

Success Factors in Project Management

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Abstract

The purpose of this paper is to indicate the variables that are responsible for the success of project management. The variables were classified into groups of four driver management skills, critical success factors, monitoring and control and lessons learned according to PMI methodology - Project Management Institute. The variables were selected for the following statistical analysis: the Correspondence Analysis selected the most important variables to manage projects, and the set of variables was evaluated by 28 project managers, who, through a questionnaire (survey) validated the most important and those that apply to most medium and large companies. Additionally statistical analysis - Analytical Hierarchy (AHP) and the joint analysis - were applied to rank the variables according to their importance. The results were obtained 18 variables of group management skills, 19 critical success factors, 13 monitoring and control, and 7 related lessons learned. The critical factors revealed in this research converged with the investigated theory, pointing basic and vital factors for a successful project management. The research pointed to each group director the 6 relevant variables that need to be managed so that the management of the projects to be successful. Therefore, several factors influence the performance of a design, however, some factors may be related to the possibility of success.

Key words: Projects; Project Management; Critical Success Factors; Successful Projects



Available online
www.bmdynamics.com
ISSN: 2047-7031

INTRODUCTION

In order to promote changes, companies increasingly make use of the project management methodology as a management tool. This tends to ensure a complete project management, a strategic alignment and efficient use of resources (KOCK et al., 2013). Every project has tasks and restrictions. Several projects are seen as management events, in which, since the methods are not well defined, it is hard to visualize them in terms of benefits.

The projects involve a complex set of processes, and the turbulences of the business environment may explain why several of them are not able to reach the planned objectives. While some projects may involve adopting or adapting information technology or improving the business process, others may simply develop a new planning policy.

That goal of the project is the first direction, responsible for transmitting the interests and values suggested for shareholders, executives and operational levels of the companies. Therefore, identifying the benefits according to the organizational context offers a logic and robust decision (Christenson, 2008). In addition to considering the principles, structures and processes that regulate the decisions that make projects successful, or what is known by critical success factors.

Project managers are on the front line and may contribute in case they have a good knowledge and understanding of the success factors of the projects and their controls (Andersen, 2006). Analyzing the project management practices and understanding how important the adequate use of the methodology is as a means to develop a competitive edge is a relevant factor for the current environment.

By analyzing the relevant literature, we verify that, within each management process, usual practices related to factors that may directly affect the success of the projects and that vary from one company to

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another (Nogeste, 2004; Nogeste e Walker, 2008). Factors and processes must be analyzed and monitored in order to temper the causes of lack of success, which might be an important contribution regarding the factors that determine the efficiency of the projects.

The results of two previous studies (White and Fortune, 2002; Fortune et al, 2011) will be used to explore the relationships among the factors associated with project success and can help organizations be more successful project delivery. The purpose of this work is to identify and hierarchize the most relevant variables for the success of project management and in order to suggest four drivers groups to increase the chances for the project to be successful. More specifically, the research question that oriented the study was: RQ1. Which are the most important variables for the success of the project management?

Even with the volume of existing literature in the area, there are still few empirical evidences that relate the identification of the critical success factors of project management to the success of project management. On the other hand, executives also look for evidences that their investments will earn the expected value by the end of each project. Therefore, the question of measuring the project management success remains open (HYVRÄRI, 2006, PATAH, 2010).

We recognize that these results are preliminary statistical. Furthermore, the small sample size limited the researchers conducting multivariate analysis. Then we highlight our statistical analysis approach to increase the adhesion between the theory and the events of the "real world" of experienced project managers on (PM).

LITERATURE REVIEW

The literature review provides a brief description of research reports used in the making of this article, addressing the Success of Project Management, Critical Success Factors (CSF) themes and the selection of relevant variables for successful management. Initially, however, it is useful to present the definition of project success.

Success of Project Management

The traditional view on project success had initial focus improvements analyzed from the iron triangle called triple restriction: scope, deadline and cost. Therefore, defining success is not an easy and it depends on the perspective of the stakeholder, the type of project, the temporal perspective and the organization.

The factors that make projects successful are part of the strategic perspective and several influences are derived from the expectations of the stakeholders (Fortune et al., 2013). The discussion on what really corresponds to the success of a project and the discovery of the managerial factors that may lead a project to success have influenced the search for obtaining a prescription as to each way to follow in order to reach success, despite the fact that we know that each project is unique and, therefore, it depends on its contingencies (Lundim and Soderholm, 1995; Soderlund, 2002; Carvalho, 2010).

Whereas since 1990 the MP literature discusses critical success factors (Packendorff, 1995), the most recent literature indicates that there are more than nine schools (areas) of expertise in PM and project success remains one of the areas (Turner, 2010). The success of the project may have an impactful perspective with time, since the success of project management may be determined at the end of the project; however, the success of the project may be postponed in months or years after the end of the project.

The questions investigated in this research also indicated that the factors within the control of the direct influence of the company contribute for the success of project management. The focus is on the controls to which the project manager has greater accessibility. Therefore, the benefits are in understanding the factors that need be monitored.

Structuring of the Critical Success Factors

The literature divides success of the project into two components: project success factors, which are similar independent variables that contribute to the likelihood of success and the success criteria, are measured and used to determine whether the project was a success or failure (and Jugdev Muller, 2012). The conceptual bases that address the paradigm were identified by Rockart (1979), Pinto and Slevin

(1987), and Belassi Tukel (1996), Pinto and Prescott (1998), Fortune and White (2006). (Morris and Hough, 1987, Turner, 1999; Wateridge, 1998).

Jugdev and Muller (2012) examined the literature on project success factors by use of keys and identification of publications and found that the publications of Pinto and Slevin (1998 a, b) were the most relevant, according Baccarini (1999) Shenhar et al (1997, 2001), and Munns and Bjeirmi (1996). The classic study identified as mission support manager, planning / project schedule, and to query the customer and prioritizing critical success factors (Pinto and Slevin, 1987). A more empirical study appeared to support this list, identifying the most important critical success factors are: clear goals, senior executive support, adequate resources (White and Fortune, 2002). By analyzing 63 publications establishing the critical factors, Fortune and White (2006) identified that there was a limited agreement among some writers on what factors. Three surveys conducted in depth (Hyvräri, 2006; Andersen et al 2006;. Christenson, 2008) based on the references above, were selected as the conceptual basis for pointing out the variables responsible for project success.

Hyvräri (2006) examined the critical success factors and the failures in project management and their relations to the variables of the organizational context. The success and failure factors were identified, and they were: clear objectives, commitment to the end user, adequate resources, ability to coordinate, effective leadership, commitment and flexibility with resources, support from the upper management, clear job description, structuring by project, technological and economic environment.

As a result, the research by Hyvräri (2006) indicated communication as the most relevant factor to implement the project. The other critical success factors found were: project communication, consulting the client, acceptance from the client, support from the upper management, project schedule, mission of the project, project execution, troubleshooting, staff management, monitoring and control.

Communication in the projects was the most important critical success factor in large companies, while the most critical one for small companies. All evidences in this research support the idea that individuals who not only have the technique, but also knowledge management, leadership and ability, lead successful projects. The most critical factors were the managerial ones, however, the abilities and experiences in management helped the project to be successful.

The experience of project managers was related to the factors of the project and to the commitment to the end user. Experienced managers are more committed to the end user, while inexperienced ones need more job description in order to manage projects.

Andersen et al., (2006), examined the relationship between critical success factors for projects and the success of the current project, and how such factors may contribute for the success of the project to be carried out even in different organizational cultures.

This research revealed that the factors within the control or the direct influence of the project contribute for greater measuring and success. The benefits are in understanding the interrelationship between the factors that need particular attention to reach the results and occasionally establishing performance indicators for project managers.

The research started from a series of critical success factors and adopted three success scales: managerial delivery ability, impacts of the project and experiences captures. From such scales, nine critical success factors were derived: communication, planning approval by stakeholders, formal and well-structured approach, commitment to the project, influence of stakeholders, understanding and accepting the proposal, restrictions, flexibility in the execution, and influence over the processes of the project.

Communication was seen as a significant contribution in order to establish a trust relationship between the participants of the project, as well as an essential aspect to assure a positive view of the long-term benefits to stakeholders, as well as the processes and procedures that support the activities.

Capture the learning and sharing it was indicated as an essential part of the knowledge management process. Lack of explanation of the results was a broad aspect of the influence and involvement of stakeholders. The interrelationship between a well-structured and formal approach to the project and a rich communication was considered as majorly significant regarding the captured experience, since it explains the degree to which the learning potential was carried out in the projects. The commitment to

the project was the factor that best explained the importance of the managerial delivery ability of managers.

Therefore, in this research, we explained the different results found between the different success factors, in which the precise communication of the project and the initial involvement of stakeholders explained the need for the managerial ability in order to deliver a successful project.

The research by Christenson (2008), who investigated how the performance goals and lessons learned impact the outcome of the project, had the purpose of improving the organizational performance and reinforcing how important it is for the project team to be involved, since planning actions in which the objectives of the project are developed and communicated (view) may increase the chances of success.

Defining the scope of the project is relevant, since projects need to be "sold" and the premises, restrictions, techniques and tools used need to be known. Therefore, analyzing the critical factors increases the chances of a successful project.

The "view" of the project is the first direction responsible for transmitting interests and values suggested by the project to shareholders, executives and operational levels of the company. It should be part of all meetings, guidelines and internal publications and, if well known, it reflects the transparency of the goal (CHRISTENSON, 2008).

Another benefit identified when the "view" of the projects is defined is establishing a trust relationship in the environment of the company, which reduces the resistance level to the project. Therefore, communication and understanding allow and promote the involvement with the end user.

Communication was indicated as a critical success factor, since without information, one is not able to guide the decisions regarding the projects. Therefore, there must be a position that knowledge management projects are essential for stakeholders, but they are also critical to manage change and to implement projects successfully.

The results support that the "view" of the projects was significantly important for the investigated projects and indicated a connection between project management, change and knowledge.

In order to give grounds for this connection, the author developed a view model based on: decision-making, objective of the project, integration, values, authorizations and strategic guide, in which the project management operates the processes in order to detect change, the change management operated the processes in order to define the change strategy, the knowledge management operates the processes and the understanding of what needs to be changed and how to accomplish that. These are interconnected by the guiding aspects of the view, with the purpose of achieving a clear view of the desired future condition and the connection to the mission of the project.

It is clear that the transferred knowledge is critical for the success of the projects, since only by interchanging knowledge cultures change, with no disrespect to the values and beliefs of the company. Therefore, defining goals and lessons learned indicate the operational direction of the project and is aligned to the strategic objectives, which helps managers in the future decisions to be made.

The support of the upper administration is in understanding and showing the whole organization how important it is to manage projects in an orderly manner. The success of a project depends on a series of factors, and the bases are the organizational structure, business alignment, methodology, informatization and qualification (CHRISTENSON, 2008).

Therefore, factors such as: showing world trends, taking initial measures for a management model to the deployed, making it clear that it is interesting that all projects are planned and followed according to the chosen model, creating an environment that promotes the fulfillment of goals (customer satisfaction, deadlines, costs, profits, quality) are measures to be taken. The set of behavioral attitudes according to the business needs is called culture. Such culture is not static, and it changes with time and with the business needs.

RESEARCH CLASSIFICATION AND METHODOLOGY

We may observe, from the researched literature, that there is need to investigate the success of project management. Therefore, at the end of project, we know whether the project was successfully managed or

not. For such, there is the need to know which guiding aspect and variables may be considered as important for the success of the management. Within that scope, this paper intends to contribute with a field survey in order to obtain and hierarchize such variables.

This research was classified as exploratory and descriptive, since it shows the characteristics of a certain phenomenon, and there is a concern with hands-on measures (GIL, 1999; ANDRADE, 1999). The study established four drivers groups, based on the ten knowledge areas of PMI. After investigating the processes, the variables were explored in such a way that they could be allocated to each suggested group in order to offer a better view of the project management.

The data were analyzed by project managers from 28 companies. The question "Which variables may leverage the chances of success of project management?" guided this research. For the companies selected, a primary data collection was carried out through a structured questionnaire for project management professionals. The researched respondents were project participants, director, project managers, and members of the project team.

The first part of the questionnaire contemplates seven questions related to projects managed by the respondent and as to his/her professional instruction. The questions are related to types and duration of projects, functions, courses and training, professional experience.

In the second part, the questions were based on the processes used to manage projects, according to the methodology promoted by PMBOK (2013). These processes include ten knowledge areas and were explored in such a way that the specific techniques and tools of each group could be allocated into four drivers groups that were responsible for a successful management. The questionnaire was constituted by seventy-eight questions, divided in groups, with nineteen questions regarding managerial abilities, twenty regarding critical success factors, fourteen regarding monitoring and control, and eight regarding lessons learned.

The analysis tools used were: Correspondence Statistical Analysis, whose function was to select the most important variables; Analytic Hierarchy Process (AHP) method, which hierarchized the variables into importance and application areas and, finally, the Joint Analysis, which validated the hierarchy of the variables statistically. The SAS statistical software carried out the correspondence and joint analysis methods, and Souza (2002) applied the AHP method using Excel spreadsheets according to the model.

The correspondence analysis is an exploratory technique for data analysis that distributes frequencies resulting from two or more qualitative variables. It allows the researcher to see associations through perceptual maps that offer the notion of proximity or association of frequencies of the non-metric variable categories (FÁVERO, 2009).

The Analytic Hierarchy Process - AHP - consists on a structured technique for decision-making in complex environments. It is a method applied for decision-making, in which human perceptions, judgments and consequences have long-term effects (FAVERO, 2009).

The joint analysis is a statistical methodology used in marketing researches, with several purposes that determine the relative importance given by consumers to relevant attributes and how useful they think the attribute levels are. Joint procedures try to assign values to the levels of each attribute, in such a way that the resulting values or the usefulness associated to the stimuli coincide with the input evaluations supplied for the research (MALHOTRA, 2012).

ANALYSES AND DISCUSSIONS

To assess the variables identified in the theoretical framework, through the perception of managers, an exploratory research questionnaire was defined containing 7 questions to analyze the organization and the profile of the respondent.

The survey data indicated that 46% of the conducted projects referred to new administrative processes or improvement management, 42% of the projects are from companies with over 5,000 employees, 68% of the companies have an income of over \$ 100 million Brazilian Reais a year, 46% of the projects last between 6 to 12 months, 61% of the performers are project managers, 46% have a short-term course, and 50% have from three to five years of experience.

From this analysis, we can see that most companies investigated have a high number of employees, and most respondents are project managers. That contributes as a basis for the quality of the answers, as well as to select the research variables.

Selecting the variables by drivers group

A set of variables that may be measured and submitted to the evaluation of the project managers was selected. Identifying the most relevant variables acted as a filter, from a significant number of variables identified by the available theoretical studies.

To assess the variables identified in the theoretical framework, through the perception of the managers regarding the level of importance and the application of the variables, an exploratory research questionnaire with four drivers groups were defined: 18 from the drivers group managerial abilities, 19 from critical success factors, 13 regarding monitoring, and 7 regarding control and lessons learned.

The 57 variables (Table I) identified were constituted by an extensive study about concepts of critical factors success, using a measurement criterion for the variables, where the variable must be subject to measurement or quantification, by its typology or by the use of some type of classification.

Table 1: Identifying the critical success factors by drivers group.

Variables from the Drivers Group Managerial Abilities	
1	Project communication
2	Acceptance of the project proposal
3	Commitment from the board of directs
4	Sufficient human resources
5	Team qualification
6	Participating in the planning
7	Identifying roles and responsibilities
8	Informing the evolution of the project
9	Determining the critical success factors
10	Defining the schedule
11	Mapping processes
12	Realistic goals and objectives
13	Flexibility to change the project
14	Review of the needs of the users
15	Determining the financial boundary
16	Determining the end date for the project
17	Minimizing risks
18	Defining restrictions
Variables from the Drivers Group Critical Success Factors	
1	Scope definition
2	Project planning
3	Influence of stakeholders
4	Ability to communicate
5	Commitment of the team
6	Defining restrictions
7	Establishing goals
8	Determining the control points
9	Defining a reward system
10	Determining preventive measures
11	Project monitoring meetings
12	Indicating the deadline and budget variation
13	Determining the critical success factors
14	Recording the lessons learned

15	Meeting the budget
16	Meeting the scope
17	Meeting the deadline
18	Project close-up meetings
19	Project documentation
Variables from the Drivers Group Monitoring and Control	
1	Project monitoring meeting
2	Establishing goals
3	Preventive measure analysis
4	Realistic goals
5	Determining a reward system
6	Determining control points
7	Identifying goal deviations
8	Feedback meetings
9	Verifying the requests from the customer
10	Project environment
11	Planned vs. actual budget variation
12	Planned vs. actual deadline variation
13	Planned vs. actual benefit variation
Variables from the Drivers Group Lessons Learned	
1	Conclusion within the planned deadline
2	Conclusion within the planned budget
3	Conclusion according to the scope established
4	Information of the project evolution
5	Changing objectives and goals
6	Discussion of the lessons learned
7	Compiling the project documents

Source: Elaborated by the authors

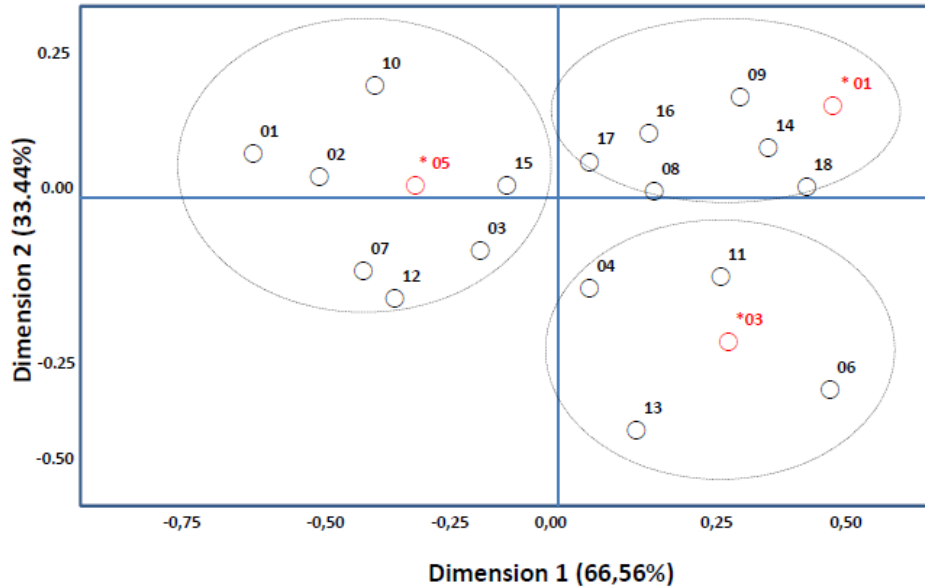
In a second stage, the identified variables were transformed into questions in order to identify how important it is and how it is applied. High, medium and low importance and application percentages were applied.

Received the field research, the Correspondence Analysis method was applied in order to classify the variables. For the drivers group managerial abilities, the variables close to the grade (*5), highlighted in black, were considered as highly important, the ones close to (*3), of medium importance, and the ones close to (*1), of low importance, as shown in Figure 1. The variables correlated with to Table I - drivers group management abilities.

The following variables: project communication, defining the schedule, accepting the project mission, team qualification, indicating roles and responsibilities, realistic goals and objectives, commitment from the board of directors, and determining the financial boundary were the variables identified as being the most important ones to be managed. The same procedures were applied to the other drivers groups.

The drivers group critical success factors was composed by 19 variables: defining the scope, planning the project, influence of stakeholders, ability to communicate, team commitment, defining restrictions, establishing goals, determining control points, defining a reward system, determining preventive measures, project monitoring meetings, indicating the deadline and budget variation, determining the critical success factors, recording the lessons learned, meeting the budget, meeting the scope, meeting the deadline, project close-up meetings and project documentation.

Figure 1: Variables from the drivers group managerial abilities, as to the importance level.



The drivers group monitoring and control was composed by 13 variables: project monitoring meetings, establishing goals, preventive measure analysis, realistic goals, determining a reward system, determining control points, determining a deviation from the goal, feedback meetings, verifying the requests from the customer, project environment, planned vs. actual budget variation, planned vs. actual deadline variation, and planned vs. actual benefit variation.

The drivers group lessons learned was composed by 07 variables: conclusion within the planned deadline, conclusion within the planned budget, conclusion according to the established scope, information on the evolution of the project, changes of objectives and goals, discussion of the lessons learned and compilation of project documents.

Hierarchy of variables by drivers group

Identified the relevant variables it was necessary to know the degree of importance of each variable. The analysis methods selected to hierarchize such factors were the Analytic Hierarchy Process (AHP) and the Joint Analysis.

In order to apply the AHP Method and build the priority establishing model, we used the model by Costa (2002), developed by Excel spreadsheets, version 2010. The method was applied on the four drivers groups suggested – Managerial Abilities, Critical Success Factors, Monitoring and Control, and Lessons Learned. The hierarchy shown by the AHP method for the drivers group managerial abilities as to the level of importance is presented in Table II.

Table II: Hierarchy of variables through the AHP method. Drivers group managerial abilities - level of importance.

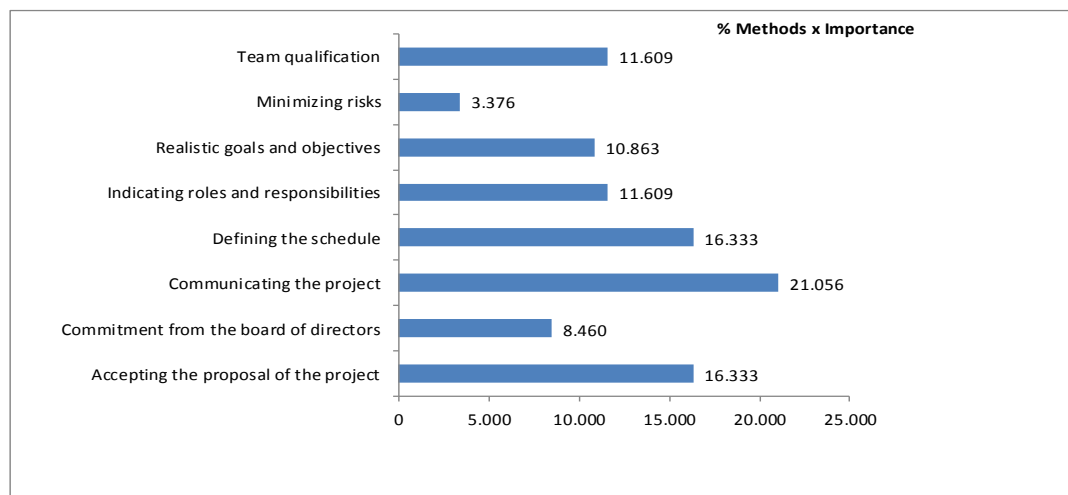
Framework II										Variables hierarchization		
Variables	1	2	4	5	7	15	16	17	Sum	Variables	Importance	Variables description
1	0,215	0,200	0,302	0,205	0,200	0,130	0,239	0,302	1,792	1	22,41%	Project communication
2	0,215	0,200	0,181	0,159	0,200	0,130	0,170	0,181	1,437	2	17,96%	Acceptance of the project proposal
3	0,043	0,067	0,060	0,114	0,067	0,043	0,102	0,060	0,556	3	6,95%	Commitment from the board of directors
5	0,024	0,029	0,012	0,023	0,029	0,019	0,011	0,012	0,158	5	1,97%	Team qualification
7	0,215	0,200	0,181	0,159	0,200	0,130	0,170	0,181	1,437	7	17,96%	Identifying roles and responsibilities
10	0,215	0,200	0,181	0,159	0,200	0,130	0,170	0,181	1,437	10	17,96%	Defining the schedule
12	0,031	0,040	0,020	0,068	0,040	0,026	0,034	0,020	0,279	12	3,49%	Realistic goals and objectives
15	0,043	0,067	0,060	0,114	0,067	0,391	0,102	0,060	0,904	15	11,30%	Determining the financial boundary
	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	8,000		100,00%	

Análise de Consistência			
α_{max}	9,130		
Índice de Inconsistência	16,14%	n =	8
Razão de Inconsistência	11,45%		

Source: Elaborated by the authors.

The Joint Analysis method, in this research, determined, from the selected variables, the relative importance of each variable in relation to the other ones. The objective was to hierarchize the variables within each drivers group. The method was applied through the statistical software SAS version 9.3. When applying the method, the selected variables were hierarchized through the correspondence analysis method. Figure II indicates the selected and hierarchized variables of the drivers group managerial abilities as to the level of importance.

Figure II. Hierarchy of variables according to the Joint Analysis Method Drivers group managerial abilities - Level of importance.



Source: Elaborated by the authors.

However, in the groups monitoring and control and lessons learned, in the importance level, and lessons learned in the application level, the correspondence analysis method only selected seven variables.

Therefore, at the end of the analysis, from the hierarchized variables (total of eight and seven), we chose to select the six most relevant ones.

Analysis of the selected variables

In this stage, the variables from each drivers group were selected by level of importance and application in order to select the six most relevant ones. Table III, IV, V and VI show the variables selected and hierarchized by the Analytic Hierarchy Process and Joint Analysis methods as to the level of importance of the drivers group managerial abilities, critical success factors, monitoring and control, and lessons learned.

Table III. Hierarchy of the variables of the drivers group managerial abilities - Level of importance.

Analytic Hierarchy Process – AHP – Method			Joint Analysis Method		
Variable Number	Hierarchy	Variable description	Variable Number	Hierarchy	Variable description
1	22.41%	Communicating the project.	1	21.06%	Communicating the project.
2	17.96%	Accepting the proposal of the project.	2	16.33%	Accepting the proposal of the project.
7	17.96%	Indicating roles and responsibilities.	10	16.33%	Defining the schedule.
10	17.96%	Defining the schedule.	7	11.61%	Indicating roles and responsibilities.
12	11.30%	Goals with realistic objectives.	5	11.61%	Team qualification.
3	6.95%	Commitment from the board of directors.	12	10.86%	Commitment from the board of directors.

Source: elaborated by the authors.

Table IV. Hierarchy of the variables of the drivers group critical success factors - Level of importance.

Analytic Hierarchy Process – AHP – Method			Joint Analysis Method		
Variable Number	Hierarchy	Variable description	Variable Number	Hierarchy	Variable description
1	13.37%	Defining the scope of the project.	1	14.85%	Defining the scope of the project.
2	13.37%	Planning the project.	15	14.85%	Meeting the scope.
16	13.37%	Meeting the scope.	4	13.52%	Commitment from the team.
17	13.37%	Project close-up meetings.	14	13.26%	Meeting the budget.
5	11.48%	Defining the restrictions.	2	12.20%	Planning the project
4	11.32%	Commitment from the team.	4	10.87%	Ability to communicate.

Source: elaborated by the authors.

Table V. Hierarchy of the variables of the drivers group monitoring and control - Level of importance.

Analytic Hierarchy Process – AHP – Method			Joint Analysis Method		
Variable Number	Hierarchy	Variable description	Variable Number	Hierarchy	Variable description
1	23.08%	Project monitoring meetings.	1	20.51%	Project monitoring meetings.
8	13.53%	Feedback meetings.	6	17.52%	Determining the control points.
11	13.53%	Planned vs. actual budget variation.	13	16.24%	Planned vs. actual benefit variation.
13	13.53%	Planned vs. actual benefit variation.	8	11.96%	Feedback meetings.
10	11.57%	Project environment.	11	11.96%	Planned vs. actual budget variation.
12	11.57%	Planned vs. actual deadline variation.	12	11.96%	Planned vs. actual deadline variation.

Source: elaborated by the authors.

Table VI. Hierarchy of the variables of the drivers group lessons learned - Level of importance.

Analytic Hierarchy Process – AHP – Method			Joint Analysis Method		
Variable Number	Hierarchy	Variable description	Variable Number	Hierarchy	Variable description
1	25.61%	Conclusion within the planned deadline.	1	28.94%	Conclusion within the planned budget.
2	25.61%	Conclusion within the planned budget.	2	23.68%	Informing the evolution of the project.
3	20.93%	Informing the evolution of the project.	3	26.31%	Conclusion within the planned deadline.
4	13.36%	Conclusion according to the scope.	4	18.42%	Conclusion according to the scope.
5	5.10%	Compilation of project documents.	5	2.63%	Changing objectives and goals.
6	4.70%	Changing objectives and goals.	6	0.00%	Compilation of project documents.

Source: elaborated by the authors.

ANALYSIS OF THE SELECTED VARIABLES

Table VII, VIII, IX and X showed the selected and hierarchized variables through the Analytic Hierarchy Process and Joint Analysis methods as to the level of application of the drivers group managerial abilities, critical success factors, monitoring and control, and lessons learned.

Table VII. Hierarchy of the variables of the drivers group managerial abilities - Level of application.

Analytic Hierarchy Process – AHP – Method			Joint Analysis Method		
Variable Number	Hierarchy	Variable description	Variable Number	Hierarchy	Variable description
10	36.20%	Defining the schedule.	10	20.27%	Defining the schedule.
1	13.80%	Communicating the project.	2	14.77%	Accepting the mission of the project.
2	13.80%	Accepting the mission of the project.	16	14.45%	Determining the end date.
16	8.49%	Determining the end date.	1	13.73%	Communicating the project.
8	8.49%	Information as to the evolution of the project.	3	9.27%	Commitment from the board of directors.
7	6.41%	Indicating roles and responsibilities.	12	9.27%	Goals with realistic objectives.

Source: elaborated by the authors.

Table VIII. Hierarchy of the variables of the drivers group critical success factors - Level of application.

Analytic Hierarchy Process – AHP – Method			Joint Analysis Method		
Variable Number	Hierarchy	Variable description	Variable Number	Hierarchy	Variable description
1	25.85%	Defining the scope of the project.	1	17.76%	Defining the scope of the project.
2	15.85%	Planning the project.	5	15.35%	Commitment from the team.
5	15.85%	Commitment from the team.	2	14.15%	Planning the project.
17	13.89%	Meeting the deadline.	16	12.95%	Meeting the scope.
16	13.89%	Meeting the scope.	17	12.95%	Meeting the deadline.
15	4.89%	Meeting the budget.	17	10.54%	Ability to communicate.

Source: elaborated by the authors.

Table IX. Hierarchy of the variables of the drivers group monitoring and control - Level of application.

Analytic Hierarchy Process – AHP – Method			Joint Analysis Method		
Variable Number	Hierarchy	Variable description	Variable Number	Hierarchy	Variable description
12	22.78%	Planned vs. actual deadline variation.	12	20.91%	Planned vs. actual deadline variation.
1	16.85%	Project monitoring meetings.	1	18.23%	Project monitoring meetings.
11	15.46%	Planned vs. actual budget variation.	8	14.20%	Feedback meetings.
13	13.58%	Planned vs. actual benefit variation.	6	13.36%	Determining the control points.
6	11.06%	Determining the control points	11	10.18%	Planned vs. actual budget variation.
7	7.88%	Identifying the goal deviation.	7	7.80%	Identifying the goal deviation.

Source: elaborated by the authors.

Table X. Hierarchy of the variables of the drivers group lessons learned - Level of application.

Analytic Hierarchy Process – AHP – Method			Joint Analysis Method		
Variable Number	Hierarchy	Variable description	Variable Number	Hierarchy	Variable description
1	38.89%	Information as to the evolution of the project.	1	24.67%	Information as to the evolution of the project.
2	12.78%	Conclusion according to the scope.	2	20.77%	Conclusion according to the scope.
3	12.01%	Conclusion within the planned deadline.	3	19.48%	Conclusion within the planned deadline.
4	11.51%	Conclusion within the planned budget.	4	14.28%	Changes to objectives and goals.
5	10.74%	Changes to objectives and goals.	5	10.39%	Conclusion within the planned budget.
6	8.07%	Compilation of project documents.	6	10.39%	Compilation of project documents.

Source: elaborated by the authors.

Shows the hierarchical variables identified, it was possible to observe, through both conducted methods, that there was a convergence of a large number of selected variables.

Critical Success Factors

This research chose to consider the variables through the Joint Analysis Method as to the level of importance. The importance represents a consensus, since there are contexts in which the variables are important, but they could not apply due to the organizational context. Table XI, XII, XIII and XIV show the variables selected for a successful project management.

Table XI. Variables – Drivers Group Lessons Learned. Success Factors.

Variable Number	Hierarchy	Variable description
1	21.06%	Communicating the project.
2	16.33%	Accepting the mission of the project.
10	16.33%	Defining the schedule
7	11.61%	Indicating roles and responsibilities.
5	11.61%	Team qualification.
12	10.86%	Goals with a realistic objective.

Source: elaborated by the authors.

Table XII. Variables – Drivers Group Critical

Variable Number	Hierarchy	Variable description
1	14.85%	Defining the scope of the project.
15	14.85%	Meeting the scope.
4	13.52%	Commitment from the team.
14	13.26%	Meeting the deadline.
2	12.20%	Planning the project.
4	10.87%	Ability to communicate.

Source: elaborated by the authors.

Table XIII. Variables – Drivers Group Monitoring and Control.

Variable Number	Hierarchy	Variable description
1	20.51%	Project monitoring meetings.
6	17.52%	Determining the control points.
13	16.24%	Planned vs. actual benefit variation.
8	11.96%	Feedback meetings.
11	11.96%	Planned vs. actual budget variation.
12	11.96%	Planned vs. actual deadline variation.

Source: elaborated by the authors.

Table XIV. Variables – Drivers Group Lessons Learned.

Variable Number	Hierarchy	Variable description
1	28.94%	Conclusion within the planned budget.
2	23.68%	Information as to the evolution of the project.
3	26.31%	Conclusion within the planned deadline.
4	18.42%	Conclusion within the established scope.
5	2.63%	Changes to objectives and goals.
6	0.00%	Compilation of project documents.

Source: elaborated by the authors.

CONCLUSION

Based firstly on the critical success factors, this article suggested guiding groups to identify organizational competences, indicate processes or groups of processes that lead to success in projects and reveal critical success factors. This study extends the researches by Hyvräri (2006), Andersen et al. (2006), and Christenson (2008) as to the identification of the variables responsible for the success of projects.

The most important variables of the projects executed were identified as the level of importance and application. The research was conducted with 28 project managers in companies from different fields of activity

In order to answer the key question that guided this research, we may say that several factors influence the performance of a project. However, few answer for the possibility of success. Critical factors revealed in this research converged with the theory investigated by indicating basic and vital factors for a successful project management. The research showed the following conclusions:

From the theoretical reference, the variables to be managed for a successful project management were identified. Using the project management methodology, which includes the ten knowledge areas, the following variables were identified for each drivers group: (1) eighteen in the managerial abilities group; (2) nineteen in the critical success factors group; (3) thirteen in monitoring; (4) seven in lessons learned.

After identifying such variables, three types of analysis were adequate: a) Correspondence Analysis, which identified the variables indicated as relevant among the critical success factors. The selected ones were rearranged within each drivers group; b) Analytic Hierarchy Process – AHP – Method, which created a hierarchy of the variables for the application and importance levels; c) Joint Analysis – determined from the variables selected by the correspondence method the relative importance of each variable and hierarchized it within each drivers group.

We verified that the hierarchy of the variables conducted by the joint analysis and AHP methods converged into a large number of variables, for the importance and application levels. This research chose to consider the variables hierarchized though the joint analysis method as to the level of importance, considered the most precise one. Through this method, six variables indicated by this research as relevant were selected for each drivers group.

The Critical Success Factors (variables) identified by the four drivers groups, by order of importance, were:

- 1) Managerial Abilities Group – ability to communicate, defining the schedule, accepting the proposal of the project, indicating roles and responsibilities, defining realistic goals and objectives and team qualification;
- 2) Critical Success Factors Group – defining the scope of the project, the deadline of the project, the commitment, planning, ability to communicate and meeting the budget;
- 3) Monitoring and Control Group – monitoring meetings, deadline variation, benefit variation, control point, budget variation and identification of goal deviations;
- 4) Lessons Learned Group – deadline, budget, communication, project proposal, goals and project documentation.

Therefore, the factors that lead projects to success depend on the objective of the project, the influence of managers, the management control and the learning records for future project consultations. In this investigation, the communication variable was considered relevant in all stages of the project management. That is, the ability of the manager makes the difference for the success of the project. In the drivers group lessons learned, the variables conclusion within the deadline and planned budget, information as to the evolution of the project, and conclusion according to the established scope were considered as the most relevant ones to be recorded. This reinforces the research by Fortune et al., (2011) that, for the decision-making, the financial variables and control factors are strongly correlated to the success of the project.

In sum, the critical factors create reference parameters that work as a basis to leverage the success of projects. The discussion on what really corresponds to the success of a project and the discovery of the managerial factors that may lead a project to success influence the path to be followed in order to be successful. The difference is in the controls, which are more accessible to the project manager. Thus, the benefits are in understanding the factors that need follow-up. Further studies may extend the research on how to structure ways to organize information, and suggest analysis structures for the results obtained, which are considered additional factors for the success of projects.

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