

A Strategy for Treat with Socio-cultural Aspects in Software Distributed Development

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Abstract: Distributed development of software (DDS) has been gaining ground among companies that develop, as they saw the DDS a great opportunity to reduce project costs. However, due to the distribution of teams, there are some problems that do not exist in traditional development co-located, such as differences in time zones, different languages, lack of team spirit, inadequate infrastructure, among other challenges often generated by socio-cultural differences between the participants. This article is just the presentation of these challenges, evaluating their effects on the development process as well as presenting a strategy to minimize them, so do not compromise the outcome of the project.

1 INTRODUCTION

Given the numerous challenges in the SDD, this paper presents an analysis of the main problems generated by socio-cultural aspects in the Software Distributed Development, as well as a strategy, elaborated based on techniques and tools of quality control widely used by conventional engineering, allowing the development team to minimize the effects that these problems cause in the project.

Thus the article is divided into six sections. Section 2 presents the literature review. Section 3 makes the presentation of the main problems caused by socio-cultural factors. Section 4 presents a strategy to minimize these problems. Finally, section 5 presents the evaluation of the strategy, section 6, the final considerations and 7, the references.

2 SOFTWARE DISTRIBUTED DEVELOPMENT

The SDD consists in distributing teams that are in different locations, cities, states and even countries, and make these teams work towards the same purpose, namely the construction of a software. This type of development has grown considerably in the last decade, motivated by the advancement of communication technologies and project

management, and has been characterized by collaboration and cooperation between departments and groups of developers physically distant (Meyer, 2006). As a result, organizations aim to gain competitive advantages associated with increased revenues, savings in development and improving the quality of the final product.

3 CHALLENGES IMPOSED BY SOCIO-CULTURAL ASPECTS IN SDD

In projects of software distributed development, especially those in a global scale, there may be groups with differences in behavior between people due to their different cultures. This can lead to complications in work planning, decision-making process, in the style of argumentation, the flow of conversation, inconsistent work practices, among others (Olson and Olson, 2003). In countries with continental extensions, such as Brazil, Russia, China, United States, among others, cultural differences can occur even with people from the same country due to regional customs (Enam, 2006). Considering that many managers do not consider the socio-cultural differences that often exist in environments of SDD, and thus, end up running the risk of causing complications in the entire project, the purpose of this section will just address the main

problems generated by this diversity:

Language: When the SDD involve more than one country, the language differences may cause difficulties to the communication.

Religion: Doctrines and religious holidays may cause delays on the projetc, beyond the possibility of create friction with the other participants.

Infra-structure: Status of roads, electricity grid precarious, lines of communication with failures, lack of airports and ports for client and staff, in short, the lack of basic framework for the proper functioning business. Besides the lack of internal infrastructure of the company itself, not giving good working conditions for employees.

Behavior: Some habits and customs common in one country may not be frowned upon by other regions, causing differences between participants and even delays in the project.

Economical Factors: Restrictions on foreign capital, high inflation rates, non-convertible local currency, etc.

Political Factors: Risk of internal and external conflicts, authoritarian government that is constantly changing the laws according to their interest, etc.

Competition: Technological and cultural competition, may cause differences and technical problems in the project due to incompatibility of technology.

Education: Technical training of the workforce, number of companies that offer training and updating, especially in information technology, where technological change is constant.

Prejudice: Some cultures may feel superior to others, creating conflict and compromising the project.

Decision Making: In certain cultures the decision-making power is centralized, while in others, decisions are taken in groups.

Legislation: Different laws (commercial, civil, labor and tax).

Organizational Culture: Habits, working methods, attitudes, way of acting and thinking shared by all members of the organization and that differentiates it from others.

4 STRATEGY FOR DEALING WITH SOCIO-CULTURAL ASPECTS OF SDD

The main problems caused by socio-cultural factors in DDS have been raised in the previous section; however, it is likely that each unit of development

have distinct regional and culture characteristics, which makes the use of generalized solutions. In this way, a more effective alternative to minimize these problems is the use of a strategy consisting of a series of steps that encompass from the identification of challenges, to analyze and present solutions. Therefore, it is precisely such a strategy that addresses the socio-cultural organizations that work with software distributed development, which will be presented in this section.

To make the strategy more reliable and more efficient in its results, a method of problem solving was used as the basis for its preparation, this is already widely used for engineering in different situations, known as QC Story. To Rossato (1996), this method is structured in a way that helps the administrator to solve the problems, putting the matter in a proper process of identification, analysis and planning of adversity. This way, every step of the QC Story, featuring a series of generic actions, may be adapted to specifically address problems caused by differences in socio-cultural aspects of SDD, forming at the end of the method, a strategy that can be used by managers in any project of distributed development.

4.1 Fundamentals of Strategy

The first step is to define the person responsible for deploying and managing the proposed strategy, so that it can effectively bring the expected results. Because it is the project management issues, and with a complicating factor, which is the central distribution of software development, the general manager will be the one responsible, in turn, he or

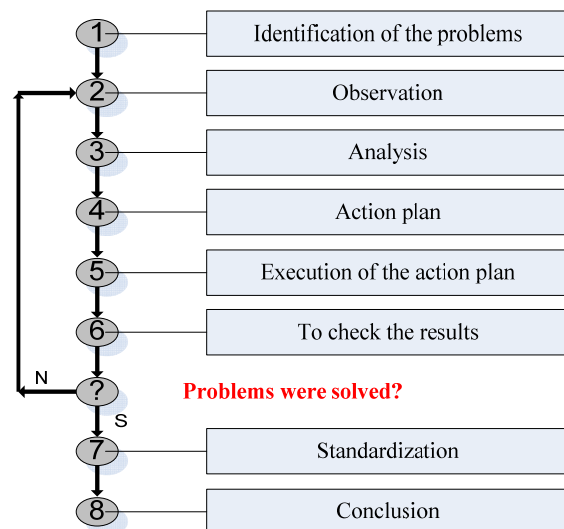


Figure 1: Flowchart of the proposed strategy.

she must rely on the help of local project managers, who will be their disseminators and coordinators spread in each of the local development. The strategy consists primarily of eight steps, as illustrated in figure 1.

Each of the steps that make up the strategy are detailed below.

4.1.1 Step Identification of Problems

To start and survey of the problems, the ideal is to conduct a meeting between the general manager and managers of local projects. In the impossibility of this be made in person, it can be done virtually, and it is then that each manager can outline the socio-cultural problems of their respective units. Two methods can be used to assist in the survey, they are: *Brainstorming e Checklists*.

4.1.2 Step of Observation

To make easier the execution of the next steps, beyond the historical data, Kume (1995) suggests the use of one of the seven quality tools, denominated stratification, that is basically to divide one determined group in several subgroups based in factors specifically appropriated. In this case, we will stratify the socio-cultural issues already raised in three distinct groups:

Group 1 – The problems generated by the people involved in the project (language, religion, habits, competition, qualifications, prejudice)

Group 2 – The problems generated by structure and way of work of the company (Decision Making, Organizational Culture, infra structure (internal)).

Group 3 – The problems generated by external factors of the company (infra-structure (external), education (University and technical courses, etc), economical factors, political factors and legislation).

4.1.3 Problem Analysis Stage

The major objective of the analysis phase is by means of the data collected in the stage of observation, find out which of the problems raised above can actually harm the process of software development, and point out the root causes, other words, the factors that generate each these problems, so that in the preparation of a plan of action (next step), we can handle and point out the best possible solutions.

In the case of SDD, each of the core development has its particular problems, which will require an individual analysis of the manager because an adversity that can be severe and seriously

compromise the work in a particular location may not exist or not be as significant in the other.

4.1.4 Step of Preparation of the Action Plan

Before preparing the plan of action, which is the main purpose of this step with the purpose to prevent the problems are resolved temporarily, and carelessness on the first turn damaging the project, an important point must be raised. For Campos (1999), the only way to resolve an adversity in a definitive way is by treating their underlying causes and not only the effects like many managers do, because these effects will reappear if the factors that generate them are still present in the process. For these reasons, it is important that the analysis phase has already been completed before the start of the preparation of action plan so that it is possible to lift the fundamental causes of each problem identified at the beginning of the strategy.

In seeking to minimize the socio-cultural problems existing in the SDD, are shown some actions that can be taken:

Language: Standardization of language, preference in hiring employees who are fluent in the languages involved, courses and training of foreign language within the company and hiring a liaison.

Religion: Instructions on the religious customs of the other members, respect for all religions of those involved in the project, raise awareness teams in order to avoid arguments and religious affairs and hiring a liaison.

Education: Ongoing training and refresher courses for developers, In-house training, taught by more experienced employees of the company.

Behavior: Exchange of officials, meetings and gatherings whenever possible and hiring a liaison.

Competition: Awareness of teamwork, valuing employees who work collaboratively, meeting to discuss conflicting issues and avoid considered rival teams working on the same project.

Prejudice: Warnings and punishments for employees with prejudicial attitudes, lectures and security awareness training and valuation of staff who have good relationships within the team.

Decision Making: Meetings with project stakeholders so that they expose their point of view and avoid unilateral decisions without prior discussion.

Organizational Culture: Provide training to the manager to deal with the different organizational cultures involved and standardization of labor.

Infra-structure (Internal): To provide appropriate working conditions for employees, create a list of problems related to infrastructure and

arrange them according to their importance and standardize the infrastructure for all development sites.

4.1.5 Step of Execution of the Plan of Action

The main purpose of this step is to put into practice the action plan prepared in the previous step, and to ensure that the strategy work out as planned, some measures should be taken. According to Campos (1999), the first step to start the execution of the method is to provide training for all involved in the project, including by making use of handouts and documents that detail all the proposed practice. It is extremely important that before the beginning of the plan, all those involved understand and agree with the measures contained in the strategy, and if any specific action generate much disagreement among the staff, it must be reviewed by management.

4.1.6 Step of Verification

At this stage, the manager should analyze and compare the results obtained using data collected before and after the implementation of the action plan prepared in the previous steps, certifying the effectiveness of the strategy and the degree of reduction of the problems (Campos, 1999). Verification can be done several times during the project, and it is up to the manager to define when it is necessary such activity.

4.1.7 Step for Standardization

From the moment that the plan of action is well adjusted to the functional structure of the company, and really is blocking problems, it is necessary not only make it a measure, but a pattern of organization's work to prevent problems reappear (Campos, 1999). Therefore this is the goal of the standardization step, take all measures proposed by the usual strategy in the daily work of everyone involved in the development project.

4.1.8 Step Completion

The stage of completion is mainly aimed to a recapitulation of the whole strategy, raising the items that had results above and below expectations, schedule delays, extra costs, remaining problems, among other relevant data that were observed during the execution of the strategy. After the assessment of this information, the manager can now begin to design improvements for future projects, aimed at increasing efficiency of the method.

5 CONCLUSIONS

During the investigations performed for the preparation of this work has not been found any strategy or methodology designed specifically to address the socio-cultural aspects in the process of software development, especially when it is distributed. This fact is due mainly to the concern that managers have with the technical factors of the project, often leaving in the background other important aspects which, although they are not technical, they can damage or even cripple the development work.

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