

Chapter 11

Real Options and Its Suitability in Assessing International Digital Investment

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ABSTRACT

Firms have experienced extreme competition because of changes in technological and global issues. Globalization of manufacturing has arisen through a faster transfer of materials, complex payment systems, and compression of product life cycle. Eventually, firms need the integration of technologies to meet the increasingly sophisticated customers' needs. Among the technologies, artificial intelligence has attracted much of the attention as it has been foreseen to have a major impact on all industries. Real options approach may be applied to make informed decisions concerning digital technologies investments. Therefore, firms could decide to defer the option of investing in artificial intelligence for the sake of finding a more favorable future environment. This chapter provides an adequate tool to reduce uncertainty in deciding whether to implement artificial intelligence in their companies. This tool comprises the strategic perspective of the investment in digital technologies that makes it suitable to be incorporated as a part of the set of strategic tools.

INTRODUCTION

Recent developments in computer science have brought about spectacular improvements in the performance of those who make use of this new technology (Szalavetz, 2018). This innovation, when applied to the manufacturing industry, uses its capacity to accumulate and communicate information to achieve greater productivity, higher quality, and lower production costs (Anaya et al., 2015; Tian et al., 2002). This places digital technologies high on the list of possible assets available for the development of business and the improvement of competitiveness. In general terms, the main purpose of digital technologies is to provide sophisticated machines, storage systems, and production facilities which can function autonomously to exchange information, trigger actions and control each other independently (Henning, 2013). The incorporation of this technology in a company will, therefore, enable it to make considerable improvements in what has hitherto been its standard mode of operation.

Although this is already occurring, the future presents high levels of uncertainties, discontinuities, and complexities (Vojak & Chambers, 2004), stimulated by rapid and unprecedented changes in the socio-political, economic and technological status quo (Amadi-Echendu et al., 2011). It is therefore of vital importance for companies to have a reliable prior understanding of the potential of deploying and implementing these technologies. According to Xu et al. (2018), the essence of digital transformation lies in the integration and interoperability of information across production and production support activities and management. As digital technologies are primarily used for the managerial activity, companies are aware that they are true drivers of growth and development, and can, therefore, help to achieve strategic objectives. Therefore, identifying, selecting and implementing the most suitable technologies from among the wide range of available alternatives imply a serious process of decision-making (Amadi-Echendu et al., 2011).

Within the area of digital technology, artificial intelligence (hereinafter, AI) has attracted much of the attention of both practitioners and researchers, as it is expected to have a greater impact on all industries (Ransbotham et al., 2017). As a technology, AI has been applied to provide managerial solutions to business management problems (Shah, 2015) and improve customer experience (Lu et al., 2018). Deciding whether to implement digital technologies is no longer something to be considered at a future date. For most companies, it needs immediate consideration since their implementation is at the core of both strategic and research agendas. Nevertheless, this process requires a detailed analysis of investment potential, since considerable funding is necessary to start (or continue) the digitalization process, especially for those companies of smaller size with limited financial resources and backing. Under these circumstances, they face important investment decisions which present great challenges to the progress of digital application (Zhou et al., 2017).

Despite these difficulties, a reasonable and informed evaluation should facilitate the decisions to be made concerning the possible implementation of digital technologies. Thus, the choice of an appropriate method which accurately assesses risks and rewards becomes compulsory before deciding on the appropriate level of investment. This is of special relevance when dealing with digital technologies because, when compared to other kinds of technology, they may become outdated and superseded due to the rapid improvements and innovations which bring new offers on to the market.

Real options have a valuable part to play in the assessment and justification of investments in technological projects. In essence, real options provide the right, but not the obligation, to take up or reject an investment opportunity in a non-financial or real asset at some time in the future (Mauboussin, 1999). As shown by Lee and Lee (2015), a real-option approach may be applied in order to make informed

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