

Mars Climate Orbiter: Case Analysis

Alexandra Maria Mavroeidakou

Abstract: *In this paper, it is going to be examined the Mars Climate Orbiter case study with the view to being suggested the methods that could be applied in order to enhance the efficacy of the venture. To do this, the Data Quality Management approach will be analyzed and correlated with the eight contributing factors that lead to failing the NASA mission. After that, it is going to be illustrated the factors that should be well-considered in order to be implemented an effective strategy.*

Keywords: Mars Climate orbiter, strategy, strategy development, business decisions, solution analysis

1. Introduction

The Mars Climate Orbiter is a renowned event happened in September 1999 when NASA attempted to discover the planet Mars. In the context of this project, the spacecraft seemed to be lost after its launch because it was failed to align the rocket force with the safe orbit. The outcome was that the orbiter smashed into the planet due to the discrepancy that the spacecraft presented with the Mars orbiter. After this disastrous event, the NASA's board published a report in which it described the reasons for the failing mission. These contributing causes involve mistakes in the way of operational navigation team, the lack of project's evaluation, the lack of efficient risk management planning, deficiencies in data systems, poor teams' communications and inadequate training, and the lack of complete end-to-end verification of navigation software and related computer models (Isabel, Savage, 1999). So, the main culprits for Mars mission fail are the poor management, financing, and testing. In general terms, a synopsis of all these reasons can be the lack of Quality management as NASA chose to apply a quick and cost-effective strategy ignoring significant data that affected the successfulness of this venture (Mokhtar & Yusoff, 2009, p. 79). From this perspective we can definitely conclude that the Mars mission requires to be evaluated in the Data Quality Management context as the administration of the data in the IT technology seems to play a significant role to such important projects (Wang, 1998).

2. Literature Review

For the completion of this study, it was used various information resources so as to give an insight into the major issues that this case study arises. Particularly, the data and the evidence provided were retrieved from journal articles, newspapers, and books which dealt with the Mars Climate Orbiter case study. In addition to this, it was found interesting bibliography concerning the strategy that the organization should follow in order to prevent pitfalls and enhance its project management efficacy.

3. Depth and Scope of Analysis

The quality approach that I would select to avoid the aforementioned failures is the one that expressed by the Peter Drucker (Knowles, 2011, p. 82) who first established the concept of the Management by Objectives (MbO). To begin with, I would create a general vision of the project idea which would be elaborated by the mission statement

that would clarify the corporate objectives of the project and the basic values that should be instilled. In the context of these steps, I would revise the FBC's goals as the triptych "Faster, Better, Cheaper" does not correspond to the project needs and the Quality Management is absent in the virtue of achieving a fast and a cost-effective project. Also, I would issue specific criteria that meet such objectives and I would perform a verification procedure so as to ensure the compliance of the project's objectives. To achieve this, I would officially issue these rules in a global issue-tracking database that would incorporate all the phases of the mission so that each employee is aware of them (Daukantas, 2003). Along with this, the line manager would be responsible for the achievement of the mission and he/she would oversee the progress of the project team by making constant reviews and by giving substantial answers to the questions provided by the team.

After that, I would construct a strategic plan in which it would be described the means of achieving these objectives and the measures that should be taken. In this phase, I would try to involve all the parties through applying the Hoshin Kanri principles so that all employees offer their ideas to the project planning stage. This is because the senior managers' and employees' commitment are very important since from their abilities and skills is depended on the outcome of the project. Also, the roles and the responsibilities of each team would be clarified and a project team should be created that would focus more on the substantial details of the project. Also, I would put a great emphasis on the effective communication between the project teams and the operations personnel so as to ensure that the data transferred would be fully understandable by the internal and external team members (Postrel, 2002). To achieve this, it would be established learning and training programs so that teams acquire the proper skills to administrate the projects' data. Along with this, it would be created a reporting and resolution system in which all employees could refer to the problems detected. To do this, at the beginning, there should be clarified the acceptable risks so as not to disrupt the project's progress (Zheng & de Carvalho, 2016). Furthermore, project managers would review teams' work and enhanced the communication in order to resolve potential problems and assess the progress of the project and its final application. What's more, I would examine the technological developments so as to guarantee the better optical tracing and the determination of the direction of the spacecraft. To continue, I will strive to attain a quality assurance through the Verification, Validation & Accreditation to secure that the navigation system of NASA

would function properly. In addition, I would expand the quality control by establishing experienced system engineering teams and well-examined engineering system with the view to enhance the mission's performance and be well-prepared to conduct a data and a risk analysis. To do this, it would be established a safety system and it would be conducted a credibility analysis to examine the engineering data available. The systems also would be updated on a regular basis and it should undergo in hardware and software testing in order to be reaffirmed that function properly. Respectively, this information would be transferred to all the appropriate members of the institutional team so as to be aware of the potential risks. Last but not least, in the context of risk management it would be developed alternative navigational schemes through the deep space network (Oberg, 1999).

4. Recommendations

The aforementioned strategy in order to prove successful requires to be clarified some certain issues. First of all, it is imperative to take into account the dynamics of human resources that would be involved in the project and the skills that they have. This entails the evaluation of the learning programs that will run during the planning of the project so as to predict the potential efficacy of the employees and their performance. Along with this, I would consider the access of all team members to the information data as the cooperation in large projects is indispensable (Oberg, 1999). Simultaneously, I will check the quality of the technology used so as to avoid program management flaws and ensure the efficacy of the project planning. Furthermore, I would examine the performance of the risk management team so as to evaluate the risk and the quality assurance and ensure that the plan is properly structured and unpredictable events could be dealt efficiently (Mars Climate Orbiter Report, 2013). Also, I would assess the past performance of NASA in order to predict the potential success of the project according to the efficacy that it showed in the relevant projects and examine whether the goal that it set is achievable. Another important consideration would be the budget allocation of this project and the alignment of this with its importance and requirements. Last but not least, a great emphasis I would give on the data quality as from this it depends on the attainment of the whole project (MacCormack, 2004).

5. Conclusion

Taking everything into account, it is suggested that NASA should draw its attention primarily on the data quality management so as to prevent the negative effects that the FBC planning caused. The aforementioned analysis proved that an integrated plan and a proper organization structure can greatly contribute to the efficacy of the project. Nevertheless, prior to each attempt, specific factors should be well considered in order to start planning because the decision-making process is heavily based on the proper use of these parameters.

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