Chapter 91
Emerging Technologies and Organizational Transformation

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ABSTRACT

Technologies continue to evolve and to largely transform business practices. In the near future, a few technologies, such as Internet of Things (IoT), Augmented Reality (AR), additive manufacturing (3D printing), and robots, can substantially influence businesses. The reason to focus specifically on these technologies as leading factors for organizational change is twofold: first, there already exist many prototypes and pilot experiments; and second, these technologies have the potential to provoke substantial breakthroughs, leading to substantial business changes. The chapter proposes an overall vision about the impact of these four emerging technologies on business practices and how they will fuel substantial business transformation. The chapter starts with a short analysis how IT influences the core business models and value formation. Then, the authors present the state of the art in e-business technologies and current emerging trends. Finally, the authors propose a detailed overview and discussion of the newly emerging bridge technologies, illustrating with examples their role and economic potential.

INTRODUCTION

Information technologies made the world closer, more interconnected and highly competitive. Due to sophisticated technologies, companies improved business efficiency and performance. Information technologies played an increasing economic role for reducing transaction costs and agency costs, providing the backbone infrastructure for value formation (Laudon & Laudon, 2007). Thus, they allowed many new business models to emerge, bringing additional sources for value-creation for customers. Moreover, e-business applications have largely transformed companies to become more flat, boundary-less, entrepreneurial, process- and project-oriented, developing complex and innovative global business models. Today, Internet is an essential and indispensable infrastructure for business transactions on many B2B and B2C levels, becoming a universal platform for services. In the recent "Global Wealth Report" (Credit Suisse, 2013), the global wealth is reaching a new high in 2013 with expectations for a rise with another 40% for the next 5 years. In the same time unemployment data hits new records, es-

pecially among young workers (OECD, 2013). Experts and politicians are already discussing the threat of a "lost generation," reflecting many more social and economic problems. Technologies bring new and unexpected dynamics of economic and social processes. This will further threaten the social and community systems, education system and public priorities. For example, robots can replace not only repetitive tasks of blue-collar workers (as in automobile industries), but they can replace the work of highly-skilled staff (such as surgeons). Additive manufacturing and e-commerce advances will contribute for more custom-oriented production, exploring the long-tail models. In the same time many new smart technologies (for example smart driver-less car, "nurse" and home robots) will change the service sector employment. Thus with evolution of technologies we can further expect more working places to be replaced by automated systems and robots or to disappear.

Many researchers and practitioners anticipate that Internet technologies will soon leave the digital world in order to make "real world" objects and environments more smart, more operational and interconnected. The estimated impact of these newly emerging technologies will result in more change in the economic and social development, bringing many new challenges to businesses. These key "bridge" technologies are augmented reality (AR), additive manufacturing or 3D printing, robotics and the Internet of Things (IoT). The common issue for these technologically different applications is that all of them are closing the gap between the world of bytes and the world of objects. They lead to the development of new content- and context-rich connected environments and mobile objects, adding many Internet functions and services to "real world" objects, people and landscapes. The reason to focus specifically on these technologies as leading factors for organizational change is twofold: the first argument is that these technologies are expected to become widely implemented in the near future through the development of prototypes, proofs-of-concepts and pilot experiments as well as early-stage mass production. The second argument is that these technologies are expected to influence major business processes, leading to substantial change in organizations. With fast adoption of smart phones and tablets, interactive technologies, wireless Internet and portable devices (as AR glasses or head-mounted devices), this vision is gradually becoming reality not only for end-customers but also for companies and industries.

The present chapter aims to analyze the impact on business development and business transformation, due to some of the key emerging technologies. The methodology follows the bottom-up approach, focusing on case studies of innovative business practices and company changes. Case studies and best practices are admitted to serve as good source for research in information technologies business application (Benbasat, Goldstein, &Meat, 1987). The first part of the chapter provides a short introduction of organizational challenges and discusses the main sources of competitive advantages. The second part presents some of the main e-business applications implemented in business organizations, including, for example, company information systems such as ERP and CRM, supply-chain systems and networks, e-commerce and digital content, social web and marketing activity, and some related concepts such as tele-working and downsizing and crowd-sourcing. The third part of the chapter will focus on emerging technologies and expected organizational changes. It will provide a detailed overview of the main characteristics, challenges and opportunities of the new emerging technologies identified above: augmented reality, pervasive computing, Internet of Things, 3D printing and robotics. The chapter will present several examples of these technologies and discuss possible implementations of these emerging technologies in various organizational settings. Finally, the fourth part of the chapter will summarize the findings and will discuss the models and business approaches for organizations.

The main outcome of this chapter is to derive to a general business framework based on theoretical review and practical examples that will enable business organizations to better understand value creation models for emerging innovative technologies. The chapter will provide arguments and examples about

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