The information systems accounting – a literature review

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Abstract

This paper was written with the intention of reviewing literature on the subject of information systems costing revealing existing gaps. More precisely, it summarizes content found on this subject. Costing reduction has been under focus by organizations, especially after the global crisis in the last decade. To reduce costs it is crucial to perform an accurate measurement. As investment in IT has grown over the years, so have IT costs. However, literature does not seem to show these growing worries. Research on this subject shows some flaws that are discussed and exposed in this paper.

Keywords: ICT; Information Systems; Costs; Accounting; Literature review; Systematic literature review; Cost models

1. Introduction

Over the last years, cost reduction has been under focus by organizations, including the Information and Communication Technologies (ICT) area. Much importance was given to cost reduction by IT management [1].

However, the increasingly rapid technological evolution brought new challenges to accounting, due to the number of components and their transversality across organizations. As a consequence of this evolution, nowadays many organizations have information systems as a backbone not only to provide better products and services to clients but to also to support business processes [2]. To cope with the new needs of organizations, over the last decades accounting has had the addition of new cost models to provide companies a tool to calculate costs in a faster, easier, and cheaper way, facing the new challenges and capabilities introduced by enterprise resource planning systems [3].

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With the intention of acquiring knowledge about information systems accounting and accounting models applied to ICT, a literature review was performed following the research question: how can information systems ongoing costs be calculated? This paper summarizes the gathered knowledge and achieved conclusions.

2. Systematic literature review methodology

The systematic literature review was based in filtering literature through several steps (see Figure 1) using defined criteria for inclusion and exclusion of documents to ensure the quality of the literature.

Figure 1 Systematic literature review process
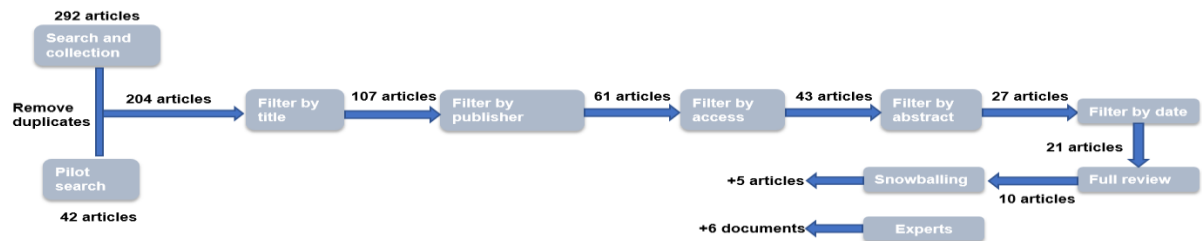
Pilot search – In order to perform this narrow research to collect the prevalent terms and expressions used, a deeply search in search engines and scientific repositories (IEEExplore, ACM, and Web of Science), was done. Strings used: "information systems costing", "information systems costs", "information technology costs" and others similar. After reading the collected articles, it was difficult to identify specific terms or expressions used across the documents, therefore generic expressions such as "costs" and "information systems" were settled.

Search and collection - This search was done over a period of three months (from September to December 2017) using seven repositories: IEEExplore, ACM, Google Scholar, Web of Science, ABI/INFORM Complete, JSTOR and ECONLIT. The results for each string were: ("Costs") - 379445 assets, ("Information Systems") – 108551 assets, and (Costs AND "Information Systems") – 292 assets.

Inclusion/Exclusion criteria - To reduce the number of obtained documents to a reasonable amount and to keep only those relevant to answering the imposed research question the following criteria was used for filtering: Title needed to refer some type of IS/IT or costing/cost models; The publisher needed to be in the top quartile (according to ScimagoJR.com) or be a conference by ACM, IEEE, or Springer, or just a conference with a lot of impact in the subject of IS (top 10 number of academic citations or belonged to the association of information systems); The document had to be of free access in the used repositories; The abstract had to mention costing of IS/IT or the intention to explain cost models or IS concepts; All documents published before 2000 were removed.

This process selected a pool of 21 most relevant papers.

3. Results

From the final 21 papers two subjects stand out as the most important towards answering the research question "how can information systems ongoing costs be calculated?": ICT cost taxonomies ([4], [5], [6],[7]) and cost models applied to ICT ([8]–[11]). The first topic is important in defining the cost object to which cost models are applied while the latter should provide a methodology for determining costs.

[4] centralized research from various authors on cost taxonomies for IS, listing and explaining all the 8 found taxonomies. However only 3 of these split IS costs into initial/acquisition costs and ongoing costs ([6],

[7], [8]). According to [5]'s taxonomy ongoing costs include hardware and software maintenance, licenses, support, ongoing training, modifications, upgrades, system staff, consumables and insurance. [6]'s taxonomy is similar but more generic and therefore not as useful as the proposed by Dier and Mooney. Remenyi considers ongoing costs account for only 4 categories: staff, maintenance, accommodation and general expenses.

The third and last taxonomy uses a different vocabulary, splitting costs into acquisition and administration costs[7]. Even further detail is given by dividing administration costs into administration control and administration operations costs. The first includes implementation and maintenance costs of centralization and standardization while the latter encompasses support, evaluation, installation/upgrades, training, downtime, futz, auditing, viruses and power consumption[7].

Although these cost taxonomies can be useful in understanding the cost objects that are ICT/IS, few detail is given by these generic categories and even worst, no comparisons are made between them. For future research improvement it would be helpful to have actual listings of cost components, such as explicit types of hardware and software. Empirical research on the use of these taxonomies could also be useful, not only to create an example list of cost components, but also to compare costs obtained using these taxonomies and discuss the advantages/disadvantages of each taxonomy.

Collected research on the application of cost models did not specifically use any of these taxonomies. [8] presented a micro-costing methodology to determine costs of a hospital information system. Using this technique [8] determined costs for 5 different categories: coding team, software investment, maintenance investment, transverse investment, and computers. All the steps taken towards calculating costs are very detailed, explaining each of the five stages to reach its goal.

[9] designed a different approach for determining enterprise information systems costs. [9] created a cost analysis methodology named EcoPOST which uses seven steps to determine static cost factors and dynamic cost factors, meaning it is an example of a dynamic-based approach to calculate EIS costs.

Other than these authors, two master's thesis documents were collected ([10], [11]). Both of the thesis' were intended to research on the use of activity-based costing (ABC), more specifically, time-driven activity-based costing (TDABC), and on how to make it easier to use. As ABC was the chosen methodology, the cost taxonomy used included activities performed at the organization's IT department used for the case studies. Since thesis' are longer pieces of research, both of the authors give detailed explanations on how costs were determined. Even more valuable, authors exposed disadvantages of using a model like ABC. Ultimately, the only problem found with this research is the lack of comparison with other types of methodologies, as both the thesis were set from the beginning to use TDABC.

From all the documents here discussed it is clear research on the costs of ICT/IS presents some gaps, as it lacks examples on the implementation of cost models and on the comparison between them. Future work should focus on providing more practical examples on the implementation of costing methodologies and even more important on comparing different models.

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