

Management of Public Projects in a Contingency Approach

An Empirical Investigation and Proposed Roadmap

Leandro Ranolfi Girardi, Roque Rabechini Junior

Nove de Julho University, Brazil
e-mail: lrkira@hotmail.com, roque@rabechini.com.br

Abstract

The research about management of public projects has grown in recent years, because the quest for compliance with the principles of economy, efficiency and effectiveness has forced public organizations to seek better performance on their projects.

Thus, this study examined how to relate the classification of projects and critical success factors to improve efficiency and effectiveness in the implementation of public projects. The authors resorted to the literature on contingency approach in project management, specifically the NCTP "Diamond" model, and the ten critical success factors of the Project Implementation Profile - PIP to propose a roadmap that will support the objectives of this research. The proposition of a roadmap is justified to mitigate the risks of schedule delays, additional costs and changing in the scope of projects.

Introduction

The quest for efficiency in public administration, coupled with the growing demand of the society for quick responses and measurable results, require the application of management techniques from the private sector in the public sector [1]. In this sense, the project management shall be considered an important tool for organizations to achieve their goals effectively. However, the success in project management has been questioned in recent years, because the premise of a universal theory might be a major cause of problems in projects, given the fundamental differences between them [2].

In this context, the contingency approach becomes an opportunity to defend a single management method does not apply to all projects [5] and that better results could be obtained if the projects were classified and were related to critical success factors. In light of the literature, the success factors in projects, in general, are linked to moderate variables associated with the characteristics of projects, which can be classified [2, 6]. Thus, beyond the critical factors are impacted by the type of projects [7], can predict the performance of projects through its strategic and tactical balance [8].

Research Problem, Objectives and Plan

The need for rapid responses, combined with the current trends of market and technological innovations, force public organizations to seek tools that allow them to adapt to these demands. The project management, whose benefits were little known in this sector, is now considered an important means of public organizations achieve their goals effectively. In

this way, is necessary to develop an integrated approach between the critical success factors and the classification of projects for better performance.

Although the use of projects in the public sector is increasing, there are still misconceptions in choosing the method of management and the critical success factors more appropriate [9]. Furthermore, deficiencies in how projects are selected and managed limit the scope of their strategic objectives [10]. However, in response to these difficulties, the use of contingency theory for projects could contribute to the choice of the most appropriate management style for different projects [4]. Assume that all projects require the same level of attention, or underestimate the true risks involved, can lead to project failure [5].

According to Sauser, Reilly and Shenhar [11] most studies have investigated the factors that help to project success, while few studies have focused on finding alternative structures that allow understand what drives the projects to fail, suggesting that the theory contingency could bring new insights. These evidences are sufficient for the authors to conclude that therefore, some merit in investigating empirically the relationship between NCTP "Diamond" model and Project Implementation Profile - PIP, through interviews with projects managers and team members and document analysis (software, management reports, spreadsheets, control, etc.).

The principal objectives of the study are: a) understand how the public projects, target of this research, were managed by the NCTP "Diamond" model and the critical factors of the Project Implementation Profile – PIP, b) examine how to relate the models (NCTP and PIP), and c) propose a roadmap to improve efficiency and effectiveness in the implementation of public projects.

This paper is structured in five sections. The next presents a theoretical synthesis on managing public projects, contingency approach in projects and critical success factors. Then, section three provides the research methodology. In section four are presented the results and their analysis from the perspective of NCTP "Diamond" model and the critical success factors of the Profile of Implementation Project. Finally, the fifth section presents the final considerations, recommendations and limitations of the study.

Literature review

For the development of this research, the following conceptual foundations were used: public projects, contingency approach and critical success factors.

Public projects

In recent decades, the use of projects in the public sector is increasing in response to pressure to abandon bureaucratic management models [9]. This movement is often labeled as New Public Management [12], providing for the application of management techniques from the private sector in the public sector to cut budgets and increase the quality of services [1].

The public project differ from private by the following characteristics: a) the political nature makes it difficult to gaining the leadership of the project, the commitment of employees and from top managers, b) the objectives are not linked to profits, influencing the definition of strategies, c) uncertainty in definition of the responsible by the process, resulting in different interpretations of the goals and objectives, beyond to prejudice the negotiations between different actors, d) presence of specific legislative restrictions that affect managerial interventions, e) lack of experience in project management, and f) lack of management controls [9].

Thus, in response to mistakes in choosing best method of management and the most appropriate critical success factors [9], the contingency theory in projects could help to mitigate these shortcomings [4].

Contingency approach

In recent years, one notes the emergence of different projects in the public sector. However, although other studies suggest that public projects can be managed in the same way, due to the similarity of business, the literature and experiences in organizations prove otherwise [9]. Several studies corroborate with this assertion, pointing out that a single management method does not apply to all types of projects [3, 4].

The classification of projects led to the development of several models to assess the contingency theory, but, so far, there is no one that is dominant [11]. Thus, it was opted by the NCTP "Diamond" model, which evolved the classification of projects considering only the technological uncertainty and complexity [13], for a model composed of four dimensions: novelty, complexity, technology and pace [5].

A novelty dimension, classified as derivative, platform or breakthrough, determines how the new products are and how clear and well defined are the initial requirements. The technology is the level of uncertainty, which, seeking to measure the uncertainty in the knowledge of technologies of projects and product development, was divided into four levels: low-tech, medium-tech, high-tech and super-high-tech. The complexity of the project, in turn, depends on the complexity of the product, dividing into assembly, system and array. Finally, the pace, which can be characterized as regular, fast/competitive, critical or blitz, is determined by the time available to complete the project [4].

The NCTP "Diamond" model, beyond to evaluate the product, task and environment, suggests what might be the ideal classification and appropriate management style to each project [5]. Furthermore, the literature indicates that the classification of the projects allows the association of their characteristics with the factors of success or failure [2, 6].

Critical success factors

The comprehensive use of projects in organizations has stimulated the search for factors that influence their success, but little consensus has been reached on the subject [14]. Thus, in a study of more than four hundred projects, Pinto [15] identified ten factors as being responsible for the success in 61% of these projects. Such factors, classified as strategic and tactical, are part of the Project Implementation Profile - PIP proposed by Pinto and Slevin [8].

In the group of strategic critical factors is the project mission, involving clearly defined goals for the understanding of the project team and other departments in the organization, and the search for detailed specification of the steps for implementing the project. The top management support was also rated as strategic when evidences the willingness of top managers to provide the necessary resources and authority for project success [8].

In the group of tactical critical factors stood out the client consultation, aiming at communication and active listening of all parties involved in the project; personnel issues, resulting in the recruitment, selection and training of the project team; technical tasks, emphasizing the availability of technology and expertise required to perform the steps of project; and client acceptance, in reason on their importance to measure the effectiveness of the project. In the same group, three other factors were characterized by participating in all phases of the project life cycle: monitoring and feedback by providing control information at each stage of the project; communication, that consists in the network where all necessary information flow between the key actors of the project; and troubleshooting, reflecting the ability to handle unexpected crises and deviations planning [8].

Thus, the literature shows that the degree of importance of the success factors is impacted by the type of project [7, 2], even if the same critical factors are used in its implementation [16]. Therefore, according to Pinto and Slevin [8], the strategic and tactical

efficiency of the projects could be assessed through performance in the implementation of the ten critical factors provided in the Project Implementation Profile - PIP.

Methodology

In order to meet and become familiar with the phenomenon under study, the authors sought to obtain a new understanding of it. So, as this research aims to increase knowledge about the phenomenon, explain and apply concepts and point out practical possibilities of conducting research in real situations, was characterized as an exploratory study [17].

The multiple case study was adopted as a method because the researcher had virtually no control over the events, the context is relevant to the organization and the theme is contemporary [18]. Aiming additional information, beyond the literature was used the documentary research, which, according to Martins and Theóphilo [17], contributes to problem analysis, by the use of documents as a source of data and evidence.

Several sources of evidence were used in the research, especially the monitoring of meetings with the manager and his staff and documentary analysis from the access to the project management company manual, management software, control spreadsheets generated by the organization, management reports and other documents, plus spontaneous interviews (unstructured) made with the manager and some members of the project team.

The object organization of this study is a national public services company, focusing on projects for economic and social development of entrepreneurs in different sectors (agribusiness, trade, industry and services). The selection of the organization, which contain approximately 1,100 employees, is because of the proximity of the author with the same, justifying the choice of units of analysis present in the state of São Paulo. In this context, two projects were selected for this study.

One of the projects of this study is from agribusiness, whose goal was to improve the productivity and quality of stone fruits (peach, plum, etc.) produced by 200 farmers present in the southeastern state of São Paulo. The project included performing managerial training, technical consultations, and actions to maintain or access new markets, providing an investment of R\$185,750.00 in 12 months. The project manager is postgraduate, has 57 years old, 9 years working in the company and 1-year experience in project management. The team consisted of 4 members.

The other project was the service, whose purpose was to train 100 entrepreneurs for the improvement of accommodation, feeding and receptive services in their endeavors, as well as create a catalog for the dissemination of sightseeing in the region. The project deadline was 2 years and investment of R\$812,580.00. The professional who served as manager of this project is postgraduate, has over 30 years old, 2 years in the company and 2 years in project management. The team consisted of 5 members.

Thus, the objective of this research was to understand how agribusiness and service projects were management through the existing theories of contingency approach and critical success factors and, subsequently, analyze how to relate the NCTP "Diamond" model and the Project Implementation Profile - PIP to improve efficiency and effectiveness in the implementation of public projects.

The development of this work involved the following steps: a) elaboration of the research question, b) description of the theoretical framework that supports the entire study, c) collecting data from the two cases studied, d) analysis and discussion of the results based in the performance of the cases, the adherence of the projects to the NCTP "Diamond" model and the Project Implementation Profile - PIP and in the investigation about evidence of relationship between the models (NCTP and PIP), and e) completion of the work, compound of recommendations and limitations.

Results and analysis

The evaluation of results was carried out using the variables described in the theoretical framework (NCTP "Diamond" model and Project Implementation Profile - PIP), and was presented at the end, a comparative analysis between them.

Vision by NCTP "Diamond" model

The adherence of the projects to the NCTP "Diamond" model was analyzed. The objective was to demonstrate the existence of differences between the management model used by managers and the required by the projects. Thus, there was no claim to exhaust, in this section, all the details that led to different classifications.

As for the dimension novelty, the agribusiness project was classified as platform, because provided a new generation of products to cater to a market still unknown by entrepreneurs (school lunch). In this new market, the quality standards were specific and pre-determined, requiring significant adjustments in production, organizational and business process. However, due to the change of manager during the execution of the project, the initial requirements were lost and the level of management has become derivative. In this classification, the projects are defined as extensions and improvements of existing products [4]. On the other hand, for the service project there was no distinction between the ideal style of management and applied (derivative), because it sought the improvement of an existing product (tourist catalog), whose specification was known as a result of similar studies in previous years.

On the issue of complexity, both projects were managed as assembly, but involved greater complexity (system). Just as projects grow in complexity, there is an increase in the ambiguity of information that can influence them and create an environment that goes beyond the capabilities of teams [19]. In the case of service project, the volume of technical and management training, prerequisite for that the clients had published their companies in the catalog, demanded the integration of different skills. The agribusiness project, in turn, required constant interaction of the manager with the stakeholders, whose political influences directly affected the project implementation.

With regard to technological uncertainty, the service project chose to use a known methodology, already tested in other projects of the organization, suggesting the classification of low-tech. However, despite the methodological basis, the specialty in "accommodation services" demanded the incorporation of new skills (medium-tech). The technological changes result in different organizational consequences [20]. The agribusiness project had the management model used compatible with the required (medium-tech), due to the use of known technique as "breaking of dormancy" of the plants, stimulating the production of the fruits in periods of low demand.

In the pace dimension both projects had differences between the ideal management style and the deployed. As for the agribusiness project, the ultimate goal was to meet deadlines and the volume of deliveries of fruit for school lunches. As the program included regular deliveries and on specific dates (critical), contemplated the fulfillment of strict schedules for which the product was in good condition for feeding. The service project was considered common (fast/competitive) and managed in this form. However, being the tourist catalog the primary means for the dissemination of the rides, the loss of time for their printing and dissemination prevented the marketing campaign, characterizing the project as critical.

In this respect, in three of the four dimensions of the NCTP "Diamond" model, the managerial approach would have underestimated: a) agribusiness project: complexity, novelty and pace, and b) service project: complexity, technological uncertainty and pace. Similar results were found in other studies, demonstrating that although the number of

projects in the public sector is increasing, there is still difficulty in selecting and choosing the most appropriate management method for that the objectives of the projects are achieved [9].

It is evident, therefore, the necessity of classifying public projects, because by the uniqueness that characterize themselves, use of a single method of management applied to all kinds of projects, is a major cause of project failure [2, 4, 5]. Furthermore, the literature indicates that the characterization of the projects could be related with the critical success factors [2, 6], contributing not only to the selection of optimal management model, but for the efficient and effective implementation of the projects.

Vision by Project Implementation Profile - PIP

When evaluating the projects in the light of the critical factors suggested in the Project Implementation Profile - PIP, it is perceived that there was low adherence, between what the literature says and practiced for the agribusiness project, (3 among 10 critical factors were applied) and high grip for the service project (7 among 10 critical factors were applied).

With respect to mission, both projects (agribusiness and service) showed no clearly defined goals. Similar results were found for the project schedule, where there was no evidence of the existence of a formal planning. On the other hand, showed up opening by senior management to the supports needed (top management support) to the service project. Divergence occurred only in case of agribusiness, which although the senior management guarantee the necessary authority and resources to the project manager, even in crisis situations, had it sharing efforts in other activities of the organization. The literature suggests that the moment of crisis is when upper management should provide greater support to the project manager [16].

In the service project there was little client consultation and low involvement of stakeholders. Thus, if the manager is not aware of the needs of stakeholders will not be able to determine whether they are being met [8]. However, in the case of agribusiness the consultation to customers occurred in different phases of the project, demonstrating concern for the efficient use of public resources. On the other hand, despite the errors encountered in service project implementation, as in the case of agribusiness, there was strong interest from project managers to the business expectations were met, resulting in an acceptance rate above 80% (client acceptance).

The fact that customers' needs have not been raised, with depth, at the beginning of the agribusiness project, aggravated the low assertiveness in the choice of specialties of team members (personnel), requiring new technical skills during the project. The reverse was found in the service project, where specialties provided supported the project needs. It is noteworthy, therefore, the importance of managers also evaluate whether team members are sufficiently committed to the activities [8, 16].

By the need to incorporate new technologies (technical tasks) was hired a consulting firm for technical support in the two projects (agribusiness and service). However, except in the case of service, even in this new approach, there was no proper selection of suppliers that guaranteed the dominance of the specialties required in the agribusiness project. Similar results were found for communication, where the only project that showed clear evidence on this critical factor was the service. In the other case there was evidence of communication, however unstructured, demonstrating that such action occurred spontaneously and unplanned.

Evidence of monitoring and feedback and troubleshooting were identified in the service project, but although the project has been divided into phases, did not provided rules of validations. In the case of agribusiness, no monitoring and troubleshooting records were found. In this sense, monitoring, alone, could bring earned for the prevention of problems during project execution [8].

Based on the analysis of the projects from the perspective of Project Implementation Profile - PIP, one realizes that, in the case of agribusiness project, there was no concern on the part of the manager, with selection and monitoring of critical factors that could guide the best performance of the project. However, the service project, even with greater adherence to the Project Implementation Profile - PIP, also resulted in noncompliance with the scope, time and cost. Therefore, it is suggested that the classification of projects would be the first step towards for better management of critical factors.

Comparative analysis

Regardless, the two models referenced (NCTP "Diamond" model and Project Implementation Profile - PIP) could bring significant contributions to the management of public projects. However, while several researches are seeking the factors that help to project success, few studies have focused on finding contingency structures [11]. In this context, it was found in this study the possibility of convergence between the two structures, whose relations were identified project by project, as shown in Table 1.

Table 1: Relationship between the models.

Project Implementation Profile - PIP	NCTP "Diamond"			
	Novelty	Complexity	Technology	Pace
Project mission	A, S	A, S	A, S	A, S
Top management support	A, S	A, S	A, S	A, S
Project schedule	A, S	A, S	A, S	A, S
Client consultation	A, S	S	A	A, S
Personnel	A		A, S	
Technical tasks	A		A, S	
Client acceptance	A		A	S
Monitoring and feedback	A, S	A, S	A, S	A, S
Communication	A, S	A, S	A, S	A, S
Troubleshooting	A, S	A, S	A, S	A, S

Legend: Table 1 shows the relationship between the models (NCTP and PIP) when analyzing the agribusiness (A) and service (S) projects.

Thus, we can conclude that the critical success factors of strategic group (project mission, top management support and project schedule) and some tactical (monitoring and feedback, communication and troubleshooting) showed possible relations with all dimensions of the NCTP "Diamond" model (novelty, complexity, technology and pace), while other critical factors (client consultation, personnel, technical tasks and client acceptance) are related randomly, suggesting that distinct relationships could occur in different projects. Corroborating with these results, other authors argue that the causes of success are not universal for all projects, since different initiatives could show different relations, demonstrating the importance of contingency approach in project management [2].

Based on the analyzes performed in this study it can be concluded that the failure of the project was the result of mistakes in choosing the best management model, corroborating with the literature [11]. The flaws identified include both strategic field, by manager had not done the proper classification of projects and thus identify the ideal management style, as in the tactical field, while neglecting the adoption and monitoring of critical factors, which may ensure better results during project implementation. In this context, Rabechini and Carvalho [14] make a similar analysis, but correlating efficiency and effectiveness on projects.

In this sense, improve efficiency and effectiveness in the implementation of public projects could be obtained by the following roadmap: a) 1^o step: classify the project by the four dimensions of the NCTP "Diamond" model (novelty, complexity, technology and pace), b) 2^o step: relate the critical factors of the Project Implementation Profile - PIP (project mission, top management support, project schedule, client consultation, personnel, technical tasks, client acceptance, monitoring and feedback, communication and troubleshooting) with the four dimensions of the NCTP "Diamond" model, respecting the characteristics of each project, and c) 3^o step: balance the critical factors, classifying them as strategic or tactical, in search of efficiency and effectiveness in project implementation.

Therefore, the proposal of a roadmap for project management is supported by the literature studied, where, due the impact of the project classification on the degree of importance of the critical success factors [7, 2, 6], the strategic and tactical efficiency could be achieved through the implement of the Project Implementation Profile - PIP, in compliance with the dimensions: a) strategic: project mission, top management support and project schedule, and b) tactical: client consultation, personnel, technical tasks, client acceptance, monitoring and feedback, communication and troubleshooting [8].

Conclusion

The bibliographic review from this study provides a set of inputs to guide the management of public projects. It is possible to identify similarity and complementarity among the surveyed references with the cases, ensuring the better interpreting and analyzing the projects studied.

The adoption of two projects of different sectors as the focus of analysis for this study led to three goals: a) understand how the cases studied were managed by the NCTP "Diamond" model and Project Implementation Profile - PIP, b) examine how to relate the models (NCTP and PIP), and c) propose a roadmap to Improve efficiency and effectiveness in the implementation of public projects.

Based on the results of this research, it was possible to understand how the management of both public projects was performed by the NCTP "Diamond" model and Project Implementation Profile - PIP. It is concluded that the mistake in the classification of projects and the negligence in the selection and monitoring critical factors can bring negative impact on the efficiency strategic and tactical of the projects. Thus, this study does not corroborate with the statement that all projects are managed by a single method. Fact evidenced by the problems encountered in the target projects of this research (schedule delays, increased costs and scope change), demonstrating that the failure of projects was result of managerial shortcomings.

It can be seen that although the organization adopt some practices for project management, there are still gaps between what is proposed in the literature with regard to the classification of projects and selection of the critical factors that contribute most to your success. Thus, it is suggested that the relationship between models should occur as pairs, in other words, the association between the variables must be analyzed by comparing each dimension of the NCTP "Diamond" model, with each of the critical factors of the Project Implementation Profile - PIP.

Therefore, this study has met its objectives previously established to highlight the importance of creating a roadmap that relate the classification of public projects to critical success factors, so that problems like those that originally influenced this study had its risks mitigated in the next projects managed by the organization. Furthermore, it is important to note that the roadmap has been empirically suggested based in the literature and that has the ultimate goal to point out practical possibilities of conducting research in real situations.

Limitations and Further research

The study has limitations, especially with regard to the involvement, even if indirect, of authors in the projects and by the roadmap proposed has not been tested. Furthermore, a more representative sample of projects would be required for the application of statistical analyzes that would support the relation between the models (NCTP and PIP). However, by the exploratory nature of this research, greater effort was made to point out practical viabilities of realization.

Finally, it is suggested for future research, statistical validation of the relationship between the models and the application of the proposed roadmap, to quantify its real contribution to improving the performance of public projects.

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