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MULTIDIMENSIONAL VALUE OF ENTERPRISE ARCHITECTURES

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ABSTRACT

The increasing complexity of organizations and the environment around them are increasingly demanding for a better and deeper knowledge about how to organize and use IT in order to fulfil the organizations mission, strategies and goals. In the past two decades, in order to obtain a description of the current IT and business state and/or to establish the desired future state, a significant number of organizations began to build Enterprise Architectures. Despite the efforts done, the resources spent and the benefits expected practitioners and researchers recognize that it is still difficult for organizations to assess and measure the Enterprise Architecture value, given the process complexity and the nature of some value factors. In this paper a multidimensional value approach is presented, that considers four value dimensions in Enterprise Architectures value analysis: strategic value, operational value, user value and economic/financial value.

KEYWORDS

Enterprise Architecture, Value, Value Analysis.

1. INTRODUCTION

With the growing awareness of the IT role and importance, the issues related with the IT management and use began to have a greater attention from organizations. Currently, one of the majors' management challenges is to combine business processes, IT and people during their planning and implementation, rather than treat them as separated elements, in order to get a whole which will satisfy all the organization needs.

An Enterprise Architecture is a complete model of an organization that provides a global view of the structure, business processes, information systems and technology infrastructure, through a coherent and comprehensive collection of principles, methods, models, diagrams and documents that describe the organization, considering the perspectives of the stakeholders.

Given the current level of maturity of concepts, frameworks, methods, models and languages used in Enterprise Architectures construction and maintenance, and its usefulness and strategic importance being accepted (Ross *et al.,* 2006), the recent attention of practitioners and researchers has been focused on analyzing the Enterprise Architectures value to organizations.

However, despite the growing interest and need for an assessment and measurement of the Enterprise Architectures value, it is widely recognized that this is still a very difficult task for organizations. This difficulty is largely due to the complexity of value analysis process and the nature of some costs and benefits, whose economic/financial value measurement is difficult to achieve. For this reason, in this short paper a multidimensional value approach is presented, which considers four value dimensions in Enterprise Architectures value analysis: strategic value, operational value, user value and economic/financial value. This approach is based on the experience in a project in progress in a non-profit organization.

2. ENTERPRISE ARCHITECTURES

Since John Zachman published, in 1987, the widely accepted Enterprise Architecture Framework (Zachman, 1987), there has been a growing interest and development in Enterprise Architectures. The importance given to the subject resulted in a significant number of initiatives, either at corporate or governmental level, which resulted in different approaches, frameworks, methods, models and languages for building and maintaining an Enterprise Architecture.

An Enterprise Architecture is commonly understood as a complete model of an organization that brings together a collection of documents (e.g., plans, inventories, models and diagrams) that describe the organization, considering the perspectives of different groups or users. However, a pile of documents does not make an Enterprise Architecture (Harmon, 2003), it is necessary that everything is integrated in a whole and stored in a single repository which will allow the observation of the relationships between the artifacts, to question the problems, to make decisions and to guide the needed process changes.

The construction of an Enterprise Architecture usually involves the description and/or representation of four architectures (OpenGroup, 2009):

- Business Architecture: defines the business strategy, governance, organization, and key business processes;
- Data Architecture: describes the structure of an organization's logical and physical data assets and data management resources;
- Applications Architecture: provides a blueprint for the individual application systems to be deployed, their interactions, and their relationships to the core business processes of the organization;
- Technology Architecture: describes the logical software and hardware capabilities that are required to support the deployment of business, data, and application services.

An Enterprise Architecture aims to help managers to think the organization as a whole, as it captures and stores in one repository a variety of interconnected information, and helps to get answers to three important issues for organizations: which are the fundamental processes of the organization, how does the IT support these processes, and how are the organizational resources organized and managed. For these reasons, Enterprise Architectures are currently recognized as the best base of knowledge and representation on the organization itself and the way that best enables the coordination of the multiple facets that constitute and relate to its core range (Gama *et al.*, 2006).

3. ENTERPRISE ARCHITECTURE VALUE

Similar to what has occurred with the IT, currently, in a significant number of organizations there is a growing desire to effectively demonstrate the Enterprise Architecture value. Because of that we are witnessing a sort of race to identify models, methods, indicators and metrics that provide evidence of the Enterprise Architecture value. In this particular case, there is clearly an attempt by IT companies (e.g., Gartner, Forrester, Microsoft) to take the lead in research and propose solutions, essentially based on models and methods adapted from the IT value analysis.

One of the reasons which contributed the most to increase the organizations efforts to analyze and measure the Enterprise Architecture value has been the current need to justify all investments. In a 2007 Infosys study (Infosys, 2007) about 57% of organizations surveyed said that they were failing to justify the Enterprise Architectures investments because they couldn't realize its value. Furthermore, Gartner stated in late 2008 (James *et al.,* 2008) that about 55% of the Enterprise Architecture projects would be stopped due not only to current economic pressures, but also because of the lack of perceived value.

The question is why it is so difficult for organizations to assess and measure the Enterprise Architecture value? A first reason is related to the concept of value itself. Typically, the concept of value is associated to the economic or financial return of an investment; however quantifying all the costs and benefits of Enterprise Architecture through financial metrics does not present itself as an easy task, given their nature and complexity.

A second reason is the lack of consensus about what should be measured. In recent years, some models and methods have been proposed such as the Enterprise Architecture Value Model (Schekkerman, 2005), the Enterprise Architecture Value Realization Model (Kluge *et al.*, 2006) or the Enterprise Architecture Scorecard Framework (Schelp and Stutz, 2007), but they essentially provide a generic framework, making it very difficult

to clearly identify which value factors should be considered in value analysis. For every organization that wants to measure the value of its Enterprise Architecture it is required a tremendous effort in order to identify these factors, which associated with the organizations lack of know-how and professionals capable of conducting the process make it practically impossible to perform the value analysis.

Finally, the Enterprise Architecture value depends heavily on how it is effectively constructed, implemented and maintained by the organization, the size and the complexity of the organization and its acceptance by the stakeholders (Bernard, 2005).

3.1 Multidimensional Value Approach

As mentioned before, one of the reasons for the organizations' difficulty in assessing and measuring Enterprise Architectures value is related to the value concept itself. In literature, the value concept is often assumed as obvious or axiomatic and many authors fail to provide a definition. Basically, the value of something results from the relationship between the satisfaction of one or more needs and the resources spent to meet them.

In organizations, the concept of business value is perhaps the most used concept and it is commonly understood as the benefit for business units and the enterprise as a whole, represented in dollar/euro terms (Sward 2006). This definition of business value by stating that the value of something must be translated into currency units emphasizes an economic/financial dimension of value, which in the current economic environment is particularly important for organizations.

However, a value analysis based only on economic/financial dimension leads to a question: can all benefits be quantified in financial terms, including those of intangible nature or indirect impact/effect? Some authors argue that it is achievable (e.g., (Hubbard, 2007; Rico, 2006)), but others claim that business value can not only be represented in monetary units, as it is a multidimensional result where different stakeholders apply different weights and types of measures to the value factors (e.g. (CIOCouncil, 2002; Harris *et al.*, 2008)).

Despite the undeniable importance of the economic/financial dimension in the analysis of Enterprise Architectures value, the complexity that arises from the need to measure everything in financial terms makes the process very complex and difficult to accomplish, especially in organizations with few resources. Given this fact, in an Enterprise Architecture project which is being developed in a non-profit organization, we came to the conclusion that it would be more practicable to address the question of value using a multidimensional approach that considers not only the economic/financial dimension, but also other dimensions where the indicators or metric could not necessarily be financial.

Based on Value Measuring Methodology (CIOCouncil, 2002) a simplified multidimensional value approach was outlined, which includes four types of value or dimensions (Figure 1):

- Strategic Value – value which results from the contribution of Enterprise Architecture for the success of strategies, objectives and business priorities;
- Operational Value – value which results from improvements on operations and existing procedures;
- User Value – value which results from benefits for the Enterprises Architectures users (individual or teams).
- Economic / Financial Value – value which results from the Enterprise Architecture financial returns.

In this approach it is considered that each value dimension can be analyzed and measured separately. This will allow for the determination whether the Enterprise Architecture has at least one particular type of value. To perform the value analysis, several value factors should be identified for each value dimension and to each factor a description and at least one quantitative metric and one reference value will be required.

Another important aspect in this approach is that one factor associated with strategic, operational or user dimensions may also be included as a factor of the economic/financial dimension, if it can be measured through a financial metric. For example, if a particular factor of the operational dimension can be characterized by two metrics, a financial metric and a metric of a different nature, it is considered possible to account for the contribution of that factor to the operational and to the economic/financial value.

Finally, when the four dimensions have been calculated and analyzed, the calculation of the "total value" of an Enterprise Architecture is suggested. This "total value" can be calculated with a standardization of each dimensions results and the use of a set of weights, which reflects the importance given by the stakeholders to dimensions and their factors.

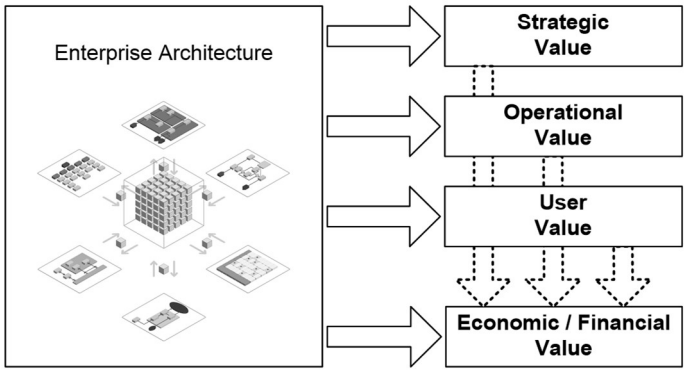

Figure 1. Multidimensional Value Approach

With this multidimensional approach we believe that the value analysis process can be more flexible through the use of financial and non-financial metrics which avoids the complexity and difficulty of translating all value factors into currency units. Moreover, taking into account that an Enterprise Architecture has a different value for each stakeholder, with this approach it is possible to associate each dimension to a group of stakeholders and see for whom the enterprise architecture is more valuable.

4. FUTURE WORK / CONCLUSIONS

Despite the enormous interest of organizations in determining the Enterprise Architectures value, it is still a difficult task to achieve, largely because of the value analysis process complexity and the indirect and intangible nature of some costs and benefits, whose financial measurement is very complicated to accomplish.

In this paper a multidimensional value approach was presented, which is the first outcome from a project that is being developed in a non-profit organization, in which it is intended to assess and measure the value of the Enterprise Architecture that is being built. The approach presented results from the assumption that Enterprise Architecture value analysis must be simplified and other value dimensions, other than just the economic/financial dimension, must be considered.

Being a project in progress, in a near future it is intend to identify the value factors that are associated with each value dimensions and characterize each value factors in terms of indicators and metrics.

Finally, by the end of the project, the development, validation and proposal of a value model for Enterprise Architecture value analysis is expected, based on the multidimensional value approach and the stakeholders views.

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