Chapter 14
Enterprise IT Operations:
Cognitive Automation and ignio™

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ABSTRACT

Over the past decade or so, for most enterprises, information technology (IT) has shifted from being a support function to be a synonym for business wellness. During the same period, though, the scale and complexity of IT for running business has grown significantly; today, performing any business function requires complex interplay of many, often invisible and dynamically changing, technology components. This is making design resilient and interruption-free IT a significant challenge. This chapter discusses limitations of traditional approaches for managing enterprise IT operations; introduces the concept of cognitive automation, a novel approach that blends intelligence with automation to transform enterprise IT operations; and describes the design of ignio™, a cognitive automation platform for enterprises. The author concludes by highlighting the challenges in driving cognitive transformation of enterprise operations and providing some suggestions for embarking upon this journey.

INTRODUCTION

Over the past several decades, information technology (IT) has become central to every industry and business. IT has been used extensively in every business for a variety of use-cases, including: (1) to enhance customer experience, (2) to accelerate business growth by introducing new products and services, or by expanding into new markets quickly, (3) to improve operational efficiency, and (4) to reduce operational risks. In fact, because of the significant impact of IT on business, most enterprises are rapidly becoming "*technology companies, with appropriate domain-knowledge and freedom-to-operate licenses in relevant jurisdictions*". Further, the role of IT has shifted from being a *support function*, to be the synonym for *business wellness*.

While this is music to the ears of everyone working in the IT industry, the rapid rise of importance of IT has also increased significantly the expectations of business from IT (Weiser et al, 1993). Any glitch or failure of IT now has direct impact on business – leading to loss of revenue, loss of credibility with

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customers, health and safety issues for employees, as well as regulatory and other compliance failures. Further, inability to take advantage of and adapt quickly to technological advances exposes businesses to technology-led disruptions; after all, proliferation of IT has greatly reduced the barrier of entry for newcomers into any business.

As they say, with great *power* comes great *responsibility*—the responsibility to make IT reliable, resilient to failures, easy to adapt, update and manage.

Unfortunately, enterprise IT teams are struggling to deal with this responsibility. Most enterprise IT systems today involve complex interplay of many different, often invisible, technology components. Further, with the emergence of software-defined technologies, fine-grain componentization (with microservices and APIs), among others, the technology components involved in supporting any business function change dynamically and rapidly, often without the knowledge of most stakeholders. This significantly increases the complexity of reasoning about reliability and security of systems. With continuous and accelerating pace of technology innovations, the complexity of enterprise IT systems is increasing, worsening the problem.

Industry best-practices for managing IT environments for enterprises were defined a decade or two ago, assuming that the technology components, involved in supporting business functions, and their inter-dependencies are well-documented and change infrequently. Most of these assumptions do not hold for modern and rapidly evolving enterprise IT systems, rendering most of the best practices inadequate to meet the demands of modern IT systems and IT-led businesses.

In this chapter, we first describe traditional approaches for managing enterprise IT operations along with their limitations. Then we introduce the concept of *cognitive automation*, a novel approach that blends intelligence with automation to transform enterprise IT operations. We describe the design of *ignio*™, a cognitive automation platform designed for enterprise IT operations. We conclude by highlighting the challenges in driving cognitive transformation of enterprise operations and provide some suggestions for embarking upon this journey.

STATE OF THE ART

Today, most enterprises rely upon a combination of the following *three* approaches to manage their IT environments, each with significant shortcomings (Berruti et al, 2017; Wang et al, 2009; Kephart et al, 2003; Weiser et al, 1993; Sterritt et al, 2003).

Approach #1: Reduce complexity through standardization.

Technology standardization is often used as a strategy by enterprise IT teams to limit diversity and thereby reduce complexity. This approach either involves post-facto *rationalization* by migrating non-standard technologies to chosen standard, or up-front *prevention* of introduction of non-standard technologies through architectural guidelines and processes.

Most enterprise technology rationalization projects take too long to implement (and are often difficult to justify financially). Further, in most enterprises, there is a constant struggle between the change-the-business and run-the business team. Change-the-business teams aspire to drive *growth* and strive to adopt emerging technologies rapidly (and thereby add greater technology diversity and complexity in the environment). Run-the-business teams, on the other hand, aspire to *optimize the existing* and strive

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