Performing Change Management using Organizational Architectures

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Abstract. In the business world, managers have to make decisions which will allow their organization to adapt to today’s reality, making it more productive, creating more financial activities, allowing it in the end to complete their objectives and their mission. Although these changes need to be managed in order to avoid the ill effect on the company during the transition period. This work focuses on the change management executed over the company, namely over the IT department, over the steps it needs to execute to ensure that the changes, changes in a way that is correct and healthy to the company allowing it to achieve a state adapted to its needs, the vision of the manager. This work creates a process which outcome provides an easy and simple way of doing the above, making it possible for the organization to adapt to new scenarios.

Keywords: Organizational Architectures, Change Management, Scenarios, Process

1 Introduction

In an ever more competitive world, it is essential for a company to maintain its competitive advantage or, to get it as expeditiously as possible. Managers today can no longer afford to manage only what already exists without taking into account the constant change occurring in today’s society, at the risk of their firm to lose the initiative and its market share. [1]

"The Manager is the person responsible for planning and directing the work of a group of individuals, monitoring their work, and taking corrective action when necessary." [2]

Being aware of this reality, a manager must have a visionary and courageous spirit in order to anticipate the necessary changes that would modify the company to remain competitive. However, these changes must be well thought out, discussed and planned, at the risk of not having the intended effect and affecting seriously the normal functioning of the organization if the process is not conducted in an effective and mature way. To do this the manager must have a high awareness of his surroundings and especially the organization to which he belongs. So solve this problem, comes into play Change Management, which defines a set of actions and validations to ensure that the planning of amendments is the correct way to achieve the desired objectives, assuring afterward a correct implementation of these
changes with the lowest impact possible to the company. Thus also increasing the individual's perception about the organization you belong to.

A research made on this subject revealed that managers today can no longer ignore the importance of careful change management due to business advantage that this process can offer a company.

"After experiencing lots of failures with change efforts, organizations are catching on. Change management has gone from a non-existent or oft-ignored topic to an integral part of project planning." [3]

2 Related Work

2.1 Change Management

Society changes constantly, its needs, its reality and its principles. An organization, like a society, also has to change, keeping itself up to date to the needs of the reality in which it’s inserted on. Therefore we conclude that these changes have to be managed in a rational, correct and careful way.

The fast development of the IT technology and of the market, associated with the bigger complexity of organizations nowadays, put this subject in the thoughts of the manager. Therefore organizations have to improve their services and reduce their operational costs, achieving this only by using IT.

“However, experience shows that IT incidents affecting the business are often related to changes.”

With change, several problems arise, affecting the organizations, its normal day to day activities, and therefore its productivity. These problems are:

- Lack of carefulness in the execution of the organization processes;
- Lack of resources;
- Insufficient preparation;
- Defective impact analysis;
- Inappropriate testing.

If the problems generated by the execution of changes aren’t controlled, the organization can enter an uncontrolled spiral, where the business will be negatively affected and the introduction of new errors will produce new incidents. [1]

Change management becomes this way a very important process for the manager. It has several advantages that we need to state:

- Reduced impact of the changes performed in the quality of the IT services;
- Better estimates of the cost of performing the proposed changes;
- Less reversed changes;
- Improvement of productivity by the organization;
- Improvement of the ability of the organization on performing changes regularly without affecting the right functioning of the organization;
- Elimination of the conflict between resources and their possible redundancy;
- Reduction of the risks associated to change.
2.1.1 Self-Awareness

“Human beings are by nature, self-awareness beings.” [2]

Individuals know their reality in a specific moment of time, know what they are doing, how they do it and in which situations to do it. This is a quality inherent to the human being. Although, organizations do not possess this characteristic, making it necessary that it learns how to know itself so that its actions are based in a profound self-awareness, allowing them to be conscientious and well funded.

Increase the Organizational Self-Awareness (OSA) allows organizations to increase their reaction capability to the constant market and reality change in which they’re inserted. This happens every time that an individual belonging to an organization is conscious about the work he has to do and how this influences him as a member of the organization, happens every time the individual understand how the organizations has to work, how it’s structured. Achieving this makes the organization more flexible and malleable facilitating the execution and acceptance of change. This problem depends almost entirely in the human component of change, turning its implementation expensive and complex. [3] [4]

This concept becomes essential, in the organization, to improve and optimize the decision making processes, learning processes. It’s also necessary to keep and increase it through the continuous interaction between the members of the organization and by their continuous submission of proposals and input.

The concept of OSA is characterized by two different dimensions:

- Individual: refers to the capacity of individual members of the organization have to respond to questions like: “Who am I in this organization”, “How are changes executed?”;
- Organizational: refers to the combination between human and automated agents, between resources and procedures that allow the organization to obtain maturity to deal with questions like: “Who are my members?”, “How do they execute their tasks?” and “What are they doing right now?”.

An organization is self-aware when these two dimensions are aligned. [2] [3]

2.2 Enterprise Modeling

“There is no way to change Enterprises or any other complex thing quickly (or safely) without starting with the descriptive representation of the thing you want to change.” [6]

Thinking about the complex nature of an organization it’s logical that it should be modeled in a way that its understanding becomes simpler making it easier its management, actualization and adaptation to new situations. This model will focus mainly in the organization objectives, activities, the individual responsibilities of all the members and over its organization and constituent elements.
“Organizational Modeling is the capture of a shared mental model of an organization of any type, be it a large corporation, a small business or a work group.” [7]

These models aggregate all knowledge concerning a specific organization, since their resources to their products, even their ways communication. If complete, it allows a global vision over the organization.

"An enterprise model is a type of extensive representation of a system, and is aimed at providing a detailed and complete understanding of a business or organization." [8]

These depict the way technology is being used, ways of improve the integration of the IT, the structure of the organization, improve business strategy, how to refine its systems and ways of improving management techniques. [9]

"The fundamental organization of a system, embodied in its components, their relationships to each other and the environment, and the principles governing its design and evolution." [10]

Thus, as [5] states, the organizational modeling process is defined as:

“Enterprise modeling is a process of building models of whole or part of an enterprise, from knowledge about the enterprise, previous models, and/or reference models as well as domain ontologies and model representation languages”

2.2.1 Change Management Process in ITIL

ITIL also believes that changes can be performed using a representative model of the organization. Therefore ITIL proposed process [1] with the objective of guarantee that changes are saved, evaluated, prioritized, planned, tested and documented in a controlled and universal way to the organization.

Figure 1 – Change Management Process [11]
This process contains the following activities:

- Creation of the Request for Change – RFC;
- Revision of the RFC;
- Change evaluation;
- Authorize change occurrence;
- Coordinate the implementation;
- Result evaluation.

This process is fundamental in an organization that wants to evolve in a sustained way. Therefore in the context of change management using enterprise models, the process described in this section gives a very important tool in the execution and validation of changes inside the organization. However it’s dependant of the human factor to be executed, being this a disadvantage for its use. [1]

2.2.2 Change in a Enterprise Model

“Organizational change can be regarded as a process that changes the state of the organization” [12]

Change can be translated as a transformation from state A to state B. Although in a modeled environment we cannot be so abstract. Therefore, as proposed in [12] we introduce two new concepts:

- Scenario: A scenario is a partial vision of the organization in a specific instant of time. This allows the introduction of time in the model, allowing us to check the state of the organization in a specific moment in time;
- Change Process: A change process is the way to produce structural changes in the organization. This is applied over a specific scenario producing a new scenario, different from the original.
2.3 Updating Problems

Enterprise Models usually fall in disuse. These models don’t accompany the organization every time it changes becoming therefore obsolete. [13]

Why does this happen? There are several explanations for this phenomenon, such as:

- Lack of motivation;
- Lack of comprehension of the importance of the model;
- Difficulty in updating the model. [13]

The Center for Organizational Engineering (CEO) proposes a way of updating a model, described in the picture below, which can solve the problem described above.

![Model Dynamic Update](image)

**Figure 2 - Model Dynamic Update [14]**

This proposal introduces two new concepts:

- Human Quality Control: This type of control obligates an evaluation of the resources and if an irregularity is found it will be recorded and studied in order to see if the model should be updated or not. This control is made by the individuals who execute this process and decision of updating the model is done by the owner of the process.
- Exception: An exception is an anomalous situation, where the flow is deviated from its normal path. When this happens asynchronous actions are executed to deal with this reality.

With this information we can introduce the concept of dynamic update of the model, allowing it to be always aligned with the reality of the organization.
3 Solution

With the background provided by the research done, we can now propose an process in order to evaluate the actions proposed by the manager.

In order to perform a viable, simple and automatic change management, three actions should be included in the process. First the manager has to propose a scenario SHOULD_BE which he wants to see the organization achieve, along with the actions he intends to execute. Second a gap analysis between that scenario and the reality today (scenario AS_IS). The last action is a validation between the differences found in the gap analysis and the actions proposed by the manager.

3.1 Change Management Process

The change management process is represented by figure 3 and the following points explain each activity in more detail.

Propose SHOULD_BE scenario: In this activity is required from the manager to make a study of what he wants the organization to achieve with those changes and afterwards present a scenario in which he describes the ideal future for the organization he manages. This activity is very important because it provides a base of comparison for the posterior validation phase, which checks the efficiency of the proposed changes.

Execute Gap Analysis: After the proposal of the SHOULD_BE scenario, this activity will be initiated. Its objective is to gather the differences between the SHOULD_BE and AS_IS scenarios, or in other words, to get the differences between the actual reality and the one the manager wants to reach. This comparison is essential to the validation because it allows the verification of what’s missing Today, in order to reach the Tomorrow reality. To see this activity in more detail see figure 7.

Proposed Changes Validation: This activity is the most important one in the whole process because it performs the actual validation of the changes. At this phase the actions planned by the manager will be compared with the information obtained in the Execute Gap Analysis activity, making it possible to check if what the manager planned is correct, and if he can process with the implementation of those actions. This activity is the last one of the change management process. To see this activity in more detail see figure 6.

These activities compose what we call the “normal path”. Although two other possible beginnings exist in this process. These occur in other to guard unexpected situations.

Updating the Model: If the manager cannot represent the change desired, because the model did not foresee that information, the event “Impossibility of representing the desired change” will occur initiating this activity. This activity in cover an analysis of the problem followed by a change proposal to update the organizational model by introducing the necessary information in order to represent the change. After the end of this activity, the flow returns to the normal path, explained above. To see this activity in more detail see figure 4.

Update AS_IS scenario: If the manager verifies that the actual physical reality of the organization is not aligned with the modeled reality of the organization then this activity will be executed, triggered by the event “Scenario AS_IS doesn’t correspond to reality”. This activity will only update the model with the real information.
Lista de Mudanças Pretendidas (SHOULD_BE)
+
Validar Alterações Propostas
+
Atualização do meta-modelo

Cenário AS_IS não corresponde à realidade

Validação Mudança

Proibido

Modelo actualizado

Produz

Consome

Proibido

Actualização do meta-modelo

Proibido

Proibido

Figure 3 - Change management Process
Figure 4 - Model updating process

Figure 6 - Solution existence verification process
Validação das alterações

+ Verificar existência de solução

Lista de Mudanças pretendidas (SHOULD_BE)

Conjunto de alterações já planeadas (TO_BE)

Imaginário

Propor alteração da representação SHOULD_BE

Aceite?

Sim

Fim

Executar gap analysis

Não

Propor revisão das alterações propostas

Aceite?

Sim

Fim

Alterações Validadas = FALSE

Não

Propor revisão das alterações propostas

Alterações planeadas permitem executar mudança pretendida?

Sim

Fim

Rever alterações propostas

Não

Alterações planeadas não permitem atingir o estado pretendido

Fim

Alterações Validadas = TRUE

Consume

Sim

Consume

Alterações não contempladas no cenário SHOULD_BE

Não

Sim

Figure 6 - Change Validation process
3.2 Implementation

In order to realize the change validation process described in the previous section, a prototype was developed over BMS (Blueprint Management System) and SA (System Architect) technology. These two applications gave all the tools necessary to test the process described because both had incorporated the methods to create blueprints, and both provided a way of representing scenarios and possible changes to the state of the organization.

3.2.1 Outputs Generated

For this process three types of output were created in order to provide the manager deep knowledge of the results and overall knowledge of the state of all the actions. These outputs are described more thoroughly in table 1.

<table>
<thead>
<tr>
<th>Type of Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report</td>
<td>For each action a validation/not validation result is specified with the reasons for this result.</td>
</tr>
<tr>
<td>Overall View</td>
<td>This blueprint provides an overall view over all the proposed changes. Makes a distinction between the validated artifacts and the not validated ones, and what actions that were validated or not over the sub-elements.</td>
</tr>
<tr>
<td>Specific Element View</td>
<td>This blueprint provides a specific view over one artifact. It indicates if it was validated or not, the action done over it and a possible solution to the encountered problem.</td>
</tr>
</tbody>
</table>

Table 1 - Output description

Figures 9 and 10 give an example of the blueprints described in table 1
4 Evaluation

This process suffered validation from two different sources. First it was presented to a company (Link Consulting) that works with business processes everyday, making it a respected entity in this area. Secondly, two different kinds of scenarios were put against this model, in order to test its consistency and accuracy. These tests are composed of a fictional and a real case.

4.1 Fictional Case

The objective was to validate the execution of two different actions, namely:

- Creation of an application;
- Creation of an application and update of another one.
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The sub actions involved are described in the following tables:

<table>
<thead>
<tr>
<th>Action</th>
<th>Type</th>
<th>Name</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE</td>
<td>Application</td>
<td>Doors</td>
<td>Project 1</td>
</tr>
<tr>
<td>CREATE</td>
<td>Component</td>
<td>Comp 1</td>
<td>Project 2</td>
</tr>
<tr>
<td>CREATE</td>
<td>Platform</td>
<td>Plat 1, Plat 2, Plat 3 and Doors</td>
<td>Project 3</td>
</tr>
<tr>
<td>UPDATE</td>
<td>Platform</td>
<td>Office 2007 SP1</td>
<td>Project 4</td>
</tr>
<tr>
<td>UPDATE</td>
<td>Component</td>
<td>Doors Integration and Excel Exploratory</td>
<td>Project 5</td>
</tr>
<tr>
<td>DELETE</td>
<td>Component</td>
<td>EA Client</td>
<td>Project 6</td>
</tr>
</tbody>
</table>

Table 2 - Sub actions of create Application

<table>
<thead>
<tr>
<th>Action</th>
<th>Type</th>
<th>Name</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE</td>
<td>Application</td>
<td>App X</td>
<td>Project 1</td>
</tr>
<tr>
<td>UPDATE</td>
<td>Application</td>
<td>App Y</td>
<td>Project 2</td>
</tr>
<tr>
<td>DELETE</td>
<td>Platform</td>
<td>Plat 3</td>
<td>Project 3</td>
</tr>
<tr>
<td>DELETE</td>
<td>Component</td>
<td>Comp 1</td>
<td>Project 4</td>
</tr>
</tbody>
</table>

Table 3 - Sub actions of create and update Application

After execution all the steps proposed, we came to the following result:

Figure 7 - Create and update actions validated

We conclude by analyzing this result that the planned actions allow the company to achieve the goals set the manager.
4.2 Real Case

The objective was to validate a real project with a greater complexity. The project chosen was one executed by BES (Banco Espírito Santo), which involved changes to a big diversity of components, applications and platforms used by this bank. The changes are described in the following picture and table:

<table>
<thead>
<tr>
<th>Action</th>
<th>Type</th>
<th>Name</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>CREATE</td>
<td>Application</td>
<td>TCI, Gestor de Imagem</td>
<td>Project</td>
</tr>
<tr>
<td>CREATE</td>
<td>Component</td>
<td>A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A12, A13, A14, A17, I1, I2, I3, I4, I5, LN1, LN2, LN3, LN4, LN5, LN6, LN7, LN8, LN9, LN10, LN13</td>
<td>Project</td>
</tr>
<tr>
<td>UPDATE</td>
<td>Application</td>
<td>DPO, BESnet Particulares, BESnet Negócios, NPT, Posto de Trabalho Balcão</td>
<td>Project</td>
</tr>
<tr>
<td>UPDATE</td>
<td>Platform</td>
<td>Flex View, Bank View, COBOL/CIC5/CB2, PackBase, EAI TIBCO, File Broker</td>
<td>Project</td>
</tr>
<tr>
<td>DELETE</td>
<td>Platform</td>
<td>ISU</td>
<td>Project</td>
</tr>
</tbody>
</table>

![Figure 8 - Actions executed over artifacts](image)

![Figure 9 - Real case actions](image)

With this information we could test if the actions planned would achieve the desired goal. After applying the process we got the following result.
As we can see from the picture above, not all of the actions are validated which means that the proposed actions do not achieve the desired goal. Therefore we need to correct these mistakes. We do this by seeing the related problem of each artifact using the Specific Element View.

After checking all the artifacts with problems, we ran the process again. We did this until every single action was validated. So in the end we got the following result:
5 Conclusion

The importance of change management is nowadays a concept increasingly accepted in the business world. We realize that this theme if well thought and implemented can optimize the IT component of the organization and produce a significant cost reduction in when producing a change in the reality of the organization.

To achieve these objectives several theories have been developed, specifically in the human and organizational component. After a study of these theories we found that the human component was associated with several of them we decided to embark on a more organizational component approach. In this area we have found only one theory with some degree of maturation, namely the process of Change Management presented by ITIL.

During the research conducted on this issue, we realize that the process proposed by ITIL was directed to a type of change which is more complex and expansive, leaving some freedom for smaller changes, in other words, not so important. Thus, using all the knowledge acquired in the research carried out it was possible to propose a process to fill the spaces that ITIL has decided not to fill. This void, in my opinion it’s getting increasingly important to allow an organization to operate in a more correct way, while optimizing their actions and decreasing their margin of error, i.e. the margin of guess work that still plagues managers today.

Another conclusion drawn from this study focuses on the fact that several proposed changes are not well enforced and that the organization representations which are created stay “sit on the shelf” not being updated or worked over time, which leads to the conclusion that the employee knowledge of the organization is limited. The aim is to improve this aspect with the proposed process, giving opportunity to all elements of making suggestions about the information they think is essential, within the area of IT.

I would like to emphasize that what I propose works directly with the information present in the modeled component of the organization, something rarely seen expressed in the theories found during the research made. This allows you to enter a high degree of accuracy associated to the fact that the validation of changes will be done in an automatic way being only request to the stakeholders to enter the information needed to validate the actions planned, namely the scenario he wants to achieve and the changes he wants to make. Another aspect that I consider very important is the learning process that has been added to this process. I believe this is factor to take in account because it’s an important step in the materialization of a good process of change, bringing this it to a higher level. The fact that the organization learns from its actions, mistakes and experiences improve the management of change made, becoming more refined as time passes.

I believe however that the work needs to mature and more validation effort. We believe that the basis of a solution to some problems inherent to a complex thematic is created.
5.1 Future Work

The focus of this work has been centered on creating a way to validate the actions proposed by the manager in an automated way and to guarantee a certain level of security during the transition of projects into production.

However we realized that this process can be improved in several ways. Viewed from the standpoint of optimization we consider the fact that the activity of gap analysis is always to be carried out whenever a change is made to the projects is clearly detrimental to the speed of the process. Thus I believe the process can be studied and improved in order to eliminate this deficiency.

Another aspect, which I think is very important, focuses on the learning task proposal. This focuses on past experience, and on the assessment of actions that have been implemented correctly. I think that with some study, this task can be incrementally improved, allowing it in the future to be associated with a component which takes into account the previous experience with an assessment of the current problem, thereby improving considerably the process.

6 References

