Chapter 17
Simulation of Knowledge Intensive Processes

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ABSTRACT

This chapter presents a literature review and theoretical investigation combining the areas of Business Process Simulation (BPS) and Knowledge Management (KM). In the beginning, it describes the concept of knowledge economy – the environment in which most modern organizations have to operate. Knowledge economy supports the concept of green technology because knowledge-intensive services aim at decreasing the use of natural resources, reducing the generation of waste as well as lowering the carbon footprint. This chapter defines knowledge intensity and Knowledge Intensive Processes (KIPs). It then investigates the relationship between KM (the discipline dealing with KIP) and BPS. It is expected that both KM and BPS can aid green technology by employing relevant techniques, which can introduce the new, more efficient technology, reduce the usage of natural resources, as well as lower the carbon footprint. This chapter presents the differences between Conventional Business Processes (CBP) and KIPs. After that, it describes problems that KIPs can pose to BPS. In the next step, it explores the opportunities and challenges of simulating KIPs. At this point, a conceptual model that embraces both KIP and BPS is proposed. Potential future research directions are discussed and in the end conclusions are drawn based on the discussions of the chapter.

KNOWLEDGE ECONOMY

Modern economies are very often described as knowledge-based. This description distinguishes between traditional economies (based on land, labor and capital) from those where knowledge becomes the most important resource (surpassing the three mentioned previously). Modern economies and societies, as compared to traditional ones, can be characterized by increased knowledge-intensity. It does not mean that knowledge and experience were not important in the traditional
economies. Quite the opposite: such economies required a substantial amount of both knowledge and experience to carry out the necessary activities. However, in the traditional economy, resources are more important than knowledge itself.

Some authors argue that “the role and significance of knowledge as an input to economic processes has fundamentally changed” (Smith 2000, p. 2). The idea behind that is that there are fundamental changes in the underlying economic processes and economic rules of the free market game. These changes involve all of the major stakeholders of the economy (ibid, p. 2). Knowledge-based economy recognizes the role of knowledge and technology in economic growth. Knowledge, “as embodied in human beings (as “human capital”) and in technology, has always been central to economic development” (OECD 1996, p. 9). However, only over the last 20 years has its relative importance been significantly and widely recognised. This realisation led to increased investments in high-technology goods and services on the one hand and R&D, human capital and training, on the other (ibid, p. 10).

Knowledge-based jobs in the service sectors are among the ones that are growing at the fastest rates. Indeed, the “knowledge workers” are in very high demand. This is due to the fact that employers now “pay more for knowledge than for manual work” (ibid, p. 10).

KNOWLEDGE INTENSITY

The increasing importance of knowledge in the modern economies and societies has changed the environment in which most of the organizations and individuals operate. This change is due to the fact that the market in the developed countries and some rising economies (such as China or India) can be characterized as knowledge-intensive ones or ones with a high level of knowledge intensity (Miles et al, 1995). In order to understand what knowledge intensity is it is necessary to properly define knowledge in this perspective. Knowledge according to Webster dictionary is “the fact or condition of knowing something with familiarity gained through experience or association” or “the range of one’s information or understanding”.

In this view knowledge is rather static – it may appear as some sort of organized information. It is necessary to realize that knowledge is not just one’s education, the contents of books, databases or web sites. It is necessary to perceive knowledge as an active phenomenon. In this view it involves one’s “ability to organize information, as well as the results of applying that ability” (Miles et al. 1995, p. 16). It is knowledge that defines an organization’s strength and competitiveness on the market.

Knowledge intensity is an indicator of how much a given organization and its operations rely on professional knowledge (Andreeva & Kianto 2011, p. 1020). Examples of such knowledge intensive organizations are companies active in telecommunication sector, R&D departments, and research institutes. Such organizations may be government or commercial ones. However quite often they cross through the private sector, public sector and academia. The profile of their employment structures is heavily oriented towards scientists, engineers and other experts. Cognitive processes (e.g. design, and development) occur more often than the physical ones (e.g. production, and manufacturing). Knowledge intensive processes in such organizations are of strategic importance (Larsen, 2001, Morris and Empson, 1998). Constant improvement and continuous strive for innovation are vital to organization’s success and survival in the knowledge-intensive environment (Nurmi 1998, Robertson et al., 2003). Their main focus is on the acquisition of knowledge either from external sources or internally, and further dissemination of it to interested stakeholders.

Whelan et al (2009) provide a very interesting study based on social network analysis that investigates these activities. The authors identify external and internal knowledge specialists who are responsible for the processes mentioned pre-