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Analysis of success and failure factors in information technology projects

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Abstract

The goal of this study was to analyze the current situation of companies that work with project management of information technology in order to perceive the relationship between failure and success of these projects related to the type of management applied. Due to the globalization of information technology companies, the cultural aspect has been evaluated, since in these companies there is collaboration between multicultural teams and this can have a direct effect on project performance. This study aims to present the factors that lead to the failure of information technology projects. Firstly, a theoretical survey on this topic was carried out, and then, interviews and questionnaires were applied in order to collect data. The analysis was performed using the Statistica software, it confirmed the efficiency and deficiency in project management practices, moreover, it also testified the lack of strategies and use of technologies that can assist the monitoring of projects from this nature.

Keywords: project, project management, information technology, failure and success.

1 Introduction

There are several articles about success and failure in projects. But only a few include the perception of cultural factors as influencing the success or failure of the projects. This article presents the main factors of success and failure observed by IT companies surveyed, and also by the authors of the literary projects in general and IT projects, showing the importance of including cultural perspective on the outcome of projects.

The perception of the relationship between organizational, cultural and managerial factors provides find answers to achieving success not only in IT projects as well as projects in other areas of activity. The aim is to investigate this relationship to evaluate the importance of each factor in the development of the project.

Research like Munns and Bjeirmi (1996), Thomas and Fernandéz (2008) and Haughey (2010) attribute the success or failure of the project to the type of management, how management practices have being made, or to the inappropriate management of areas of the project, ignoring the cultural and human aspect of project performance. To understand the perceptions of the factors of success and failure in information technology projects it is necessary to discover answers about what influences the outcome of the project.

Studies conducted around the area of IT projects have a high number of failures in their projects. To overcome the triad of factors (cost, quality and time) cited as mainly causes of failure and success of projects is necessary to investigate other criteria. The cultural perception may be a way found to improve the level of success of current IT projects whereas globalization brings people of different cultures to work together and this can may somehow influence the development of the project. Each person brings with them beliefs, ideologies and attitudes that are brought to the organization and this influences his decisions, it is necessary to know the level of this influence to the development of their work.

2 Project Literature

The Project Management Institute (2008) define project as a temporary endeavor undertaken to create a unique product, service or result. Meredith and Mantel (2003) affirms that project is usually a periodic activity with a well-defined set of deliverables. And Vargas (2002) define project as a non-recurring development, characterized by a clear and logical sequence of events, with beginning, middle and end, which is intended to achieve a clear and defined objective, being driven by people within predefined parameters of time, cost, resources, and quality.

Figure 1 presents the matching of the main objectives of the project management, there are some functions that are not shown, because each project is different, but related in the same manner explained in this figure. The projects, when they are inserted within the same organization, interact and compete with other projects simultaneously generating competition for the resources. To solve this type of conflict is necessary that the parties enter into agreement to define the priorities of the organization. According to Mota and Almeida (2007) project management can take two views: one located (where the planning of each project is done in isolation) and integrated (where management is performed for a set of projects).

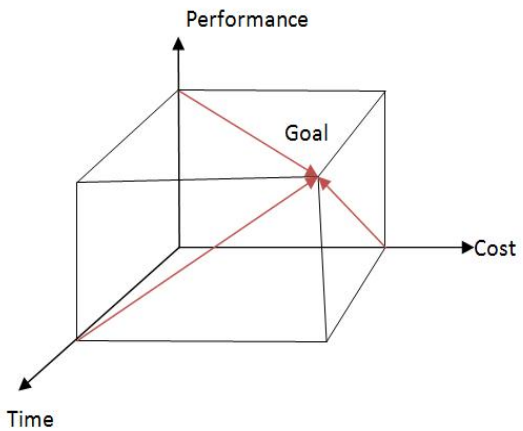

Figure 1: Performance, time, cost and goal of the project. Source: Adapted from Meredith and Mantel 2003

Whereas different types of projects compete with each other, it is important to know about the life cycle of each project. According to Project Management Body of Knowledge (2008) a project life cycle is a collection of generally sequential and sometimes overlapping project phases whose name and number are determined by the management and control needs of the organization or organizations involved in the project, the nature of the project itself, and its area of application, as can be seen in figure 2.

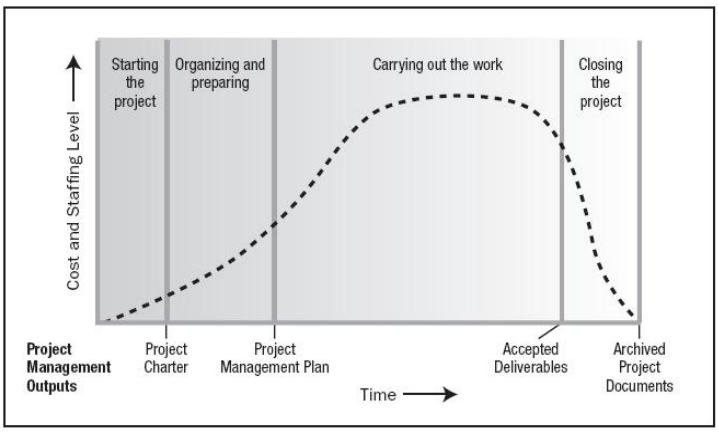

Figure 2: Typical cost and staffing levels across the project life cycle. Source: PMBoK 2008

According Vargas (2002) the life cycle of the design is that a set of stages can vary from four to nine stages. He found that for all types of projects are implemented five phases described below:

- Initiation: This is the initial phase of the project where a need is identified and structured in a structured problem
- Planning: This phase describes what is done during the project implementation
- Implementation: This phase refers to the implementation of what was previously planned, in other words, are put in practice everything that was previously planned, so here are spending more effort and resources that the other phases
- Control: This phase has the role to control everything that is being accomplished through preventive and corrective actions
- Completion: This last phase is the evaluation of the project through an audit

In regards to Life cycle, Steward (2007) proposed an IT project life cycle management process that can be seen in figure 3.

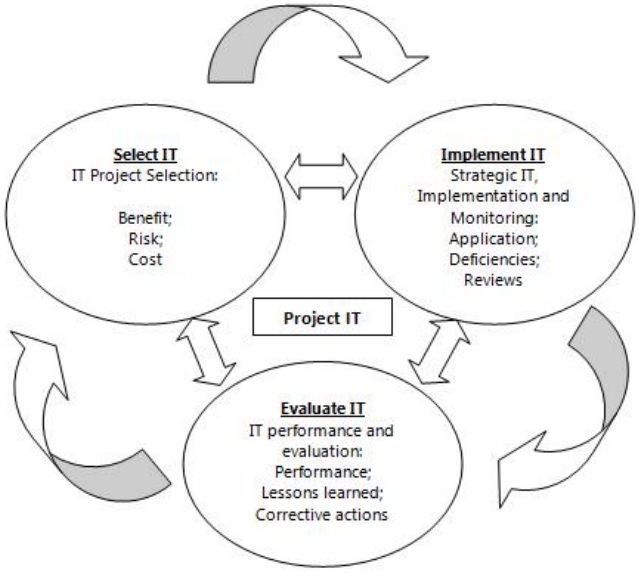

Figure 3: IT project life cycle management process. Source: Adapted from Steward 2007

In the life cycle of IT projects proposed by Steward (2007), each stage consists of a step by step that must be followed for each phase evolves to the next, causing the project to be constantly selected, implemented and evaluated.

3 Project Management

The guide of Project Management Body of Knowledge (2008) affirms that most experienced project management practitioners recognize there is more than one way to manage the project and the project management is the knowledge application, skills, tools and techniques to project activities in order to meet your requirements. According to Miranda (2003) management of large projects is a difficult task considering the complexity, uncertainty and the large number of activities involved. Project management is a set of processes that form a cycle of activities that allow loops until all steps are carried out perfectly.

Therefore when starting a project, its management must be done through a set of processes, each with a particular function, which should be completed only when there is output as the closure of the project. The Project Management Body of Knowledge (2008) defines project management in nine areas of knowledge management (integration, scope, time, cost, quality, human resources, communication, risk and procurement management). In each area of knowledge in project management are listed processes, tools and techniques that every area can use to manage the entire project through their individual contributions.

4 Determinants of success and failure in project in general and information technology projects

To define what is success or failure is something subjective and hence many times this concepts are mistakenly evaluated whereas it depends who is making such a judgment. According to Clarke (1999) there are a several number of factors that has to be considered to achieve the project success, as can be seen in figure 4.

Figure 4: Some factors to consider in project management. Source: Clarke 1999

Clarke (1995) identified four factors as critical to success of projects:

- Communication throughout the project
- Clear objective and scope
- Break the project into "bite sized chunks"
- Using project plans as working documents

In regards to success factors, Cooke-Davies (2002) lists twelve success factors of success that are implemented by many national and multinational organizations, shown in Table 1.

Table 1: Success factors

Factors	Success Factors
Factor 1	Adequacy of company-wide education on the concepts of risk management
Factor 2	Maturity of an organization's process for assigning ownerships of risks
Factor 3	Adequacy with which a visible risk register is maintained
Factor 4	Adequacy for an up-to-date risk management plan
Factor 5	Adequacy of documentation of organizational responsibilities on the project
Factor 6	Keep project (or project stage duration) as far below 3 years as possible (1 year is better)
Factor 7	Allow changes to scope only through a mature scope change control process
Factor 8	Maintain the integrity of the performance measurement baseline
Factor 9	The existence of an effective benefits delivery and management process that involves the mutual co-operation of project management and line management functions
Factor 10	Portfolio and programme management practices that allow the enterprise to resource fully a suite of projects that are thoughtfully and dynamically matched to corporate strategy and business objectives
Factor 11	A suit of projects, programme and portfolio metrics that provides direct "line of sight" feedback on current project performance, and anticipated future success, so that project, portfolio and corporate decisions can be aligned
Factor 12	An effective means of "learning from experience" on projects, in a way that encourages people to learn and to embed that learning into continuous improvement on project management process and practices

Source: Cooke-Davies 2002

However, as the Cooke-Davies (2002) reports in his article, there is the omission of the human factor as a determinant of the extent of project success. This omission is justified for two reasons: the research was

focused on what people do and not the quality of their interactions and decision-making and secondly, because there was no separation of human factors and process factors, being implicit, therefore the human factor.

According to Miller (2000) it's important to know that diverse project teams can be more innovative and creative than teams I which everyone is alike because multiple points of view are good to the development of projects. Therefore is relevant study the influence of human factors in organizations and projects through the study of culture

Belassi and Tukel (1996) proposed a framework with specific situation and include the factors that were found to be critical for project's success, as can be seen in figure 5.

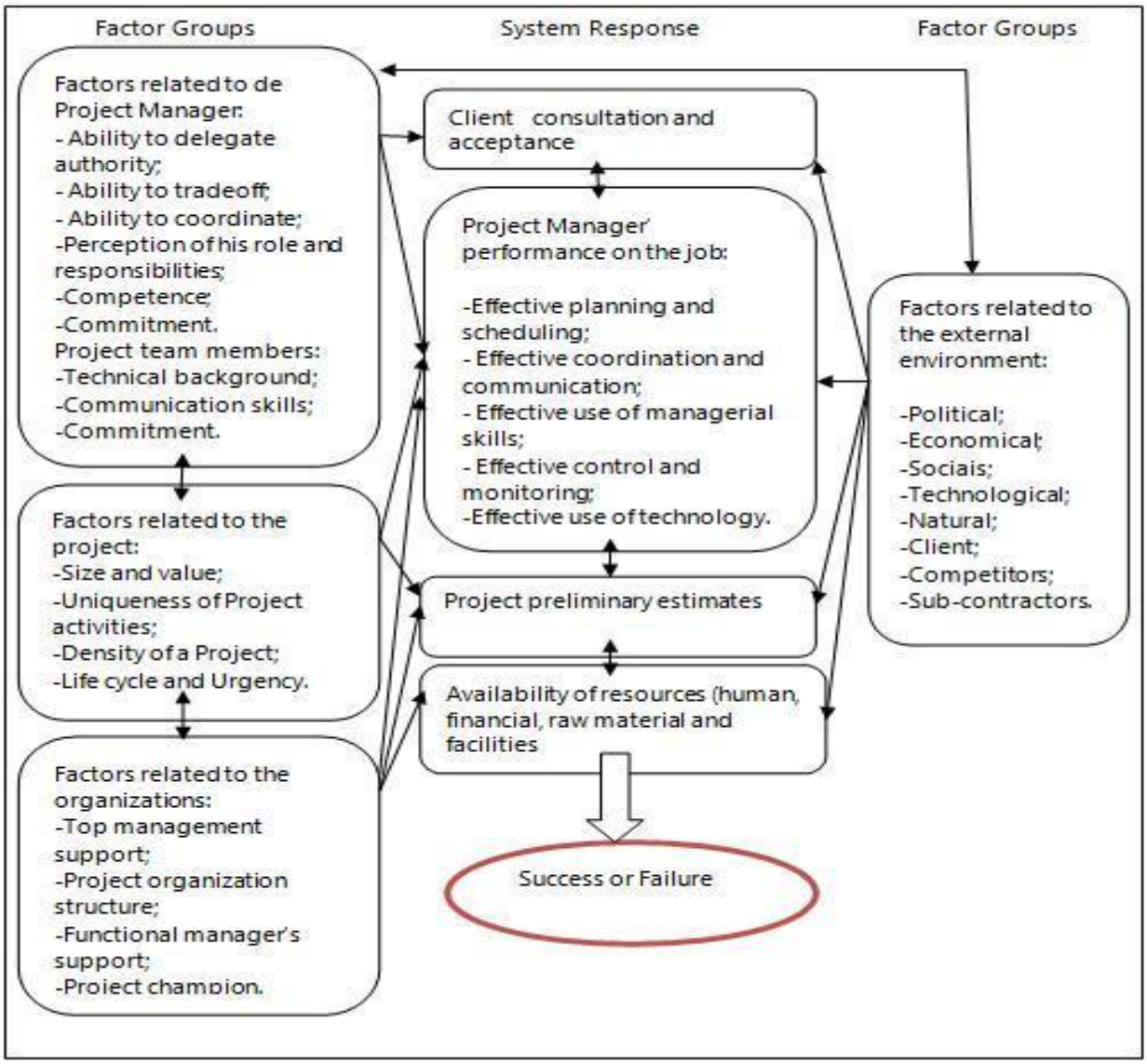

Figure 5: Framework to success or failure. Source: Adapted from Belassi and Tukel 1996

Belassi and Tukel (1996) grouped the factors into four areas:

- Factors related to the project
- Factors related to the project management and the team members
- Factors related to the organization and
- Factors related to the external environment

What lead to success or failure of project is a result of the combination of the group of factors that can influence a factor in another group. Therefore is important to know the intra-relationships between the factors in different groups.

According Repiso et al. (2007) to succeed in project management of Information Technology is necessary to observe that there are certain peculiarities in existing IT projects that make them different from other types of project and increases the chance of failure.

Guimarães et al (2008) says that some difficulties typically encountered in the practice of managing IT projects are poorly defined IT projects, market pressures, use of tools not fully tested, and lack of adequate communication, complex projects, risky and costly effort.

5 Methodology

The method applied in this research is survey exploratory, using qualitative and quantitative analyzes from interviews and questionnaires.

The sampling is non-probabilistic intentional, in which case the researcher chooses certain types of elements to belong to the sample in this case, people directly related to information technology projects of the company. The criterion used was to find businesses in the area of management of IT projects should be structured, organized and developed.

The instruments for data collection were interviews and questionnaires because both are important to better analyze objective and subjective questions.

The interview consists of four open questions allows the respondent can build your answer freely and the questionnaire consists of 40 statements using a Likert scale, ordinal scale categorical ranking established with values of 1 to 5 where 1 means strongly agree, 2 means agree, 3 means neither agree nor disagree, 4 means disagree and 5 means strongly disagree, which allowed the comparison between the responses for data analysis. The data analysis was developed using tools of statistical methods and the software called Statistica.

The interviews and questionnaires were applied to companies in the state of Pernambuco. Were interviewed and questioned in charge of construction projects of these organizations during the second half of 2010, a total sample of 28 responses, among them 5 did the interview.

6 Data Analysis

This research was conducted in companies that manage information technology projects to understand what factors are linked to the failure or success of IT projects. In the following sections it can be seen the descriptive and exploratory analyzes of data collected from these companies. First it will be explained the analysis of interviews and then the analysis of the questionnaires.

In the first part of the research, interviews were conducted in order to perform analysis on the perception of the determinants of success and failure in information technology companies. In Table 2, there are factors that determine success and failure in information technology projects according to the interviewees.

The interview questions were:

- What are the determinants of success and failure and how are they ranked and related?
- Is project success and failure graded?
- When are perceptions of success and failure formed and do they change with time? When can a final 'reliable' or 'stable' perception be formed?
- Do different stakeholders form different perceptions? (sponsor CEO, CIO, CFO, programme director, project manager, contactor, end user, consultant, member of the public, etc)

Table 2: Evaluation of interviews regarding factors of success and failure

Organizations	Factors that define Success	Factors that define Failure
Organization 1	Customer expectation; Scope; Time; Risk	The relationship between the factors of failure are inversely proportional to that determine success
Organization 2	Requirements Cost, Quality, Time and Scope; People and appropriate tools and Monitoring Project	Lack of communication; lack of experience of people and Lack of Knowledge of market
Organization 3	Communication, Focus, Persistence and Cooperation Team	Lack of clarity of objectives; Uncommitted Team; Leadership and Lost Time Market
Organization 4	Profitability, Customer Expectations, Achievement and Improvement Society	Loss; Customer Dissatisfaction; Bring harm to society
Organization 5	Good project planning; complete the planned; Flexibility to change; Teamwork	The relationship between the factors of failure are inversely proportional to that determine success

Source: The author

As can be seen in Table 2 each respondent ranks and orders the factors that think important for achieving project success. According to respondents, the factors most remembered as determinants of success are complying with the requirements of schedule, cost, quality and scope. Most respondents said that a non-attendance of the factors that determines the success are factors that determines the failure, in other words, the relationship between the factors of failure are inversely proportional to that determine success. This interpretation was made colleting the opinion of respondents. It may be noted that none of the respondents judged the culture as a determinant of project development.

Table 3: Evaluation of interviews regarding the classification of success and failure and conflict among stakeholders

Organizations	Rating of Success and Failure	Conception of Success or Failure	Stakeholders' conflict
Organization 1	Three Levels: Extremely Successful; Successful; Total Failure	Conclusion	Yes
Organization 2	Two levels: Success; Failure	Planning	Yes
Organization 3	Three Levels: Extremely Successful; Successful; Total Failure	Implementation	Yes
Organization 4	Three Levels: Extremely Successful; Successful; Total Failure	All the lifecycle	Yes
Organization 5	Four levels: Extremely Successful; Successful; Failure; Total Failure	Planning	Yes

Source: The author

As can be seen in Table 3 that the majority of respondents ranked the success and failure in three levels, this means that there is a fuzzy concept between success and failure that allows sorting on many different levels which would be an extremely successful, a success, a failure and a total failure, for example. Regarding the conception of success and failure throughout the life cycle of the project, this small sample still does not provide sufficient data for a conclusion, showing that there is a common sense of where you conceive the perception of success and failure in the project. With respect to possible conflicts between the perceptions of stakeholders, all of the respondents replied positively, in other words, all dealing with the management and negotiation of the parties involved in the project so that it's seen as much as possible of your requirements.

In the second part of the research, exploratory questionnaires were applied to elucidate the current situation with regard to the cultural aspect in the design of information technology through the analysis of some statements that make it possible to verify the behavior of people in the companies questioned.

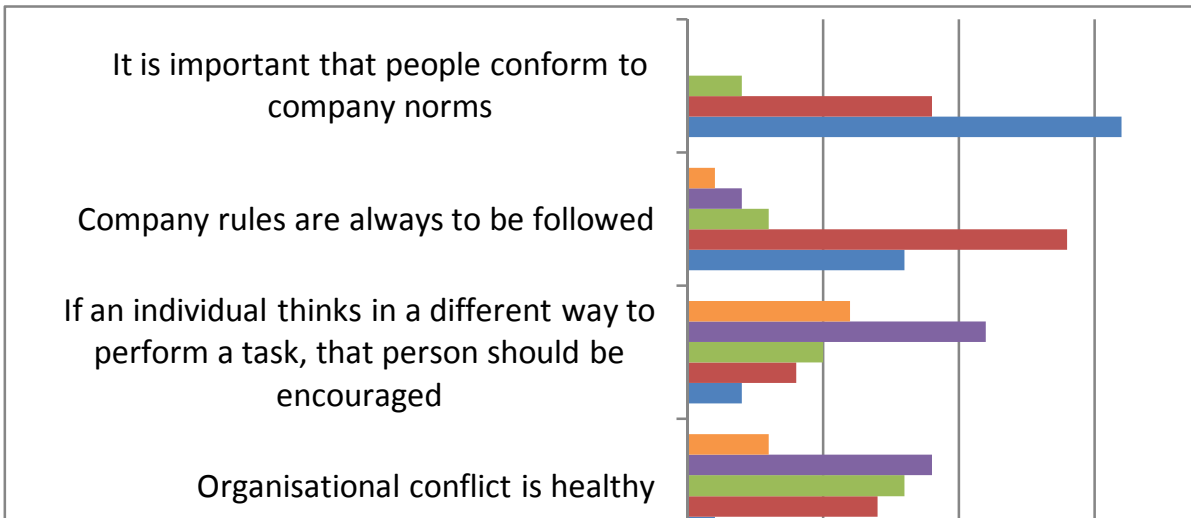

Figure 6: Organizational Behavior.

It can be seen in figure 6 that the majority of respondents, 89,28% strongly agree and slightly agree about the importance of people comply with the norms of the company so that the same objectives are achieved and 78.57% of respondents strongly agree and slightly agree that the company rules should always be followed, this means that most concern the norms and rules of the organization that works by giving importance to its fulfillment. It is observed indifference of 17.85% for the encouragement of different opinions regarding the conduct of activities, but 57.14% agree and strongly agree that organizational conflict is healthy.

In Figure 7, in regards of decision-making, 71.42% of the respondents like to take risks, while only 7.14% did not like. About have to make decisions it is clear that 82.14% of the respondents opine that employees should participate in making decisions, a fact confirmed by the significant disagreement as to the managers make all decisions, 71.42%.

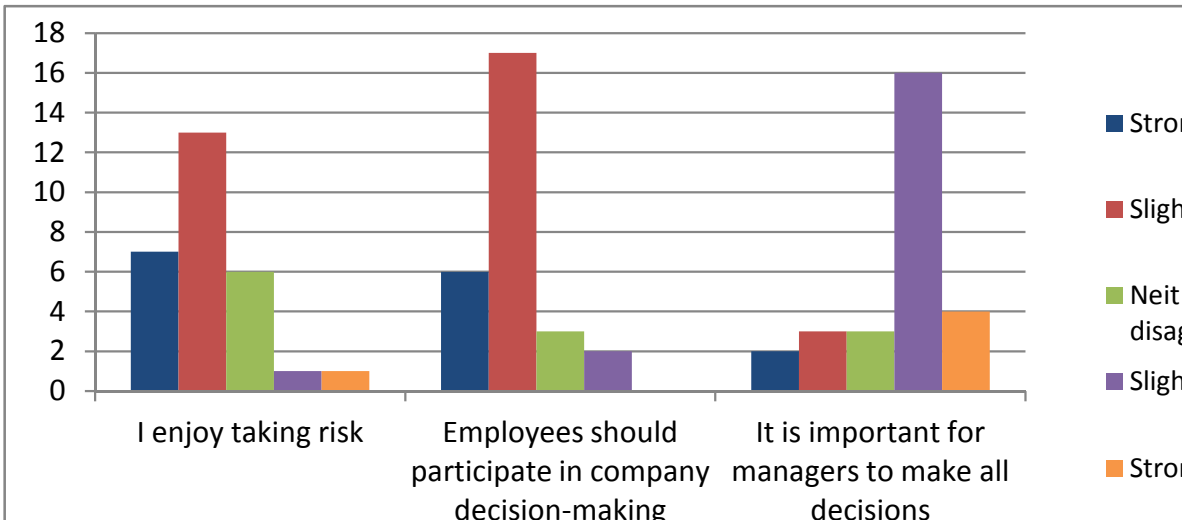

Figure 7: Decision-making.

How to Figure 8 there is a relationship of teamwork and individual work. When asked about the group work there is a preference of the majority of responses strongly agree and slightly agree with this statement, 57.14%, as well as being able to work independently when needed, 78.57%. About be a leader, 25% disagreed, 42.85% are indifferent and 32.14% strongly agree and slightly agree.

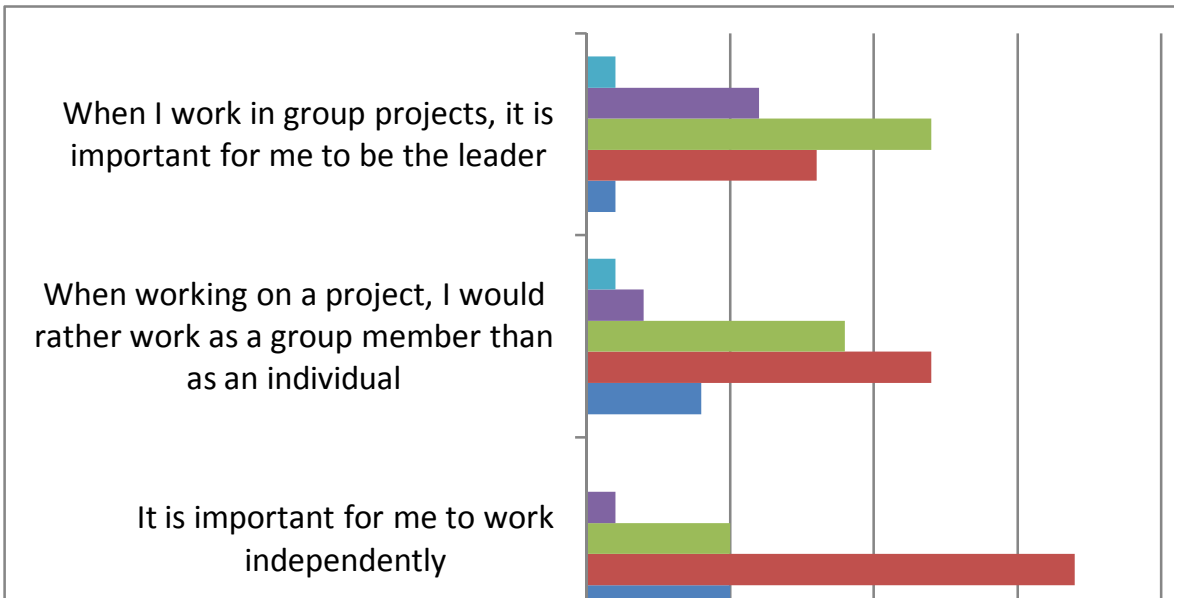

Figure 8: Way of working.

In respect of the negotiation process, the majority of respondents agrees and strongly agrees that it is important to greet each other with handshake before any negotiation. About be flexible during the negotiations, 96.42% of the respondents slightly and strongly agree and 46.42% slightly and strongly agree that it's important to complete a deal before starting another, this is consistent with the formality of the business when it comes to relations with the market, according to figure 9.

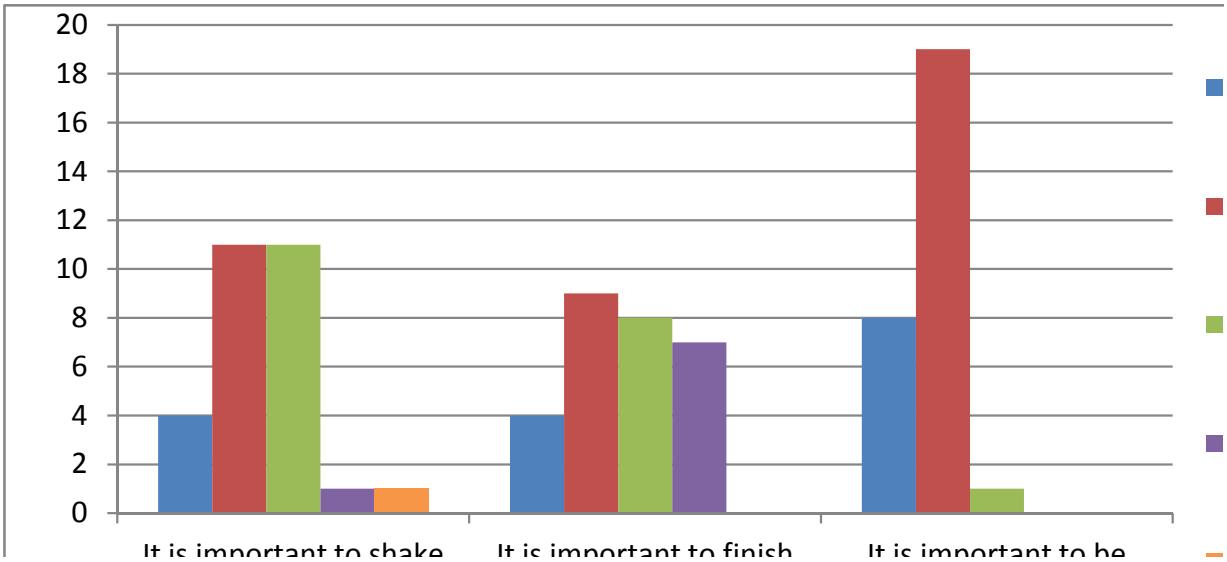

Figure 9: Negotiation Process.

7 Conclusion

It is concluded that in the area of project management of information technology, internal and external factors of the organization directly interferes with the development of work of the companies surveyed. Perceptions of success and failure are divergent. What determines success and failure varies from organization to organization, and the cultural factor not even mentioned by any organization, which allows us to observe the attitudes, beliefs, nationalities and ethnic groups are not perceived when it comes to achieving success of the projects.

There are numerous studies that investigate the determinants of project failure, however, studies that include the cultural aspect as the determining factor is negligible. The objective of this study was to present, in the view of respondents, which factors determine the success and failure in information technology projects and to relate these factors to cultural issues and project management.

In general the work could achieve the proposed goals, even with some limitations of time, distance and access to respondents. The area of information technology companies becomes ever more present and important for national and global economy. Researches on issues involving the improvement of the IT sector and project management, as well as studies of organizational culture and human behavior has great importance and contribution, this was the purpose of this study.

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