Chapter 7
Racing Ahead With Innovation: The Case for Hybrid Models and Ethical Decisions

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ABSTRACT
Massive societal change will result from the rate of continuous technology advancement and the pace will increase. The enterprise will face operational and technical challenges and society will increasingly expect the highest ethical conduct. What strategy will allow the organization to remain innovative and thrive in these circumstances? To develop new insight, anticipatory skills, and better decision making, a case is made for the adoption of model building and simulation. In addition to the benefits of shared conceptual artefacts for communicating in the enterprise, modelling requires a deep understanding of the ethics and reflexivity needed to deal with complex issues and using a transdisciplinary framework for inquiry may increase understanding. For innovation to emerge, participatory and co-creative approaches for sense-making are proposed to shift the responsibility for ethical decisions to more actors in the enterprise. This approach allows leaders to engage with the informal coalitions in the enterprise and shape the required strategic direction.

INTRODUCTION
The pull of applications and simultaneous technology push are seen as major drivers for Industry 4.0 (Lasi, Fettke, Kemper, Feld, & Hoffmann, 2014). Artificial Intelligence, Virtual Reality, Additive Manufacturing, Robotics and the Internet of Things are the technologies and applications that are visible manifestation of the disruptive nature of the Fourth Industrial Revolution. Lasi et al. concludes that this will have a massive effect on business and information systems engineering.

The position and focus of this chapter is that there is a need for interventions that will allow enterprise to maintain calm as the storm of change rages, to remain viable and to make ethical decisions. Several avenues exist to achieve these goals, and as the title suggests, modern modelling approaches in support of innovation and decision-making are proposed as crucial for success. Specifically, including a hybrid

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anticipatory modelling and simulation capability formally into the workflow of an enterprise may act as the catalyst to ensure that knowledge generation and innovation proceed at the pace required and that decisions are made ethically and transparently.

This chapter will explore several aspects of information and knowledge, model building for sense-making from a broad philosophical and ethical perspective, transdisciplinarity as an appropriate mode of inquiry, and innovation. Finally, the ideas around hybrid system models and simulation will be introduced. Practical aspects of enabling a capability and workflow in the enterprise will be explored and combined with organisational change initiatives, and in conclusion, the prospects for future work in this area will be touched on.

BACKGROUND AND STRUCTURE OF THIS CHAPTER

People, in general, experience a sense of unease around situations that imply change. Over the past 250 years, humanity has experienced unprecedented change. This was brought on by the first industrial revolution, in essence, an explosion of technology, and with it came an explosion of the population (Brynjolfsson & McAfee, 2016). Steam machines made mechanical production possible and allowed for the effective distribution of heavy loads of produce over long distances using steam trains. The supply chain was suddenly long, fast and potentially more complicated than before.

The second industrial revolution was made possible by the invention of electricity and the assembly line. Between the end of the Second World War and the turn of the century, the advent of the computer, digital technology and the internet ushered in the third industrial revolution (Schwab, 2017).

Around 2007 Apple released the iPhone. It was more than a phone, more than a personal digital assistant and more than a small computer. It integrated these concepts and offered an internet connected communications device, with small applications available to do a multitude of tasks. These applications, developed by a new breed of software developers, were available from an electronic repository, curated by Apple, and at prices that disrupted the concept of boxed software available only in a physical shop. Just as with electronic music and movie downloads, the concept of the supply chain for digital goods changed overnight. The world of advertising was impacted; Facebook and other social channels suddenly had a new portal for delivery, and advertisements could be served based on specific usage patterns.

Shapiro and Varian (1998) foresaw this type of disruption about ten years earlier and observed that software and hardware platforms must be collectively managed as an ecosystem to remain viable in the changing environment. Steve Jobs subscribed to the position of Alan Kay (2018), who famously said: “People who are really serious about software should make their own hardware” and took it one step further by also curating the type of content delivered by their ecosystem. The technology changed, but as Shapiro and Varian pointed out, the laws of economics did not change. In this case the innovation was around the control of the platform for delivery, the mechanisms of delivery and the deliverables that are tightly integrated and controlled to gain a competitive advantage. Being first to market with this complete package had the obvious advantage that it attracted more customers and subsequently more developers to the ecosystem.

The introduction of the iPhone followed the earlier presentation of a revolutionary music player, the iPod, that used solid-state storage and could store and play music downloaded from the iTunes web store owned by Apple. The proven technology of the iPod found its way into iPhone, which essentially incorporated all the functionality of an iPod and more. The pace of this disruption took many competitors,
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