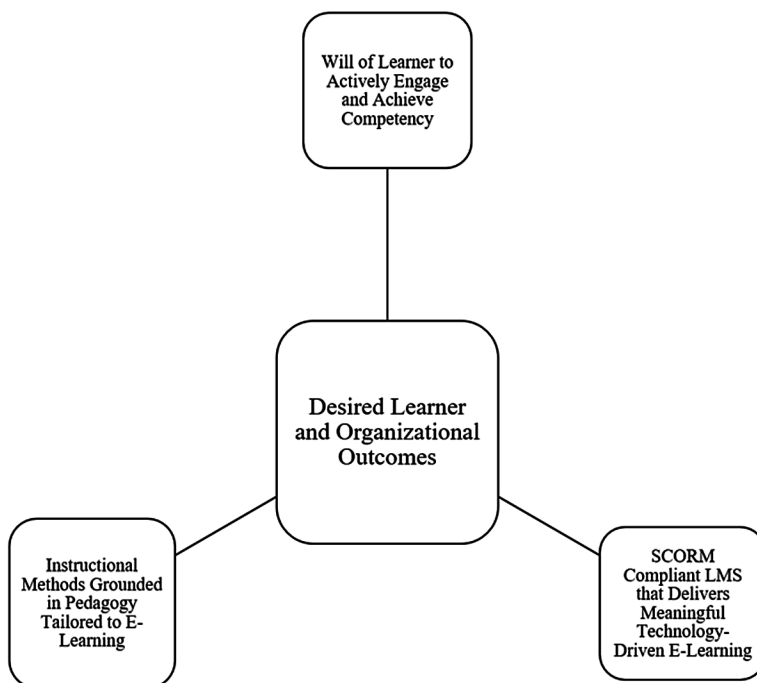
This text posits that e-learning should be a mutually beneficial relationship. The learner should have access to affordable, relevant e-learning content that builds desired skill sets and competencies. Institutions facilitating e-learning should either result in a better-trained employee or an alumnus that goes on to be successful after graduation. If the relationship becomes one-sided, it can strain admissions at universities or reduce training compliance at corporations (Maxwell, 2012). Additionally, fostering the relationship between e-learning technology and the learner promotes employee will. Through the promotion of learner will, it is possible to create a culture where loyalty exists. The cultivation of workforce and learner loyalty can transform the institution into a global destination for top talent. As the information on academic and corporate institutions continues to become more abundant online, loyalty and

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technology-driven e-learning platforms could develop into sustainable competitive advantages (Barney, 1991).

Establishing SCORM compliant LMSs should be focused on achieving improved learner outcomes. Similarly, achieving improved e-learning outcomes should not deplete the academic or corporate institution's budget. By focusing on how learners desire to consume created content and e-learning technology interconnect, institutions can flourish. This relationship draws together will, resources, and e-learning specific pedagogy. Figure 2 illustrates a summary of this concept below.

Figure 2. Will, Resources, and E-Learning Specific Pedagogy.



Technology has developed at a pace where organizations of all sizes now must confront technology-driven e-learning as a workforce development tool (Stephenson et al., 2012). Generation Y (Millennials) and Generation Z (Centennials) childhood and teenage technological immersion results in these two learning groups to expect full technology-driven accessibility (Carlson, 2009). In popular media, you often hear about the friction between generations and other non-scientific comparisons. Ideally, leave non-scientific speculation out of the equation of technology-driven e-learning development and implementation. E-learning expands beyond Generation's

Y and Z as self-improvement spans no particular generational cohort. Comfort with the utilization of technology-driven e-learning has fundamentally changed adult education and self-improvement accessibility.

Where adoption and full acceptance continues to be a challenge is in higher education. The proportion of higher education instructors from a Gallup survey of 20,819 faculty and 1,337 digital learning leaders that say they fully support the increased use of educational technologies in 2019 is 39 percent (Jaschik & Lederman, 2019). While the support for the increased use of educational technologies is up from 29 percent in 2017, significant acceptance gaps remain. Since 2013, faculty skepticism about technology-driven e-learning has decreased; however, pedagogical, LMS usage and questions of academic rigor remain a dividing line (Jaschik & Lederman, 2019). For clarity, technology-driven learning has made significant strides, and this information is to inform the reader about potential e-learning implementation challenges. It is critical to understand that while technology has been present in our daily lives for decades, e-learning is still a relatively new concept at academic institutions. Gallup found that 41 percent of instructors have taught technology-driven e-learning courses for less than five years, and only 25 percent have taught online for more than ten years (Jaschik & Lederman, 2019).

The avoidance of e-learning in academic and corporate institutions is no longer a sustainable nor cost-effective option. Potential losses include decreases in student enrollment and inflated corporate training budgets (Kaylo et al., 2013). While potential losses are part of any technology adoption, steps are available to reduce faculty avoidance. The first step is pairing instructors with an instructional design specialist to assist in LMS content curation and student engagement best practices (Jaschik & Lederman, 2019). The concept of pairing instructors and instructional designers is promising. Ninety-three percent of faculty members who participated in attitudes on technology survey say their experience was positive and agreed that instructional designers improved the quality of their courses (Jaschik & Lederman, 2019). After pairing instructors with an instructional design professional, the next recommendation is to address academic fraud in the e-learning environment. The prevalence of academic dishonesty has been present for generations in the face-to-face learning environment and crossed over to e-learning. The degree that academic dishonesty crossed over to e-learning is on a scale, unlike anything experienced in the face-to-face learning environment.

Websites like Course Hero, Chegg, and Quizlet, to name a few, are a great study resource for students across the globe. Where help often crosses into academic dishonesty is when students utilize those services to complete quizzes and other assignments. These services are not intentional springboards into academic dishonesty; however, the degree of information available to students is staggering. Figure 3 below shows a sample of what is available to students for a relatively low

E-Learning

cost. What the picture shows is that face-to-face, technology-facilitated, hybrid, and technology-driven students have unprecedented access to course assistance outside of the classroom or LMS. If instructors happen to utilize quiz or assignment questions generated by the publisher, those step-by-step answers are available to students. The prevalence of LMSs in academic and corporate environments, decrease in pen and paper coursework, and reliance on technology has created a market for these type of services. This text recommends having at least 30% of your course grade, including proctored examinations or assignments. Services like ProctorU, Examity, and PSI Online can help both academic and corporate institutions verify content mastery, rigor, and integrity.

Figure 3. Sample of E-Learning Student Resource Tool

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Business Statistics 3rd edition

Rent From \$19.49 | **eTextbook** From \$59.99 | **Buy** From \$42.99 | **Textbook Solutions Only** \$14.95/mo.

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* Savings are calculated off list price
† See terms and conditions

Digital proctoring services keep technology-driven e-learning courses entirely online yet maintain the pedagogical tenants of content mastery, rigor, and integrity. The combination of SCORM compliant LMSs, instructional design support, and ancillary services like digital proctoring can verify content mastery and positively impact the learner and organizational outcomes (Jaschik & Lederman, 2019).

SOLUTIONS AND RECOMMENDATIONS

Much of this chapter has discussed e-learning's impact on learners and organizations. Academic and corporate leaders are leveraging e-learning, especially technology-driven offerings, more than ever. Cost control, learner outcomes, and technological sustainability are the three areas of focus for leaders when examining e-learning's organizational impact. Forty-five percent of digital learning leaders in the 2019 Gallup attitudes on technology survey said that inclusive access platforms are achieving their two primary goals of reducing course material costs for students and improving education outcomes (Jaschik & Lederman, 2019). Since 2014, digital learning leaders continue to realize e-learning's potentially sustainable impact on cost control and improved learner outcomes. As a result of this realized impact, elite academic institutions now offer undergraduate, graduate, and professional degrees exclusively via e-learning. Corporate institutions are even offering learners opportunities to hone skill sets and earn credentials that were previously only for people employed at the company.

Numerous SCORM compliant authoring tools and compatible LMSs now exist, and the resulting competition affords leaders a diverse range of customizable options. The previous statement does not signify that SCORM compliant LMS creation is cheap for large organizations. A SCORM compliant LMS system that services a large corporation or academic institution has licensing, per-user, instructional design, hardware, information technology staff, and internet infrastructure costs to address. These costs can vary significantly by physical location, the current e-learning system, and the learner population. As the number of learners increases and the complexity of LMS functionally rises, so will costs. In academic institutions, an overlooked cost is faculty training and follow on support. When corporate or educational leaders are examining whether to upgrade a current LMS or create a technology-driven e-learning program, instructor training, and follow on support should be treated as a priority.

Engaged learners can promote educational institution's credibility or, in the case of corporate employees, become more informed, productive, and mindful of achieving positive organizational outcomes. As learner and employee engagement increases, organizational culture can realize the benefits of a positive impact. Investment in e-learning is something of value that should include all the stakeholders previously mentioned. Without collaboration, e-learning implementation can be challenging, and instructor adoption comfort levels can remain stagnant for years (Jaschik & Lederman, 2019). Leaders should gather feedback from instructional designers, instructors, and other organizational stakeholders before selecting a SCORM compliant LMS. The concept of meaningful collaboration and incorporating feedback into LMS

development is crucial. Leaders that actively implement these considerations are likely to enjoy a positive and impactful organizational e-learning experience.

SCORM'S Implementation Impact

SCORM compliant LMS development does not occur in a silo. Focusing too much on technical development can result in a system that learners and instructors are not comfortable adopting. If content curation over-emphasis occurs, then the configuration of the LMS could suffer and make user navigation time-intensive and complicated. Either outcome is not successful but is a common theme in e-learning implementation. Where the issue is most common is whether technology-driven e-learning can deliver the same outcomes as in-person courses. A Gallup survey of 20,819 faculty and 1,337 digital learning leaders found that eighty percent of leaders believe e-learning can deliver similar results as in-person courses in comparison to only thirty-two percent of faculty (Jaschik & Lederman, 2019). SCORM compliant LMSs as a technology-driven strategy to deliver e-learning have to gain instructor confidence early in the implementation process. Clear communication of e-learning's flexibility and LMS resources that assist instructors with the reinforcement of academic rigor is essential.

Establishing that SCORM compliant LMSs can not only deliver e-learning content but reinforce academic rigor and enhance learner outcomes is critical to receiving faculty support for implementation. The process of generating support for e-learning in corporate settings should follow a similar process as positive messaging and the incorporation of employee feedback in the planning, development, and implementation phases of LMSs can improve adoption rates (King, 2013). SCORM compliant LMSs also afford leaders the ability to assess and capture e-learning benefits to continually refine content curation and delivery (Maxwell, 2012). As the institution's ability to evaluate e-learning benefits and areas of opportunity increase, it can create a competitive advantage by offering learners unique content and access to leading experts (Anton et al., 2019). The University of North Carolina (UNC) Kenan-Flagler's School of Business online MBA program was an early example of unique content and leading experts coming together. Before Kenan-Flagler launched its online MBA program, elite business schools chose to offer top-ranked MBAs exclusively in-person and on campus. Fast forward to 2020, dozens of globally-ranked business schools now have entirely online e-learning undergraduate and graduate degree offerings.

The willingness of top-tier academic institutions to offer entirely online undergraduate and graduate degrees is a promising sign for the future of e-learning. As SCORM compliant LMSs have become more dynamic, organizations have started to realize e-learning is not a fad but a value-added activity for academic

and corporate institutions worldwide. As technology closes communication gaps and brings technology-driven education to global audiences, SCORM compliant LMSs will remain the technological backbone of e-learning. SCORM's ability to interconnect with an array of compliant LMSs will foster collaboration amongst multiple institutions, as we see with edX's MicroMasters® program. The edX platform has allowed academic institutions from across the globe to collaborate and offer e-learners course credit, and if the learner completes all requirements, they can earn a Master's degree. This level of learner empowerment and accessibility is unique to technology-driven e-learning (Cortez, 2012).

Are SCORM compliant LMSs the only answer for delivering e-learning content? The answer is no, as a diverse range of e-learning delivery platforms is now available to academic and corporate institutions. The reason for SCORM compliant LMSs being the e-learning interface of choice is twofold. First, SCORM compliant LMSs have been the academic and corporate e-learning platform standard since 2004. Second, SCORM compliant LMSs resources, learner interfaces, and instructional methods have continually evolved as the e-learning environment has grown in complexity and number of learners. As the complexity of the e-learning environment continues to increase, this text believes that SCORM compliant LMSs under the right leadership can meet this challenge.

FUTURE RESEARCH DIRECTIONS

Assessing leadership and instructor relationships in the development and implementation of e-learning systems would be informative. Tracking this relationship longitudinally to see how instructor incorporated feedback benefited LMS development, implementation, and learner adoption could be of interest to researchers and practitioners alike. Examining this relationship could yield additional pathways in improving learner and organizational outcomes via SCORM compliant LMSs. Second, a limitation to this chapter is analyzing communication channels between leaders, instructors, and learners. Assessing how communication channels impact LMS implementation, e-learning delivery, and adoption rates could be informative. As machine learning (ML), artificial intelligence (AI), and virtual reality (VR) become more prevalent, communication channels will likely be a determiner of learner success and instructor adoption rates. Third, assessing how instructors and learners adopt e-learning from a global sample could allow researchers to develop a more comprehensive theoretical foundation. The improvement of theory and measurement of e-learning competencies could lead to targeted interventions for areas of opportunity for academic and corporate learners.

The continued development of e-learning pedagogy will benefit from examining how learners, instructors, and LMSs interact. The relationship between instructor, learner, and e-learning technology will require a cyclical and incremental approach to strengthen theoretical underpinnings and trait measurement.

CONCLUSION

SCORM compliant LMSs combined with sound pedagogy have resulted in the proliferation of e-learning across academic and corporate institutions. As technological advances continue on a global scale, e-learning will remain an integral part of academic and corporate education. This study posits that SCORM compliant LMSs will remain the industry standard for e-learning educational offerings. The general conclusion is that technology-driven e-learning has made significant strides in content curation, academic rigor, and the ability to verify learner mastery.

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Chapter 12

Educating for “Buoyancy”: Professional Skills for a New Generation of Digital Natives

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ABSTRACT

The future of education matters to all of us. This chapter presents a theoretical-inductive construction of the future of education, inspired by the advancements envisaged in the Fourth Industrial Revolution (also abbreviated to Industry 4.0 or IR4.0). Recent developments in the technological field make it imperative that university syllabi foster and grow technological and non-cognitive soft skills in tandem. The latter—socio-emotional skills—are considered crucial skills that endow “buoyancy” and resilience to the workforce. Empathy, cultural sensitivity, and tolerance are the key professional skills that should be nurtured among the upcoming generation of digital natives. The chapter builds on a previous publication and aims at advancing concrete proposals for the future of university education.

INTRODUCTION

*Even with his four legs, the animal slips;
Even with all his knowledge, the scholar makes mistakes.*
Lao Proverb

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Educating for the future is as relevant as it is challenging, simply because we cannot afford to pay the price of failing to anticipate the upcoming reality. In planning for the future of education, we have to accept that we may be wrong in our choices and decisions because the future is unpredictable. This research begins with a fact: the 19th-century educational model of rote learning and “remembering facts”, which to a certain extent is still in practice, will be easily replaced by ordinary robots in future. All current educational models are based on emulations of past experiences adapted to sectorial perceptions of reality. Nowadays, robots are able to backflip¹ and to reproduce large quantities of recorded data that most humans cannot. Thinking about the future of education is a vital concern of all responsible educators, academics, entrepreneurs and policy-makers. In the discussion of the future of education, we must answer the following question clearly: what are we all looking for? To put it simply, we are anticipating a higher value of human skills in a world of speed, inequality, uncertainty and technology. Consequently, I argue in favour of a concept of education designed to prepare citizens to face the current Fourth Industrial Revolution (IR4.0) and the upcoming IR5.0. This paper presents a methodological theoretical-inductive and constructivist perspective, combining qualitative, participant observation and further developing previous insights on education published in 2018.

Analysis

“Universities will remain vital places for the development of global citizens; a university thinks internationally, is based in the local economy, but works for the purpose of national and regional development.” Dawn Freshwater, Vice-Chancellor, University of Western Australia

In 2009, I was invited to attend an international intensive, two-week-long course in Germany. The course dealt with advancements in technology, and it was delivered by a multidisciplinary team of instructors with different academic and professional backgrounds. The core subject comprised several themes (role-plays), from which participants were free to choose one. Each role play had a theoretical background, further readings, and a fictional and contingency scenario. Participants were challenged to come up with solutions and roles. They were free to research and interact with each other and with members of the local society, inside and outside the teaching venue, before presenting their case. This was one of the best learning experiences in my life. Indeed, real-life experiences do not come neatly packed in boxes, and such experiences are part of an ever-changing endless reality. After this course, it became clear in my mind that education is a transformational instrument, one that is interdisciplinary and capable of developing a set of balanced skills in tandem.

Education is an industry of values, ideas and skills. Therefore, it is the ultimate avenue for facilitating the transition from the present into the future, and for a fair understanding of the past and an accurate vision for what is to come. Education should combine respect and modernity, develop the ability to establish human bounds (bridging and bounding) and instill the desire for collective positive transformation. Education is about endowing humans with understanding, cultural sensitivity and the idea of enduring sustainability. In fact, when one researches future educational models, it becomes clear that we must bear in mind the transformations induced by the current industrial revolution and those that will take place in future industrial revolutions. In this paper, the term “education” stands for university education, because we believe that the entire education system is designed as a pathway to access universities. When universities change, sooner or later, the entire education system will change. Following this line of thought, Figure 1 presents a parity study emphasizing some aspects of the Fourth and Fifth Industrial Revolutions (IR4.0 and IR5.0), one of which is the impact on labour skills. It appears that these two industrial revolutions are (or will be) dominated by an overwhelming spread of technology that is constantly evolving as well as by the necessity of permanent reskilling, depending on the pace of digital evolution. Automation and artificial intelligence will increase the need for different types of human skills. Nevertheless, both industrial revolutions face unprecedented environmental concerns, a serious apprehension of sustainable energy production, unbearable equity challenges, and massive migration movements towards developed states. Another important aspect is a certain level of dehumanization as a result of digitalization and robotization.

Figure 1.

Industrial Revolutions	Period	Geographic Area	Dominant source of energy	Leading technological features	Leading technological development	Leading Industries	The leading transportation means	Social and communication impact	Labour Impact	Educational Impact	Symbols
1.0	1760 1900	Europe and North America	Coal	Standardization	Steam engine	Textile and Steel	Vessels and trains	Horse power replacement and Mechanization. Local Communication	Massive and intensive labour, creation of factories	Mass production Manufacturing Mass of low skilled labor	
2.0	1870 1960	Europe and America	Oil and Electricity	Mass Production Mechanical Assembly Line	Internal combustion engine, the bulb and telephone	Metallurgy, Auto, Machine Building	Large vessels, vehicles and trains	Employment and massive job creation. Global agency and delayed communication	Automation, and factories transformation	Value chain and mass production Mass of low skilled labor and few high-qualified	
3.0	1960 2000	Europe, America, and Australasia	Nuclear Energy and Natural Gas	Programming, Electronics Digital and Robotics	PC, internet, iPhone, semiconductors, optics, and robots	Auto, programming, and Chemistry	Vehicles, trains and airplanes	Free time and individual economic empowerment. Real time agency and mass of peers-to-peers communication	Large Corporations Private Entrepreneurship	Digital world High technical skills, and innovation	
4.0	2000 2050 (est)	Semi-Global	Renewable Energies Low-carbon technologies	High-speed mobile internet; artificial intelligence; widespread adoption of big data analytics; and cloud technology. Humanoid robots, AI, augmented reality, 3D printing, crypto, block chain, IoT, Genetic engineering and virtual reality.	Interplay of scientific fields Smart-factories (high configurable)	Cyber-physical Systems, High-tech, and higher levels of efficiency of production and consumption	Electrical and autonomous vehicles, fast trains (maglev type), subways, drones, and long-haul airplanes	Merging technology and human life (biopic limits). Inequality. Empowerment of social communication networks.	Adaptability, customization, and acceleration of speed Data Analytics and Sciences, Software and Applications Developers, and E-commerce and Social Media Specialists	Human-robots interaction Comprehensive work force: interdisciplinary. The continuing reskilling imperative	
5.0	2050 ?	Global with niches	Micro grids and Hydrogen	Network of networks and acceleration of speed	Nanotechnology, vehicle-vehicle communication, and smart distribution or self-making	Clean technology, chemistry and agriculture	Intelligent transportsystems, Hyperloop, hypersonic aircrafts	Strive for humanism in a world of technology. Advanced intercultural communication and global citizenship	Constant change Dominance of digital natives. Increased collaboration between humans and smart systems	Socioemotional skills Low human intervention. Skills for service of humanity and inclusion	

Sources: Priseanu, P. (2016). Challenges of the Fourth Industrial Revolution. Knowledge Horizons. Economics, 8(1), 57-62. Min Xu, Jeanne M. David & Suk H. Kim (2018). The Fourth Industrial Revolution Opportunities and Challenges. International Journal of Financial Research Vol. 9, No. 2. Gauri Pratik (2019). What the Fifth Industrial Revolution is and why it matters. WEF, Retrieved on January 2020, from <https://www.weforum.org/agenda/2019/01/what-the-fifth-industrial-revolution-is-and-why-it-matters/>. The Future of Jobs Report, and <https://www.cde.com/2018/10/26/future-of-jobs-report-on-expected-shorts-2018/> from <https://www.weforum.org/agenda/2018/04/the-fourth-industrial-revolution-by-klaus-schwab/>

In 2014, the European Economic and Social Committee (EESC) reminded us all that *“The technology behind industry 5.0, which can help human beings and robotics to work better together. This entails learning more about collaborative robotics and human-machine interface.”* Robotization will replace most of the manual repetitive and unskilled tasks, while humans will perform jobs demanding more complex ethical decision-making, creativity, supervision of operative systems, quality control and socially emphatic roles. Consequently, it seems that the technological trend is not only associated with the replacement of repetitive skills by machines, but it also entails a certain degree of interrelated skills, so that humans and machines operate in conjunction. Furthermore, the constant need for reskilling seems to push the education models to formulate lifelong education solutions which are very much dependent on the ever-changing labour characteristics and dictated by technological and market developments.

A report produced by the World Economic Forum (2018, p. 12) clearly anticipated: *“on the one hand, a continued fall in demand for manual skills and physical abilities and, on the other hand, a decrease in demand for skills related to the management of financial and other resources as well as basic technology installation and maintenance skills. Skills continuing to grow in prominence by 2022 include analytical thinking and innovation as well as active learning and learning strategies. The sharply increased importance of skills such as technology design and programming highlights the growing demand for various forms of technology competency identified by employers surveyed for this report.”* What seems to be important is not only a marked reduction of repetitive tasks allocated to humans, but also the need for different types of skills, and of course the heightened demand for digital and technological skills. Currently, citizens are born as digital natives². These developments call for a constructive balance between the acquired skills, combining the so-called “human” and “technological” skills. Indeed, as emphasized by the same report (World Economic Forum, 2018, p. 12) *“‘human’ skills such as creativity, originality and initiative, critical thinking, persuasion, and negotiation will likewise retain or increase their value, as will attention to detail, resilience, flexibility and complex problem-solving. Emotional intelligence, leadership and social influence as well as service orientation also see an outsized increase in demand relative to their current prominence.”* This report advances a clear concern to educate for a particular type of soft skills, to balance the overwhelming dominance of technological and digital skills.

Klaus Schwab (2016, p. 16) argued in his book that *“The fourth industrial revolution will generate great benefits and big challenges in equal measure. A particular concern is exacerbated inequality.”* It appears that IR4.0 is likely to contribute to widening the income gap as the demand for new skills will leave millions of workers effectively unskilled or under-skilled. Automation, customization

and the new network of digital networks of markets are only workable if they are designed and sustained to address the market of masses. The disruption caused by inequality poses a potential danger to globalization and societal order. The individual and social freedoms rendered by IR2.0 and IR3.0 can only be sustainable within a responsibly skilled society. In a very interesting article published recently in the context of the World Economic Forum, Gauri (2019) describes the future of education in the following terms: *“The advance of the Fourth Industrial Revolution (robotics, artificial intelligence, augmented reality, virtual reality and the like) has produced a developing scenario in which the service of humanity seems too often eclipsed by the momentum of technology and commerce.”* The eventuality that universities around the world will respond to the market demand for digital and technological skills by offering purely technological syllabi will exacerbate inequality in a world dominated by technological skills. As more private universities struggle to maintain their economic sustainability, and as public institutions strive to keep their expenses within public budgets, technological syllabi may very well be the natural response to a market driven by IR4.0. Education in the service of humanity is not directly nor immediately monetized. Nurturing and honing non-cognitive skills will be an important challenge for universities worldwide, not only in terms of their syllabi design but also in relation to grading students and giving awards for their performance. According to Kattan (2017), *“research is showing that there are concrete benefits to non-cognitive skills, both in education and labour market outcomes ... These skills are also becoming more important as trends like automation shift the skills needed to compete in today’s fast evolving labour markets.”* Figure 2 displays the results of a jobs survey conducted by the WEF (2018), which identified trending skills in 2022, including emotional intelligence, critical thinking, reasoning and problem-solving, and learning strategies.

In 2018 I argued that universities should develop their syllabi to foster the effective advancement of skills in three different categories: (1) Intuitive Professional Reality Construction (education to develop skills to support the relationship between us and our profession) – This set of skills should equip students to thrive in their future technical labour environment and their specific field of professional knowledge; (2) Positive Emotional Intelligence (education to develop skills to support the relationship between us and others around us) - This set of skills helps students to establish and develop interpersonal relations in their private and professional arena; and finally (3) Ethical Judgement (education to develop skills to support the relationship between us and us) – This set of skills helps students to develop their reasoning power and insight into individual wellbeing and their responsibilities as global citizens. Indeed, no purely technical, humanistic, artistic syllabus will prepare students for the upcoming industrial revolutions. From the perspective of IR4.0, the major concern is the balance between technological skills and transversal,

Figure 2.

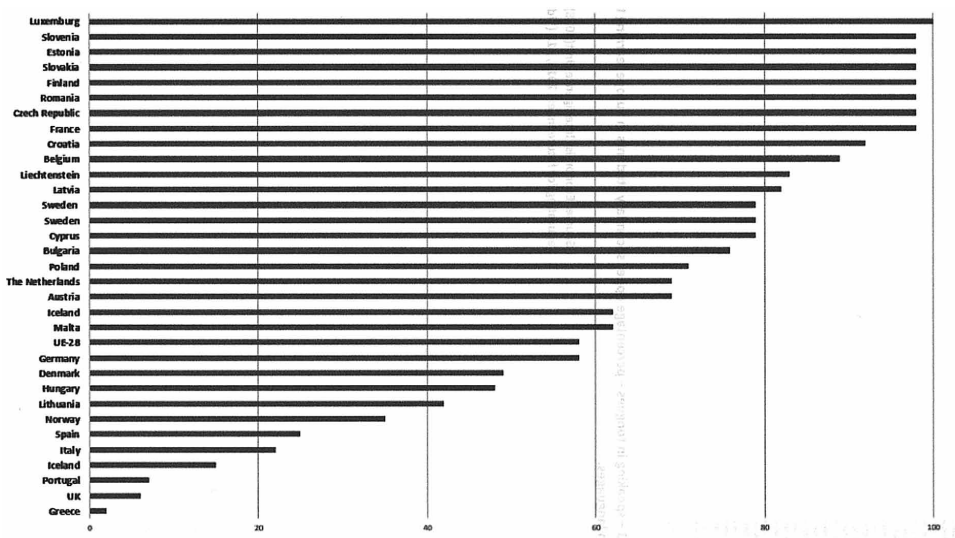
Today (2018)	Trending (2022)	Declining (2022)
• Analytical thinking and innovation; • Complex problem-solving; • Critical thinking and analysis; • Active learning and learning strategies; • Creativity, originality and initiative; • Attention to detail and trustworthiness; • Emotional intelligence; • Reasoning, problem-solving and ideation; • Leadership and social influence; • Coordination and time management.	• Analytical thinking and innovation; • Active learning and learning strategies; • Creativity, originality and initiative; • Technology design and programming; • Critical thinking and analysis; • Complex problem-solving; • Leadership and social influence; • Emotional intelligence; • Reasoning, problem-solving and ideation; • Systems analysis and evaluation.	• Manual dexterity, endurance and precision; • Memory, verbal, auditory and special abilities; • Management of financial and material resources; • Technology installation and maintenance; • Reading, writing, math and active listening; • Management of personnel; • Quality control and safety awareness; • Coordination and time management; • Visual, auditory and speech abilities; • Technology use, monitoring and control.

interdependent and interdisciplinary “soft skills”, particularly soft skills in the service of humanity. In addition, university education in the scope of IR4.0 must also include a set of activities to address the issue of education for global competences, namely in economics, identity, citizenship, environmental stewardship, ethics of diversity and interdisciplinary knowledge for the common good, coping with constant change, adversity, and tolerance. Therefore, the major challenges for universities in the future are not technological responses to market demands in technological domains, but maintaining the balance between the need to adapt to technological advancements and the continuous efforts to offer appealing programs to build global competences in the service of humanity. Fromherz (2017, p. 11) in a remarkable book about the state of Qatar, affirms that in Qatar, “*education is viewed as a means of creating marketable, international skills; education is focused on connecting Qatar to the outside world, not on the issues of governance and society within Qatar itself.*” Hence, the real challenge for the upcoming IR will be related to the development of skills in the areas of positive emotional intelligence and inter-personal relations and in ethical judgment in a globalized world, areas that should be extended to global citizenship and the service of humanity. Intuitive professional reality construction will adjust to the labour market demands.

In the same report produced by the World Economic Forum (2018, p. 22) mentioned earlier, we are told that “***Technology-related and non-cognitive soft skills*** (also often referred to as socio-emotional skills) ***are becoming increasingly more important in tandem***, and there are significant opportunities for innovative

and creative multi-stakeholder partnerships of governments, industry employers, education providers and others to experiment and invest in new types of education and training provision that will be most useful to individuals in this new labour market context” (emphasis mine). Non-cognitive skills cover areas such as interpersonal communication, conscientiousness, perseverance, empathy, intercultural awareness and teamwork. This group of skills will be critically important to student achievement, both in and beyond the university classroom. Indeed, universities of the future will be challenged to incorporate non-cognitive skills in their syllabi, which include interpersonal skills, persistence, communication skills, ethics, leadership, and other “soft” skills that can neither be objectively measured nor accurately monetized. There are already some interesting initiatives in this field, which the World Bank has developed.³ Another good example is PISA (Programme for International Student Assessment)⁴, a pre-university programme coordinated by the OECD. PISA measures 15-year-olds’ ability to use their reading, mathematics and science knowledge and skills to meet real-life challenges. Until 2021, PISA’s focus is on mathematics with an additional test in creative thinking. In 2024, PISA will focus on science and include an optional assessment of competence in foreign languages. Figure 3 displays a 2015 survey of upper-secondary students in the European Union learning two or more foreign languages. The command of foreign languages, side-by-side with cultural sensitivity, will be decisive skills in education tailored to IR 4.0. Skilled workers of IR 4.0 and 5.0 must command at least two foreign languages.

Figure 3.



The central point of the argument for the need to develop human (*non-cognitive soft skills*) and technological skills in tandem was emphasized by Klaus Schwab (2016, p. 105) when he reasoned the following: *“Let us together shape a future that works for all by putting people first, empowering them and constantly reminding ourselves that all of these new technologies are first and foremost tools made by people for people. Let us therefore take collective responsibility for a future where innovation and technology are centred on humanity and the need to serve the public interest, and ensure that we employ them to drive us all towards more sustainable development.”* The majority of the current literature appears to be mesmerized by technological advancements, in particular advancements in artificial intelligence. However, many seem to forget that technology only makes sense when used for the benefit of all. In the same line of reasoning, the limits of machine learning (algorithms) are precisely in the areas of non-cognitive skills. Technology must be incorporated in university syllabi as a tool but by no means should technology be deployed to steer or to lead decision-making. Empathy and tolerance will be the key professional skills to ensure “buoyancy” in the future workplace of the upcoming generation of digital natives. In 2019 during the 9th global meeting of the CCNGO-Education 2030, UNESCO declared that *“Equity and inclusion in and through education provide the cornerstone of a transformative education agenda. However, latest figures show that major challenges remain in addressing exclusion, marginalisation, disparities, and inequalities to ensure that no one is left behind.”* IR 4.0 and IR 5.0 could be, to a certain extent, the harbingers of the return to our human origins. As technology advances, we have to preserve more basic areas of knowledge such as agriculture, fishing, human well-being and medical sciences. In 2018, Østergaard talked about the importance of the “human touch” in the upcoming industrial revolution, from the market point of view. In his words, *“This Industry 5.0 trend is more anti-industrial than industrial. It is a return to something earlier, to a time before industrialization, when a gift, for example, was something someone you knew spent months knitting or carving or creating by hand. It was just for you, because the person who made the gift knew you personally and thus knew how to make a gift for you and no one else.”*

The UNESCO education strategy in 2014 (UNESCO, 2014, p. 51) stresses the ability to engage positively with cultural differences, which is one of the leading characteristics of education in the future: *“It will be important to consider how the information, knowledge and communication revolution is transforming people’s understandings of time and space, and of individual roles and relationships in societal development. Moreover, the multiplication of new media, combined with greater physical mobility in the context of globalization, is heightening exposure to multiple and often conflicting new value systems and cultural models. The impact of this on the socialization function of formal education needs to be considered.”*

The question of multicultural and intercultural societies and relationships will dominate the construction of the non-technological side of the future syllabi. New entrepreneurship, new markets, future joint ventures, and future research initiatives call for an outstanding capacity to deal with intercultural differences and conflicts. According to Barrett (2013, p. 6), in 2013 the Council of Europe published a document that addresses this problematic in the following terms: *“Thus, a multiculturalist approach involves acknowledging and respecting the cultural needs of minority groups by making allowances for the fact that their beliefs and practices may differ from those of the dominant group, and by adjusting and adapting laws, rules and regulations in order to enable minority individuals to adhere to their own cultural practices. It involves the rejection of the idea that minority cultural groups should abandon their distinctive cultural beliefs and practices and assimilate into the national majority culture.”* The Council of Europe has been very active in addressing this problem and discussing the features of interculturalism. The publication of the White Paper on intercultural dialogue – *“Living together as equals in dignity”* (2008) – was a very early and serious step towards a new level of understanding of intercultural dialogue to reduce prejudice and stereotypes in the public domain. Interculturalism is especially important because it concerns the ability to build social cohesion based on shared universal values. UNESCO has prioritized this matter at the highest level, naming it as “a key pillar in any (future) education system” (UNESCO, 2014, p. 45): *“Strategic objective 2 - Empowering learners to be creative and responsible global citizens: ... This dimension of education is fundamental, yet education systems often give it less priority by focusing more on the cognitive aspects of learning. UNESCO, with its intersectoral mandate, combining education, the social and natural sciences, culture, and communication, is uniquely placed to promote ‘learning to live together’ as a key pillar of any education system. Its action in this regard will focus on three thematic areas: global citizenship education, education for sustainable development and health education. All are concerned with attitudes and dispositions affecting behaviour.”*

All universities will face another challenge, which is the recognition of competences. Indeed, according to an Australian survey (EYGM, 2018), there are business sectors in which education has a high professional impact (nursing, education, law, business and psychology) and others with a minimal professional impact (communication, creative industries, performative arts and culture). However, this is not directly related to syllabus design but the way the universities currently recognize professional competences based on soft and hard skills. To obtain a degree, universities around the world overweigh attendance and repetition as the basis to award a diploma, discouraging self-learning, independent thinking, “out of the box solutions”, and autonomous and alternative acquisition of skills. IR 4.0 calls not

Figure 4.

IR 4.0 and 5.0 Challenges	Interdisciplinary Education Skills to be Developed in Tandem	
• Overwhelming spread of technology; • Constant technology evolution; • Almost universal data access at fast speed; • Productive processes dominated by automation; • Collaborative robotics and human-machine interface; • Unprecedented environmental concerns; • Surge of energy demand; • Serious apprehension for sustainable energy production.	Technology-related	• Digital technology; • Artificial intelligence; • Robotics; • Sustainable energy production; • Anti-pollution technology; • Physics, chemistry, nanotechnology; • Permanent technological reskilling; • Digital economics.
• Surge of human inequality; • Pressure on unemployment; • Dominance of technological conglomerates; • Growing perception on dehumanization; • Exclusion and marginalization; • Unbalanced gender in corporate roles; • Gender conflicts and violence; • Disparities and inequalities; • Intensification of intercultural violence; • Exacerbation of cultural violence; • Continuation of massive migration movements.	Non-cognitive skills	• Initiative, contingency and flexibility; • Analytical-critical thinking; • Creativity and innovation; • Active learning and learning how to learn; • Command of foreign languages; • Resilience and adversity; • Persuasion and negotiation; • Decision-making and problem-solving attitude; • Leadership and social influence; • Environmental stewardship; • Corporate social responsibility; • Social entrepreneurship; • Identity and citizenship; • Ethics of pluralism, globalism and tolerance; • Multiculturalism and interculturalism.

only for a balance of skills, but also for a balance between formal and alternative educational acquisition of competences.

Figure 4 juxtaposes the most distinctive features of IR 4.0 and 5.0 with the interdisciplinary educational skills that universities should develop: technology-related and non-cognitive skills. It is reasonable to conclude that future educational models to equip students for IR4.0, notwithstanding the fact that it is a technological industrial revolution, cannot be entirely driven by technological concerns.

CONCLUSION

The mind is not a vessel that needs filling, but wood that needs igniting. Plutarch (AD 46-AD 120)

While IR 4.0 will improve technological solutions in the service of humankind, technological revolution on its own will eventually cause great suffering and injustice. Technology alone will not transform a dystropic world into one that fulfils the dreams of generations of humankind. Technological revolutions meet be human centered. This is where the role of education is decisive. Education has

to inspire and trigger self-discovery. Education is at the same time a public good (non-excludable and without rivalry under the jurisdiction of the public sphere), a common good (beneficial for all members of society), and a global common good (various resources, services and values we share with the rest of humankind, beyond the public and private spheres). Education is not a private commodity, cannot be monetized and it must be at the service of humanity. Therefore, education has more than a merely economic function, and as UNESCO contends, it enables “*individuals, especially women, to live and aspire to healthy, meaningful, creative and resilient lives. It strengthens their voices in community, national and global affairs. It opens up new work opportunities and sources of social mobility.*”⁵ Governments, institutions, international organizations, universities, associations, citizens, we all have to mull over the future of education, combine multiple perspectives, and recognize that technology is merely a tool for the common good.

Industrial revolutions create a smarter world but industrial revolutions in themselves do not make humans smarter. Among other challenges, the prospect of a dystopian technological world is looming ahead – climate change, unemployment, and automation are direct consequences of digitalization and robotization. As a result, future education models must factor in preparedness for technological advancement to benefit people and to mitigate exclusion and inequality. Technology must be seen as a tool that brings advantages to people, and therefore the agenda of education as a cornerstone of transformation should be based on empathy, equity, inclusion and tolerance: key professional skills that will endow buoyancy and resilience to the upcoming generation of digital natives. Intercultural skills curb fear and create trust. However, this can only be achieved in tandem with technological competences and skills of empathy, culture, ethics, as well as with the ability to question and to learn how to learn. Education needs legitimate professional roles and responsible leadership and social engagement. Education has to be a force for good, which can only be achieved with a balance of technological and non-cognitive skills.

Universities will continue to create, deliver and capture value by developing skills that help students to think and reason. Universities must educate to foster human-to-human skills that ensure the buoyancy and resilience of the upcoming generation of digital natives to ride the new industrial waves. To capitalize academic value, four major changes must be put in place as early as possible:

Rationale - Amartya Sen (1999, p. xii), the winner of the 1998 Nobel Prize in Economics, clearly pointed out that “*Development consists of the removal of various types of unfreedoms that leave people with little choice and little opportunity of exercising their reasoned agency. The removal of substantial unfreedoms, it is argued here, is constitutive of development.*” The international community has yet to recognize the full potential of education as a catalyst for development. Sen argued in favour of freedom of access to material goods, basic services, dignity and respect,

as means to attain development and to make life meaningful and worthwhile. In my view, universities should bear in mind that education must offer an inspirational catalogue of choices and opportunities to free individuals from social, political and economic fear and transform them in global citizens, capable of contributing to limit national social inequalities;

Academic staff – Teachers must love learning and teaching. Academic staff should engage in long-term and systematic peering, exchanging and learning to adapt pedagogical methodologies and transform lectures in an “open market”, where students take what they are most interested in. Lectures should stimulate the individual acquisition of new skills. Joint degrees, co-teaching, and co-supervision of research should be adopted. Academic staff have to learn to use the learning tools made available by the network of academic agents to which they are connected. Interdisciplinary learning is decisive and traditional and non-traditional teaching methods must be combined – role-plays and hands-on projects can produce miracles. Interdisciplinary learning leads to the multi-answers approach, which is the best educational instrument in the context of IR 4.0 and 5.0. Interdisciplinary learning is a must in the context of globalization. Moreover, there should be a recognition of skills that are formally and informally acquired;

Syllabi – Syllabi are menus of free choice in which technology and culture are the main offerings. Syllabi that are purely based on technology or on social sciences have no place in the university of the future. Every syllabus must be designed to develop interdisciplinary skills, interdependency, sustainability, digital competences, interpersonal communication, intercultural tolerance and a reasonable command of at least one non-native language. Interdisciplinary spaces promote critical thinking (asking relevant questions and answering them), encourage cooperation, and instil an effective problem-solving attitude. Syllabi should be semi-open, and should help students learn how to learn. Syllabi should also encourage experiences overseas. There should be learning situations in which students are forced to make choices, embrace collaboration, exercising communication, adopt critical thinking, and discover creativity – situations in which they embrace their human condition. Syllabi must take into consideration alternative methods for acquiring competences;

Universities - Universities should be open spaces for scientific fora, cultural industries, social interaction and student mobility. Universities must transform themselves to act as hubs of social interaction, engagement, collaboration and recreation that interface with the surrounding communities (EYGM, Greg Pringle, 2018, p. 19). Universities have to understand the power of interdisciplinary spaces and multidisciplinary academic teams. Interdisciplinary spaces are the cradle of deep and applied knowledge. Universities should structure standard educational niches and customize such niches according to the demand for education. Universities could also mix degrees and shorten the length of time to acquire qualifications. Universities must

invest more in research and online content and connectivity. Universities worldwide should build an effective system to measure non-cognitive skills;

Rankings - Global rankings will continue to have an important reference role in the education market. However, rankings should put more value in the ability of institutions to combine technological skills with international mobility, environmental sustainability, cultural tolerance and global knowledge. Rankings should measure the universities’ ability to create interdisciplinary synergies, co-teaching, hands-on and academy-industry-society networks. In the context of IR4.0 and IR5.0, rankings must look at holistic education for human benefit and the ability of universities to create self-learners as an advantage.

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ENDNOTES

- ¹ Retrieved on February 4, 2020, from <https://www.youtube.com/watch?v=WcbGRBPkrps>
- ² Alan Yung (2018, p. 36) Digital natives initiate internet access at an early age, possibly even before starting primary school. Digital immigrants acquire digital skills at a later age. Today’s toddlers might play online using a tablet or a smart phone. Toddlers might manage a few functions through touch screen

controls, before being able to speak a full meaningful sentence [...] Digital natives think and processes information in a fundamentally different way from children in the pre-digital era, who may not even be a digital immigrant. Instead of spending hours on reading books [...] digital natives, are more likely to be playing online games, browsing internet, messaging and chatting, uploading and commenting on photos, and taking selfies as daily activities. Digital natives are influenced from childhood by the instantaneous feedback offered online and exhibit more prominently certain traits, such as craving interactivity and expecting an immediate response to their every action. In addition, they are accustomed to twitch speed, social networks multitasking, random-access to whatever online information, value graphic-first, actively connected, fun, fantasy, quick-payoffs [...] online network multiplayer games [...] use multiple digital gadgets other than the mobile phone. Digital native students learn from their teachers, who are digital immigrants, and at the same time the digital immigrant educators learn new things from their students (Bauerlein, 2011).

³ Retrieved on February 8, 2020, from <http://documents.worldbank.org/curated/en/516741468178736065/STEP-skills-measurement-surveys-innovative-tools-for-assessing-skills>

⁴ Retrieved on February 8, 2020, from <http://www.oecd.org/pisa/>

⁵ UNESCO (2015). Sustainable Development Post 2015, begins with education, retrieved on Feb 9, 2020, from <http://www.unesco.org/new/fileadmin/MULTIMEDIA/FIELD/San-Jose/pdf/229603E.pdf>

Chapter 13

Aiding the Fourth Industrial Revolution in the Developing World: Socio-Cultural Leadership in ICT4D – Learnings From Telecentres in a South Asian Country

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ABSTRACT

Academic research that examines different leadership models utilised in the digital age within ICT4D that facilitates the Fourth Industrial Revolution for the marginalised people are scarce. This study focused on the e-Sri Lanka program, initially funded by the World Bank as a unique South Asian project that established a network of 1,005 Nenasala telecentres. Sri Lanka is further focused on building an e-smart, e-inclusive society through ICT4D. In 2020, the Nenasala 2.0 initiative is to be expanded on the Nenasala network to scale up e-society innovations. This context provides an exciting research bedrock to explore. The research findings revealed

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that leadership at various organisational levels will be key to Nenasala 2.0 and ICT4D program sustainability. The Nenasala model that benefitted from unique community-based leadership was termed socio-cultural leadership. A replication of the study in other developing countries to identify the leadership needed in ICT4D could prove invaluable as it may identify viable complementary options to commercially orientated telecentres.

INTRODUCTION

The Fourth Industrial Revolution is obscuring boundaries between the physical, biological, and digital dominions. The speed of breakthroughs within these fields has no historical precedents of humankind and is evolving at an exponential phase. More importantly, such advancement in technology is disrupting every industry in the world from machines utilised, production methods, management methods, and government regulatory systems. Advances in artificial intelligence (AI), robotics, quantum computing, the Internet of Things (IoT), 3D printing, nanotechnology, biotechnology, genetic engineering, energy storage, materials science are at the forefront driving this technical and industrial revolution.

Within this rapid change Information Communication and Technology for Development (ICT4D) can be considered not only as a technology diffusion mechanism, but also a sector facing the threat of decline unless innovative approaches are found. This context is explored in the form of South Asian regional telecentre movement and findings of a case study of unique community-based Nenasala (which means Knowledge Hubs) telecentres. Nenasala is a portal to reach remote, disadvantaged communities in Sri Lanka's ICT4D journey. Overall, Nenasala is a grass-root non-profit and for-profit demand-based Private & Public Partnership (PPP) initiative. Information and Communication Technology Agency (ICTA), oversees the implementation of the Nenasala program and has the sponsorship of the Sri Lankan government, international donors, and the World Bank. In this chapter, it will be revealed how a new hybrid breed of Socio-Cultural Leaders (SCL) in Sri Lankan Nenasala telecentres successfully utilised Corporate Social Responsibility (CSR) to gain not only sustainability within the ICT4D initiative, but also competitive advantage against commercial telecentre counterparts.

Sri Lanka has a unique multi-ethnic cultural and religious base. Hence the researchers were interested in investigating how this diversity in leadership, influences Sri Lanka's effort in bridging the digital divide. Moreover, e-Sri Lanka was the first World Bank-funded project in South Asia, which sets the best practice for the other countries in the region to follow. Sri Lanka is also a recuperating country

after 30 years separatist war. Another reason for the special interest in this study was the unique and unparalleled innovation as a holistic, long-term, development-driven approach to establish a network of Nenasala telecentres. Nenasalas cover all under-privileged areas in the island, including the war-torn North and the Eastern provinces to uplift and the quality of life of the disadvantaged through e-economic development. Authors of this chapter also found that there is an empirical research gap in this area, especially the absence of academic research in Nenasalas which spanned over 15 years showing a great promise towards building a knowledge society through CSR collaboration.

This chapter borrows a theorem from the education field, Socio-Cultural Leadership and applies it to the community-based leadership style utilised by Sri Lankan Nenasalas. Fundamentally, SCL in the context of community-based CSR oriented leadership is defined in this chapter ‘as a leadership style that actively seeks to ensure that disadvantaged groups gain the advantages typically limited to mid-high-class societies despite the lack of affordability’. In this context, SCL is supportive of the argument that bridging digital divide should play a more prominent role in social reform efforts, which aims to alleviate poverty. SCL leadership has taken four paths in Nenasalas. Firstly, the majority of community model based Nenasalas have been run by religious institutions (such as Buddhist temples, Hindu kovils, and churches) led under the patronage of local religious clergy. Secondly, community groups operated Nenasalas directed by community leaders. Thirdly, local entrepreneurs have taken the leadership within a business model that incorporates a high sense of CSR as an integral part of their local community. Fourthly, locally based NGO leaders have led Nenasalas under the NGO patronage within the models prescribed by ICTA. However, all leaders and individuals who champion Nenasalas have been driven by and are in tuned with socio-cultural aspects intertwined with the development that benefits the disadvantaged. As such, unique hybrid models of SCL have emerged amidst Nenasalas in Sri Lanka.

CSR is promoted as a form of corporate self-regulation integrated into the organisations business model that enhances corporate sustainability by accommodating socio-cultural concerns that organisations encounter. However, different countries have distinct social structures, dominating issues, institutions, and interests. Even with rapid globalisation, it is apparent that societies maintain unique business systems that structure business–community relations. Yet, there is little reflection on what CSR means in terms of socio-cultural concerns that organisations encounter and how CSR is implemented in organisations with different SCL styles and for-profit, and not-for-profit financing structures.

Traditionally most ICT business strategies focused on upper and middle-class consumers. Nonetheless, most of the world’s population are categorised as poor or lower-middle class. Ten per cent of the world population lived in extreme poverty

in 2015. In 2015, 736 million (The World Bank Group, 2019) people lived on less than \$1.90 a day, living at the bottom of the economic pyramid predominantly in developing countries. Assisting the bottom of the economic pyramid requires disruptive innovations such as telecentres and microfinance, that acts as enablers for ICT4D enterprises.

ICT4D in developing countries focused largely on telecentres as they are seen as the ‘silver bullet’ for fair sharing of the benefits of the digital revolution. It is an efficient way to disseminate ICT to rural and semi-urban underprivileged marginalised groups. These groups included students who lack resources, women, people with disabilities, war-displaced, and certain ethnic and indigenous groups such as minorities. Governments, INGOs, and NGOs have recognised the benefits of this model with respect to development. Even so, the literature indicates that most South Asian telecentre projects were ‘white elephants,’ which failed when donor funds concluded as they were not designed to be profitable within their CSR objectives, which aimed to address socio-cultural concerns. However, Public-Private Partnerships (PPP) were perceived as a viable alternative business model. PPP took advantage of the profit-seeking motive, financial capital, and technological expertise of the private partner with the public partner’s drive to improve citizens’ quality of life within the CSR synergies undertaken.

Yet the authors found evidence that devised Nenasala models have stood the test of time successfully, even with the substantial CSR synergies embedded within those programs. Despite the war-ravaged past of Sri Lanka, Nenasalas have aided bridging the digital divide with its high CSR prominence, alignment with society and culture, through its hybrid SCL model, without dependence on external donor funding.

BACKGROUND

The Fourth Industrial Revolution

Like the previous industrial revolutions in the history of humankind, the Fourth Industrial Revolution promises to raise global income levels, lift millions out of poverty, and improve the quality of life for populations around the world. However, the benefits thus far have been mainly limited to first world with an unequal share of new technology, new products and services. Technological innovation has also led to gains in efficiency and productivity in the first world and opened new markets to drive economic growth.

However, economists such as Erik Brynjolfsson and Andrew McAfee (2011) argue that this industrial revolution has the potential to yield greater inequality and disrupt labour markets via displacement of workers by machines and thus widening

the gap between capital-driven technology versus labour. In the developed world, this displacement of workers by technology has resulted in an increase in safe and rewarding, highly skilled, highly paid jobs for the majority. Yet this result has differed in the developing world. Lack of access to the technology for the majority and the available technology has contributed to inequality in job market leading to a low-skilled, low-paid class of poor. In such countries, access to technology and ICT is one of the main reasons as to why incomes have stagnated for less educated and lower-skilled workers leading to degradation of the quality of life. This social segregation of a population, in turn, has led to an increase in social tensions.

The technologies of the Fourth Industrial Revolution have affected the businesses significantly. Overall impacts on business were through customer expectations, product enhancement, collaborative innovation and globalised organisational forms and regulation. For business leaders, the accelerated innovation and the velocity of disruption of the Fourth Industrial Revolution were hard to comprehend. Many industries were seeing the introduction of new technologies that created entirely new ways of serving existing needs. Technology-enabled platforms combine both demand and supply to disrupt existing industry structures to build an on-demand, Just in time (JIT) economy. Disruption also flowed from innovative but agile competitors with access to global digital data-based services and platforms which were used for research and development, marketing, sales, distribution, outperforming the incumbents market leaders. Demand has also grown for transparency, consumer engagement within new patterns of consumer behaviour built upon access to mobile networks and data. Besides, the Fourth Industrial Revolution has lowered the barriers for businesses to create wealth, altering the personal and professional environments of workers globally. Overall disruption has caused business leaders to understand their changing environment faster, challenge the assumptions of underpinning their business operations, and to innovate relentlessly.

With the rapid pace of change and broad impacts, regulators are proving unable to cope. New technologies and platforms increasingly enable citizens to engage with governments, voice their concerns, coordinate their efforts, and even circumvent public authorities. Simultaneously, governments gain new technological powers to increase their control over populations and businesses, particularly in the realm of regulation. Even to truly understand what it is they are regulating; government regulatory agencies are now forced to collaborate closely with business and civil society.

The Fourth Industrial Revolution has changed the sense of privacy, ownership, consumption patterns; the time we devote to work and leisure, and how we interact to nurture relationships with each other. Some argue that this has led to diminished human capacities, such as compassion and cooperation. Similarly, the advances in biotechnology and AI is redefining life span, health and cognition reshaping

moral and ethical boundaries. However, humans still have control in shaping the future. People are responsible for guiding technology evolution as the government's regulators, citizens, consumers and investors to reflect common objectives and values. For this, people must develop a comprehensive and globally shared view of how technology is affecting people reshaping economic, social, cultural, and human environments. Eventually, what matters is people and values such as putting people first and empowering them for creativity, empathy, stewardship and a shared sense of destiny.

Different Shades of Grey: Corporate Social Responsibility (CSR); Responsiveness (CSR₂) & Performance (CSP)

CSR is not a new concept and dates back over 50 years. However, Carroll and Shabana (2010) argue that 1970s was the decade in which Corporate Social Responsibility (CSR) Responsiveness (CSR₂) and Performance (CSP) became the centre of discourse. They differentiate between CSR and CSR₂ as companies 'assuming' a socially responsible posture and the literal act of responding towards society. They further note that in the 1990s the CSR concept transitioned significantly to alternative ideas such as CSP, corporate citizenship, stakeholder, and business ethics theories. Nevertheless, most conceptualise CSR as supporting the corporations' long-term interests by strengthening the environment that corporations belong to (Lee, 2008).

CSR discourse still lacks agreed normative basis underpinning its practice due to the absence of agreed universal definitions (Okoye, 2009), making theoretical development and measurement difficult (McWilliams & Siegel, 2006). Montiel (2008) points to Carroll's (1979) definition, 'the social responsibility of business encompasses the economic, legal, ethical, and discretionary expectations that society has of organisations at a given point in time' as the most cited. Still, Dahlsrud (2006) notes 37 other definitions for CSR and note that this figure is an underestimation of the true number. Nonetheless, within this research, the researchers favour the World Business Council definition of CSR 'the commitment of business to contribute to sustainable economic development by working with employees, their families, the local community and society at large to improve their quality of life'.

Garriga and Melé (2004) classify CSR theories and related approaches into four general groups including '(1) integrative theories, in which the corporation is focused on the satisfaction of social demands and (2) ethical theories, based on ethical responsibilities of corporations to society'. In spite of that, stakeholder theory adopted by management literature for its descriptive accuracy, instrumental power and normative validity, has emerged as crucial for understanding business and social relationships within the above CSR contexts (Lindgreen and Swaen, 2010). While the CSR concept suffers from a level of abstraction, the stakeholder approach offers

a practical alternative for assessing the performance of a firm and comparing other firms within and across industries and social auditing for internal and external use. As a stakeholder-oriented concept, CSR could be viewed as ‘societal expectations of corporate behaviour; a behaviour that is alleged by a stakeholder to be expected by society, or morally required and is therefore justifiably demanded of a business’ (Whetten et al., 2002).

However, there is little reflection on what CSR means and how CSR is implemented in enterprises with different leadership (ownership structures) and cultural contexts (Lindgreen and Swaen, 2010). Recent research highlights that enterprises nurtured ‘peculiar’ CSR orientations with ‘intimate and personalised stakeholder relationships, moderate innovation, limited institutionalisation of CSR processes, and limited identification with the business case for CSR’ (Jamali, 2008). Equally, Lee (2008) notes that researchers may need a new set of theoretical and CSR models to conceptualise unique competitive challenges and constraints these organisations face in their unique environments.

CSR Synergies Within Sustainable Development

Academic literature examined indicates that Sustainable Development (SD) is one of several theories and approaches used to intellectualise CSR (Garriga & Melé, 2004). However, there are also over 100 definitions of sustainable development (Holmberg & Sandbrook, 1992). The most declared is the Brundtland (1987) definition, which states sustainable development is ‘a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are made consistent with future as well as present needs’ (Banerjee, 2008). Nonetheless, strong linkage of SD and CSR synergies and their importance is evident by global initiatives such as UN Secretary-General Kofi Annan’s 1999 United Nations Global Compact initiative which encourage businesses worldwide to adopt sustainable and socially responsible policies (Post, 2013).

The prominence of CSR synergies in SD and resulting corporate interest is driven by the managerial discourse that argues ‘not only is doing good the right thing to do, but it also leads to doing better’ (Bhattacharya & Sen, 2004). Others such as De Geus (2002) further argues that companies fail ‘because their managers focus on the economic activity of producing goods and services’, and they forget that their organisations’ true nature is that of a community of humans. Although the market outcome of CSR is still inconclusive at best (Lee, 2008), majority of shareholders and institutional investors believe that strategic adoption of CSR could lead to financial rewards and sustainability in the long run. One of the factors that determine whether CSR synergies have a positive, negative or neutral effect on firm’s financial performance is stakeholder influence capacity (SIC), which refers

to ‘the ability of a firm to identify, act on, and profit from opportunities to improve stakeholder relationships through CSR’ (Barnett, 2007). However, this requires CSR synergies to be consistent with the firm’s strategies (O’Sullivan, 2006). Equally, with grass-root lobbying campaigns, a firm’s stakeholders today possess considerable leverage in shaping leadership decision making and related organisational processes, thus influencing the firm’s strategy (Walker, 2012). However, SD and stakeholder approach to CSR synergies is an identifiable theme in many ICT4D programs.

Telecentres for Low-Cost ICT Dissemination Within ICT4D

According to the documentary data, CSR and SD are prominent in the debate on ‘Universal Service’, which counters ‘Digital Divide’ between the information ‘haves’ and ‘have-nots’. The debate on the digital divide has taken place along the polarities where on one end, the market alone will take care of any perceived disparities, and on the other end, that government should implement policies that subsidise access. Within these polarities, Mariscal (2005) provides three general theoretical perspectives that could be used to form policy design to improve rural ICT development, namely Market Economy, IT for Development and Social Capital.

United Nations (2019) estimates that extreme poverty is decreasing. In North America, despite strong job creation, extreme poverty has risen in the United States to roughly 1 million between 2010 and 2016. According to the United Nations, in the European Union, the ‘data for 2016 indicate that 23.5 per cent of the population, or 118 million people, were at risk of poverty or social exclusion. Much of this decline is due to the rapid progress achieved in East Asia and South Asia. China has virtually eliminated extreme poverty over the past three decades’, and India has also made significant progress since the 2000s. However, global progress is uneven. More than 40 per cent of the world population who live in extreme poverty are still living in sub-Saharan Africa.

While the Asian economies achieved tremendous progress in lowering extreme poverty, many segments of society are still being left behind with an estimated 400 million people living in extreme poverty with their access to ICT limited and with marginalisation based on gender, rural-urban and poor-rich gaps. National level planning has been a key to bridge the digital divide with collaboration between the government and NGO sectors in ICT4D projects. The documented lessons suggest that development professionals (helpers) must start from where the local actors (doers) are, through incremental improvements within grass-roots initiatives, and the transformative change cannot impose from above. Nevertheless, the economics of rural reconstructions are changing. In keeping with this trend, certain developing countries in South Asia have taken initiatives to introduce ICT facilities through telecentres to semi-urban, rural, and remote areas. Most of these telecentre development projects

have sought initial start-up donor funding while encompassing CSR synergies that are inherent to the culture of those countries.

Roman & Colle (2005) state that Telecentres remain an atheoretical area of research and provide an overview of where telecentre research is most required. They suggest that Telecentre research should focus on three broad, interconnected areas, including the impact of telecentres on social and economic change and conditions needed for the long-term sustainability of telecentres. They also suggest studying these aspects at two levels. At Micro-level it is vital to identify the infrastructural, social, economic and cultural factors that account for sustainability of local institutions and at macro-level, which is essential to outline the national and international environment that frames global systems, public policy for contextually appropriate digital technological innovations.

The documentary data indicates that when costs are spread to a larger group or when technology experts can be brought in, a shared access model represents an effective method to disseminate ICT. Governments have realised the advantages of this model, which is termed the 'telecentre movement'. The telecentre phenomenon is seen as a 'silver bullet' for equitable sharing of the benefits of the digital revolution, first materialised in Scandinavia and the United States in the 1980s. Defined loosely as 'technology-based community centres as points of presence for socio-economic changes' (Shadrach, 2012), telecentres have been knowledge-focused organisations that can be accessed by anyone for a range of ICT services such as internet access, telephone, fax, computer services as well as for a variety of e-social and e-government services. They also assist job creation and income generation through e-commerce and to propagate microfinance schemes that assist the rural poor. Several models of telecentres can be distinguished based on multiple characteristics that they encompass. These models vary from small internet cafes started by individual entrepreneurs to networks of telecentres set up on the franchise model by NGOs or by governments. The documentary evidence suggests that telecentre models were chosen and how they are implemented may lead to differing degrees of accomplishment in terms of longevity and growth.

Nonetheless, telecentres indicate a mixed success rate (Casparly and O'Connor, 2003) and their role in development remains controversial as not all agree that they have delivered. Most telecentre movements were initially donor-funded, and many failed when donor funds concluded. The models were not designed to be financially sustainable in the long term (Hosman, 2008). PPPs were promoted as an alternative business model, which benefits from the private partner's objective of profit-seeking, financial capital, and the technological expertise combined with the public partner's drive to improve citizens' quality of life through CSR synergies. However, PPP development projects' track records also indicate a large number of unsuccessful initiatives (Hosman and Fife, 2008), which go unreported thus not assisting the

learning process with little been written about the sustainability or scalability of such projects (Roman & Colle, 2005).

Furthermore, development impact through investing in ICT with CSR synergies has been found to be indirect, complex, and challenging to measure (Saunders College and Mullins, 1994). Additionally, the costs and CSR benefits of telecentres do not occur simultaneously or even within comparable time frames. Although costs are immediate and regular, benefits are slow to mature, irregular and partly unpredictable (Hanna, 2010).

Measuring Telecentres and CSR Synergies

The documentary data emphasise that CSR models are complex, difficult to test as they contain subjective measures based on opinions and complex data. Furthermore, current models do not lend themselves to the development of a methodology that could be used in the field. Their contributions are primarily taxonomic. Jamali (2008) argues that such a taxonomic approach can potentially be remedied with a more practical stakeholder approach. However, the central challenge for leaders today is 'how to arrive at some workable balance' between instrumental and other criteria (Lee, 2008). Use of non-financial measures (Lee, 2008) and qualitative techniques (Wattegama et al., 2010) such as focus group discussions and story gathering to capture feelings and emotions are better suited for multi-stakeholder evaluation models based on stakeholders' viewpoints of CSR synergies and to generate complete pictures of telecentre initiatives.

Telecentres in South Asia

Southern Asia comprises the countries of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. The documentary data denotes abundant examples of telecentre and pilot projects within these countries. However, better-established telecentre projects in the region are found in India. At a macro level, only very few telecentre initiatives have exhibited greater sustainability outcomes within the CSR synergies envisaged, scaling up beyond their pilot stages.

Data collected indicate telecentre success seems to be linked to catering for local needs of the targeted population through the envisaged CSR initiatives. Yet, telecentres face numerous other challenges including lack of complementary infrastructure, relevant leadership and human capital (e.g. skilled managers, staff and technicians), poor revenue generation ability due to low population density, low subscriber affordability and earning capacity that influence their sustainability, and capacity for service delivery (Caspary & O'Connor, 2003). However, lessons have also been learnt through these efforts and difficulties. These indicate relative

success of telecentres working under capable leadership, common CSR focus through an umbrella organisation over stand-alone ones, and the realisation of the need to subsidise CSR synergies of telecentres in remote areas for the long term. Within this backdrop, Sri Lanka predominantly innovated their own home-grown CSR initiatives while sustaining a healthy association with the similar projects in India to share experiences and for exchanging of expertise and vision.

SRI LANKA: A CASE STUDY

‘e-Sri Lanka’ ... Sri Lanka’s ICT4D Journey to Date

‘e-Sri Lanka’ initiative, the first of its kind to be funded by World Bank in South Asia, is a holistic, long-term, development-driven approach. It is the nation’s plan to empower its people through ICT. It aims to bring ICT to every Sri Lankan citizen while attempting to transform the way the government interacts with its citizens. The reports reviewed indicate persistent efforts of the National Chamber of Commerce, local software industry leaders and the Sri Lankan government to convince the World Bank to fund the ‘e-Sri Lanka’ program within a backdrop of political change and continuing separatist war. World Bank sanctioned e-Sri Lanka project in December 2004 with a USD 53 million Credit Agreement between GoSL and The International Development Association (IDA). e-Sri Lanka vision consequently translated into a strategic action plan covering six areas with ambitious ICT and CSR symbiotic synergies. These focus areas were ICT infrastructure; policy, institutional development and leadership, re-engineering Government, ICT investment and private sector development, ICT human capacity development and the e-Society program. This reflects Sri Lanka’s aspiration to join the region’s emerging ICT enabled commercial centres. With its guiding principles drawn from ‘new development economics literature’, e-Sri Lanka has matured into a coherent national e-development strategy with local understanding, strong political commitment, broad grassroots support, and initial implementation capacity of CSR synergies through multi-donor-funded programs. Since the cessation of the 30-year long Sri Lanka’s separatist conflict on May 2009, Sri Lanka is on a wave of social and economic development powered by peace, harmony and social equity. As a result, the e-Sri Lanka project was focused on the war impacted the northern and eastern provinces of the country with several quick win e-government solutions to improve service provision and speedy socio-economic development.

With GoSL focused on development utilising ICT to enhance competitiveness, reduce poverty, and enhance the quality of life of citizens, the Information Communication Technology Agency (ICTA) of Sri Lanka was established in 2003 and

entrusted to define, initiate, and implement Sri Lanka's ICT policy, which includes e-Sri Lanka. Conceptualising the ICT strategy and the various associated programs were funded with contributions from World Bank, USAID, CIDA, SIDA and ADA.

ICTA functions as the apex ICT institution of the GoSL, a permanent entity under the Ministry of Telecommunication and Digital Infrastructure. Covered by the Information and Communication Technology Act No. 27 of 2003, (ICT Act), it functions as a legally structured company utilising lean organisational methodologies, an operational strategy based on project management, outsourcing, and collaboration with implementation partners for projects. ICTA retains the roles of oversight, monitors and evaluates outcomes, assess impacts, provide feedback to government, and ensure accountability of outsourced partners. It is noted that performance orientation, understanding stakeholder perspectives, public accountability and dissemination of findings, outsourcing common activities ensures compatibility and consistency in approach across all programs and has contributed to ICTA yielding high results. With free education and a Literacy Rate of 93.3%, Sri Lanka is a popular destination for knowledge workers in South Asia. The 2019 A.T. Kearney Global Services Location Index ranks Sri Lanka as 28 and notes the financial attractiveness of the country within the global BPO sector. ICTA is credited for improving overall Computer Literacy rate to 27.5% with a Digital Literacy rate of 40.3 in 2018 (Department of Census and Statistics, 2018). On average this will be one out of five households owning a laptop or desktop computer. Interestingly digital literacy is outstripping computer literacy as smartphone usage grows in the country. Overall, the computer literacy rate among computer aware employed population was 61.7% in the first half of 2018 (Department of Census and Statistics, 2018). ICTA programs have also assisted ICT service exports to be the fifth-largest foreign exchange earner in the country with USD 250 million in 2008. In keeping with that development, ICTA hopes the IT/BPO industry to be the country's number one export revenue earner with a target of USD 5 billion in export with an ICT workforce to 360,000 by 2022. An integral part of ICT4D drive through ICTA is the '1000 Nenasala Telecentre project' which aims to create a knowledge economy for the disadvantaged with increased profitable knowledge work, while bridging the digital divide with the involvement of multifaceted local stakeholders.

Nenasala Telecentre Initiative

The telecentre program as arguably the most visible and known part of the e-Sri Lanka initiative which acts as its primary interface to the citizens in rural areas where roughly 82 per cent of the country's people and nearly 90 per cent of its poor live. As the diffusion of ICTs in rural areas is limited, the establishment of Nenasalas was the most effective, fastest and efficient way to provide access to ICTs for rural

areas. On a strategic level, Nenasala is a 'single window' delivery model for citizens to access various e-services provided by the government and various agencies, faster and efficiently. Sri Lanka's telecentre network was initiated in 2004 in collaboration with Intel Corporation. The early pilot consisted of 20 telecentres funded by the World Bank under the name of Vishwa Ghana Kendra (VGK). Consequently, VGK became a Nenasala with the contemporary goal of constructing 1000 telecentres with grander CSR synergies and a geographical spread that covers the entire nation under former President HE Mahinda Rajapaksa's 'Mahinda Chinthanaya' election platform for developing rural and remote disadvantaged communities. ICTA states that the main objectives of a Nenasala in 2019 are to assist communities in poverty reduction, social and economic development and peacebuilding.

ICTA is responsible for planning, program management, compliance with agreed policies, and quality assurance within the five main stakeholders' groups. The largest stakeholder groups out of these are the Nenasala owners and operators who were recruited through a competitive selection process. Native language content and e-government service developers are also critical strategic partners keeping Nenasalas relevant to Nenasala users, developing opportunities for knowledge work, and empowering local knowledge workers. From the outset, the Nenasala program has also benefited from a team of experts drawn from government agencies, international donors, private sector, NGOs and telecentre leaders, who studied telecentre-based poverty alleviation efforts in neighbouring countries.

The Nenasala program focused primarily on rural communities with a population of no more than 5,000. Locations for telecentres are selected based on criteria developed with stakeholders to provide the minimum conditions needed for sustainability: a population of at least 2,000, a secondary school with at least 300 students, a reliable supply of electricity through the grid, and proximity to a fixed market with at least 15 wholesale vendors. Overall, the Nenasala project targets populations of students, small and micro enterprises, women, people with disabilities and other marginalised groups. All candidates who set up telecentres are required to submit business plans. Although initially local entrepreneurs were generally given priority on establishing Nenasalas; NGOs, local government, community and religious organisations have taken the lead in the most impoverished areas due to the social development commitments incorporated within CSR synergies of telecentres. Standard subsidies are granted based on the merits of the business plans, which had to focus on CSR initiatives. However, subsidies declined over time as the telecentre generated enough funds to contribute toward its costs. A parallel voucher scheme provided subsidised access to specific telecentre services for targeted beneficiary groups.

Using the Microsoft Unlimited Potential curriculum, Intel's Teach program and certain other international computer curricula, each Nenasala has trained between 500 - 1,000 rural youth and students each year in technology skills, making a

significant contribution to the growth of 'e-Diriya' national ICT literacy initiative in response to Sri Lanka's low e-literacy rate. Today Nenasalas offer training, certified and accredited by various professional bodies including Tertiary and Vocational Education Commission (TVEC) and the International Computer Driving Licence (ICDL) program. Youth trained in ICT often started up micro-enterprises bolstering the human resource capacity of the islands BPO ICT sector. Furthermore, Nenasalas also employ their graduates.

Nenasala Telecentre notion has centred on much debate at the design stage, as it involved a large-scale program with CSR synergies to create small enterprises in Sri Lanka. Nevertheless, a telecentre ecosystem has emerged with ICTA's nurturing, aided by complementary programs of e-Sri Lanka such as delivering local content through the e-government and e-society programs. Learning to learn through monitoring and evaluation with synthesising inputs from multiple stakeholders has proven to be critical in adopting this program. Continuing entrepreneurial education for telecentre operators, broadening connectivity options, building Regional Impact Teams (RIT) to assess progress, creating a telecentre academy in partnership with the National Open University of India and the University of Colombo in Sri Lanka, and organising national awareness seminars for telecentre operators to exchange experience and best practices are some of ICTA's current progressive focus areas for this program. Researchers note that this development of human capital by providing knowledge work opportunities through CSR synergies as a key factor, which may contribute to the long-term sustainability of telecentres.

According to ICTA Nenasala Interim Survey in 2008, the main objective of a Nenasala is to act as a hub of information, provide affordable basic communications and to be a catalyst for rural communities in aid of poverty reduction, social and economic development, and peacebuilding. Feelings, beliefs and expectations of the users within this development thrust have helped many Nenasala operators to get recognition, and Nenasalas to distinguish themselves from the rest of the cybercafés and telecentres as a brand. By 2015, ICTA managed to establish a network of 1005 Nenasalas. Furthermore, in the second phase of e-Sri Lanka, wherein more public and private e-services are likely to be promoted, Nenasalas are poised to take centre stage of the agenda in enhancing IT literacy in Sri Lanka capitalising upon the adaptive, innovative aspect of Nenasala driven projects. Within this backdrop, local entrepreneurs, community groups, NGO's, public service agencies and religious establishments have established Nenasalas through entrepreneurial, business-driven, and the NGO managed models promoted by ICTA. However, documentary data thus far indicates that these different models seem to exhibit various degrees of resilience and success in achieving sustainability.

Sustainability is the key to long-term survival. ICTA has championed Nenasala in part due to political thrust to expand the program and, in part due to the desire to

ensure the long-term sustainability of the program beyond the period where external subsidies are available. Nonetheless, the sustainability gap between Nenasalas operated under general categorisations of for-profit and not-for-profit seems to be significant. It was alleged that this gap could be related to how CSR is conceptualised and practised by the leadership that drives these models.

MAIN FOCUS AND ISSUES

On the surface, Sri Lanka is following a hybrid of IT for Development and Social Capital policies for its e-Sri Lanka ICT4D programs and Nenasala telecentre initiative. These theoretical perspectives are associated with social, human capital and stakeholder theories. In 2010, ICTA CEO, in his presentation to Tele-Centre.org Foundation launch, noted that the government of Sri Lanka sees Nenasala, as a means to an end and not the end game. He stressed that subsidising for good (or a long time) is not a taboo considering the benefits envisaged. This comment was seen, as an admission that Nenasalas' viability is irrevocably linked to subsidising its CSR synergies to benefit the rural society.

Moreover, in 2008, only 50% of the centres reported potential to achieve commercial viability within the category of community-based models. Furthermore, ICTA Nenasala Interim Surveys in 2010 indicated that perceptions of sustainability differed between Nenasala leaders of different ownership models. Nenasala Outcome Evaluation Final Report (2010) also acknowledged the sustainability disparity and noted that a review of social, management, economic and technical aspects of Nenasalas were required to get a comprehensive picture of the sustainability as it is multifaceted within CSR synergies promoted. Except for putting forward recommendations to enhance commercial focus, there has been little effort to investigate the causes of the differing sustainability of different Nenasala models with their prominent CSR synergies. Under the circumstances, the authors of this research were of the opinion, that this might be due to the perception of Nenasala leaders on how they conceptualise CSR synergies within these models particularly in satisfying the political, traditional socio-cultural expectations within local communities in Sri Lanka. Hence, the authors conducted their research on the Sri Lankan Nenasala telecentres firstly as to how CSR conceptualisation and implementation within the Nenasala telecentre models influence their sustainability. Secondly, to shed further light on how the telecentre models utilised in Sri Lanka could be improved for better use of the existing network of Nenasalas that contribute towards knowledge work in eliminating the digital divide and poverty.

The comprehensive documentary analysis of archival material undertaken within this research related to Nenasala telecentre project primarily aided the

conceptualisation of designs and operations of Nenasalas. Secondly, discovered whether differences in telecentre models existed and whether those differences led to different sustainability outcomes within the CSR synergies envisaged. The documentary data do indicate differences in models, particularly around the leadership of Nenasalas that appears to impact sustainability outcomes differently within the CSR synergies and initiatives. Researchers obtained further data on this premise by conducting focus group discussions with Nenasala stakeholders, and interviews with ICTA officials to potentially highlight how different models' operationalisation may lead to greater or fewer sustainability outcomes within the CSR synergies and leadership utilised. The field research utilised qualitative methods to capture feelings and emotions of multi-stakeholders to generate a comprehensive picture within the case study methodology, as it is suitable for intensive study of a single unit, for understanding a larger class of similar units (Yin, 2009).

FINDINGS, SOLUTIONS AND RECOMMENDATIONS

Within the study, it was uncovered that sustainability was mainly dependent on the leadership provided to these Nenasalas than the level of CSR synergies associated with the models as previously thought. The researchers referred to this unique community-based leadership style adopted by Sri Lankan Nenasalas as Socio-Cultural Leadership (SCL) by borrowing the theorem from the education field. Fundamentally SCL in the context of community-based CSR oriented leadership was defined as a 'leadership style that actively seeks to ensure that despite lack of affordability, disadvantaged groups gain the advantages usually limited to mid-high-class societies. Hence, SCL was focused on bridging the digital divide and played a more prominent role in social reform effort within the country, which aimed to alleviate poverty. Although SCL has taken four paths based on Nenasala models, they all incorporated a single-core theme. That is, all leaders and individuals who championed Nenasalas were driven by and were in tune with socio-cultural aspects, which are intertwined with ICT4D that benefits the disadvantaged in their local communities. This uniform vision seems to have originated through the intrinsic Sri Lankan social and cultural determination of caring for the underprivileged. Furthermore, ICTA's insistence to serve the disadvantaged in Sri Lankan villages by providing ICT4D services at a low cost or subsidised manner through Nenasala as one of its primary goal also aided this vision. For the discussion, the Nenasala results are differentiated by for-profit, not-for-profit focus and the prominent model groupings of community and business-based models.

The most prominent SCL was exhibited by the religious clergy, predominantly Buddhist monks. The clergy was at an advantage in their SCL qualities due to their

fundamental status in the community as leaders who already focused on social, community, and religious wellbeing of rural communities. Most clergies as SCLs were found to be born leaders and capable, methodical organisers at the grass-root level. Although most of them had little knowledge of ICT or technology and were not directly involved in the day-to-day operations of Nenasalas, SCLs were skilled at setting the strategic direction, recruiting capable individuals to manage the Nenasalas and to garner community support around Nenasalas. However, all religious institutions such as Buddhist temples also had 'Dayaka Sabhas' (Devotee Boards) that aided the running of temples and the projects associated. Although some prominent 'Dayaka Sabha' members as local village leaders had significant SCL and influence in decisions made, most clergies played the pivotal role in making decisions of Nenasalas.

Clergy as SCLs voiced their opinions freely compared to other SCLs due to their prominent social standings. They were better at articulating their positions and could moderate their messages to suit the audience. Their outspoken manner was noted by researchers in town hall meetings organised by ICTA for local Nenasala operators to discuss current issues they faced with the local politicians and government officials. The skills that the clergy developed delivering sermons to devotees, addressing prominent people in society on important community issues, officiating in many significant occasions of personal, family and community levels may have contributed to this distinct advantage in better articulating their messages and enhancing their distinct SCL. The ability to rise above politics and personal influence was also a definite advantage in their SCL. Where other leaders were obstructed by the opinion of politicians, government officials, or local village politics, the clergy remained mostly above these challenges and managed to impose their message on the others. Furthermore, the prominent venerated nature of religious SCLs within Sri Lankan society as guardians of society and people in difficult times gave them a unique position to achieve significant community support and the support of local government officials with little resistance. When reflecting on the diversity of opinion, political and religious affiliations, and interpersonal politics that was prevalent at a village level in Sri Lanka where Nenasalas mainly operated, the SCL of the clergy was a distinct advantage.

The clergy was also successful in comparison to other SCLs, in getting the support of the community to fund and aid Nenasalas. In Sri Lanka, the tradition of donating to religious institutions is prevalent either based on religious or philanthropic views. This practice also extended to government institutions and private businesses due to social influences. For example, one Nenasala affiliated with a religious institution that started the provision of services with two computers grew to service the community with 40 computers purely based on community donations of computers to the Nenasala. Although in some occasion's donations

received were not sufficient to cover all the expenses, Nenasalas run by religious institutions were not focused on commercialisation or profit-making from such activity. As noted by one SCL, ‘clergy as SCLs were not in the business of making money and only sought to serve and benefit others who could not even afford to pay for the basic ICT services. Their primary aim was to provide services free of charge or at a subsidised manner utilising the donations or grants received. Although free or subsidised services could be offered quite successfully within this model with clergy as the foremost SCLs, other SCLs could not achieve the same level of success due to differences in their social and cultural standing. The operators of Nenasalas were also influenced by the philosophy of serving others under the SCL of the clergy. This allowed the Nenasalas to source instructors and operators on a volunteer basis at no cost. Nevertheless, the downside of this practice was that the instructors were only available on their free time in afternoons or on weekends, unlike commercial ventures that operated during peak periods within the day. However, the SCLs who participated in the study acknowledged that commercialisation of Nenasalas was required to attract prominent instructors on a permanent basis, which necessitated payment of a salary. These payments were currently made either through donations or income generated from the Nenasala.

Nenasalas run by religious SCLs benefitted from a ready-made publicity mechanism to promote Nenasala services through other programs already run by the religious institutions. SCL of the clergy was essential in the promotion of Nenasala to villagers, as a worthwhile exercise. Furthermore, the religious institutions already attracted rural villagers and thereby created a clientele for Nenasalas. For example, existing Sunday Dhamma schools (religious schools) in temples and other youth programs in religious institutions were crucial as a ready-made youth clientele for Nenasalas. Nenasalas run by religious SCLs also had an advantage compared to other Nenasalas as operating expenses incurred, such as electricity and ADSL charges were subsidised by providers as these Nenasalas were classified as part of the religious institutions.

Furthermore, the premises where Nenasalas were located were owned by the religious institutions and did not require rent payments. Such advantages made the not-for-profit community model associated with religious institutions very successful in operational cost reduction aspects. However, such Nenasalas also faced difficulties due to this symbiotic association. For example, religious institutions and SCLs necessitated a modest dress code within Nenasalas, which created an issue. Entering a religious venue required one to remove their shoes, which was an inconvenience for patrons. Furthermore, a minority of villagers did not share a spiritual view for various reasons did not visit Nenasalas due to perceived religious linkages. In addition, most religious institutions were situated within a village away from the main road. This requires visitors to travel away from main roads to reach Nenasala.

Nevertheless, enterprising SCLs were quick to remedy these issues by relocating Nenasalas into premises detached from the religious institutions or much closer to the main road. This not only eliminated the problems associated with dress code and distance, but it also created an opportunity for commercialisation by creating an effective detachment of Nenasala services from the religious philosophy which was based on free service.

Village societies of various types ran second prominent not-for-profit grouping of Nenasalas. These ranged from village welfare societies to village youth sports clubs. Although this model was similar to religious institutions in many regards, the decisions were taken by a village committee led by an SCL as its principal leader. These committees and SCLs usually alternated annually with new office bearers being elected democratically by the villagers. The advisory and monitoring services of Nenasalas that operated under the village societies were typically carried out through the village societies' committees, made-up of prominent village elders or government officials. However, in this model, the SCLs were mainly visible at the committee level. How well the Nenasala functioned within a given year was mostly dependent on the capabilities and aptitude of these SCLs elected. Largely, the SCLs associated with village societies were prominent people within the villages such as Justices of the Peace, Principals of schools as people who could bring the village community together similar to the role of religious clergy on a civil level to benefit their local communities. Conversely, in some cases, the SCLs were found at the operator level where the village committee lacked the knowledge in ICT even to provide basic guidance and governance to Nenasalas.

Nevertheless, day-to-day operations of these Nenasalas were conducted by computer literate youth recruited from the village. The operators usually had qualifications on ICT at a certificate level. Although these youth saw Nenasala as an opportunity for employment and as a stepping-stone to greater job opportunities in ICT and BPO industry, they also had a desire to serve their local community that they were a part of. This sense of service was heightened by the fact that the operators had to report to the village society that was made up of prominent people in the village, who maintained deep-rooted local bonds and loyalties with village families. Nonetheless, as better employment opportunities arrived, such operators left employment at village Nenasalas affecting its stability and sustainability. To prevent this, SCLs in village societies offered salaries to operators from income generated by the Nenasalas or by other programs that were associated with the village society. Such attempts to maintain continuity against constant change and attrition were another service the village society SCLs provided within this model.

A higher level of commercialisation with subsidised services was also evident within this model than Nenasalas associated with religious institutions. However, the decision of SCLs to employ village youth within these Nenasalas as operators was

a compelling cause to uplift the commercialisation since it attracted other village youth to Nenasalas due to similarities of interests, social connections and through the introduction of youth-focused services such as gaming and online social media. For example, one Nenasala reported that their premier service was Skype calling service as most youths had their parents or relatives working overseas. Although they had to travel further to get to the Nenasala, oppose to a telecentre in town, local youth were inclined to use the Nenasala as they felt that they had more freedom in a familiar atmosphere where the operators understood their circumstances since the operators were also from similar family backgrounds. Nevertheless, due to a significant number of village families purchasing personal computers, the continuous operation of Nenasalas was at risk.

Furthermore, constant competition from cheap data packages offered with smartphones that youth purchased exacerbated this plight. However, there was still a population in rural villages that could not afford such hi-tech solutions due to chronic poverty and remained loyal clients of Nenasalas. As such, the provision of ICT services at an affordable rate and dissemination of ICT knowledge within villagers was seen, as a prominent task carried out by the village society Nenasalas. Nevertheless, SCLs believed that the local government officials (Grama Sevaka Niladharis etc.) and departments could be better integrated with Nenasalas run by village societies for better provision of e-government services to benefit the communities engaged in agriculture.

The third group of not-for-profit Nenasalas were those under the patronage of NGOs. These Nenasalas had an operational mix of religious institutions and village societies-based models. The NGO based Nenasalas were mainly operated on donor funding for providing ICT benefits to local target groups. These target groups could be specific, such as children or women in a particular village or all families in a village or a region. NGOs had substantial CSR synergies linked to their programs and business models while accommodating socio-cultural sensitivities of their local target groups. Cultural and social diversity was prominent in Sri Lanka in various regions based on language, race, and religion. This local focus and sensitivity towards socio-cultural concerns and community needs were visible in Nenasalas sponsored by INGOs as well.

Most Nenasalas of this type had some level of subsidisation by the parent NGO either within operations or in payment of operator wages. However, commercial viability was a primary focus of the NGOs to ensure that the Nenasalas could perform beyond the initial level of funding and subsidisation received from the NGO. In some examples, the NGOs initially donated resources, buildings, and funds for eventually the Nenasalas to conduct their operations independently in a financially viable manner. NGO SCLs were enablers to start Nenasalas by individuals who operated the Nenasalas independently or affiliated with the NGO under the guidance of the

NGO. Although the operators were generally given the freedom to manage day-to-day activities of the Nenasalas, local NGO SCLs in committees or boards provided directions for executing overall Nenasala strategies.

Nevertheless, a prominent operator SCL or a board member SCL was identifiable in successful operations of this model. In one example, an individual in the Eastern province of Sri Lanka had set up a local NGO associated with an INGO based in Japan. This local NGO was providing Nenasala services to children through computer training services, based on his vision and determination to benefit local disadvantaged youth in the region. As the income generated from Nenasala services was not sufficient, he also worked part-time to supplement his income to continue his NGO work. This drive, determination, and vision for benefiting the local community through philanthropic activities was a key trait of the SCLs that were involved in the NGO movement at board or the operator level.

However, some Nenasala operators noted that having an NGO SCLs behind Nenasala could also hinder its progress as the focus of NGO projects changed when NGO SCLs changed. Also, some participants indicated that during the Sri Lanka's separatist war NGOs priority was given to basic needs of local target groups such as food, shelter and medicine at the cost of ICT training through Nenasalas which was seen as a secondary need. With the end of hostilities and the separatist war, Sri Lankan Nenasalas have been benefiting from the undivided focus of NGO based SCLs particularly in the North and East of the country that is currently going through a rapid development phase. Nonetheless, some participants noted that NGOs had a declining prominence in the country upon its return to normalcy. However, with more than 1500 registered NGOs in Sri Lanka, the NGO SCLs were still committed to reducing poverty in rural villages as many disadvantaged people were from remote rural areas.

For-profit Nenasalas were led by local entrepreneurs who operated a business model with a high sense of CSR intending to serve the local community. The Nenasalas operated by local entrepreneur SCLs were financially viable from a traditional business sense than the not-for-profit models. That is, although not-for-profit Nenasalas were financially secure and sustainable through donations and grants, for-profit Nenasalas under the entrepreneur SCLs were profitable business ventures that made profits after covering their expenses. However, entrepreneur SCLs hybrid business model had CSR aspects that manifested in different ways at a different intensity to benefit local communities. This ranged from providing services at a lower rate than non-Nenasala telecentres to giving scholarships to needy children for ICT courses.

Furthermore, these SCLs were the most efficient and most innovative. They paid particular attention to how important decisions such as recruitment could be generating a different amount of revenue within the business venture. For example,

these SCLs were more inclined to hire well-known computer tutors due to their celebrity power in attracting students to these Nenasalas. These SCLs also paid close attention to hiring competent multi-skilled operators at the best market price to have the best Return of Investment (ROI). In general, entrepreneurial SCLs recruited degree qualified youth on every occasion possible. However, this decision was based within the income of the Nenasala, and in most circumstances, such recruitments were linked to a specially funded project or e-venture.

Oppose to other SCLs in the study, the entrepreneurial SCLs had the highest focus on commercial viability and provision of additional services demanded by local villagers. The focus was much more on pricing services suitable to the local clientele rather than subsidisation for the sake of social benefit. SCLs were also keen to exploit any available opportunity to make services affordable such as providing scholarships for disadvantaged children sponsored by local businesses and corporate philanthropists. In one example of such action, a Nenasala SCL in the Central Province offered computer certificate courses at half price compared to non-Nenasala competitors through guaranteed scholarships secured through a philanthropic businessperson. Moreover, entrepreneurial SCLs always attempted to price services lower than their non-Nenasala competitors to ensure that they could attract more clients through building a reputation and a brand name known for being reasonably priced. However, entrepreneurial SCLs avoided providing free services, arguing that people did not value or subscribe to a service just because it was free. Instead, they focused on quality at the right price affordable to the local community.

Entrepreneurial SCLs also focused on complementary revenue-generating methods such as selling computer accessories and providing additional VAS services like computer and mobile phone repairs exhibiting a keen sense of business. These attempts varied from selling popular movie CDs, stationery, office VAS such as printing, photocopying, and laminating; and BPO linked subcontracting received from local and overseas BPO providers. It was also noted that the most successful SCLs of this nature had some level of previous engagement in the ICT industry before they got involved with Nenasalas. As such, these entrepreneurial SCLs had the knowledge required to focus heavily on spinoff e-ventures that either secured grants or generated additional revenue. For example, one entrepreneurial SCL who operated two Nenasalas in the Southern Province noted that he initiated an online art-selling project and employed a local fine-arts graduate who was successful in generating ad-hoc revenue for the Nenasala through online sales. Besides, he has started an online service for local fisherman for providing information on possible fish stock locations based on favourable weather conditions that attracted fish to a certain area. However, it was emphasised that the entrepreneurial SCLs did not receive much support for such e-ventures as in with other SCL models in terms of advice, finance, or moral support.

Nonetheless, a highly motivated entrepreneurial SCL could make decisions and take actions faster than SCLs in other models. Other SCLs usually liaised with an advisory committee or a board that could influence Nenasala decisions, which delayed taking direct actions and decisions to the frustration of a highly motivated SCL who wanted to operate the Nenasala at a faster phase. As one participant noted, 'if changes are required within Nenasala, I make it happen overnight'. However, the responsibility for success was also a heavy burden on the SCLs who perused this model and unilateral decisions. Most successful entrepreneurial SCLs spent their own money and attempted to gain commercial viability by finding the niche market for the immediate local area they serviced. Yet, these Nenasalas were seen by outsiders as a government-controlled venture even though the control and ownership were not with the government. This belief prevented entrepreneurial SCLs from obtaining bank loans for expansion plans or modernisation like other contemporary private small businesses. Nevertheless, microfinance providers in Sri Lanka such as Sanasa Bank did offer loans to entrepreneurial SCLs who operated Nenasalas within and commercially sustainable business model after they demonstrated their creditworthiness.

ICTA officials also agreed that the key to success of Nenasalas had been the leadership provided by SCLs individually or through a form of highly coordinated, motivated SCL committees. It was emphasised that leadership was fundamental, as a good SCL could solve most problems Nenasalas faced from finances, HR, technical and issues surrounding local society and politics. However, ICTA did not differentiate or prefer the leadership of a model. Yet, they noted that the most prominent SCL examples were seen in religious SCLs (such as Buddhist temples, Hindu kovils and churches) led under religious clergy and through Nenasalas led by local entrepreneurial SCLs who operated the business model with a greater sense of CSR. In the first category of SCLs, success was attributed to the religious-based focus of assisting the disadvantaged in society. In the second model, success was assigned to the commercial focus with attention to the customisation of services to the local community at the right price. Likewise, ICTA did not differentiate SCL qualities based on religious, social, or cultural divisions within the country. ICTA believed that locally focused and appropriate Nenasala setups would automatically cater to such sensitivities inherently, as the local clientele would demand them. Such focus on the target clientele could be seen with the religious, NGO and entrepreneurial SCLs within the Nenasala models.

Nonetheless, ICTA officials were extra careful to choose the best candidates as owners of Nenasalas within the initial screening process. All potential Nenasala owners had to present a business plan where they had to clearly articulate the sustainability aspects, including the financial viability of the Nenasala and the SCLs vision for its development. ICTA official also interviewed the potential SCLs to

determine their suitability, ability, and determination before finalising the Nenasala establishment. Secondly, ICTA focused heavily on leadership training as they saw a disparity between the capabilities, motivations, and the dominant traits of SCLs who set up Nenasalas. ICTA provided initial five-day residential training to the owner and an operator of each Nenasala before its commencement. The training covered all aspects required for successful Nenasala operation, and the SCL attributes that would secure the best performance from employees and gain local community support. The training was documented in a comprehensive manual that was prepared by an external consultant under the mandated base curriculum of ICTA. Although ICTA understood that it would have been ideal for providing ongoing rotational training to update the skills of Nenasala SCLs, budget constraints and the ad-hoc nature of donor funding for the Sri Lankan ICT4D roadmap prevented this from becoming a reality. However, in ICTA's experience, SCLs who initiated Nenasala remained with the venture long-term compared to operators who had a higher attrition rate. As such, it was envisaged that the SCLs' skills and knowledge would be passed on to any recruits hired in lieu of rotational training required.

ICTA officials noted that a baseline understanding of ICT was required by the SCLs to guide Nenasalas for best results. However, they did not object to SCLs who had no ICT experience taking the ownership of Nenasalas, if those SCLs exhibited the aptitude, capability to engage the relevant qualified people, and the drive required for Nenasala establishment. Furthermore, ICTA did see merits of guidance gained from a strong single SCL as it allowed prompt decision-making and fewer complications with internal politics and social conflicts. Nonetheless, the advantage of a committee or a group of SCLs was that the ideas were collectively brainstormed to reach a mutually acceptable decision that would better suit a majority within the community opposed to an individual SCL's decision which may be misguided. For example, an entrepreneurial SCL who was motivated by accolades and recognition noted, that he was going to avoid service as it was not the focus of recent ICTA excellence awards which was contrary to the Nenasalas purpose. In another example of a bad decision of an entrepreneurial SCL focused on ROI noted, that he avoided providing Skype services as too many members of the same family attended the Nenasala for one Skype call with their overseas relatives causing crowding in his establishment. Instead, he wanted to pursue more profitable and less inconvenient services such as online gaming, again contrary to the Nenasalas purpose and a harmful practice for the village youth. Yet, the overwhelming experience was that positive SCLs gained results despite difficulties faced on many levels. However, even the strongest SCLs faced challenges from external threats that affected Nenasalas in today's uncertain market. For example, competition from cheap data services offered by mobile carriers was a severe threat to fixed-line internet providers such as Nenasalas. However, 'Sarvodaya' an early pioneer in the Sri Lankan telecentre

movement as a well-known 60-year-old national NGO has remedied this threat through 'Fusion', their ICT4D arm. Fusion was focused on e-Empowerment of communities through a combination of telecentres, mobile phones, and smart devices (Android phones and tablets) that span across sectors of education, agriculture, microfinance, youth, and women empowerment. The SCLs within Fusion focused more on mobile smart devices that interacted with VAS provided through the Fusion website. This allowed their telecentres to make the transition to mobile technology to gain the early mover advantage in the technology life cycle. Although other SCLs who were associated with Nenasalas and ICTA acknowledged that this move was inevitable due to the shift in dominant technology, they noted that the fixed-line technology with computers still offered services to rural poor that could not be achieved through mobile smart devices.

The existence of an overarching body such as ICTA to keep SCLs focused on a uniform vision was highlighted as a critical aspect of the project's success. Furthermore, with the maturing of ICTA, the second wave of Leadership took over the e-Sri Lanka and ICTA strategic direction, providing adding a layer of direction to the initiative. The SCLs provided by Nenasala and other complementary program managers were credited by grass root level SCLs as main guiding lights for the project's accomplishments within Sri Lankan society at a village level. The SCL provided by the ICTA officials made such programs relevant to Sri Lankans and international stakeholders and were credited for its long-term viability focus and the strategic direction in response to disruptive digital technology. The continual SCL of governments and the past President HE Mahinda Rajapaksa from 2005 laid a solid foundation for the next phase of the e-Development master plan 'SMART Sri Lanka'. As political stability is required for in any long term ICT4D effort, this stability provided by the oppositions alike for the betterment of the nation indeed has allowed for the past stability and future focus required by this program to grow.

ICTA officials predominantly saw the Nenasala SCLs contribution within the broader context of ICT4D path Sri Lanka had to take. They acknowledged that the SCLs in not-for-profit community-based models were particularly important to developing countries such as Sri Lanka with limited resources at the government and local community levels. In spite of that, ICTA officials conceded that the long-term viability of the Nenasala project could not be based on the not-for-profit concept as the country gets more westernised and market-oriented. This was to say that the models had to generate income sufficient to cover expenses without external donations. It was noted that at some stage there might be a natural progression of Nenasala models towards a more profit-focused enterprise as it was evident by the success of the for-profit business model already within the Nenasala program today.

Nonetheless, the CSR synergies that were intertwined within the models were expected to survive due to the deep-seated social and cultural prevalence in Sri Lanka

towards the well-being of the disadvantaged. This trend may have occurred in the developed western countries considering that the current norm in these countries seems to be commercial ventures with selected CSR synergies. Nevertheless, the unique hybrid model of SCLs that was highlighted in Nenasalas would be applicable to and be significant to other developing countries in the South Asian region that has a similar social, cultural and religious bound. Although these similar social, cultural and religious aspects may act as a common underlining unifier, there needs to be prominent SCLs within a given model to compliment the underlining unifier within the model. This is highlighted by the significance and the success of not-for-profit community-based models associated with the SCL of clergy provided in Sri Lanka within the currently prevalent social and cultural norms. Still, as these critical focus points within a society change, the success or the prominence of SCLs and the associated model are also expected to change. Hence the belief as the country develops and gets more commercialised, ICT4D would be following the course chartered by developed countries with profit-focused ventures and a philanthropic approach to poverty alleviation through CSR synergies. However, this change is not expected to happen in the near future in Sri Lanka or other developing nations, even with the changes to dominant technology and introduction of disruptive innovations such as mobile data. This was due to the long path that still lay ahead for developing countries such as Sri Lanka where the poverty alleviation still requires SCLs even for the success of anticipated new technology in the near future.

Although gaps between grass-root, non-profit and for-profit organisations have been explored in subjects such as microfinance (Augustine, 2012) and interdependence of non-profit and for-profit business models within technology-driven sustainable community development (Arora and Kazmi, 2012), for the first time, this case study explored how CSR conceptualisation by leaders within different telecentre models impacts sustainability, at both micro and macro levels of the Nenasala telecentre initiative in Sri Lanka. It is envisaged that further field research could contribute to the operationalisation of telecentres and to identify issues not previously identified in the CSR literature primarily related to subsidised, micro-financed grass-root level organisations. The finding revealed how leadership was crucial for Nenasala telecentre success. A new hybrid breed of socio-cultural leaders (SCL) prevalent in Sri Lankan not-for-profit Nenasala telecentres, successfully utilised SCL within CSR synergies to gain sustainability and a competitive advantage against their commercial telecentre competitors. The findings also complement the sustainability debate and critical themes, such as the leadership of telecentres within the different models used.

NENASALAS IN 2020

Since the inception of the project, comprehensive monitoring and evaluation (M&E) approach has been envisaged for measuring performance, learning lessons, and making required corrective actions. Regular follow up collection of data at the Nenasala centre level has been promoted. However, as Nenasala logbooks have not been adequately maintained by the centre operators the day to day administrative and usage data which would be useful to measure sustainability was not available. Several periodic and independent evaluation surveys have been conducted by ICTA's central M&E unit using random field visits to improve transparency. Even with limited data, ICTA has uncovered sustainability problems with the program. As a result, ICTA has decided to strengthen the operations of Nenasalas through capacity, skills and entrepreneurship development training for Nenasala operators along with additional training on mobile application development. Mobile application development is a fast-growing industry. It is expected that such training would help Nenasala operators to explore new business opportunities. The training initiative has trained three hundred and forty Nenasala operators by the beginning of 2018 to ensure better management of Nenasala centres and to ensure that the Nenasalas are financially sustainable

The initial objective of the Nenasala in the 2004/5 era was to bridge the digital divide prevalent in Sri Lanka, especially among the rural society. After the separatist war ended in 2009, this objective widened to facilitate access to ICT to communities in the former conflict regions. It's goal was to improve the wellbeing of communities with the use of digital technologies. ICTA has established 1005 Nenasalas by now (ICTA, 2019). According to an ICTA survey, approximately 55% of the Nenasalas are currently operational and continue to provide IT training and ICT services to their community (ICTA, 2019). The same survey identified that Nenasala is still a vital service provider to rural communities. Furthermore, due to the use of mobiles and other digital devices, the e-services offered by the private and public sector organisations have increased. There is significant adoption of these mobile digital technologies and services by the rural poor. Nenasalas in such localities have been facing challenges to achieve financially viable, demand-driven operations. The digital technology consumption in both rural and urban Sri Lankan communities has led to the business models of Nenasala to transform. As a result, ICTA has decided to revamp Nenasalas.

With the rise of digital technologies transforming the way of life of it's citizens, and GoSL's vision of a knowledge-based society through a digitised economy, ICTA is launching Nenasala 2.0 and Centre for Digital Life (CfDL) in 2020. ICTA has invited applications for franchises opportunities throughout the island for Nenasala 2.0. Current Nenasala operators can apply for franchise opportunities and will be

given a higher priority within the revamped initiative. Apart from the traditional benefits franchisees get such as the right to use the 'Nenasala' brand and partnership in multinational and local conglomerates within the ICTA national program; they have been given the opportunity to be the intermediary to provide digital benefits to the society and engage in government digital transformation initiatives.

The Enhanced Nenasala (2.0) concept will still provide services to the poor either subsidised or free through external organisations such as NGOs and the Government. It is hoped that Nenasala (2.0) will retain local knowledge, support localised industry and be the grass-root level digital intermediary which act as a bridge for the dissemination of digital services and opportunities to the public from participating partner organisations nationally and internationally. The objective of the initiative remains the establishment of a minimum of 1000 enhance Nenasala's across Sri Lanka and to increase digital adoption among all segments of the society. These Nenasalas are to be staffed by a minimum of two staff members certified on ICT.

ICTA has proposed a fully franchised model with three types of Nenasala models across the country. The first model is called Enhanced Nenasala. The existing 400 Nenasala owners are eligible to apply for this concept. The second model is Rural Entrepreneurs Nenasalas. It is expected that 600 rural entrepreneurs will have the opportunity to participate in this model. As the third model, ICTA has advocated Corporate Franchised Nenasala. ICTA believes that corporate Partners would take up this opportunity to set up 1000 new Nenasalas. ICTA still intends to be the focal point of assisting central coordination and control via a Centre for Digital Life (CfDL). CfDL will be in Colombo and will be staffed by five employees initially and fifty Nenasala district coordinators. CfDL plan to operate a Help desk for technical support six-day per week with a minimum of eight hours per day availability to assist in conducting demos of various government services to Nenasala operators. It is hoped CfDL will increase the digital literacy of Nenasala staff, disseminate knowledge, and monitoring and evaluation the competency of staff to customise future projects initiatives. CfDL will also be a digital intermediary between public and private to distribute their digital services and goods.

ICTA also plans to strengthen the monitoring and evaluation for more robust periodic evaluation studies to measure the achievement of expected outcomes. Closely monitoring ongoing activities would provide the opportunity for corrective measures to overcome the issues faced by the Nenasalas. The monitoring and evaluation would feed in the Sustainability Plan of the new business models. The enhanced Nenasala concept is to be self-sustaining and would be able to operate independently. The operational costs are to be covered by generated income. ICTA team aims to monitor each Nenasala to guide them to achieve the best outcomes possible.

CRITICS, LESSONS, FUTURE DIRECTIONS IN THE FOURTH INDUSTRIAL REVOLUTION

Detractors of telecentres argue that although it was a valid concept in the early ICT4D efforts in the 1990s, increased affordability of digital equipment and disruptive technologies, growth of complementary digital services and increased necessities such as electricity in rural communities have superseded telecentres. However, they do not dispute the impact of early telecentre projects such as the Sarvodaya Village Information Centre initiatives had in Sri Lanka in introducing rural villagers to computers and technology for the first time. They also acknowledge that the early gains thus far through telecentres allowed governments, NGOs, and other organisations such as the World Bank and the United Nation's development organisations to provide vital services to improve agriculture, health, and social services to rural communities in Sri Lanka.

Nonetheless, history has shown numerous ICT4D ideas that looked good on paper at a macro level have been unworkable on the ground, like in the case of numerous telecentre models and rural 'Micro-Telco' initiatives. Furthermore, most telecentre projects in the world have been ill-thought-out and executed with flawed unsustainable economic models. Considerations of sustainability by ICT4D implementers in the past have been limited to the initial set up and the duration of the funding provided by donors. Today, donors are much more focused on economic viability, ROI, and the ability of locals to maintain telecentre operations in the long term while delivering a clear social benefit promised. The past short-term focus has proven to be not well suited for ICT4D initiatives such as telecentres that required continued operational, technical and funding support at the grass-root level.

Yet, a digital technical paradigm shift is recognisable with the take-up of mobile technologies in developing countries such as Sri Lanka, which require a clear rethink of ICT4D approach. While rural ICT4D fixed-line initiatives struggled to endure, mobile phone take-up has emerged as a success story, particularly in the Asian continent. Many rural locations without fixed telecom infrastructure in Sri Lanka now have mobile phone coverage as a result of market deregulation since the 1990s, policy changes, introduction of new technologies and incremental network coverage expansions. It is also clear that mobile technologies are competitive and cheap as seen with Sri Lankan market experience. It is acknowledged that the cost of ICT equipment, in general, is falling to a level that many rural families could afford mobile smartphones and tablets that could be connected to the internet via mobile data connections.

The country's mobile penetration level has been higher than the world and regional averages. In 2018, Sri Lanka saw growth with mobile penetration at 115 subscriptions per 100 people. While it is not an indication of market saturation,

this is a slight drop from previous figures. Within a highly proactive regulatory regime and a competitive mobile market with five leading operators, Sri Lanka is listed as the least expensive countries for mobile-cellular services in the region (ITU, 2016) and is ranked 35th globally in the 2016 mobile-cellular price basket, which measures the affordability of services (ITU, 2017). Despite Sri Lanka having a dynamic broadband market, with different fixed solution providers, Sri Lanka's fixed internet and broadband penetration remains low and is below the regional and developing country averages with fixed broadband subscriptions at 7.21 per 100 people (ITU, 2018). The fixed telephone subscription rate declined and was at 12 per 100 people (ITU, 2018). This could be attributed to higher take-up of mobile devices and fixed internet and broadband enabling means of communication such as Voice over Internet Protocol (VoIP) and Instant Messaging (IM). Sri Lankan regulatory bodies and ICTA has allowed for natural market growth of mobile technology due to the greater competition and cost advantages the market offered. The government has also focused on the provision of various e-government applications compatible with mobile devices to further drive demand within disadvantaged and to assist higher rural take-up rates.

Although current ICT4D rhetoric suggests that there is no need for fixed-line ICT4D initiatives in remote areas and thus donors should focus on mobile solutions for their future ventures, this rhetoric and criticisms seem rather simplistic and premature. Commercial enterprises such as mobile phone companies are inclined to serve the higher population areas in cities to gain a more extensive revenue base. They would also be reluctant to engage in non-mainstream interests with greater capital cost and to provide tailor-made solutions to the rural poor as seen by current examples of the developed countries. Therefore, it opens a multitude of opportunities in ICT4D initiatives, particularly in smaller rural markets, which require bottom-up ICT4D initiatives to effectively serve niche rural poor markets as opposed to the top-down generic mobile phone solutions. Moreover, the failures faced by telecentre ICT4D projects mainly occurred not due to technical failures or technology changes. The longevity of such projects has been affected due to poor design, implementation, lack of leadership and short-term focus.

Conversely, leadership is crucial for these ICT4D initiatives. Having a team of inspirational leaders who contributed at various levels, who were driven by measurable results and could motivate others, has been lacking in grass root and program level of ICT4D efforts in Sri Lanka and broader South Asian countries. Furthermore, nurturing potential leaders to achieve alternative visions within the emerging disruptive digital technologies has not been a priority for most developing nations that have been dependent on top-down initiatives of donors. Yet, as the world transforms to knowledge economies in the fourth industrial revolution, there is an urgency for a new dynamic leadership model to drive national policymaking

and strategy, similar to the drive visible at social and economic development at the grass-root level. Although there have been a clear advancement of digital technology and accompanying complementary infrastructure required for ICT4D in developing countries such as Sri Lanka, it is argued that lives of disadvantaged rural people in the least developed areas of the country are better served with grass-root leadership initiatives that have central coordination and governance through a responsible national authority. Without such leadership, the fate of any mobile ICT4D development initiative currently focused by the ICT4D fraternity may not be favourable.

CONCLUSION

The fourth industrial revolution is characterised by disruptive and innovative technologies and a new era of synergetic effects between technologies across industries that have remained siloed in the past. Those developments affect all disciplines, economies, industries and governments and may even challenge the notion of what it means to be human. It is the researchers' view that developed counties and urban populations will be more impacted and benefit by these disruptions as opposed to the developing countries and rural populace. Yet, the researchers' do subscribe to the belief that these changes will eventually impact the future generation's digital direction even in rural areas. The question then becomes, how to harness those changes to shape a better future? A future, in which technology empowers people rather than replaces or displaces them; progress and serving society rather than disrupting it; and in which, disruptive technologies are managed within societal moral and ethical boundaries to benefit all parts of society.

Eliminating the inequality between technological "have" and "have not" which is generally based on demographics and geographic differences is the essence of ICT4D. One of the most prevalent approaches of ICT4D in the developing world are Telecentres. Telecentres are designed with the purpose of lifting the living standard of the rural population with information and opportunities to integrate them with the development drives and services available to urban populations. Telecentres have been set up by multipurpose community organisations. ICT access provided by telecentres disseminates information, accommodate e-transactions, promote e-government services while providing basic IT functions to the larger population it serves. These telecentres are subsidised and guided by parent organisations. Corporate Social Responsibility (CSR) synergies these Telecentres encompass bring benefits greater than the sum of its parts. Academics have used Corporate Social Responsibility (CSR) Responsiveness (CSR₂) and Performance (CSP) to express the notion of social responsibility of organisations that operate telecentres, transcending the economic, legal, ethical, and discretionary expectations of the society. With the

fourth industrial revolution, the goal posts have shifted on ICT4D organisations and CSR synergies they champion.

The researchers of this study explored how CSR conceptualisation by leaders within different telecentre models impacts sustainability, at both micro and macro levels of the Nenasala telecentre initiative in Sri Lanka. Sri Lanka's ICT4D journey e-Sri Lanka, and the Nenasala initiative provide some clues as to how ICT4D can manage these disruptive technologies for the benefit of the larger society. As per the Sri Lankan Nenasala experience, leadership which is bounded by social and cultural norms of the country is seen as an excellent way to developing new frameworks for the future benefit of all, especially the disadvantaged. The leadership uncovered in Nenasala telecentre initiative in Sri Lanka was themed as Socio-Cultural Leadership (SCL). Fundamentally, SCLs are leaders that ensure the disadvantaged groups gain the advantages typically limited to mid-high classes. In the context of ICT4D, CSR and SCL are supportive of bridging the digital divide for social reform and alleviating poverty, particularly in rural areas. Overall, all SCLs who championed Nenasalas have been driven by and were in tune with socio-cultural aspects of Sri Lanka, which were intertwined with CSR synergies focused on development that benefited the disadvantaged. The study uncovered how CSR was conceptualised mainly depended on the prevalent perceptions of SCLs of Nenasalas and ICTA officials. The researchers of this study explored how CSR conceptualisation by leaders within different telecentre models impacts sustainability, at both micro and macro levels of the Nenasala telecentre initiative in Sri Lanka.

The analysis of archival material indicated differences in models in Nenasala operationalisation. Therefore, the CSR manifestation within operationalisation through leaders of different Nenasala models, which may result in disparate impacts on sustainability, is a significant issue that required scrutiny. Sri Lanka Nenasala models have taken four paths. In all four models; CSR, CSP has made significant contributions to the objective of Sri Lankan Nenasalas to achieve the best outcomes for the community. Sri Lanka as a developing country has indicated that not-for-profit, community-based Nenasalas seem to be more significant contributors to society and culture. Out of the not-for-profit community-based models, cultural and social aspects seem to be best aligned with SCLs of Sri Lankan religious institution based Nenasala telecentres. The religious leaders have held prominent venerated positions in society and have been capable, independent and competent leaders who had large followings. Nenasalas directed by community leaders and NGOs also have made an impact on the rural population they served, due to the underlining CSR synergies they pursued within their Nenasala models. Nonetheless, the SCLs associated with local entrepreneurs who operated a business model with a high sense of CSR seems to be more conducive for commercial viability and hence sustainability of Nenasalas in the western sense. Nenasalas of all those four models have been successful

in achieving the CSR goals that benefit the disadvantaged, especially if capable leaders led them in tune with socio-cultural aspects intertwined within the models. It is also noted that the leadership, determination and entrepreneurial thinking of the leader at the grassroots level has been the key to success at that level. Although these CSR goals may reduce in future with the changes introduced by the fourth industrial revolution and the technological innovations, it is the researchers' view that CSR goals will remain, and gradually adapt in response to changes as per the past observation in ICT4D projects in Sri Lanka.

The SCL at the overarching parent program seems to be most prominent and valuable towards sustaining the longevity of the initiatives such as Nenasalas and e-Sri Lanka programs through strategic direction within digital disruption. The SCL provided by ICTA officials, and relevant ministers as the patrons of the ICT4D initiatives has been the key for stability and continuity of the overall vision. Although Nenasala SCLs have been prominent at the grassroots level due to the benefits they provided the local rural underprivileged communities, without the unifying direction, overall strategy, and policy from the overarching body such as ICTA, the success of the program would have been significantly stifled. The researchers believe that the SCL importance will shift more towards the governing bodies from the grass-root level leadership within Nenasala 2.0 initiative in 2020, as it would be difficult for a grassroots leader to comprehend the change of the fourth industrial revolution.

Therefore, observations in Sri Lanka is significant as these SCLs, particularly on the not-for-profit community-based models seem to be mutating to a semi for-profit business model with significant CSR synergies that benefit the local communities as seen in the developed western countries. What was observed in Sri Lanka could be the commercialisation needed for more viable and sustainable business models. It is the researchers' view that with the Fourth Industrial Revolution, such micro-level changes will shift to a macro level while keeping the focus on benefiting the disadvantage. Furthermore, the change of dominant technology and introduction of disruptive innovations within the Fourth Industrial Revolution does not change this necessity to have SCLs at both micro, and macro levels at grass root initiatives in developing countries such as Sri Lanka, as the new technology also requires the same guidance and care to defuse threats to the rural populations through SCL, as they did with current prevalent technology. In the researchers' view that the lag in the introduction of disruptive digital technologies to rural populations in developing countries such as Sri Lanka, will maintain the current digital divide in the foreseeable future necessitating the need for ICT4D initiatives such as Nenasala 2.0.

However, the proposed Nenasala 2.0 model is similar to what was implemented by ICTA previously. As ICTA survey notes that approximately 55% of the Nenasalas are currently nonoperative, the researchers suggest that lessons which were evident from the past need to be revisited. Although political, social and economic instability that

plagued Sri Lanka from 2015 to end of 2019 may have contributed to the reversal of gains of Nenasala program and the wider ICTA driven ICT4D initiatives. Nenasala 2.0 needs to incorporate solutions to those fundamental issues if it is to bring forth better results. The researchers suggest returning to the basics and identifying organisation strengths, weaknesses, opportunities, and threats related to the project within planning. It is the researchers' observation that leadership is the key to the success of the projects, along with continuous measurements and evaluation, followed by funding. Independent funding sources such as crowdfunding, allow the SCL to fund initiatives on their merits at the grassroots level, with the help of the worldwide philanthropic population, in keeping with the true sense of social responsibility.

The researchers of this study explored how CSR conceptualisation by leaders within different telecentre models impacts sustainability, at both micro and macro levels of the Nenasala telecentre initiative in Sri Lanka. For the first time, this case study examined the Sri Lankan telecentre models within the CSR synergies they encompass and their conceptualisation by leaders. It is envisaged that further field research could contribute to the operationalisation of telecentres and to identify issues not previously identified in the CSR literature primarily related to subsidised, micro-financed grass-root level organisations. The findings also complement the sustainability debate and critical themes, such as the leadership of telecentres within the different models used. Further research would also attempt to provide an in-depth understanding of CSR conceptualisation by leaders, the best leadership practices of the existing grassroots not-for-profit and for-profit outlets, as well as enablers and hindrances of CSR synergies on sustainability and leadership. Yet a unique hybrid model of SCLs has emerged in Sri Lankan Nenasalas which could be applied to other developing countries in the South Asian region as many have similar social, cultural and religious bounds as the underline unifier for overall programs.

The study addresses the knowledge gap identified as to whether SCLs in different telecentre models in ICT4D affects organisational sustainability. It also provides a unique Asian perspective to be shared with the international community, academia, and regional players. The authors hope to shed more light on the subject with the finalisation of further field research.

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KEY TERMS AND DEFINITIONS

ADA: Austrian Development Agency/
CIDA: Canadian International Development Agency.
CSP: Corporate social performance.
CSR: Corporate social responsibility.
CSR₂: Corporate social responsiveness.
GoSL: Government of Sri Lanka.
ICT: Information communications technology.
ICT4D: Information and communication technologies for development.
ICTA: Information Communication Technology Agency of Sri Lanka.
INGO: International non-governmental organizations.
IT: Information technology.
JIT: Just in time.
NGO: Non-governmental organisations.
PPP: Public-private partnership.
SCL: Socio-cultural leaders.
SIDA: Swedish International Development Cooperation Agency.
USAID: United States Agency for International Development.
VAS: Value-added service.
VGK: Vishwa Ghana Kendra.
VIC: Village information centres.

Chapter 14

Reimagining Social Innovation and Social Enterprise for Industrial Revolution 4.0: Case Study of China and UK

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ABSTRACT

This exploratory study aims at understanding the social aspects of the Fourth Industrial Revolution by suggesting how the interface involving technological innovation and social innovation can resolve societal and socioeconomic problems with stress on sustainable development. The authors view social innovation and social enterprise as new amalgam for solving social problems in the era of the Fourth Industrial Revolution. By applying theoretical analysis of the existing literature about the correlation between the Fourth Industrial Revolution and social innovation and

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social enterprise, they aim to describe the opportunities, forms, and the challenges unfolding in this new age. UK and China case studies will provide the empirical evidences that could support social innovators and social enterprises understand the implications in fields of application of the Fourth Industrial Revolution plus the interplay between them.

INTRODUCTION

Alvin Toffler in 1979 presented the notion of a new information age. We are witnessing a vast range of ever-advancing technologies that are driving disruptive innovations that will continue to change and redefine our world. It's a time of enormous promise, but also of new challenges. Digital technologies literally have become both tools and weapons. They take us back to Albert Einstein's words in 1932, reminding people of the benefits created by the machine age but calling on humanity to ensure that its organizing power keeps pace with its technical advances (Smith and Browne, 2019). It was underlined by several innovative ideas such as the ending of mass manufacturing and mass utilization, customized goods and services, demassification of media, devolution, and hyper-flexible jobs. Information technology and communication (ITC) tools currently exemplify that imagery. Anticipation of continuing advancement, financial development, skill improvement and expertise as massive leveler are repeatedly associated with innovative ITCs. The five transformational functionalities associated with ITC era are: "aggregation, dissemination, customization, collaboration, and vocalization, have fundamentally changed the way many sectors carry out their businesses" (Hecht 2008). These new technologies will impact all disciplines, economies, and industries and even challenge our ideas about what it means to be human (Bawany 2018a).

Today, many individuals and organizations across the globe are exploiting this change to disrupt every industry. Uber, Alibaba, Airbnb, Netflix, and Tesla are just a few famous examples of companies that have transformed lifestyles, including the way people travel, shop, and stay, and there are many more. "The unprecedented pace of technological progress has allowed us to upgrade and modernize much of our infrastructure and solve many long-standing logistical problems. For example, Babylon Health's AI-driven Smartphone app is helping assess and prioritize 1.2 million patients in North London, electronic transfers allow us to instantly send money nearly anywhere in the world, and, over the last 20 years, GPS has revolutionized how we navigate, how we track and ship goods, and how we regulate traffic" (Creighton, 2018). "The root cause of these transformative trends that are driving this current wave of disruption include technological growth, globalization, and demographic changes. We need to understand how the interaction between these forces has defined

the present and will continue to shape the future by their impact on businesses, economies, industries, societies, and individual lives' (Bawany 2018b).

Technology, innovation and social change make the easy supposition of forward linkages among these keywords. They are considered to be the triple helix of modern post-industrial society. Quite often technology is identified for implementation in recessive areas and then introduced using innovative adaptations to stimulate social change. However, these direct linkages can at times be inconsistent. "There is evidence to suggest that technology is playing an important role in economic development; however, this exponential increase comes with its own set of complexity that must be steered. Technology today is having an immensely uneven economic impact, creating huge advances and wealth for some while leaving others behind as it displaces jobs and fails to reach communities that lack broadband connectivity" (Smith and Browne, 2019).

The crucial concern expressed, is that it is not easy to forecast how various technologies will progress. Across many industries, a rising tide of volatility, uncertainty, and business complexity is roiling markets and changing the nature of competition (Doheny, Nagali, and Weig 2012). All this instills fears of disruption, oppressive power and intrusive power, rupture, joblessness and indistinctness (Garibaldo 2016; Clastells 2000; Holtgrewe 2014; Fuchs 2010, 2012). As LaPiere (1965) pointed out several years ago, the relationship between innovation and social change is much more convoluted than what we sanguinely imagine: "No innovation is ever more than the cornerstone upon which, given proper social acceptance, a new element of social life may be erected. Seen thus, it is obvious that a social element does not immediately and automatically results from an innovation, and that the distinction between the one and the other is multidimensional. The innovation is new, the social element established; the innovation is accepted only by its innovator, the social element by the society at large; the innovation is an idea in the mind of the innovator manifest, perhaps, in some material tool or device, while the social element is a functioning part of the social system, incorporated in the culture and embodied in the personalities, practices, or equipment of the members of the society" (La Piere, 1965:12).

So we ought not to presuppose uncritically that the dissemination, adoption, and implementation of innovation is predictably advantageous for the society. The attractiveness of innovating per se needs to be separated from its effects. This concern has more bearing for social technologies rather than material technology (Tornatzky et al 1980, p. 5). Currently the 'Fourth Industrial Revolution' refers to the rapid inchoate transformations resulting from the application of a new wave of technological innovations. Illustrations of the impact of Industry 4.0 are extraordinarily analogous to post-Fordism, knowledge economy and the "New economy" or "Internet economy", which led to the establishment of widely spread manufacturing networks

which in turn heralded a defining moment in industrial production, particularly in regard to: the balance of power between large and small companies; the blurring of boundaries between industry and services and between production and consumption; the growth in autonomy and creativity of work performances and indecision-making capacity by workers (Kelly 1998; Florida; 2012).

Digitalization is altering not just the industrial production methods and processes, but also scaled in the virtual participation in politics and society, and is structured by social media platforms like twitter and face book and this has further modified the role of states and governments. It has altered how various state services such as health and education are delivered. Studies on the 4.0 focus on the perils of digitalisation for the workers and forecast an “end of work” (BMAS 2015), other researchers emphasize the prospects that digitalization presents for social innovation (Buhr 2015; 2016). Artificial intelligence (AI) research has explored a variety of problems and approaches since its inception, but for the last 20 years or so has been focused on the problems surrounding the construction of intelligent agents – systems that perceive and act in some environment. In this context, “intelligence” is related to statistical and economic notions of rationality – colloquially, the ability to make good decisions, plans, or inferences.

The formation of shared theoretical frameworks, combined with the availability of data and processing power, has yielded remarkable successes in various component tasks such as speech recognition; image classification; autonomous vehicles; machine translation; legged locomotion, and question-answering systems. There is now a broad consensus that AI research is progressing steadily, and that its impact on society is likely to increase. Because of the great potential of AI, it is important to research how to reap its benefits while avoiding potential pitfalls but also on maximizing the societal benefit of AI (Russell, Dewey, Tegmark, 2015) So we are already witnessing an increase automation changing all areas of the market, culture and political affairs.

Both the risks and the opportunities are vast and Fourth Industrial Revolution (IR 4.0) offers boundless possibilities. “The potential benefits are huge, since everything that civilization has to offer is a product of human intelligence; we cannot predict what we might achieve when this intelligence is magnified by the tools AI may provide, but the eradication of disease and poverty are not unfathomable. Because of the great potential of AI, it is important to research how to reap its benefits while avoiding potential pitfalls.” Professor Klaus Schwab, Founder of the World Economic Forum, believes this phase will be built around “cyber-physical systems” with the blurring of the physical, digital and biological. As we embrace this machine age, we are confronted by new ethical challenges, calling for new laws. In some cases, the entire moral code may need to be rebooted. Such is the nature of technological breakthroughs. We believe that humanity will soon be on the cusp of re-thinking

morals – an Ethics 2.0. (Dalmia and Sharma, 13 Feb 2017). Such opportunities can be harnessed by means of targeted coordination and change-management if Industry 4.0 also becomes Welfare 4.0. There is currently no in-depth research available into the consequences of digitalisation in and for contemporary welfare states and their adjustment towards Welfare 4.0.

New approaches are needed to tackle major social issues, “most especially in the presence of the systematic retreat of the governments from the provision of public goods in the face of new political ideologies that stress citizens’ self-sufficiency and give primacy to market-driven models of welfare” (Nichols, 2006: 1). Social entrepreneurship and social innovation are part of the solution, as they both explicitly aim to provide innovative solutions to unsolved social problems, putting social value creation at the heart of their mission in order to improve individuals’ and communities’ lives and increase their well-being.

The Authors’ Research Approach

The authors of this chapter come from different subject disciplines and therefore it is written with an interdisciplinarity approach. The authors’ subject areas are business, economics, and social/political sciences. In writing this chapter, the authors have applied a qualitative theorizing approach. Hence, this chapter has used a number of academic sources, including academic literature and documentary data sources (e.g. policy reports and social media sources).

In this chapter the authors examine how the fourth industrial revolution is taking shape after the global financial crisis of 2008. The first section summarizes the contemporary debates in connection with technology and social innovation. Following on from this discussion, the next sections apply geographical case studies of the United Kingdom and China to show the transformation of a fourth industrial revolution in terms of social innovators and social enterprise.

Connecting Technology and Social Innovation: New Blueprint

Technology is largely identified with the hardware of production or technical artifacts. ‘Innovation’ refers to implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations (OECD 2005). Social innovation stands in contrast to technological innovation, and some researchers such as Howaldt and Schwarz (2010, p. 15) foresee a paradigm shift from a technology-oriented innovation paradigm that has been historically influenced by the industrial society, to a new social innovation paradigm that is shaped by the growing service sector. Technology has indeed contributed to social change with the

industrial revolution, the green revolution, the computer age, the digital revolution and now the Internet innovatively creating disruptive technologies irreversibly impacting the way people do things in developed or urban areas. Consequently, creating a different way of life for those who can afford and use it.

Social innovation is 'à la mode'. It is a broad term for a systemic change in institutions, social relations and the market. It is a concept of new social capability (Moulaert et al., 2013) and is an approach to find new solutions to social problems (Murray et al., 2010). Zapf (1991:89) defines social innovations as 'new ways of doing things, especially new organizational devices, new regulations, new living arrangements, that change the direction of social change, attain goals better than older practices, become institutionalized and prove to be worth imitating. Caulier-Grice et al. (2012:18) define social innovation as follows: "Social innovations are new solutions (products, services, models, markets, processes etc.) that simultaneously meet a social need (more effectively than existing solutions) and lead to new or improved capabilities and relationships and better use of assets and resources. In other words, social innovations are both good for society and enhance society's capacity to act". Social innovation, or at least innovation to provide answers to social needs, seems to be at the heart of the fast developing literature around social enterprise concepts. "Social Innovation occurs because socially innovative actions, strategies, practices and processes arise whenever problems of poverty, exclusion, segregation and deprivation or opportunities for improving living conditions cannot find satisfactory solutions in the 'institutionalized field' of public or private action" (Moulaert et al. 2013a: 2). 'They are initiatives (usually promoted through a bottom-up process) that propose grass-root solutions that rupture pre-existing socio-economic structures and that promote the involvement of the beneficiaries in the processes' (von Jacobi et al. 2017; Ziegler et al. 2017).

Social Innovation is clearly social in form and content and represents a serious challenge, at least ideationally and normatively, to the complementary logics of market and state. It revalorizes, in particular, the idea of social networks and moral communities, of reciprocity and solidarity, of negotiated consent and unconditional commitment. Therefore, we could say that the recent developments in the social economy have taken on board several of the 'other' dimensions of social innovation such as the innovation in social relations in societal and community spheres, human development targets, socio-political empowerment, etc.

Accordingly, social innovation can also be viewed as a general, shared 'consciousness' about the nature of problems that modern societies face and the ways that they should be confronted. It is from this perspective a real challenge to the reading of innovation in technological and an organizational term only is presented. The growing importance of the idea reflects wide and profound dissatisfaction with recent directions and outcomes of 'innovation' in technology, markets, policy and

governance systems, and particularly a sense – to remain polite – that the benefits of such innovations are not being distributed as generally or as equitably as they should (Jessop et al., 2013: 199). It has a key role in: the Millennium Agenda; in Barack Obama’s Office of Social Innovation and Civic Participation; in the EC’s Innovation Union Programme (BEPA 2010); in OECD policy advice on the role of social entrepreneurship in combating social exclusion and socioeconomic restructuring (Noya 2009; OECD 2010). Furthermore in the strategies of organizations and foundations such as Ashoka Innovators for the Public, the Skoll Foundation, and the Schwab Foundation for Social Entrepreneurship with a global outreach promoting market driven social innovation (Elkington and Hartigan 2008; Reich 2011). Globalization combined with technology, social media and constant information has disrupted people’s lives in both physical and existential ways. Increasing market integration, changing demographics, and shrinking public budgets have fuelled a pervasive redefinition of the state’s role in providing for the social welfare of citizens. Social innovation is relevant for labour market, start-ups, co working, knowledge production systems (crowd sourcing, open source, creative commons), organizational innovation (hybrid organizations, platform cooperativism, social enterprises, social housing). In each of these fields social innovation is identified as a route to solve problems and conflicts (Busacca, 2017).

As emphasised by Howaldt and Schwarz (2010: 5) “problems have in part changed radically and intensified in conjunction with the drastic acceleration of change in the economy, society and culture, and awareness has clearly grown regarding the limited potential that technological innovations and established management and problem-solving routines have to resolve issues”. To overcome these problems or challenges and to understand the parallel rise of new kinds of social movements, social innovation and social entrepreneurship have been seen as having an important role in driving social change. This becomes more evident when social innovation has a strong technological component. In the shift from industrial capitalism to cognitive or conscious capitalism (Vercellone, 2007) the capital/labour ratio need to change radically.

Balancing IR 4.0 in China: The Threefold Impact

Since its incipient stages the data science and artificial intelligence (AI) for social good movement has created a very large portfolio of examples that show how partnerships between (a) technologists, and (b) non-profits, social enterprises, government agencies or other similar mission-driven organizations can facilitate the achievement of seventeen sustainable development goals (SDGs) (Chui et al., 2018). Thus, utterly technology transformation driven for innovative business seems to be insufficient. Innovation, in its broadest sense, and social innovation in particular,

can recalibrate AI innovate technologies to augment efficiency, which can then be employed to advance welfare and societal needs of the world population.

The ongoing Industrial Revolution 4.0 in People's Republic of China (hereafter referred to as China) has been built on the framework political concept of Socialism with the Chinese characteristics for the new era, which is the foundational stone of the two geo-economics initiatives – the Belt and Road (B&RI) and the Greater Bay Area (GBA). Xi Jinping thought on Socialism with Chinese Characteristics for a New Era, has been added to the Communist Party of China's (CPC) Constitution during the 19th Congress. The political rational is to advance an economic system capable of generating wealth, redistribute and preserve the ability of China to serve the future generations. This political rational, is using the IR 4.0 as one of the instruments to achieve higher quality production, efficient use of resources, equitable and sustainable economic and social development. The current modernization of China, uses the IR 4.0 as a landmark to improve governance capacity and to pursue reform in a more systematic, holistic and coordinated way. Based on this concept, it appears that IR 4.0 impact on China is threefold: (1) Intelligent manufacturing; (2) Economic internal and external integration; (3) Social-economic concerns.

- **Intelligent Manufacturing:** The European Union Chamber of Commerce in China (2020) asserted that “Made in China 2025” is an initiative to comprehensively upgrade Chinese industry... and the heart of the “Industry 4.0” idea is intelligent manufacturing, i.e., applying the tools of information technology to production and to all the chain of value creation. China is committed to change from the massive factory of the world to home of smart industrialization with global reach, which uses resources in a balanced manner and provides equitable internal profit redistribution. Digitalization facilitates economies of scale, the integration of the supply chain, in the domestic and external contexts. Digitalization as an innovation modality, is triggering new dimensions of production-client relationship, helps to control waste and inefficiencies, curb production costs, face market competitiveness, deal with customer fluctuations and facilitates the new market-personalization e-demands. Digitalization and robotization of manufacturing will deliver a significant contribution to the reduction of labor costs, and encourage the transfer of labor needs to another level of technological education. The IR 4.0 opened new opportunities on collaborative research (human and machines), which also brought unprecedented educational challenges. According to Statista (Thomala, 2020), China is home to the largest online community in the world. [...] The Chinese internet population was around 840 million in 2019 and would surge up to 975 million by 2023. By comparison, the internet user-base of the United States was around 285 million in 2019[...] According

to China Internet Network Information Center (CNNIC, 2019), as of June 2019, the user size of online shopping was 639 million or 74.8% of China's total netizen population, up 28.71 million over the end of 2018; the number of mobile shopping users had reached 622 million, up 29.89 million from the end of 2018, taking up 73.4% of mobile Internet users. The Chinese internet penetration rate is around 60 percent, indicating that two out of five citizens are still offline. These figures illustrate well the extraordinary potential of e-commerce, m-commerce and other internet based services, in the context of this concept of smart industry.

- **Economic Internal and External Integration:** IR 4.0 is influencing the solutions related to smart industry are based on regional functional arrangements such as the Greater Bay Area, the Special Administrative Regions, the establishment of the Special Economic Zones (including the different formats Namely - Open Coastal Economic Zones; China National Economic and Technological Development Zones; China National High-Tech Industrial Development Zones; Border Economy Cooperation Districts; China Pilot Free Trade Zones), and the policy of partnerships. Technology is enabling a continuous urban migration, fostering a higher level of internal consumption, and therefore challenging the intercontinental and domestic value chains. Innovation and technology development is expected to inject new impetus into the economy, improve people's quality of life and create quality jobs for young people. Big data appears to be the driving force of internal functional integration, with several projects moving forward. Among them, stands the Outline Development Plan for the Guangdong-Hong Kong-Macao Greater Bay Area, which has advanced the establishment of a global data hub in the Great Bay Area. The challenge is the fact that the Greater Bay Area combines two unique features – It has to adhere to the principle 'One Country Two Systems' and at the same time to respect the three existing legal jurisdictions. The global data hub in the Great Bay Area is seen vital for the region to build data resources in order to integrate smart production into make digital economy. The Hong Kong government has invested over \$100 billion in I&T related projects in eight major areas, including: increasing resources for R&D; pooling together technology talent; providing investment funding; providing technological research infrastructure; reviewing existing legislations and regulations; opening up government data; enhancing procurement arrangements; and strengthening popular science education (The Guangdong-Hong Kong-Macao Greater Bay Area (Greater Bay Area), Hong Kong Government, 2020).
- **Special Economic Zones** and Special Administrative Regions play an important role in the China's external market integration, as they are

advanced information and technology centers and clusters for innovation in all trade related areas. SEZs perform a similar role to that of a vehicle's differential... to adapt their economic-legal systems to economic, trade and market circumstances (Leandro, 2019: 127)", using information and technology as the main drivers. According to World Investment Report 2019 on Special Economic Zones (ibid: 8) China had established 156 high-tech development zones (HTDZs) by the end of 2017. Starting in the late 1990s, HTDZs were established in major cities such as Beijing and Shanghai and in provincial capitals, building on the existing knowledge and industrial base. [...] Incentives offered include access to quality infrastructure, corporate income tax exemptions for the first two years, a preferential 15 per cent corporate income tax, exemptions from tariffs on high-tech equipment and special treatment for employees at the discretion of each zone [...] In these zones, the ratio of research and development (R&D) expenditures to total production value was 6.5 per cent, three times the average in the national economy. Patents granted to enterprises in the zones account for 46 per cent of all business patents granted nationwide.

- **Social and Economic Concerns:** Digitalization, robotization, innovation and integrated global value chains in market digital economy are inducing and will create deeper social asymmetries. This fact is not compatible with the Socialism with the Chinese characteristics for the new era. As consequence, the Chinese leadership are taken robust and extraordinary political initiatives, to bring a human dimension to all the relations arising from the dynamics of production-consumption agents, especially in relations the medium and large size corporations with interests in the production and distribution areas. Therefore, People-to-people exchange (P2P), Corporate Social Responsibility (CSR), Social Entrepreneurship (SE), and Intellectual Property Rights (IPR) became important pillars of social and digital market sustainability.

The section 1 (cooperation mechanisms) of the 13th Five-year plan for economic and social development of the Peoples Republic of China (2016-2020) stressed the importance of P2P inside and outside China. P2P concept is understood as the efforts which will be made to promote exchanges and dialogues between different cultures to form the basis for the advancement of regional cooperation. [...] P2PE aims at developing human social capital through the following ideas: (1) encouraging the establishment of human interaction at different levels; (2) fostering new and reciprocal relationships to promote wider dialogue mechanisms; and (3) promote mutual benefits. Thus, P2PE complements state-to-state cooperation (S2SC) and fosters corporations to corporations exchange (C2CE) [...] (Leandro, 2019: 39-40).

Since 2009 when Global Compact network China was formally launched and the Shanghai Stock Exchange launched the “Social Responsibility Index”, the perceptions on the importance of corporate social responsibility became at the center of the industry-market developments (Sharma, 2013). Furthermore, the increasing level of internationalization of the Chinese corporations, especially bearing in mind the B&RI engagement, increased the sense of social responsibility while raising ideological and ethical standards, prioritizing the social interest in cultural development, integrating social and economic interests, enhancing the capacity of international communications (Li et al, 2018:4) and looking at environmental sustainability in a responsible way. The recent technological developments encouraged by the IR 4.0 called for a higher degree of social acceptance, leveraging advanced levels of positive domestic and international reputation. Chinese corporations are currently seen as vehicles to promote internal social peace and external soft power. The 19th CPC congress mentioned the fact that “The Chinese agenda” is more comprehensive, multilevel and multifaceted... Indeed, multifaceted refers to actors with different roles, including governments, society and enterprises... enterprises not only create economic value and material wealth for their country, but directly influence the image of the country through their conduct. Therefore, public diplomacy is an advanced form of corporate social responsibility, making enterprise a significant power to perform public diplomacy (Li et al, 2018: 14).

Another interesting aspect of the Chinese social concerns is the raising of social entrepreneurship (SE). According to the China Social Enterprise and Social Investment Landscape Report (2019: 2), “the concept of SE was first introduced to China in 2006. Over 93% of the 371 SEs surveyed were established after 2006, out of which 44% were set up only after 2014. This leads us to conclude that the “self-identified” Chinese SE are at an early stage in their life cycle”. In 2019, the China’s Ministry of Civil Affairs reported the existence of 800,000 social organisations registered, which represents a booming of grassroots nongovernmental organizations when compared with 1990. According to the China Social Enterprise Report (Lane, Andrea, 2012). 2012)63% of social enterprises operate on a city or village level, 13% on a provincial level, 17% reach national level and 8% operate on an international level. In relation to the “social investors’ venture philanthropy of public and private investors are currently the main source of investment. Nearly half of the “self-identified” SE state that their mission is to serve the interests of the public or community. The top eight social areas engaged by the surveyed SE are Education (21%), Community development (13.4%), Employment and skills (12.3%), Environment and energy (9.8%), Professional services for social innovation and entrepreneurship (9.3%), Healthcare (7.4%), Elderly care (6.5%), and Poverty alleviation (5.7%). Nevertheless, 72.2% of the SE serve the disadvantaged groups, including people with disabilities, long-term illnesses or living in poverty. The Chinese government seems to be

cognizant of the importance of combining CSR and SE, especially in the Chinese remote areas and along the BRI geographic corridors.

Finally, the Chinese government attaches great significance to Intellectual Property Rights and clearly put forward concrete steps to implement strict protection. Since 1980 when China became part to World Intellectual Property Organization, the government has acceded a number of international IPR bodies and treaties and has passed consistent legislation to effectively protect industrial and personal rights. Furthermore, China has engaged in the establishment and fortification of the judicial organs for trying intellectual property rights cases and the optimization of the judicial system are important guarantees for the people's courts correctly to handle such cases and conscientiously to protect intellectual property rights according to law Information Office State Council of the People's Republic of China (1994). China is introducing new Intellectual Property Rights policies and coordination mechanisms (such as the Action Plan for Implementation of National Intellectual Property Rights strategy 2014-2020), creating new legal instruments, reinforcing the legal system, introducing IPR concern in the public administration system, and is more and more open to international cooperation.

Innovation and Social Enterprise in the UK

The debate about Industry 4.0 and its global impact is increasing due to debate about digitization, the Internet of things, and smart knowledge and systems (Friess & Ibanez, 2014; Vermesan et al., 2014). Industry 4.0 is a global concept, but it can take many different forms, and names, around the world. The concept of Industry 4.0 has its origins in Germany and has been recognized by other leading industrial nations, although it is known as "Connected Enterprise" in the United States the focus here tends to be more on a more holistic digital evolution, and many use the term digital supply network and the "Fourth Industrial Revolution" in the United Kingdom and tends to be more factory-based. Britain is well-placed to benefit from this new industrial revolution. There is consensus that the impact of Industry 4.0 will be more profound, irreversible, and much more rapid than the previous three generations. Social innovations which are recognized for novel methods to tackle social challenges will play an important role on individuals, society, and organizations (Hahn & Andor, 2013). The concept of social innovation denotes the processes and factors that lead to a sustained positive transformation to the network society (Mulgan, 2006; Phills et al., 2008). It is defined as an innovative solution to the increasing challenges that face society – one that is more effective, more efficient, more sustainable, or more equitable than existing practices (Phills et al., 2008).

There is a growing worldwide recognition of the importance of social enterprise and social innovation in UK for regenerating cities and creating sustainable and

resilient communities. While researchers, academics and practitioners concur that there is no single definition that appears to capture its essential nature (Doherty et al, 2009; Teesdale, 2011), there is consensus however, that a social enterprise is a business engaged in some form of trading to produce a surplus or profit (Sepulveda 2010). In the United Kingdom in particular, the creation of viable and sustainable social enterprises continues to be at the core of the government's social reform programmes. A major assumption of this strategy is that social enterprises should be run not as welfare interventions, but as businesses that can generate surpluses to plough back into the community. It is not surprising therefore, that in this current economic climate characterised by intense competition for resources and market, social enterprises in the UK are providing interesting insights into business model innovation. Like any businesses, they are not immune to current developments that include digitisation and business process improvements that businesses are currently adopting in order to achieve efficiencies and deliver more value. For example, in the UK, social enterprises are increasingly embracing for-profit business practices in the form of share capital legal frameworks. These resource mobilisation strategies have traditionally not been associated with social enterprises, thus highlighting innovation in the way they are widening their sources of finance to achieve financial sustainability (Mswaka et al, 2016). A legal structure or constitution is defined as an operating framework of an organisation that relates to the way the organisation is set up as well as the rules and regulations that governs the ways it operates (Snaith, 2007). This discussion extends current literature and knowledge by examining the role that social entrepreneurs are playing in the adoption of innovative practices (Hall et al, 2012) in the way they operate in order to create value.

In order to achieve greater insight into the development of social enterprise in the current competitive environment in the UK, it is important to understand the link between entrepreneurship and innovation as this has significant impact on social and economic changes in any society (Hall et al, 2012; Schumpeter, 1934). There is consensus among researchers and academics that seminal work associated with Schumpeter (1934) is considered to be a useful starting point to understand this link. Schumpeter (1934) suggests that there are two kinds of entrepreneurs; firstly, the ones he describes as dynamic or innovators. These individuals, through destructive processes create opportunities and platforms for more innovations to be effected (Swedberg, 2006 Wong et al, 2005). Secondly, Schumpeter posits that there are individuals that can be described as static. These rely on what they already know and work within these confinements (Swedberg, 2006). The former type of entrepreneur underpins our understanding of social entrepreneurship and innovation in the UK, given that social enterprises are considered to be key sources of social innovation and its diffusion via a number of pathways and thematic areas (Mulgan and Murray, 2009). In this discussion, the Schumpeterian approach is complemented by the

Kirzner's (1973) theory of entrepreneurship that focuses on alertness and ability to exploit opportunities expeditious as key attributes of successful entrepreneurs. Kirzner (1973) argues that opportunities are a result of deliberate equilibrative actions by entrepreneurs which includes the introduction of new products or new ways of creating value. The ability to spot opportunities and develop infrastructure to exploit them therefore assists us in understanding how developments in markets are forcing social entrepreneurs to explore innovative ways of operations.

The challenges facing social enterprises, particularly the need to achieve financial sustainability in resource constrained environments is taken as the starting point in developing this discussion's conceptual understanding. This allows us to locate this understanding within the broader discourse on how social enterprises are adopting innovation in their practices in the UK. There are over 70 000 social enterprises in the UK, contributing over £24 billion a year to the country's economy (Social Enterprise UK Report, 2018) and so the sector can no longer be ignored. While antecedent empirical research work scrutinising the impact of technology and innovation on social enterprise in the country appears to focus broadly on social innovation (Shaw and de Bruin, 2013) without providing deeper insight into the nature of the innovative practices. While there are different pathways of social innovation (i.e. innovations targeted at social need), this discussion focuses solely on how social enterprises have embraced innovation in their legal frameworks or constitutions to maximise value creation. These entities, like any commercial companies require new discoveries and strategies (Keeley et al, 2013) to drive forward and strengthen their strategic growth paths.

For-profit share capital legal structures such as company limited by shares (CLS) have traditionally not been associated with social enterprise, given their focus on profit maximisation, which appears to be an antithesis of social enterprise (Brown 2007). Their emergence signifies both business model and structural innovations (Keeley et al, 2013) as they seek to be more financially sustainable while at the same time configuring their internal organisational systems to create more value and achieve greater social impact. In the UK the introduction of share capital legal frameworks for social enterprise such as the Community Interest Company (CIC) and the New Company (NEWCO) (Barker, 2003) shows that social entrepreneurs are exploring innovative infrastructure or platforms to widen their financial bases (Lehner and Nicholls, 2014; Mswaka and Aluko, 2015). The innovation is that these vehicles provide mechanisms to reward personal entrepreneurial innovativeness. Additionally, they protect personal investments in the organisation such as intellectual property, which previously, could not be achieved through traditional social enterprise legal structures such as the company limited by guarantee (CLG) (Bull and Ridley-Duff, 2008). Furthermore, through this structure, social enterprises can pay dividends to investors at market rates, which is a new development in the social enterprise sectors.

Dividends are a proportion of the earnings of a firm that is returned to shareholders and investors according to the shares they hold (Grant, 2002).

These developments have in turn resulted in modifications of their internal governance systems (Lyon and Humbert (2012) since issuing of equity shares implies that they have to widen their ownership structures (Bugg-Levinne et al, 2012). It is thus not surprising to see for-profit stewardship governance models in the contemporary social enterprise sector, as social entrepreneurs seek innovative ways of ensuring financial sustainability and longevity of their operations (Van Slyke, 2005). These developments are consistent with the Schumpeterian (1934) and Kirznerian (1973) approach to entrepreneurship, that sees social entrepreneurs disrupting the current order through innovation, adaptation and alertness (Hubert et al, 2006) to create value for themselves and the wider community. Thus the corporatisation of social enterprise through commercial legal structures shows the development of value proposition developed through innovation and creative market oriented approaches to deliver long lasting social impact (Zeyen et al., 2013).

CONCLUSION

The collective forces of globalisation, technological progress and growing market demand has shaped a new kind of innovation: one that is widespread across many agents and sectors and more unwrapped. That involvement in the economy is mirrored in the swift expansion of the “gazelles” of the enterprise ecosystem. “This contemporary opening-up of the innovation discourse re-connects with the early-Schumpeterian spirit (Schumpeter 1934[1911]), in which innovation plays a major but problematic role in the long-term dynamics of industrial economies and societies (Jessop, Moulaert, Hulgard, & Hamdouch, 2013). On the one hand, significant innovation has demanding social preconditions and, on the other, it affects the whole socio-economic system through the imitation, dissemination and collective appropriation processes that it triggers” (Hamdouch, 2007).

The sustainable dimension of business activity is getting bigger and new forms of collaboration between diverse stakeholders are evolving, sometimes to restore a neglected space, other ones to invigorate an unsuccessful business and others to create a social business, to setup a hospital or school. In these business setups productivity is no longer based on profitability but on the maximization of knowledge, innovation and adaptation skills. Francis Fukuyama has termed this the “Great Disruption” in the social values that had prevailed in the industrial-age society of the mid-twentieth century. The challenges of discovering effectual and sustainable resolution to numerous social struggles are extensive, and way out may necessitate scores of the constituent coupled with successful novelty in business

design. However, resolution to social problems, for instance, enhancement in health, education, economic, political and cultural concerns concurrent with enduring poverty; time and again requires breaking free from entrenched systems that underpin existing stable conditions. This alteration is made achievable by the influential forces entrepreneurship which unleashes innovative ideas, organizes production, assumes risks, and engages with customers to accumulate wealth or attend to pressing social causes, often across national borders. As all revolutions, the current and the next phase of the industrial revolution must be driven by the human social dimension, designed to deliver in line with human needs, and implemented to advance human social-equity. Technology, at the end of the day, should remain as it is – merely an instrument to benefit human existence.

The scope of innovation in ‘official approaches’ (OECD, European Commission and National Intellectual Property Rights Offices) based on research on science and technology, innovation economics, management science etc. has been widened over the last two or three decades. A new wave in innovation policy has emerged from the early 2000s, when the OECD (2002) and the European Commission began to recognize the social dimensions of innovation, with EC circles finally acknowledging the importance of SI in 2010 (The Young Foundation and SIX, 2010).

Social innovation is talked in economic terms to support new neoliberal public policies. (Jessop, 2013:121) sums this as: ‘We care about social issues along with the modernization of the economy and the improvement of the economic competitiveness through R&D and technological innovation.’ Moreover, in this business-gear policy discourse, SI is often promoted as a catalyst of market-oriented (‘hard’/ ‘true’/ ‘genuine’) innovation: it should supplement innovation and competitive dynamics in a global competitive economy, in which the ‘creative destruction’ process engendered by rapid technological change, and the globalization of the economy requires ‘social measures’ in order to gild the bitter pill of the social problems it bears (de-industrialization and investment off shoring, structural loss of jobs, growing inequalities, etc.).

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Chapter 15

Epilogue:

Retrospective and Prospective Reflections on Change

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ABSTRACT

This chapter presents a brief reflection on emergent themes, issues, and problematic areas chapter authors have drawn to readers' attention to and tentatively indicates some potential future directions for research and development whilst recognizing rapidly changing social mores and culture is a deep river running through diverse channels in the Lifeworlds and Workworlds of leaders today. The heroic actions of medical personnel under severely stressed hospital and patient care systems in the current Covid-19 pandemic is noted. The authors have pointed to perceived gaps in leadership regarding the uptake and understanding of digital technologies and suggested that implications include new ways of thinking and new competences for changed ways of working in the networked world of business. Crucially, the authors reiterate that these are deeply human endeavors, and the complexity of the technology does not negate or overwhelm the interactive dynamic complexity of human relations between leaders and others who inhabit and view these conjoined worlds through many cultural windows.

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INTRODUCTION

We are in a new world of instant and relatively inexpensive communication devices and all organizations with access to the increasingly ubiquitous digital technology can interact globally from many formerly inaccessible locations. However, as we have suggested in various chapters in this book and in our previous books in the series (Smith and Cockburn, 2013,2014), the impact of such digital technology goes far beyond the confines of business organizations. Socio-digital media for example has not only increased business conferencing and interaction between distant colleagues but it can also be reasonably asserted with confidence that social discourse and human interaction in other realms has also grown massively as a result.

It has been estimated that registered users now exceed one billion people globally and that this will climb to 2.5 billion by 2017 including 93% of marketers, 70% of which also have a Google + and Facebook is a major presence globally and the USA leads the world in terms of average time spent online each day although 86% of their users are outside the continental USA (Smith, 2013, Jones, 2013, eMarketer report, 2014). In 2013 47% of Americans indicating in 2013 that Facebook is their primary influencer for purchases they made compared to 24% in 2011(Jones, 2013). Pandemic fears are likely to add greater impetus to the use of ‘virtual teaming’, and online purchasing assuming supply and distribution issues such as traffic queues at borders are resolved since drones are not yet capable of fulfilling all of the supply chain tasks.

Of course there are cultural variations and the preferences seen in many countries as to how such media ought to be utilized by people and businesses as well as differential access for people thus influencing penetration rates especially in emerging nations (Solis, 2012, Smith, 2013, Pew Research, 2012) . At present, Chinese social media is running closely behind USA and other developed countries but is effectively in ‘catch up’ mode (Smith, 2013; *eMarketer* report, 2014). The cultural impacts have been shown for instance in the varied reactions of users to service providers seeking their real identities before allowing them to sign up; the so-called ‘nymwars’ whereby users have resisted giving real names, instead preferring pseudonyms in certain countries.

Currently, GIS technology has been used to track the spread of Covid-19 pandemic and mobile phone apps have also been used in South Korea to track sources of infection, alert others to nearby ‘hotspots’ and even nearby people who have tested positive for the disease, thus prompting some ethical questions regarding privacy, surveillance and the impact on future societies as more pandemics are anticipated in future as the world becomes more urbanized and humans encroach on former wilderness areas (Machalaba, Romanelli and Stoett, 2019). This pandemic has caused major economic impacts resulting in some businesses going bankrupt and

estimates of its likely impact on global businesses of up to losses of up to 6 Trillion dollars and the loss of millions of jobs.

International tourism for example, until the national lockdowns across the world in late 2019 through 2020 to date, had been reporting as continuing to rise, albeit with variations and some perceived slowing in particular tourist destinations according to the UNWTO. The latter organization's report suggested a steady 3-4% growth forecast till 2030 (UNWTO, 2013). However, in this more geographically mobile world where travel abroad for holidays or business is becoming increasingly commonplace and is continuing to increase according to reports (UNWTO, 2014) there is now a question mark as airlines and tour operators have already taken a big hit from the government actions to suppress and mitigate the spread of the Covid-19 pandemic. Thus, the Tokyo Olympics have now been deferred until 2021 and many other sporting events have been cancelled or fixtures have had to take place in doors and with no audience as a precaution to avoid further spread of the pandemic.

However, forms of instant social networking and communication are an obvious boon to people of all ages during national or local lockdowns where they are confined to home and these remain particularly popular with the millennial demographic (Acheive, 2013). More than ever before, smartphone purchases are rising as these devices have found favor with those self-isolating at home as well as millennials in particular "Smartphone usage continues to rise, as mobile devices best enable the connectivity and news information gathering from peers, mobile content sources, and organizations that Millennials seek." (Acheive, 2013). This technology has also helped overcome limitations and constraints of time and space and applications such as Skype or Facetime, that enable and encourage people to stave off loneliness or homesickness by keeping in touch regularly with friends and relatives living far away or even elderly relations nearby who are vulnerable and in the Covid-19 'at risk' category and so have limited visitors in many countries.

Such technologies, however, can also be disruptive in social, economic and business terms as well as culturally. Castells (2007) has hypothesized that a number of media trends are converging towards change in the relationship between the leaders and the powerful and between them and those who contest their influence or those who wish to resist such leaders. Among these media trends are the emergence of new forms of socio digital communication technologies (and adaptations to them such as 'Google bombing' and 'Googlewashing') now in the armory of some activists and resisters. Such adoption and adaptations are discussed in detail in earlier chapters. He sees these challenges and the growing use of weapons such as 'Google bombs' as "...cultural battles that are fought to a large extent in the communication realm" (Castells, 2007, p257). Nevertheless, the disruptive digital technology referred to in this and in our last volume is about more than communications technology per se.

Innovaro (2013) confirmed the broad disruptive technology trends we outlined in last book apply (Smith & Cockburn, 2013). Basically, these trends in disruptive technologies are summarized in the list below:

1. Mobile Internet
2. Automation of knowledge work
3. The Internet of things
4. Cloud technology
5. Advanced robotics
6. Autonomous and near-autonomous vehicles
7. Next-generation genomics
8. Energy storage
9. 3D printing
10. Advanced materials
11. Advanced oil and gas exploration and recovery
12. Renewable energy (Innovaro, Technology Foresight, 2014, p2)

We have outlined elsewhere a wide variety of cultural changes emanating from the above in a number of social and cultural spheres in peoples' lifeworlds as well as in organizational workworlds ranging from the so called Fabrication labs, to shared resources and services from short-term house or vehicle rentals to crowd sourcing of venture capital and donations for other causes (Smith & Cockburn, 2013, 2014). Chapter authors in the current book have discussed other observations on perceived longer-term and some short-term cultural and behavioral changes, or emerging social norms and the need to shift educational practices and some priorities. For instance, globally in the wake of Covid-19, we are seeing shifts in cultural norms such 'social distancing', a reduction in handshakes, or other ways we greet friends and relatives and emergent social taboos on the European tradition of kissing families on both cheeks on meeting. How long some of the latter behavioural changes will be maintained is not yet known but the fear of a 'second wave' of the pandemic after the current wave of infections is likely to induce some longer-term social changes.

We have taken a longer-term and broader sociocultural perspective on the trends in global businesses practice, so elaborating scenarios and patterns in the 'VUCA' environment as outlined by Lawrence (2013) mentioned in chapter 2, much further to provide examples of global power shifts, new and often transdisciplinary technology professions and emerging social and demographic trends that cut across or reinforced the above.

The net effects of all of this is that these confluences and currents put leadership in the slipstream and that places new demands on leaders and teams in all kinds of ways and in diverse industry and service sectors. Global business organizations as

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diverse as governments and energy entrepreneurs are facing unprecedented demands that they be successful in their given niches whilst operating in increasingly complex dynamic environments (Innovaro, Fall 2013). As emphasized throughout the previous chapters of this book “Business as usual” is no longer a viable option; stand still long enough and like a rabbit in the headlights of oncoming traffic, others will run you over. Today and tomorrow there are likely more major pandemic impacts in organizations in attempting to tackle countrywide restrictions and businesses of all kinds must change or die.

As organizations reinvent themselves to address the myriad of constantly shifting opportunities and constraints, so too must leaders re-equip themselves to successfully confront the changed business landscapes they now face. Throughout this book the authors have emphasized that leaders must recognize and address the complexity they face. Complexity induces helplessness, waste, and ultimately failure, unless addressed appropriately, and leadership holds the key to developing the kind of probing, team-based culture that will *continuously* deal successfully with complexity.

Constant technology-mediated communication is changing the way people think of themselves and how they communicate. They can come to believe that they are able always to get attention, always able to be heard, and never have to be ‘alone’. However, there is also a dark side. Human ‘Connecting’ that is solely by electronic means can also lead to isolation. Some may become socially deskilled; often not allowing the necessary amount of time to think or listen mindfully to each other with the ‘noise’ and interference or constant sensory stimulus of pop-up messages, texts, tweets, Facebook updates, emails etc.

The impact of digital technology on teamwork skills has not been explored in any depth in the literature (Barnes et al, 2013) and because space is limited, in this chapter the authors only intend to draw leaders’ attention to this important topic; a future book, in progress, will provide leaders with an in-depth understanding of this important topic.

Objectives:

- Outline some key themes and issues from the book
- Locate the technological as existing within diverse cultural frames and constraints
- Demonstrate the continued relevance of the practical leadership learning models we proposed

BACKGROUND

In an earlier book chapter, the authors clarified the impact of digital technologies on the functioning of the dynamic leadership models recommended in Smith and Cockburn (2013, p. 40-54). These models remain as applicable to the leadership of teams as to any other form of organization leadership. Just as in the case of more general organizational leadership, a clear understanding of the role of the team leader is necessary. The four major elements of the leadership role that were identified by Smith and Cockburn (2013, p. 40) are certainly germane to a team leadership situation; for example, how does the team leader collaborate in team strategy formulation? How will the team leader develop plans to support team strategy? What responsibility does the team leader have for ensuring continuous improvement in the team?

When the team leader has a clear understanding of his/her role this leader may begin to analyze how to successfully perform his/her role using the Focus, Will, and Capability performance model described in Smith and Cockburn (2013, p. 41). The next step is for the leader to cycle through a succession of activities as set out in Smith and Cockburn (2013, p.42-43); this step enables a leader to develop enablers related to his/her team leadership role. In all of these activities, the team leader should be familiar with the potential impact of digital technologies on the steps as detailed in an earlier chapter of this book.

Team members also need to understand complexity (Smith & Cockburn, 2013, 2014, 2016). They will then see how the melding of experience and intuition available through team member interaction contributes to their capability to sense and respond which is the key to dealing successfully with complexity (Smith & Cockburn, 2013, p. 95). Clearly, social media interaction among team members (including the team leader) will facilitate this process of sensing and responding

Regardless of the availability of digital communications, leaders and teams engage in human interactions albeit mediated by various types of devices and technological systems of all kinds. These leaders still must pass through a development cycle as shown in Figures 1 and 2 (below) from our earlier book.

Certainly, judicious use of social-media tools, analytical techniques and models such as those described in the chapters in this book may hasten progress through the cycle especially for widely dispersed or roaming leaders and teams. However, lack of periodic face-to-face communication will often retard trust formation – trust is key to successfully passing through the cycle. In any event a successful team leader must make significant effort to facilitate open communication, and to be familiar with the temperament of all team members. It is recommended that the team leader review his/her own communication skills as well as the available mobile technology being used to keep in touch with base or other business units. There are seven key

Figure 1. Leader developmental cycle overview

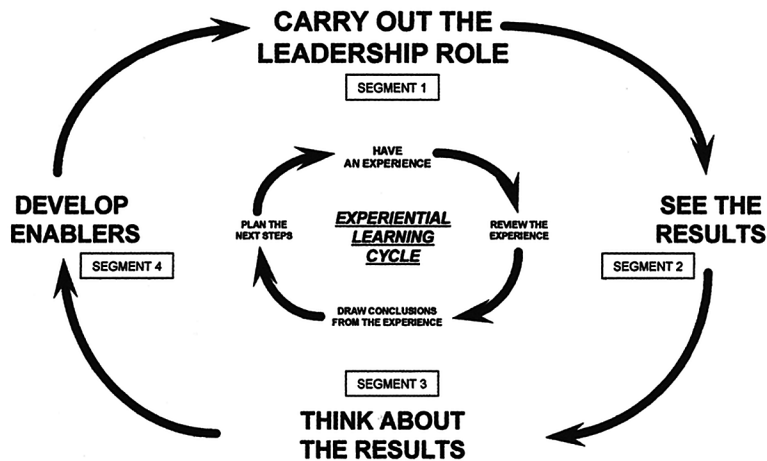
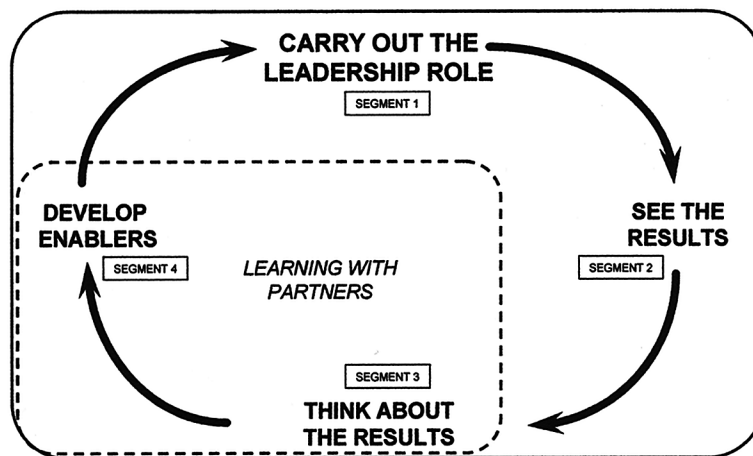


Figure 2. Leader and teams learn and collaborate to develop enablers



questions that all teams must work through and continuously review in order to pass through the team development cycle iterations successfully. These are:

- Why are we doing this?
- What's the purpose?
- What's the work?
- What kind of a team do we need to be?
- What does what?

- When are we successful?
- How can we improve?

The team leader cannot answer these questions on behalf of the team but must work with the team members to establish the appropriate answers. In this regard judicious use of social-media should facilitate the process and speed up the team development in global business and with geographically distributed teams.

Figure 3 (below) sets out a series of questions for the team leader to answer and reflect upon in assessing their own team leadership skills; working through these questions in a team environment will also help the team leader gain an unbiased assessment.

Figure 3. Questions leaders must answer

- Does the team know why it was formed ?
- Does the team have a clear purpose and decision ground rules for action?
- Do you participate freely in defining the purpose and rules?
- Are the teams' goals clear and explicit?
- Does the team have written objectives?
- Do you give regular developmental feedback to the team regarding their skills, roles and accomplishments?
- Are team goals regularly calibrated collectively between leader and members?
- Do you participate in team's decision making?
- Do you regularly communicate that team purpose and objectives to the rest of the organization?
- Do you use the word 'we' when describing team performance?
- Does the team know what will constitute success?

MAIN FOCUS OF THE CHAPTER: TWO ECONOMIES AMID DIVERSE CULTURES

Other future explorations at an organizational level of the impact of emerging technologies on leadership in organizations are likely to analyze how corporate cultures will evolve in the era of Big Data and the emerging demographics in Western societies and in the emerging markets and economies. Recent research has also indicated that, as Lee Rainie, Director, Pew Research Center's Internet & American Life Project stated: "Experts believe the internet is becoming kind of like electricity in people's lives: more important, more powerful, more embedded in the rhythms of their lives, but less visible" (Pew, March 11,2014). The new and future employees will have different expectations and because of the technology may be more informed and better-educated about rights and responsibilities with many seeking greater autonomy and freedom from many of the constraints imposed on

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their forebears and especially are likely to be keen on BYOD (Pew Research, March 2014) as the title of the Pew report states “Millennials in Adulthood; *Detached from Institutions, Networked with Friends* “. They will want to be engaged but may not be loyal to any organization for too for long (Pew, March 7, 2014).

Social networking media has already enabled greater political awareness and forms of activist organization, which in some cases has redrawn local and global political landscapes (Smith & Cockburn, 2013). Recently social media has been credited as having played a large part in the Iran government elections, as well as President the re-election of US President Obama. Some have suggested that increasing use of digital technology has begun to reduce graft and corruption as official websites obviate the need for ‘greasing palms’, reduce trips to see officials and thus also enable greater organizational transparency (Sunhil, 2005).

Sunhil (2005) illustrates this notion with a case example:

“At the village of Ramanagaram in Andhra Pradesh, farmers walk into a ‘Bhoo Dhakilegala Milige’ (Land Record Shop), and buy certified printouts of land records, which help them verify or prove land ownership or tenancy. In the process, they are free from the whims, inefficiency and corruption associated with village accountants who create, modify and supervise handwritten manual records.”

As McKinsey Global Institute suggests: “Our research shows that the emerging economies’ share of Fortune Global 500 companies will probably jump to more than 45 percent by 2025, up from just 5 percent in 2000 (Exhibit 1). That’s because while three-quarters of the world’s 8,000 companies with annual revenue of \$1 billion or more are today based in developed economies, we forecast that an additional 7,000 could reach that size in little more than a decade—and 70 percent of them will most likely come from emerging markets“ (MGI, 2014). There are sets of socio economic and cultural factors that will impact here in various ways.

The web and digital technologies will have a role to play here too so 2025 will likely see the anchoring of capital and power shifts we highlighted in one of our previous books (Smith & Cockburn, 2013) in line with demographic changes, emerging disruptive technology applications in a new global business culture. This will inevitably also involve a multifaceted global business culture rather than a unitary, homogenized culture. The global political as well as demographic power shifts, we referred to previously are still unfolding in diverse and often unexpected ways as people attempt to address local and international problems.

Beyond the above sorts of sociocultural changes, other forms of collaboration have made a deep impact, e.g. in corporate training environments. Mobile wireless and Digital technologies combined have enabled mobile, virtual project teams to work together in real time on live projects from various locations around the globe

and whilst travelling. Other aspects include remote presentations from highly sought-after experts including interactive virtual conferencing online and from smartphones and other devices.

Moving beyond the organizational level of analysis, McKinsey Quarterly authors have suggested that the future for global business will have to involve better utilization of emerging technologies to reduce and resolve chronic underutilization and inefficiency as a means to not only turnaround current problems but initiate a new dawn of industry if boldly executed. The McKinsey article states their foundational theses thus:

“Our argument is relatively simple:

- *Combining information technology, nanoscale-materials science, and biology with industrial technology yields substantial productivity increases.*
- *Achieving high-productivity economic growth in the developing world to support the 2.5 billion new members of the middle class presents the largest wealth-creation opportunity in a century.*
- *Capturing these opportunities will require new management approaches.*

Rather than settling for historic resource-productivity improvement rates of one to two percentage points a year, leaders must deliver productivity gains of 50 percent or so every few years.” (Heck & Rogers, 2014)

In fact, the authors, contrary to much current theorizing on sustainability and finite resources Heck and Rogers state: “Indeed, rather than facing a crisis of resource scarcity, the world economy will be revitalized by an array of business opportunities that will create trillions of dollars in profits.”(Heck and Rogers, 2014). According to these authors there are five distinct approaches that must be deployed to succeed: substitution, optimization, virtualization, circularity and waste elimination. Some of these have been heard before in various guises but it is the integration of the emerging technologies to effect changes and maximise the five areas that is where the promise of making a difference is located.

This optimistic scenario will require much better leadership as well as the sophisticated technology to engage the levels of globally cooperative endeavor necessary and the kinds of culture change in other areas of societies, which will entail long-term commitment to the circular economy of recycling in particular as the issues of climate change and the likely future contagious outbreaks continue. The renegotiation and reformation of society no less is involved and has moved from the institutions of government to the wider public sphere today by virtue of the evolution

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of these technologies. As Castells (2007, p 258) says:” Our societies continue to perform socially and politically by shifting the process of formation of the public mind from political institutions to the realm of communication, largely organized around the mass media. “However, despite the public gaze, the promised gains are enticing and well worth the effort. The journey to the future begins here and now but human leadership of a new kind is also necessary, as we have sought to illustrate with respect to a variety of emerging technologies. Turbulence, excitement, passion and problems may be expected though they may all manifest in unexpected ways.

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KEY TERMS AND DEFINITIONS

Coronavirus 2019 (COVID-19): Is a highly contagious viral disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), first identified in 2019 in Wuhan, China and which has since spread globally, resulting in the WHO declaration of the 2019–20 pandemic.

Google Bombing: Refers to a practice that was used to link searches to terms other than those sought. One particular example was linking George Bush's biography with negative search terms such as "miserable failure", 'jerk', warmonger, etc.

Googlewashing: Is basically the opposite to 'Google bombing' and is about manipulating media to remove opposition and to improve the impression or image of a term with positive links.

Millennials: Is a term which refers to the generation born in the 1980s and coming of age on or after the millennium.

Nanoscale: The term is 10^{-9} meters (one billionth of a meter).

Nymwars: A term used to refer to the reluctance of many internet and social media users to requests for their real names rather than pseudonyms.

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Peter Smith, as President of The Leadership Alliance Inc. (TLA), maintains a worldwide consulting practice assisting leading public and private sector organizations enhance performance by optimizing activities related to Interactive Planning and critical sustainability and innovation drivers such as knowledge management, organizational learning, entrepreneurship, and complexity leadership. Through his research and practice in Dynamic Complexity, Network Visualization & Analysis, Social Network Analysis, Complex Adaptive Systems, and other emerging paradigms, Peter has developed unique in-depth expertise in cross-organizational learning and digitally-facilitated knowledge sharing, collaborative community development, and the identification of Opinion Leaders and Innovation Champions – keys to enhancing Social Capital and successfully implementing any significant organizational undertaking. The breadth of Peter's practical hands-on management experience has proven invaluable in ensuring that he can relate to the problems and pressures faced by organizations in today's complex and ambiguous global environments, and it is fundamental to framing his research interests which include Triple Bottom Line Sustainability, strategic capital, knowledge management, organizational learning, social capital, entrepreneurialism, innovation, networks, complex systems, complexity leadership, digital platforms and related emerging paradigms. Prior to establishing his consulting practice Peter held various senior positions with Exxon in New York and across North America in I/T, HR, R&D, Operations, and Mathematics. In 1990 as an Exxon representative he was one of the founding associates of Peter Senge's Organizational Learning Center (OLC) at MIT, and during the period 1990-94, first as an Exxon representative and later as an independent consultant for TLA, he participated in various systems thinking, microcomputer simulation, and system dynamics activities and projects through the OLC. During this period he also became a TLA associate of Interact, the Philadelphia-based consultancy headed by Dr. Russel Ackoff, and Dr. Jamshid Gharajedaghi. Peter has served as Professor of Management Learning Processes with the Canadian School of Management, as Executive Director of The International Foundation for Action Learning- Canada, and as Chair of the International Community of Action Learners. He is Managing Editor of the

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Tom Cockburn, AFNZIM, is currently Director (Policy) at the Center for Dynamic Leadership Models in Global Business founded in 2012 as a unit within The Leadership Alliance Inc., in Toronto and a member of the EU-funded Virtual research network “Horizon”-the Responsible Research programme. Tom obtained his first degree with honours from Leicester University, England, both his MBA and Doctorate were gained at Cardiff University, Wales. Tom also has 8 years senior academic experience as Head of a UK Business school and 2 years in a Deputy Head of School role in New Zealand as well as adjunct and visiting E-faculty roles on Henley Business School (UK and NZ) and Ulster University Business Schools’ MBA and MSc programmes. Tom was Academic Learning and Teaching Fellow at the Australian School of Business, University of New South Wales, Sydney, 2007-2009 before returning to private consulting work in New Zealand. He has worked as a senior member of several professional bodies, journals and as a review member of the *Cutting Edge Awards Committee* of the US Academy of HRD. At present, he is a member of the Editorial Advisory Board of Emerald’s *Online Case Studies in Emerging Markets* and the *International Journal of Technology and Human Interaction* (IJTHI) and an Ad Hoc reviewer for the *International Journal of Sociotechnology and Knowledge Development* (IJSKD), and for the *Management Teaching Review* journal (MTR). Tom served as University representative at the UK Association of Business Schools (ABS), 1996-2001, and as a panel member for the Pilot development of Senior management standards for the accreditation of post-experience MBAs and DBAs, part of the ABS contribution to EQUIS/EFMD, 1998-2001. He has carried out several Institutional Teaching audits in the UK for the Higher Education Funding Council as well as a series of international MBA programme reviews in Europe, New Zealand, Australia, and Malaysia. He was accepted as Associate Fellow (AFNZIM) of the New Zealand Institute of Management in 2010 and has 5 years Board experience on the Standing Conference of Welsh Management Education Centres, one year as a non-voting Trustee in the *K’aute Pasifika* Trust Board (an educational and health NGO of Pacific Islands Communities in New Zealand). Tom now lives in Spain and continues working on his research

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Tomas Backström is a Swedish researcher, and a tenured full professor in innovation science and leader of the innovation management research at Mälardalen University in Eskilstuna in Sweden. He has been a researcher in the work life area since his PhD in 1996. Starting with an undergraduate degree in theoretical Physics his work has developed more and more multi disciplinary and he has published articles and chapters in a wide spectrum of venues such as: *The Learning Organization*, *International Journal of Computer Integrated Manufacturing*, *Economics and Business Letters*, *Nonlinear Dynamics*, *Psychology*, and *Life Sciences*, and *Emergence: Complexity & Organization*. Professor Backström's current research deals with innovation management and creativity in groups and organisations, with a special focus on communication and leadership. It is often performed in cooperation with organizations characterised by decentralisation and distributed responsibility, where emerging structures are of high importance. Complex systems theory is used as a meta-theoretical base.

Kalyan Kumar Banerjee is among the ten co-founders of Mindtree (www.mindtree.com), among the most promising globally focused mid-sized IT companies from India in the last two decades. After being part of the growth and transformation of the computer industry for 26 years, Kalyan pursued his interests in Education. After three and half years at a University, Kalyan now focuses on education in under-served segments – beyond the big cities and beyond the mainstream pedagogy centered around textbooks and classroom. Klorofeel Foundation focuses on underprivileged children, and is woven around the principles of content around local context, meaningful education, activity based learning in a joyful environment served by local teachers, and with focus on local community support. Klorofeel Education Association strives to showcase child-centric pedagogy served in a joyful environment, in smaller cities, with focus on community connect, local problem solving, teacher development and parent development (an unaddressed area). While Pro Vice Chancellor at a University, Kalyan had driven to create a curriculum focused on building intrinsic interest in the discipline through engaging in real, meaningful projects designed to enhance employment capacity in the industry. Such transformation was attempted through multiple initiatives that included a sustained focus on projects, meaningful labs, an evolving examination system, and engaged faculty. Kalyan envisions an academic ecosystem that empowers students from all socio economic backgrounds

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Marianne Döös is Professor emeritus and a senior researcher within Organisational Pedagogy at Department of Education, Stockholm University, Sweden. Her research deals with the processes of experiential learning in contemporary settings, on individual, collective and organisational levels. Topical issues concern interaction as carrier of competence in relations, shared and joint leadership, conditions for competence in working life and organisational change and development. Marianne Döös has authored and co-authored many articles and books. Two relevant examples among her publications are *Collective learning: Interaction and a shared action arena* (in *J. of Workplace Learning*, 2011) and *Changing organisational conditions: Experiences of introducing and putting function-shared leadership (FSL) into practice in schools and pre-schools* (in *Leadership and Policy in Schools*, 2020).

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Michael A. Goedecker is a German/American Security Researcher, born in 1971 in New York City. He has worked in the IT Security field for over 20 years, training and consulting for fortune 500 companies. He has worked on worldwide security projects for various companies and industries that range from cyber defense to attack analysis and focused on Cyber Espionage, Warfare and Crime. New research and books in the works concentrate on distinguishing the differences between Threat and Risk Intelligence as well as using Proactive Security Team methodologies to detect and stop as many attacks as possible. Michael has a Master of Science from Ulster University and is currently working on a Doctorate.

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Jamie P. Halsall is a Reader in Social Sciences in the School of Human and Health Sciences at the University of Huddersfield, UK. His research interests include communities, globalisation, higher education, public and social policy. Currently, Jamie is a Fellow of the Royal Society of Arts and a Chartered Geographer of the Royal Geographical Society, and was awarded Senior Fellowship of the Higher Education Academy in January 2017. Jamie is the author of *Understanding Ethnic Segregation in Contemporary Britain* (Nova Publishers, 2013), and co-author of *Sociability, Social Capital, and Community Development: An International Health Perspective* (Springer, 2015) and *Aging in Comparative Perspective: Processes and Policies* (Springer, 2012); he also co-edited *Mentorship, Leadership, and Research: Their Place in the Social Science Curriculum* (Springer, 2019) and *The Pedagogy of the Social Sciences Curriculum* (Springer, 2017).

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Peter has been involved in several research projects. And his current interests are cross-disciplinary, and positioned in the intersection between operations management and innovation management research. His research deals with the origins of and conditions for learning and development of innovation competencies on an individual and organisational level as well as the relation between those.

Matthew Kolakowski is an Assistant Professor of Management and Healthcare Administration at Valdosta State University. He completed his Ph.D. in Business Administration at Oklahoma State University. His work focuses specifically on the effects of causation and effectuation processes on entrepreneurial venture investment performance. Other research areas include the impact of strategic intent on medium to large organizational performance and e-learning pedagogy.

Francisco José Leandro received a Ph.D. in political science and international relations from the Catholic University of Portugal in 2010. From 2016 to 2017, he took part in a post-doctoral research programme on state monopolies in China - One belt one road studies. In 2014 and 2017, he was awarded the Institute of European Studies in Macau (IEEM) Academic Research Grant, which is a major component of the Asia-Europe Comparative Studies Research Project. From 2014 to 2018, he was the Programme Coordinator at the Institute of Social and Legal Studies, Faculty of Humanities at the University of Saint Joseph in Macau, China. He is currently an associate professor and Assistant Dean of the Institute for Research on Portuguese-Speaking Countries at the City University of Macau, China. His most recent books are *The Challenges, Development and Promise of Timor-Leste* (2019) and *The Belt and Road Initiative an Old Archetype of a New Development Model* (2020).

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