Chapter XVI
The Evaluation of IT Investments through Real Options

Maria Alice Frontini
University of São Paulo, Brazil

Fernando José Barbin Laurindo
University of São Paulo, Brazil

ABSTRACT
The decisions about IT investments are increasingly more complex, due to technical uncertainties and to the dynamics of organizational and strategic issues. One promising alternative for solving this problem would be the use of real options. Thus, this chapter intends to apply a relatively new methodology, called real options, used in corporate strategy for evaluating and deciding about new investments in IT. In order to do so, an analytic review of the literature is presented. The real options methodology is particularly recommended in two situations: in the case of the existence of a significant level of uncertainty about the benefits to be achieved by IT investments, or when IT benefits do not impact directly the current business but create a platform for future investments, capable of producing future new business impacts.

INTRODUCTION
As information technology (IT) evolves, investment decisions upon it become increasingly more complex. Chief information officers (CIO) face prejudice from top management, concerned about the real benefits that IT can bring up to business. Technological uncertainties make it very difficult to estimate the value that can be extracted from the usage of new IT solutions, and the IT benefit
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is even more integrated to the organizational, process, and marketing dimensions of a company.

This scenario can bring two consequences to the business environment: on the one hand, the CIO is confronted with greater skepticism about the approval of new projects; on the other hand, this conservatism can be taking the entrepreneurs to a lack of investments in IT infrastructure projects that can represent the foundation for the outcome of other projects, which can be a basis for future opportunities for products and services innovation offered by the company to the market.

This chapter intends to, through an analytic review of the literature, apply a relatively new methodology, called real options, used in corporate strategy for evaluating and deciding about new investments in IT. Particularly, this methodology is highly recommended when there is either a considerable level of uncertainty about the benefits to be achieved by the investment, or when IT benefits do not directly impact the business but create a platform for future investments, hence future business impacts.

PERPECTIVES ON IT ASSESSMENT IN ORGANIZATIONS

Lately, many aspects have been discussed on the role and governance of IT, either in academic reviews or in managerial environments. On the one hand, there are doubts about results yielded by IT investments. On other hand, IT applications cause enchantment, especially those related to global economy and the Web (Porter, 2001; Tapscott, 2001). Farrell (2003) emphasizes that IT brings significant gains when related to organizational processes, and even further when integrating the industry value chain (Porter & Millar, 1985). In this item, two aspects are highlighted: the strategic role of IT in the organizations and the evaluation of IT effectiveness.

The Strategic Impact of IT Effectiveness

One of the first initiatives to understand IT role in organizations established a model to assess IT organization in alignment to business, according to phases in business growth and/or in business maturity.

Nolan (1979) is the most widely known and disseminated model. Taking into account the introduction of automation and information technology into enterprises, Nolan proposed a framework which establishes four phases in the IT evolving pattern. Afterwards, the author enhanced his model into six phases: initiation, contagion, control, integration, data administration, and maturity.

- Initiation: When first computers are purchased for labor reduction and for reducing paper handling.
- Contagion: When IT is expanded to other functions such as invoice, inventories, and checks emission. There is not, however, the concept of information integration.
- Control: The growth in the use of information systems in the organization becomes explosive; the IT department is professionally administered.
- Integration: The restructuring demanded by the previous stage is completed, in response to the pressure for better administration; information systems are guided to support needs of different managerial levels. Information has better quality, as a direct result of centralization of the IT department under a single administrative structure and as a consequence of the use of databases management systems.
- Data administration: Is dominated by database technology. The IT department recognizes that information is a very valu-