Available online at www.sciencedirect.com

ScienceDirect

Procedia Computer Science 91 (2016) 642 – 651

Procedia Computer Science

Information Technology and Quantitative Management (ITQM2016)

A Multi-Criteria Model in Information Technology Infrastructure Problems

Carolina Ferreira[a], Andrea Nery[b], Placido Rogerio Pinheiro[a,b]*

[a]University of Fortaleza, Graduate Program in Applied Informatics
Av. Washington Soares, 1321 - Bl J Sl 30, Fortaleza, 60.811-905, Brazil

Abstract

Technology has become a vital component for organizations. Therefore, it is necessary to ensure quality and efficient IT solutions in order to meet the expectations of the business areas. In this scenario, we have realized the need to align the technology areas of management practices with organizational strategies and thus ensure the availability of solutions. This paper aims to propose a model to optimize the decision-making of the problem management process based on the best practices proposed by the ITIL (IT Infrastructure Library), using the concepts of a multi-criteria methodology. The model suggests the prioritization of problems that cause a most negative impact on the business of an organization, in order to reduce or prevent damage.

Peer-review under responsibility of the Organizing Committee of ITQM 2016

Keywords: Problem management, Information Technology Infrastructure Library (ITIL), Multi-criteria approach.

1. Introduction

With the rapid evolution of technology in recent decades, the IT departments of organizations have become highly demanded and charged for services with higher quality, performance and availability. Thus, there have been several offers and models of service delivery to the most diverse IT activities. Furthermore, it is noteworthy that models applied to the management of IT service operations have emerged in recent decades with the spread of quality frameworks, IT management and governance, including: the ITIL (IT Infrastructure Library), the COBIT (Control Objectives for Information and related Technology) and the PMBOK (Project Management Body of Knowledge). These models are quite complex and focused on different critical points:

* Corresponding author. Tel.: +55-085-98736-2781; fax: +55-085-98166-4659.
*E-mail address:*placido@unifor.br.

Peer-review under responsibility of the Organizing Committee of ITQM 2016
doi:10.1016/j.procs.2016.07.161

the COBIT contains a model for governance and management of IT organizations and has a focus history on audits. It is even a reference to some of the other models; the PMBOK covers the processes necessary to conduct projects and it also suggests the ITIL best practices for IT infrastructure operations.

There is not a model that fully meets the critical success factors for the management of technology services. There is a need to combine the practices suggested in accordance with the reality of each company in order to meet a demand for IT solutions that require processes increasingly integrated and efficient. Moreover, the ITIL (IT Infrastructure Library) [6] defines the IT Service Management (ITSM) as "the implementation and management of quality IT services in order to meet business needs." The ITSM is made by the IT areas of the companies or by the IT service providers, through the appropriate mix of people, policies, processes and technologies. These points need to be fully aligned with the strategy of organizations to ensure the availability of IT solutions to meet business expectations.

The areas of IT organizations need to better define the processes that are part of the entire life cycle of the services provided and there is a fundamental importance of the processes that operate on the failures of the IT infrastructure which supports the solutions. Timely and assertive action will make a difference in the time the services will be degraded or halted. On the other hand, the reality of the IT environments of organizations is that of numerous failures due to the diversity of hardware and software solutions that support the business demands. There is also a constant need for updates, patches, upgrades and deployments of new solutions that ultimately generate problems.

The problem management process is designed to not only diagnose the causes of faults occurred and correct them in order to optimize the impact, but also act proactively to eliminate recurrences, or even avoid them. However, the decision-making process of which problems to act on and in what order of priority, so as to optimize the impact to the business and ensure greater availability of the services is very complex. In Section 2 the problem management process proposed by the ITIL methodology is described by focusing on the activity that requires a decision-making process for prioritizing the problems. The multi-criteria methodology is detailed in Section 3, showing how it can be applied in the context of decision-making in the problem management process. Section 4 reports how the study was conducted. Finally, sections 5 and 6 present the proposed model and a case study to validate it, respectively.

2. Problem Management

The ITIL (Information Technology Infrastructure Library) is a framework for IT Service Management, developed by the OGC (Office of Government Commerce) of the English Government in the late 80's. The ITIL has established in the market as the best practice for Management IT services. However, between 2007 and 2008, the current version, the ITIL® V3, was launched with a development in its organization, considering all the processes of the previous version, but organizing them in life cycles containing five phases. Moreover, in 2011, the intellectual property rights of the ITIL® were transferred from the OCG to the Cabinet Office. In the same year, it had its content revised and the ITIL® V3 2011 edition was generated.

The ITIL version 3 proposes the concept of service life cycle containing stages, each with different goals, as follows[6]:

− **Service Strategy - SS:** tounderstand the company's strategy and define how IT services will meet the strategic objectives of the organization;

− **Service Design - SD:** toguide the design of IT services to ensure service quality, customer satisfaction and the cost-benefit relationship of the services provided;

- Service Transition - ST: toguide the development of resources for the creation of new services or services in IT operations and ensure that they meet the business needs according to the "strategy" and "design" of the services;