Abstract

IT drives to the goal of acting as a service provider to the rest of the business. However, responsible IT Service owners are challenged by the fact they often don't have a clear perspective of the business health of critical processes that their IT systems are supporting. Most event data from infrastructure management tools is IT-centric, and has little relation to relevant business conditions. By enabling IT to gain visibility and a better understanding of the condition of business services and processes that are key to the business, IT Service managers and service owners will have a better business perspective and the right level of knowledge to respond to, and negotiate with the business. The link between Business Processes and IT Services goes far as the granularity goes, and, it is proposed the relation between activities and transactions be the bound that connects them. This relation can be used to measure costs and performance. Regardless the form that companies calculates this indicators, it’s now possible to create bullet proof SLA reports that are non-repudiation efficient. Providers could in the future be obligated to respond for their performance and customers could be more satisfied with their IT Services since they will be aware the right price to pay and demand the right service-level.

Keywords: IT Governance, COBIT, ITSM, IT Service Monitorization, BPM

1 INTRODUCTION

In our days most of Enterprises could not survive without the help and support from Information Systems. For many Enterprises Information Systems represent their most value, but often the least understood assets. Successful enterprises recognize the benefits of information technology and use it to drive their stakeholders’ value (ITGI, 2005). Strategic alignment should link business strategy imperatives with IT initiatives and services that are measurable. Thus, IT Governance is a topic of major concern to any Enterprise that use complex and vast systems that support their Business. On a CIO’s point a view, this Systems reflects as Services in IT Governance. There are many variables that need to be defined so that the alignment between IT and Business is consistent and at the same time flexible to always be updated and align with Business Goals. With Globalization and the growth of competitiveness of Service Providers, Outsourcing gains a primary role on CIO’s agenda. The reduction of costs that specialization brings is a sufficient issue to consider Outsourcing as an alternative to in-house production. In some cases, this alternative becomes the unique solution, when Companies do not have infrastructure or the capacity to do it itself (Ross, et al., 2004).

IT Governance is the preparation for, making of and implementation of IT-related decisions regarding goals, processes, people and technology on a tactical or strategic level. The framework for defining IT Governance is employed to compare how IT Governance is defined in literature, and within a group of IT Governance experts. COBIT is the most well-known framework for IT Governance and it is frequently used by practitioners. While comparing COBIT’s definition of IT Governance to the previously identified concerns of literature and practitioners, it showed that COBIT does support most needs, but lacks in providing information on how decision-making structures should be implemented (Simonsson, et al., 2005). In this quest are several issues that need attention, and one problem is
already identified: the alignment between Service Level Agreements and IT Governance. IT Service Management integrates on IT Governance and must respond to an investment made in a Service that is bought and must prove that is a good investment. These Services must be aligned with one or more Business Goals and to do this alignment, metrics must be defined so that this management can be made. The Service Level Agreement is as contract that specifies the level of service that must be provided (Cater-Steel, et al., 2006). There are very roles on this negotiation and different views that have to be converged.

Service Level Management is often regarded as one of the most important management disciplines in IT Service Management, vital for customer-orientation and provision of high-quality IT Services. SLM is responsible for determining, monitoring and reporting IT Service quality metrics in line with the commercial business goals of the entire organization. It is important for an improved relationship between s service provider and customer (Schaaf, 2007). ITIL is the most used framework on this matter and the academic programs also points ITIL as the best framework to teach in business-schools and Management Information Systems curricula in Universities (Galup, et al., 2007). In an ITSM point of view the information produced by SLM improves IT Services but in Business point of view, there is lack of information regarding how the ITSM performance integrates the Business performance.

Any enterprise—corporation, government, or non-profit organization—can be viewed as the sum of its business processes. Each process delivers value to customers, suppliers, employees, or other stakeholders. BPM, the discipline for enabling and automating business processes, is in a period of rapid growth and will fundamentally change the way computing power is applied in organizations.

Today a business process has some activities that have one or more service that fully supports them. If that service stops and we ask to the operational manager why, consulting a BAM dashboard it’s possible that he can identify the reason “pointing the finger” to the Service Manager. At the other side, the service manager and the Business Support team w ork in the way to solve the incident, and in the end, service manager congratulates himself and his team because they solve the incident rapidly maintaining the performance, but is operational manager satisfied?

Thus, we have two types of indicators that are sensible to an incident: the business-level and the service-level. But are they aligned? What is the cost of that service to both managers? What is the cost to the business when a service stops? Normally we encounter 2 different visions (1) focus on the business processes (2) focus on the services. Regardless the business goals, it’s possible that the BPM and ITSM aren’t aligned. Figure 1 shows the different views between business and services. A manager has a view concerned with business and with the objective to maintain business running no matter what and with best performance possible. Thus, Service 1 failed! What is the implication with the business? Which processes are affected? And what can I do to keep the business running? I’m paying the right price for this Service 1? How many business processes are affected by this Service 1? Do I have the right Service?

Instead, service view is different. Service management is concerned with the resolution and management of the incidents and problems and with the objective to restore service as soon as possible. Thus, Service 1 failed! What is the incident? It’s a problem? How can we solve this incident? When will be the service restored? It’s our KPI’s accomplished?

Each one of these views has different frameworks and different tools to monitor and support them. But there are needs to create a view from a top that permits to those who evaluates and choose services that support the business, which creates information to define the real value of a service and who is responsible to pay the costs, in a process-oriented way.

This thesis is an approach to align these two levels of monitorization accordingly with the business goals, based on COBIT, ITIL and BPM and on the information provided by the service monitorization.
Several concepts have been developed during the last few years such as IT governance, IT score-cards, and benchmarking that have been considered by IT and business executives. But surprisingly, a recent study by the IT Governance Institute (ITGI) that covered 335 CEOs and CIOs in 21 countries, reported “while more than 91 percent of executives recognize that information technology (IT) is vital to the success of their businesses, more than two-thirds of CEOs are not comfortable answering questions about governance and control over their IT processes.” The study validates that the major problem continues to be “the in-adequate view of how well IT is performing” (Son, et al., 2005). It’s imperative for the success of Companies now and in the future, to have a better control of the IT and IS. This control it’s only possible if IT were manageable. To conquest this goal, it’s necessary to measure.

Throw time, Managers had the need to create Business Process architecture in order to create a map of the organization processes and goals. Business process management is a field of knowledge at the intersection between management and information technology, encompassing methods, techniques and tools to design, enact, control, and analyze operational business processes involving humans, organizations, applications, documents and other sources of information (Aalst, et al., 2003). But since BPM is supported by IT Services, wouldn’t make sense if there was some kind of alignment between them?

With time and with the need to divide costs throw business units, the relation between internal customers, internal business support and service providers got more complex. Today, IT services are delivered through a mix of structured and unstructured work activities. Structured activities rely primarily on standardized processes, procedures, and tools. In IT service support and delivery, an increasingly popular standardization effort is embodied by Information Technology Infrastructure Libraries (ITIL) (Office of Government Commerce, 2001) (Hochstein, et al., 2005), which prescribe processes for capacity management, availability management, service-level management, and financial management to achieve high quality IT services.

Unstructured activities involve local work practices, custom developed tools, ad hoc collaborations with colleagues, and informal procedures. These activities include seeking information from colleagues or external sources, writing custom scripts, troubleshooting, renegotiating policies, seeking approvals, discovering change impacts, and sharing information on demand (Bailey, et al., 2007). Results from the studies of IT service delivery suggest that considerable time is spent on unstructured
work activities (Barret, et al., 2004) (Maglio, et al., 2006), which are not surprising as knowledge work is typically collaborative, informal, and situated (Suchman, 1983).

Customer orientation is one of the most important strategic orientations in the context of strategic IT management in today’s enterprises (Hochstein, et al., 2005). Enterprises need to manage the delivery of services that support users in conducting their activities in the context of business processes. They have to achieve a common understanding between the customer/user and provider through managing service level expectations and service level delivery, and delivering and supporting desired results (Schekkeman). External IT providers as well as internal IT departments are no longer sheer technology providers. Instead, most of them act increasingly as service providers for IT users. These IT users, respectively customers, demand functionality with a defined quality that supports their activities within business processes and improves their productivity (Abeck, et al., 2005).

In order to specify IT provider / IT customer coordination, IT services need to be defined. Service and quality characteristics for such IT services are negotiated between service providers and customers and specified by means of a service level agreement (SLA) (Hochstein, et al., 2005). Thereby, it makes no difference whether the user receives the service from an internal IT department or from an external service provider. This transformation from a technology oriented IT shop towards a customer oriented service provider that engineers its IT processes in a systematic, methodical manner can only be done in terms of a service oriented IT management (Hochstein, et al., 2005). Appropriate information technology investments can help companies gain and sustain a competitive advantage (Melville, et al., 2004). Although they form a subcategory of technology, information technology projects possess unique characteristics. It is significant that many information technology investments have proved unsuccessful, exceeded budget, and even harmed companies (Bingi, et al., 2002) (Chen, 2001) (Somers, et al., 2003).

Companies model and optimize their business processes as a means for increasing the (external) value gained from these processes (Loeffler, et al., 2004). As the majority of business processes in today's highly automated world are supported by IT systems (Witty, et al., 2001), the success of a business strategy is also linked to the availability of the appropriate IT systems; poor IT investment decisions may entail corporate failure. This is the case if (i) IT systems do not fully support the specific business processes (e.g., using only standard software that lacks the appropriate adaptations), (ii) the IT systems are inefficient with respect to the firm’s strategic objectives, or (iii) the core functions are shared and freely available (Neubaur, et al., 2007). Thereby, the decision of the right service has a major importance. How can we better the information delivered for this proposal?

A plethora of service oriented IT management concepts have been developed in the past. The IT Infrastructure Library (ITIL) is the de-facto-standard for IT service provider and it is probably the most extensive concept for IT Service Management (ITSM) (Office of Government Commerce, 2000). ITIL can be defined as a generic reference model that supports planning, monitoring and controlling of IT services (Hochstein, et al., 2005). Its most important components are “Service Delivery”, “Application Management”, “Service Support” and “ICT Infrastructure Management” (Office of Government Commerce, 2000). Concepts for the provision of IT services can be found in “Service Support” and “Service Delivery”, especially within the process definition for service level management (SLM).

The performance optimization tools used to accurately gauge performance, as with all the software tools used by the organization, have to be in the organization’s CMDB (Configuration Management Database). Configuration management is the implementation of a database that contains details of the organization’s elements that are used in the provision and management of its IT services. This also is known as an asset register. Now, that we have the tool, the basis of usage is guided by the SLA. The application should comply with the service level agreements (SLA) before it passes out of the hands of the performance analysis team. An SLA is framed and finalized after discussions with the intended client, and it shall contain the kind of results expected in specific terms and the level of severity (Sankarasetty, et al., 2007).
3 PROPOSAL

The introduction to the proposal begins with the conclusion of the problem in Chapter 3. After the analysis, some facts can be stated as needs or problems which probably an IT System solution could help.

In order to help to focus and organize, 4 points were defined as the back bone of this proposal:

- Types of companies aimed: Governments, big companies with or without a large percentage of IT Outsourcing and Service Providers.
- Legal Obligations: Sarbanes-Oxley and Basel II.
- Management needs: IT and Business Strategy’s alignment; SLA’s implementation in a customer-oriented process; IT measurement and payoff; choose the right Service;
- Best practices used in IT: COBIT, ITIL and BPM

Resuming, there’s a needed of a Business Process-oriented IT Services Monitorization, which permits a better measurement of IT Services performance and costs in order to respond to the Legal Obligations and Management needs, interacting directly with the Business Processes. After the study of the areas related with this work, and particularly the Service Level Management, the proposal that help aligned the monitorization of IT Services on a Business Process perspective was clearly.

Probably the best way to espouse this idea is in the form of a Framework, which is used in research to outline possible courses of action or to present a preferred approach to an idea. To create this Framework I propose 6 steps:

1. Framework;
2. Pre-requirements;
3. Implementation;
4. Monitorization;
5. Evaluation;

During this Chapter I’ll try to explain the proposal in a way to aggregate Management needs with IT Service monitorization.

3.1 Framework

First it’s needed a Conceptual Model that helps understand and organize the ideas. Based on Enterprise organization of areas and the relations between them, a cycle is created.

COBIT, ITIL and BPM helps throw this cycle that goes from Business Requirements which defines goals that are represented in Business Process throw BPM. This Business Processes have Activities that need IT Support that delivers Services which provides Information, creating Competitive Advantages responding to initial Business Requirements.

This cycle creates in each area Key Performance Indicators that helps managing those areas independently and at the same time aligned with the goals define by Business Strategy. This cycle defines the 3 pillar Business Process-oriented IT Service Monitorization Framework, depicted in Figure 2. The main objective is not during the Implementation but in the Monitorization of performance and costs.
The Relation between Customers and Providers and the SLA is one of the problems. It’s very hard to define costs on a Service since IT doesn’t know how the costs can be divided between customers. At the same time, IT Service doesn’t know which services are costing more to the business in that specific time when several are stopped. Enough information and systems are available to manage IT Service Support as to manage Business Process Management. The problem is in the monitorization and in the evaluation on relation between IT Services and Business Processes.

### 3.2 Pre-requirements

For greater success on the implementation of the proposal, some pre-requirements are expected. These requirements are essential and the better are the know-how and state of maturity of the requirements, greater are the success factor. Such as:

- A IT Governance Framework such as COBIT to a better BPM and ITIL integration and Management;
- A Business Process Management must have well defined and normalized Business Processes which represent the strategic goals and needs;
- A IT Service Management Framework such as ITIL to good IT Service Delivery and Support and a CMDB that support them;
- KPI’s must be Specific, Measurable, Achievable, Relevant and Timely;
- A Balanced Scorecard which:
  - Translates the vision into operational goals;
  - Communicates the vision and link it to individual performance;
  - Business planning;
  - Feedback and learning and adjusting the strategy accordingly;

Normally, the CIO has these competences and has the better comprehension of these requirements. It’s essential that Managers have Dashboards that permit interact, configure and manage information of
the KPI’s and the Monitorization. An IT Governance and IT Service Management mature. A CMDB which permits centralized and organized information of information systems.

3.3 Implementation

For the implementation independently of the physical architecture used by companies, it’s needed that the Logical architecture respects the relations as depicted in Figure 3.

Figure 3 Logical relation of the Framework.

SLA will permit to divide costs and evaluates the performance of each service as a singularity. In the other hand, KPI’s will permit no measure performance of each area and relation between them will permit an impact analysis from IT Service to Business Goals.

Each entity can have particularities of the business in hands, but in this relation are several points to be attention:

1. SLA Definition;
2. KPI Definition;

SLA Negotiation and Definition

SLA must have three types of information: (i) Service, (ii) Business Unit and (iii) the relation between Transaction and Activity.

(i) In the Service Information must be defined:
   - Total Cost = Base Cost x Availability;
   - Hierarchy of Service Transactions;

(ii) In the Business Unit
   - Activities and the related Business Process that will use this Service;

(iii) Activity x Transaction Relation;
   - Which Activity uses which Transaction;

This information is essential to cost division and performance measurement proposed on Evaluation step.
**KPI Definition**

The KPI’s should have a hierarchy. A Goal KPI can be affected by 1 or more Business Process KPI, and at the same time a IT Service KPI can affect 1 or more Business Processes.

This relation will permit to measure performance in a Business Process-oriented way, proposed on Evaluation step.

**Business Process – Activity – Transaction – Service Relation**

This relation will permit a macro view of the relation between all Services and Business Process in order to have an exact measurement of an IT Service impact. The finer the granularity we have, the more will be the Evaluation precision. An IT Service is a group of Transactions. These Transactions realize actions that are atomic i.e. Home Page, Log In, Create Product, Edit Collaborator etc. These Transactions could also have a hierarchy, i.e. to Create Product we need to access the Home Page. Transactions can also have the Function designation where for a group of variables returns a result. In Information Systems can also be seen as buttons, commands, web services etc. Also, Transactions and/or IT Services can be grouped in an Application or Web Page. This is not important. What matters is the IT Service as a whole and not it’s organized. Transactions are also important because it’s what is used by the Activities.

Also, it’s not important to know what kind of software, hardware or infrastructure is used for an IT Service. For a Customer-oriented view it’s only important what they can see or use. IT Support must have the resources to guarantee this proposal. As illustrated in Figure 4 is the relation between Business Process – Activity – Transaction – IT Services that is the base of this proposal. We have 2 possible scenarios: (1) when two or more IT Service affects one Activity and (2) when two or more Activities are affected by one IT Service.

![Diagram of Business Process Monitorization and IT Service Monitorization relation.](image)

**Scenario 1** – If IT Service X and Y fail, Activity 1 and 2 are affected. But if Transaction X1 fails and X2 doesn’t, only Activity 1 is affected. In the Performance context Business Process A and Business Process B are affected. Table 1 shows the relation of Scenario 1.
However, if Transaction X2 heredities from Transaction X1 (ex: Transaction X1 as Home Page and Transaction X2 as Log in, it’s possible if the Home is “down” it’s not possible to make a Log in), when Transaction X1 fails, also Activity 2 is affected. In this case Business C is also affected.

Scenario 2 – If IT Service X fails, Activity 1 and 2 are affected. But if only Transaction X2 fail, only Activity 2 is affected. In the Performance context only Business Process C is affected. Table 2 shows the relation of Scenario 2.

This is why it’s necessary to have Transactions. It’s the base that relates Activities and IT Services. It’s also important the hierarchy of the Activities. That also possible that Activity 2 it’s only be realized if Activity 1 is finished. BPM have to deliver this hierarchy.

### 3.4 Monitorization

A real-time monitorization expects that IT Support deliver not just to the Service that is stopped but also the transaction of that Service. The BAM monitorization will not change, because the granularity of this kind of tools goes only to Activities. Operational managers doest need to know that is the transaction that have failed, only the Business Process and Activities, so that he can make the necessary arrangements so that the business where less affected as possible. On the IT Support point of view, normally it’s not necessary which transaction fails, because that is a concern of IT Provider. Only maters the time-to-repair is respected, other SLA requirements and IT Services KPIs. But when there’s a need to divide costs and measure performance, this relation will permit to be accurate.

On a Dashboard, the information necessary for who manages Business Process is the Business Process affected by an Activity that cannot be executed, caused by a system failure. Since Business Process are “persons” which executes tasks, managers can re-organize and re-plan the work of the collaborators that maybe are stopped to. Each business has their own characteristics and needs, and it’s not an objective to identify all benefits, only to explain the possibilities of this monitorization.

### 3.5 Evaluation

On the Customers mind, are several questions that are a concern that this proposal could help. Such as:
• Am I paying the right price for this IT Service?
• Do I have the right IT Service?

Regardless the formula used to divide the cost of an IT Service for the Business Units that is used; it’s not important if the IT Services KPI’s where acceptable but if the expectations of the Business Units were satisfied. When an SLA is negotiated without background history of the Service performance it’s very difficult to know the right price to pay. But with time, information can be gathered and analyzed, with the goal of measure how the performance of business process where affected by the IT Services that Support them.

Table 3 shows an example where IT Service X accomplished SLA requirements on Availability and Time-to-Repair but where the business measure was affected in 10%. I.e. this 10% could be a product that could not be delivered on time because of IT Service failure.

Both BP A and BP C uses IT Service X, but only BP A is affected by the IT Service X regardless if it accomplished SLA contract.

<table>
<thead>
<tr>
<th>Business Impact</th>
<th>SLA Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BP A</td>
</tr>
<tr>
<td>IT Service X</td>
<td>Trans. X1</td>
</tr>
<tr>
<td></td>
<td>Trans. X2</td>
</tr>
<tr>
<td>IT Service Y</td>
<td>Trans. Y1</td>
</tr>
</tbody>
</table>

Table 3  Business and SLA impact.

This helps to analyze if we are paying the right price for the IT Service and/or comprehend if the IT Service is the right for that Business Process. At the same time, Business is satisfied with IT Service Y but regardless the business satisfaction, SLA was not accomplished. Maybe it’s possible to renegotiate the SLA lowering the indicators and as well the price of the IT Service, without penalize the Business performance. This view also brings new points to have in consideration when IT Services KPI’s are defined. They have to relate with Business Processes KPIs in order to align with business goals.

In both cases, business wins!

4 CONCLUSION

By enabling IT to gain visibility and a better understanding of the condition of business services and processes that are the key to the business, IT Service managers and service owners will have a better business perspective and the right level of knowledge to respond to, and negotiate with the business

Regardless the difficulty in getting references for this thesis on the matter of monitorization, the need for this kind of tools is demanding every day. In the study of IT Governance and IT Service Management areas, it was possible to conclude that the future passes throw a precise and sustainable measurement and analysis of business and IT performance.

Business modulates itself as business processes and Business Process Management is the base for a well a consistently measure of business performance. IT is increasing every day in enterprises because the competitiveness in the markets today, and few activities developed by companies aren’t supported by any kind of IT Service.

The link between Business Processes and IT Services goes far as the granularity goes, and in form on conclusion, I define the relation between activities and transactions the bound that connects them.
This relation can be used to measure costs and performance. Regardless the form that companies calculates this indicators, it’s now possible to create bullet proof SLA reports that are non-repudiation efficient. Providers could in the future be obligated to respond for their performance. At the same time, customers and users could be more satisfied with their IT Services since they will be aware the right price to pay for an IT Service and have tools to demand the right service-level.

I also conclude that companies aren’t probably ready to deliver this kind of information. Business Process Management and IT Service Management work separated and for this alignment companies probably need the way they work. Companies are ready to rapidly IS implementation that support the monitorization. The bottle neck will be the creation of information architecture for this kind of solution. Figure 5 depicts a resume of the framework benefits.

![Framework benefits](image)

**Figure 5** Framework benefits.

ITIL and COBIT is fundamental to this line of work. The success factor of this proposal passes throw a well managed and governed IT Service area. It’s possible that in the long run the results could get confused if the business weren’t well aligned with the business. The awareness of an actualize CMDB would also help to support this architecture.

After a great number of information gathered from the monitorization, Data Mining could be the future to try to forecast, business bottle necks and IT Service critical periods. There is also very important the companies where process and customer-oriented. If the results were not toward in this way, it’s possible that this is not the best way to analyze this matter.

**References**


