Valuating IT Governance Strategies With Real Options in a Decision Making Framework

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ABSTRACT

Information Technology Governance (IT Governance) is an integral part of enterprise governance which aims at controlling the formulation and the implementation of strategic objectives of an organization. The implementation of IT governance strategies generates goals and projects whose achievements are subject to the availability of IT resources. In order to monitor the achievement of these strategies, the authors propose to extend the traditional Real Option Analysis (ROA) framework to valuating governance strategies and illustrating them as classical governance notions. A decision-making framework aiming at generating the best investment decisions and responding to governance constraints is developed. In their simulation model, the authors consider control elements associated with quality, resources and time. This modeling approach stands out by opening the way to new decision-making models based on ROA and compliant with IT governance activities.

KEYWORDS

Decision Support, Governance, Information Systems, Information Technology, Pricing, Real Options, Resources Modeling, Simulation

INTRODUCTION

IT Governance is meant to define the objectives assigned to the information technology, to plan, to set and implement the processes related to the management of the IT life cycle. It corresponds to the implementation of the means necessary for the decision makers to ensure that the organization IT meets the preset company strategies and objectives. A basic definition of governance is to consider that it describes how a system is managed and controlled. Thus defined, governance is the combination of monitoring i.e. ensuring that today’s decisions prepare tomorrow properly, and control i.e. measuring the gap in comparison to what was expected, states Peter Weill (2004). A major preoccupation for the IT steering committee is to construct a proper board based on control elements that can be measured in terms of their importance level responding to change and to rising issues.

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ROA offers decision-makers a varied range of tools to manage risk and uncertainty in their investments. It also provides advanced scenario analysis that an organization can use to address management accounting issues and IT governance strategic objectives. However, the application of financial techniques of ROA is subject to criticism due to the fact that essential assumptions are not fulfilled as pointed out by Ullrich (2013). The fact that gathering data that directly fits into models described in ROA is difficult. There is some information, like the cost and benefit estimates. However, to calculate real option theory parameters happens to be hardly evident (Asundi & Kazman, 2001). The idea of transferring ROA to real investments trace back to Myers (1974), whereas, the application of ROA to the valuation of IT investments started in the early 1990s. Since then, major advances have been made with significant results. In his good overview about managerial flexibility, Trigeorgis (1996) takes over the main options that could be implemented with ROA. Taudes (1998) introduces a flexible ROA model responding to changes in an organization environment. On their part, Benaroch et al. (1999) focus their research on determining the optimal timing of investing. More recently, Hilhorst et al. (2006) consider individual preferences besides a market valuation combined with a ROA model, while Angelou et al. (2009) apply the Analytical Hierarchy Process, through which different sources of uncertainty are modeled. Munoz et al. (2011) consider ROA as a decision-making tool to assess investments in a specific risk management context. A simplified options-based decision rule is proposed in (Crasselt & Lohmann, 2016). In this paper, the authors suggest the use of ROA as a decision-making tool which responds to IT governance constraints. Kim & Eom (2016) in their good survey about decision support systems framework, identify the tools used at the managerial level to build such frameworks.

Initially, the authors have identified some important notions of IT governance based on the analysis of the related literature (Weill, 2004; Niemann, 2009). They have also tried to illustrate their randomness in a basic Monte Carlo simulation (El Ghorfi et al., 2014). In this paper, the authors introduce a mathematical model derived from ROA to monitor the advance of strategic governance objectives. Three main metrics “risk, quality and time” are considered in order to give instant feedback on the conduct of IT projects responding to governance precepts. The proposed approach is discussed in a concrete case study and some key features are compared to similar existing works in the literature. In the following sections, the authors describe both notions of IT governance and ROA which will be used in their framework. Finally, the authors report the experimental results of their proposed model and discuss its potential to address the IT governance modeling issues.

**IT GOVERNANCE BASIC NOTIONS**

This section aims at defining the different components which act on IT projects. IT strategies and their derived IT goals are defined from the analysis of IT governance literature (Weill, 2004; Niemann, 2004). Based on the managerial literature (Reix, 2005; Georgel, 2009), IT resources are split into four main categories. A model including quality, resources and time is proposed to monitor the achievement of IT projects.

**IT Strategies and IT Goals**

IT Governance could be considered as a type of project management aiming at hitting a moving target (Weill, 2004). As a matter of fact, as long as changes generated in the internal or external environments of the company can either move the intended target or modify the situation in which the objective happens to be, it would be vain to hope that the trajectory of the objective be identical to the initially anticipated one as illustrated in Figure 1 in the Appendix.

The elaboration of strategies and objective indicators is of primordial importance in IT governance. The mediation of the decisions to take and their resulting actions is generally ensured by an IT steering committee willing to hit the target assigned to one objective or its portfolio. So far as the target is moving, the decision maker is responsible for the adjustment of its corrective action levers in order
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