METHOD FOR DEFINING STRATEGIC PROCESSES AND INDICATORS OF PERFORMANCE IN BUSINESS PROCESSES OF THE BRAZILIAN GOVERNMENT

DANIEL SOUZA COELHO

Ministry of Planning - Brazil
E-mail: daniesc@gmail.com

Abstract - Managing the quality of information technology business processes is a great challenge for organizations. This research proposes the application of a method to define strategic processes of information technology and select indicators for these processes, aiming the performance management of the strategic information technology business processes in a Brazilian federal institution of education.

Index Terms - business process management, indicators, information technology

I. INTRODUCTION

Any organization, whatever its area of action, should plan its activities. The elaboration of a strategic plan objectives, mainly, to provide directions to be followed by the organization, guaranteeing alignment and identifying responsibilities, aiming the achievement of the institutional objectives and maximization of results. In public institutions the planning of actions is also fundamental. The planning of Public Bodies should be designed with the objective of promoting public welfare, using public resources to benefit society in a transparent, sustainable and effective manner.

The need arises to follow the IT processes to check if the objectives defined in the planning are being met or will be met within the specified time frame, thus providing the inputs for the institutional objectives to be achieved. This monitoring, or measurement, is one of the focuses of this work.

The research described here aims to apply techniques for defining strategic processes and selecting indicators to control the quality of the organization's IT processes.This article is structured as follows: After this Introduction follows Section A, which presents the definition of the problem, including objectives and methodology of the work. Section II presents the bibliographic review, where the fundamental concepts for understanding the research are discussed. The proposed solution, the method to control the performance of IT processes, is presented in Section III. Section IV presents a case study, showing the application of the proposal in a strategic process of an organization. The conclusions of the paper are presented in Section V.

A. Problem Statement

The public body mentioned here is a public institution that offers free professional education, articulated to research and extension projects. Every four years, the agency elaborates its strategic planning, called Institutional Development Plan (IDP). The IDP is the basis for strategic IT planning, documenting the institution's IT objectives related to IT solutions, processes and services that must be deployed or improved to achieve the institution's business objectives. The Information and Communication Technology Master Plan (ICTMP) is the institutional planning of information technology. However, this sector does not have yet a method or tool to monitor IT processes related to institutional objectives. This paper aims to minimize this gap, proposing a method to select strategic processes and to define indicators for measuring the quality of IT business processes.

II. LITERATURE REVIEW

In this section, some of the main concepts related to the topic of work will be presented.

Section 2.1 deals with Strategic Management and its sub-areas. Section 2.2 presents the process management and the main related concepts. Finally, section 2.3 deals with performance indicators.

A. Strategic Management

Strategic Management is the set of actions that must be applied to put into practice the strategy planned for the company. An organization's Strategic Management process describes how the strategy seeks to create value for its shareholders, customers and the community through well-implemented top management decisions that achieve the expected success. Reference [23], based on [5], [18] and other authors, raised the steps that make up the process of strategic management. Strategic management, in short, comprises strategic planning, implementation of strategies and evaluation of results.

In Brazil, the search for effectiveness, efficiency and economy of administrative acts is a constitutional and legal priority of the state. Each government agency has its Institutional Master Plan (IDP), a document that should contain the organization's objectives and goals for a given period. The IDP must be aligned with the

government's overall and sectoral strategies, if any. In addition to the IDP, public bodies must elaborate their strategic planning of information technology, with the goals and objectives of IT that will give the necessary support for the organization to reach its objectives listed in the IDP. This document, often called ICTMP - Information and Communication Technology Master Plan - is the main instrument that guides the organization's investments and acquisitions in information technology goods and services in order to maximize the fulfillment of its strategic objectives [2]. The ICTMP was included as mandatory in federal public administration bodies after the Normative Instruction SLTI / MP Nº. 04/2014[21].

B. Process management

Process management is an important strategic management area in an organization. Therefore, it is very important to define what is process and process management, in the context of this work. According to [15], a business process comprises the set of one or more related procedures or activities, which, collectively, accomplish a business objective in the context of an organizational structure. Thus, organizations that want to thrive in the information age should use process management and analysis methodologies, based on organizational strategies and capabilities [24]. Business Process Management (BPM) is a methodology that covers several concepts related to process management. This methodology is based on a set of techniques that unifies business management and information technology. BPM allows modeling existing processes, testing variations, proposing and managing improvements that the organization wants to adopt [27].

C. Indicators

Measures are essential for knowledge, control and decision making of any professional. Likewise, measures, indicators, are essential for business. Through indicators it is possible to know the quality of a product, the stability and capacity of a process, or the current stage of a project. With this knowledge it is possible to control, make decisions and improve the quality of processes and products. It is also possible to make adjustments that guarantee the success of the activities performed in the organization [25]; [28]. It is virtually impossible to speak of quality indicators without mentioning Robert Kaplan and David Norton. Both published together many articles and books on the subject. According to the authors [13] the organizational indicators can be compared to the instrument panel in an airplane. There are a number of instruments that provide information to the pilot so that he can safely fly the plane to its destination. Without them, no pilot would risk commanding a complex craft like a jet plane. Like pilots, organizational managers need indicators that allow them to keep on the road to business excellence [13]; [7] [29].

For a process measurement program to be deployed in an organization in order to produce the expected results, it must be supported by a process capable of ensuring the disciplined execution of the set of activities involved. The measurement process can therefore be defined as a set of steps that guides the performance of measurement in an organization. An efficient measurement process is a critical success factor of the measurement program, since it is the one that directs the activities to be performed so that with the results of the analysis of the collected data it is possible to identify trends and anticipate problems [16]; [25]; [20].

III. PROPOSED METHOD

As described in Section 1, this paper aims to propose a method for selecting strategic processes and defining indicators for monitoring the performance of information technology processes. This section presents the proposed methodology.

The methodology applied here came up from [34], who puts methodology as an approach, normally structured in a logical sequence of steps, used by a group of people to solve a certain problem, from its identification to the implantation of a Solution and monitoring the results obtained.

In order for a performance monitoring program to be deployed in an organization in order to produce the expected results, it must be supported by a method capable of ensuring the disciplined execution of the set of activities involved. The process of measurement and quality management, therefore, can be defined as a set of steps that guides the management of the quality of processes in an organization. An efficient quality management model is a critical success factor of the program, as it directs the activities to be carried out to identify trends and anticipate problems [25].

The proposed method is an adaptation of methods and processes extracted from the literature and presented in Section 3. The main references were [19], [25], [31], [6] and [10]. It consists basically of two steps:

1. Identify strategic process;
2. Select process indicators;

The steps were extracted from [19]. According to the author, these steps are fundamental within a larger context of quality management in an organization, regardless of what other techniques or methods will be used in this work.

Each step will be presented in detail in this section. In the next section will be presented the case study, which shows the application of the method in a real process of an organization.

A. Identify strategic process

The first step of the method proposed here is to define which process will be managed. Obviously, the ideal situation would be for performance monitoring to be applied to all processes within an organization. But the

reality is that it is virtually impossible to monitor all organizational processes at the same time. Therefore, the proposal of this work is that the organization begins applying the method gradually, first in some strategic processes and then applies to the other processes, as it gains maturity in the proposed techniques.

Reference [8] recommends that the implementation of process performance control be initiated with a pilot project that serves as a learning experience on the methodology, that shows results and that serves as an example (mirror) for the expansion of the application to other areas of the Organization, or for other business processes within the same industry or organization. The definition of strategic processes varies from one organization to another. It depends on the type of business in question, type of customer service, nature of the organization (public, private, third sector), among other factors. Here are some sources that can help the organization to define which of its information technology processes should be monitored.

The most important principle of public administration is the principle of legality, which can be summarized as the obligation of public administration to act in accordance with the law. The principle of legality also applies to the strategic processes of public organizations. The law obliges public bodies to implement certain lawsuits, while others are charged by government regulations or by the jurisdiction of the control bodies. These are processes that the institution, independent of its will, must implement and manage under penalty of suffering the appropriate legal sanctions. Brazilian legislation contains some specific laws about information technology management. Each of them emphasizes IT processes that must be managed in public agencies. Some brazilian IT laws can be seen in Table 1.

Table 1. Brazilian laws about IT

Law	IT ProcessRelated
Digital Governance Act (8638/2016)	Digital Governance Committee; Information security process;
IN 04/2014 SLTI/MP	Strategic IT planning; IT Contracts Management; IT Acquisition;
Portaria 04/2017 SETIC/MP	Software Development Process

Laws, especially those cited in Table 1, should be the first sources used to define which IT processes should be managed within the government organization [1].
Good practices guides are the second strategic process source.
In IT, the work of identifying strategic processes is facilitated by a number of good practice guidelines that show (critical IT processes that must be worked out for the success of the entire organization. Some of these guides have been briefly introduced in Section 3.

COBIT and ITIL libraries can be used to guide IT processes that must be managed within organizations. Both provide more generic processes, which apply to virtually any IT area in any organization. However, there are other guides to good practice that can be used to guide which information technology processes are most strategic in certain contexts. For example, if an organization works with software development, you can use the CMMI guide as a driver to the most important processes in your context of action. In the other hand, in an area that works with projects, the PMBOK or other guide to good practices in project management can help define the priority processes that must be managed by the organization [33]

B. Select process indicators

The next step for controlling performance in a process is to define which indicators will be used to measure the quality of the business process. This is a very important activity, since a mistaken choice of indicators may make it impossible to monitor the process or generate the expected results.
Reference [7] presents some benefits that the use of indicators in the processes of information technology allows to obtain:

- Establish improvements to processes and services;
- Know how close or far you are to your goals;
- Identify the causes of variations in process performance;
- Verify that IT is adding value to the business;
- Manage based on facts and statistical data;

Some factors are essential for a given indicator to be adequate to performance in monitoring process performance [22],[14], [31]:

- Simplicity
- Selectivity
- Low cost
- Be easily understandable to employees;
- Information available in real time for the entire organization;
- Evaluate the process, not just individuals.

All these characteristics must be taken into account when choosing the quality indicators in a process. The valuation of one characteristic over the others varies according to the process and strategy of the organization, but in general, none of them should be overlooked.
Reference [7] states that the survey of indicators should seek to meet the measurement objectives, which are derived from the institutional objectives. Indicators can be "basic" or "derived" measures. Data for "basic" measurements are obtained by direct measurement. Data for derived measures come from

other data, usually by combining two or more basic measures. Derived measures are usually expressed as ratios, compound indices, averages, and other aggregate summary measures. They are usually more quantitatively reliable and their interpretation makes more sense than the basic measures used to generate them.

The authors' recommendation, like [22], is that a large number of indicators should not be used for a single process. The more indicators, the more difficult it is to measure, monitor and make decisions based on them. The use of a few indicators, these being strategic, is sufficient to analyze the performance of the organization or sector and is much easier than managing a huge number of metrics.

In summary, one can condense the proposed procedure for selecting indicators in a process as follow [13],[22], [7], [14]:

1. Raise possible indicators: Make a survey of possible indicators for the process analyzed.
2. Analysis of characteristics: Check which ones meet the requirements proposed by [14] and [22], previously presented.
3. Organizational alignment: Check which indicators are more aligned with the organization's strategy and the objectives of the process in question.
4. Data provision: Check if it is possible to obtain the data needed to measure and manage the indicator.
5. Documentation: After all previous steps, you should have reached a small set of indicators, or even a single indicator. Once the indicator has been chosen, your information should be documented.

IV. CASE STUDY: IT INCIDENT MANAGEMENT

This section demonstrates the application of the methodology proposed in Section 3 in a real process of a Federal Institute (FI), in order to demonstrate the applicability of the proposed method for quality management in IT processes.

The paper covered the IT incident management process, which is part of the IT Services Management macro process. This is one of the main processes performed by the FI Information and Communication Technology Center, since it is responsible for meeting the demands of users of IT services. A customer's view of the quality of an IT area within an organization depends to a large extent on the quality with which their demands are met. So this process is so relevant to any institution.

A. Identify strategic process

The choice of the process in question was based on criteria of the internal context of the FI, especially the institutional planning and the planning of information technology, besides the external context.
The strategic map of the FI has as one of its objectives the "Fostering and improving the use of Information and Communication Technology", presented in the "People and Technology" perspective. This institutional objective is the source of the organization's information technology objectives, presented and detailed in the Information and Communication Technology Master Plan (ICTMP).
The institute's ICTMP, developed from the institutional planning, establishes as one of its goals "Deploy ITIL-based IT Service Management processes". IT Service Manage-ment, according to ITIL, is a set of processes and functions that aims to provide the organization with information technology services aligned to the business need. Information Technology Service Management is the instrument by which the area can begin to adopt a proactive stance in relation to meeting the needs of the organization, contributing to evidence its participation in the generation of value [17].
IT Service Management aims to adequately allocate available resources and manage them in an integrated way, making the quality of the set perceived by its customers and users, avoiding the occurrence of problems in the delivery and operation of the services. Information Technology. The process is the responsibility of an industry called the Service Desk.
IT Service Management consists of several processes, the main ones being:

- Incident management;
- Configuration management;
- Problem management;
- Change management;
- Service level management;

Therefore, the incident management process is directly linked to the FI information technology goal of deploying IT service management.

Reference [33] places IT incident management as one of the most important processes within the information technology context. In ITIL terminology, an incident is an unplanned outage of an IT service or a reduction in the quality of an IT service. Failure of equipment that has not yet impacted an IT service is also an incident. Incident Management aims to restore the normal operation of the service as quickly as possible and thus guarantee the best levels of service quality and availability [26].

B. Select process indicators

The first challenge in relation to process data was the definition of indicators. This activity followed the steps proposed in Section 3.2. Given the context of the process, it was clear the need to use a performance indicator that could portray the quality of the service provided to the customer, and, in a way, to estimate their satisfaction. References [9] and[7] put some

indicators that can be used to measure an IT service management process, which were used as possible indicators for the process under study:

- Percentage of abandoned calls;
- Availability of applications;
- Efficiency of each level of support;
- Downtime;
- Call waiting time;
- Calls answered within the predetermined period;
- Total calls received / month;
- Total calls received / month;
- Percentage of calls forwarded to second level;

Following the suggestions of indicators, the next step was to check if the proposed indicators met the desired characteristics of an indicator, listed by [22] and [14] and cited in section 3.2 of this paper. The indicator "Total incoming calls / month", despite being a very interesting indicator, was disregarded for this research, since it is an indicator in which statistical process control is difficult to apply (it does not make sense to define an upper or lower limit Number of calls received, for example).

Another indicator eliminated in this analysis was "Percentage of calls forwarded to second level". This metric was considered difficult to understand by the employees, besides having a high cost to obtain the necessary information (cost of time and processing, not necessarily financial). The indicators "Stop Time", "Availability of applications" and "Efficiency of support levels" were also disregarded because they did not have data for analysis. The other indicators met the requirements listed. The next step was to analyze the organizational alignment of the proposed indicators. The indicator "Calls answered in the predetermined period" was disregarded, due to the fact that there are no pre-determined deadlines for meeting requests. For the same reason the indicator "Percentage of abandoned calls" was disregarded. How to define an abandoned call, if the organization does not have an estimate of the service time of each request? From which moment does a call leave the state "pending" to "abandoned"? The impossibility of answering these questions led to the abandonment of using "Percentage of abandoned calls" as an indicator for the process.

Of the possible indicators, only "Call waiting time" and "Total calls attended / month" remain. Both met the next step of the process, which is to check the alignment to the organizational strategy. The "Call Answering Time" indicator was considered more appropriate to measure process performance from the user's point of view. Although it is a very important indicator, "Total Calls Received / month" tells only how many requests were answered, but does not indicate how the service was provided. The "call answering time" allows us to know, in a simple and objective way, one of the main quality factors in a service from the point of view of the client: its execution time.

One of the objectives of using the Attendance Indicator is to provide input for the survey and, in particular, the follow-up of Service Level Agreements (SLAs). The SLA is an agreement established between a supplier and the customer, where the level of service delivery that is required between the parties that guarantees specific levels of performance and reliability is formalized [9].

CONCLUSION

This paper presents a method for the selecting of strategic processes and defining of indicators, aiming to manage the performance of strategic information technology processes in a Brazilian government agency. This methodology originated from the need to manage the information technology processes and allowed the implementation of performance control in a strategic process of a public institution.

The first activity of the presented methodology is the choice of the strategic process to be managed. Organizations have many processes, so it is not usually possible to deploy quality management for everyone at the same time. In this way, it is necessary to know which process is most relevant to be managed, through the organization's planning, guides to good practices or legislation.

Another important step of the research was the choice of indicators for managing process performance. The indicator is the main entity of quality management, since it is the measure that allows checking if the process is attending the needs of the organization. Several criteria were chosen for selecting a strategic process indicator. This work assumes that the selected indicator already has data available for collection and analysis. It is possible, however, to work on the data, removing inconsistencies or unnecessary information. This process has a cost, which must be considered when choosing the indicator. A case study was conducted in an IT process of the institution, applying the methodology proposed for defining strategic processes and performance indicators.

As a strategic process, the IT incident management process was chosen, a fundamental part of the IT services management process, which is a fundamental part of the organization's IT management. The indicator chosen for this process was the response time for requests, an indicator strongly recommended by good information technology practices. The methodology proposed in this work allowed the agency to manage its IT processes in ways never before seen. The follow-up of process indicators facilitates decision-making and directs strategic actions. This type of monitoring, done periodically,

introduces a new paradigm in monitoring the performance of the institution's IT processes. Future work suggests the application of the proposed method in other IT processes, and even in another organization, in order to evaluate the robustness and flexibility of the proposal. The application of the proposal in other areas, such as in software development, would allow the analysis of the model from another point of view and new conclusions about its performance. Another suggestion for future work is the integration of the method used here with the main models of IT process management, such as [11] or [33], especially in the processes of quality management and level of service management.

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