



## **Chapter V**

# **Methodologies for IT Investment Evaluation: A Review and Assessment**

Egon Berghout

Delft University of Technology, The Netherlands

Theo-Jan Renkema

Eindhoven University of Technology, The Netherlands

## **INTRODUCTION**

The evaluation of information technology (IT) investments has been a recognised problem area for the last four decades, but has recently been fuelled by rising IT budgets, intangible benefits and considerable risks and gained renewed interest of both management and academics. IT investments already constitute a large and increasing portion of the capital expenditures of many organizations, and are bound to absorb a large part of future funding of new business initiatives. However, for virtually all firms, it is difficult to evaluate the business contribution of an IT investment to current operations or corporate strategy. Consequently, there is a great call for methods and techniques that can be of help in evaluating IT investments, preferably at the proposal and decision-making stages.

The contribution of this chapter to the problem area is twofold. First, the different concepts, which are used in evaluation are discussed and more narrowly defined. When speaking about IT investments, concepts are used that originate from different disciplines. In many cases there is not much agreement on the precise meaning of the different concepts used. However, a common language is a prerequisite for the successful communication between the different organizational stakeholders in evaluation. In addition to this, the chapter reviews the current methods for IT investment evaluation and puts them into a frame of reference. All too often new methods and guidelines for investment evaluation are introduced, without building on the extensive body of knowledge that is already incorporated in the available methods. Four basic approaches are discerned: the financial approach, the multi-criteria approach, the ratio approach and the portfolio approach. These approaches are subsequently compared on a number of characteristics on the basis of methods that serve as examples for the different approaches. The chapter concludes with a review of key limitations of evaluations, suggestions on how to improve evaluation practice and recommendations for future research. This chapter draws on earlier work as published in Renkema and Berghout (1997), Berghout (1997), and Renkema (1996; 2000).

## BACKGROUND

Investments for developing and implementing information systems (IS) are large and increasing. They constitute up to 50 percent of the capital expenditures of large organizations (Earl, 1989; Davenport and Short, 1990; Keen, 1991). Information systems are not only used in administrative and decision making tasks but are changing the shape of production processes (e.g. embedded software, workflow management, or ERP packages) and enable the development of new products and services (e.g. chip card services, e-commerce). The many empirical studies carried out in the 1990s show that organizations have several problems with the evaluation of proposals for IT investments (e.g. Hochstrasser and Griffiths, 1990; Bacon, 1992; Farbey et al., 1992; Yan Tam, 1992; Willcocks and Lester, 1993). A number of causes can be identified. Because information systems are often for a great extent integrated in the organization, it is difficult to establish the boundaries of the system. For instance, which user costs of a new electronic mail system should be considered in an investment proposal? Another possible cause is the ongoing dispute on the relevant decision criteria. How should, for example, long term impacts of an IT investment be incorporated? An example of this is the contribution of a database management system to the realisation of corporate data infrastructure in an organization.

A plethora of methods and techniques have been proposed to assist in the evaluation of IT investment proposals. A number of researchers have identified over sixty methods, that all aim to be of help in the evaluation of IT investment proposals (Swinkels and Irsel, 1992; Berghout and Renkema, 1997). An overview of these methods is given in the Appendix. Already in 1961 the International Federation of Information Processing devoted its first conference to evaluation issues (Frielink, 1961) and in 1968, Joslin, wrote a book on computer selection (Joslin, 1968). The purpose of this chapter is to improve insight in the current methods for the evaluation of IT investments, with a focus on evaluation in the proposal stage, and to assess their main strengths and weaknesses. For the moment this is the maximum that can be strived for, as research that has validated evaluation methods is hardly available. General prescriptions about the use of which method in which circumstances should be applied can not be given. Current research is still focusing on finding the essential evaluation criteria, the circumstances in which these should be used and the inclusion of the criteria in the evaluation process (Berhout, 1999; Renkema 2000).

## TERMINOLOGY

### Necessity

In order to be able to compare methods for the evaluation of IT investment proposals, one should avoid misinterpretations about the different concepts used. Also in evaluation practice the communication between stakeholders in the evaluation process can be improved by the use of a common language. Often when discussing IT investments notions are used, e.g., costs and benefits, without being certain that everyone means the same thing. This section discusses and defines the concepts that are used in evaluation and in the remainder of the chapter.

### Definitions

A distinction is made between *financial* and *nonfinancial* impacts. Financial impacts are the impacts which are expressed in monetary terms. Nonfinancial impacts are not expressed in monetary terms. The latter category is referred to as *contribution*. An *impact* is defined as an event that arises from the introduction of the information system, starting

18 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: [www.igi-global.com/chapter/methodologies-investment-evaluation/23669](http://www.igi-global.com/chapter/methodologies-investment-evaluation/23669)

## Related Content

---

### An Extensive Review of IT Service Design in Seven International ITSM Processes Frameworks: Part I

Manuel Mora, Mahesh Raisinghani, Rory V. O'Connor, Jorge Marx Gomez and Ovsei Gelman (2014). *International Journal of Information Technologies and Systems Approach* (pp. 83-107).

[www.irma-international.org/article/an-extensive-review-of-it-service-design-in-seven-international-itsm-processes-frameworks/117869](http://www.irma-international.org/article/an-extensive-review-of-it-service-design-in-seven-international-itsm-processes-frameworks/117869)

### A CSP-Based Approach for Managing the Dynamic Reconfiguration of Software Architecture

Abdelfetah Saadi, Youcef Hammal and Mourad Chabane Oussalah (2021). *International Journal of Information Technologies and Systems Approach* (pp. 156-173).

[www.irma-international.org/article/a-csp-based-approach-for-managing-the-dynamic-reconfiguration-of-software-architecture/272764](http://www.irma-international.org/article/a-csp-based-approach-for-managing-the-dynamic-reconfiguration-of-software-architecture/272764)

### An Enhanced Text-Classification-Based Arabic Information Retrieval System

Sameh Ghwanmeh, Ghassan Kannan, Riyadh Al-Shalabi and Ahmad Ababneh (2009). *Utilizing Information Technology Systems Across Disciplines: Advancements in the Application of Computer Science* (pp. 37-44).

[www.irma-international.org/chapter/enhanced-text-classification-based-arabic/30715](http://www.irma-international.org/chapter/enhanced-text-classification-based-arabic/30715)

### Information-Centric Networking

Mohamed Fazil Mohamed Firdhous (2018). *Encyclopedia of Information Science and Technology, Fourth Edition* (pp. 6556-6565).

[www.irma-international.org/chapter/information-centric-networking/184351](http://www.irma-international.org/chapter/information-centric-networking/184351)

### Research of Biogeography-Based Multi-Objective Evolutionary Algorithm

Hongwei Mo and Zhidan Xu (2013). *Interdisciplinary Advances in Information Technology Research* (pp. 125-135).

[www.irma-international.org/chapter/research-biogeography-based-multi-objective/74537](http://www.irma-international.org/chapter/research-biogeography-based-multi-objective/74537)