

PAPER • OPEN ACCESS

## Adoption of project management methodologies in Colombia project manager's perspective

To cite this article: H F Castro Silva *et al* 2018 *J. Phys.: Conf. Ser.* **1126** 012032

View the [article online](#) for updates and enhancements.

### You may also like

- [The benefits of applying project management methodology on project delay: A study in construction projects in Iraq](#)  
Hayder K Aljamee and Saja M Naeem
- [Estimation and Analysis of Costs for Electrical Power Transmission Lines in Iraqi Projects](#)  
Wadhah A. Hatem and Kadhim R. Erzaij
- [Intelligent management methodology based on the performance results of customs authorities](#)  
Galina Goremykina, Yulia Gupanova and Zoya Udalova



**IOP | ebooks™**

Bringing together innovative digital publishing with leading authors from the global scientific community.

Start exploring the collection—download the first chapter of every title for free.

# Adoption of project management methodologies in Colombia project manager's perspective

**H F Castro Silva<sup>1</sup>, T Velásquez Pérez<sup>2</sup> and M P Rojas Puentes<sup>3</sup>**

<sup>1</sup> Universidad Pedagógica y Tecnológica de Colombia, Sogamoso, Colombia

<sup>2</sup> Universidad Francisco de Paula Santander, Ocaña, Colombia

<sup>3</sup> Universidad Francisco de Paula Santander, San José de Cúcuta, Colombia

E-mail: hugofermando.castro@uptc.edu.co, tvelasquezp@ufpso.edu.co

**Abstract:** Project management is a discipline with broad global growth in recent years, judging by the growth in formal education programs, professional societies, editing of bodies of knowledge and certifications for practitioners in the discipline. This cross-sectional quantitative research identifies the degree of adoption of project management methodologies and analyzes the relationship of their application with the project success in the Colombian context. The results of this study suggest that there is no statistically significant relationship between the application of project management methodologies and the project success.

## 1. Introduction

Although project management as a discipline has its origins in the 1960s [1,2], it is, after 1980, that project management has become increasingly popular in various industrial sectors [3,4]. The need and acceptance of project management as well as the obligation to deepen its study, have generated the formation of professional organizations in the discipline and the development of bodies of knowledge or methodologies and standards of best practices in project management [5], which have been adopted in a large number of organizations [4].

According to [6], projects were historically considered as large and complex undertakings, and between 1930 and 1950, they were carried out mainly at the initiative of the authorities, who prioritized the problems of decision, formulation and achievement of the objectives against the project efficiency. However, in the 1960s the methods and techniques of project management gradually began to be used in English-speaking countries, being the origin of the discipline with a classical view [1-2-7]. Since 1980, the number of projects in all fields and the focus on their efficiency and effectiveness have made project management the ideal way to design, manage and execute successful projects and provides a permanent advantage in the dynamic context of industrial organizations [3,4,8,9]. Currently, project management has professional organizations in the discipline, bodies of knowledge and standards of best practices [5], which have been adopted in a large number of organizations [4,6,10].

In a project environment, a methodology is considered as a defined process that documents a series of steps and procedures that use an integrated set of tasks, techniques, tools, functions, responsibilities, and milestones, through which the project advances, is carried out, concludes and is delivered successfully [11]. In a complementary way, for [12] the project management methodologies are structures that guide the operations and allow to achieve their objectives, usually arranged as a set of clearly defined processes, resources and activities. Later, in 2009, [13] proposes a series of



characteristics that must be associated with a methodology, so it can be considered as good within the field of project management.

In the last decades, the discipline has had a rapid expansion in terms of significance and impact, because of the emergence of GP professional associations in several countries, which have tried to standardize methodologies under the assumption that they are effective for most projects in all sectors and environments [14]. According to [15], this approach to the GP generalization and standardization reflects its origin in the bases of engineering; however, according to these same authors, the discipline navigates at a crossroads between specialization and fragmentation to serve sectors where the contexts in which the projects are implemented have distinctive characteristics.

In this way, project management has become an essential element for the success of projects in all types of organizations, regardless of the industrial sector or the project size. Within the context of project management, GP methodologies are seen as a means that can be applied to increase the probability of meeting project goals [11-16]. The appropriate use of the different GP methodologies give advantages to the organizations that implement them, in comparison to those that do not; for example, the first ones have clearer objectives in their projects, have a better identification of the necessary resources for their execution, ensure a better rendering of accounts and results, and improve the achievement of project objectives [11-17]. However, there are no empirical studies in Colombia that show the degree of adoption of project management methodologies, nor research that proves these hypotheses related to the positive impact of the application of project management methodologies on the project success.

## 2. Methodology

The research objectives are to describe the degree of adoption of GP tools and analyze their impact on the project performances in the Colombian context, in such a way that the research development is framed in the non-experimental quantitative paradigm, because it uses data collection and statistical analysis to test hypotheses, establish patterns and test theories [18]. In order that the results of this research can be compared with those obtained in other studies, the design of the methodology is similar to that of studies with common characteristics in other areas such as those of [19,20].

Once the literature review was carried out, a questionnaire for data collection was designed consisting of three sections. In the first section, demographic information related to the type of organization and project characteristics is investigated; the second section is dedicated to collecting data related to the application of project management tools in each phase of the project life cycle. This type of questions is designed on a Likert scale.

The population of this research is constituted by the total of project managers in Colombia and therefore it has a large size. The parameter to be estimated is a proportion and no previous studies are considered, so it is necessary to use a random sampling that "consists of dividing the population into subsets whose elements have common characteristics; that is, homogeneous strata inside [21]. In this case, as suggested by [22], the sample size is calculated under the scenario of maximum variability, that is, with  $p = q = 0.5$ , with a significance level of 5%, and an estimation error of maximum 0.05 ( $e$ ), obtaining that the sample size is 273 project managers. The data tabulation and analysis as well as both descriptive and independent hypothesis tests, are carried out in the *statistical software R*®.

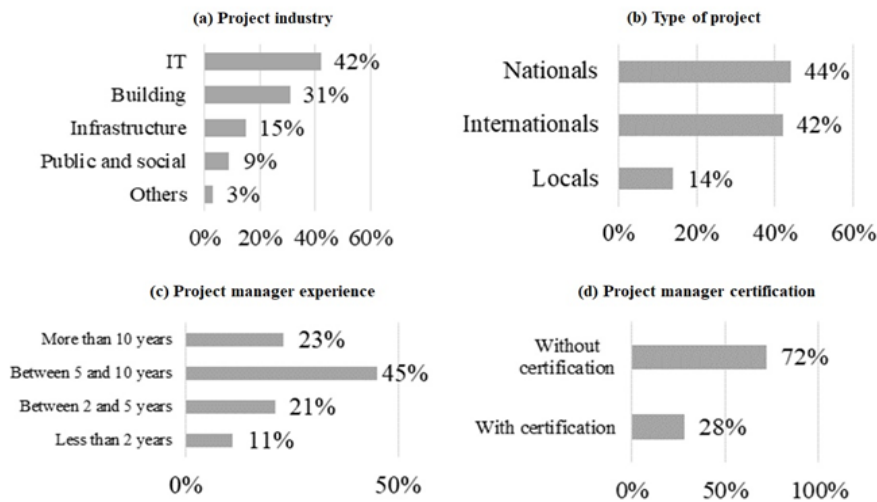
## 3. Results and discussion

In this section, we present the results of the analysis of the data obtained from the application of the questionnaire to project managers in Colombia.

### 3.1. Demographic characteristics of the sample

The project managers that make up the sample of this research, mostly participate in information technology projects (42%) and in construction projects (31%), followed by infrastructure projects and public or social projects. It is noteworthy the large percentage (42%) of project managers participating in the study who have directed international projects, and that only 14% of them participate in local

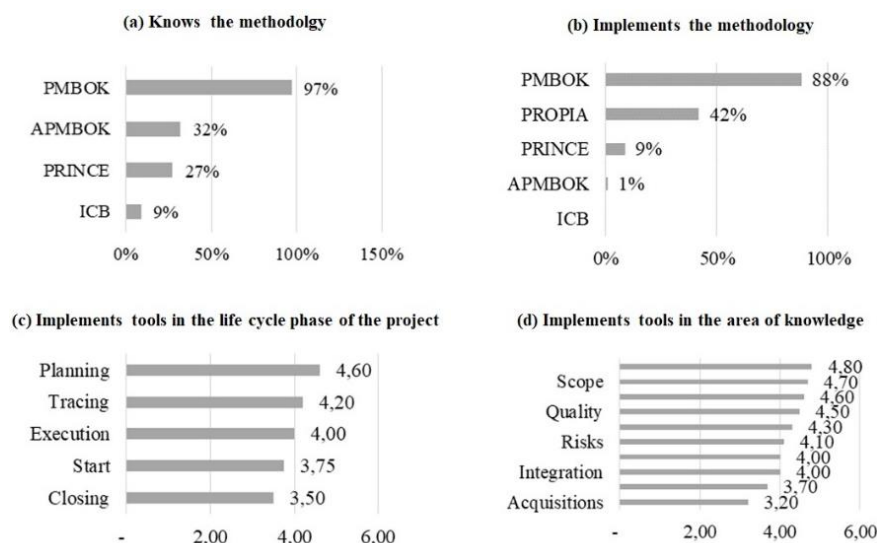
projects. Likewise, the importance that is given in the Colombian context to the certifications of the project managers is relevant, judging by the fact that 72% of them is already certified in some project management standard. Finally, 77% of the project managers participating in this study have five or more years of experience. These results are illustrated in Figure 1.



**Figure 1.** Demographic characteristics of the sample of project managers in Colombia.

3.2. First research question

The marked influence of the US project management standard is evident. Almost all project managers know the PMBOK issued by PMI, approximately one third of the sample knows the European APM standard, and approximately one quarter of the project managers are aware of the UK PRINCE standard, as represented in Figure 2. Regarding the methodology or standard implemented by project managers, 88% manage their projects using the PMBOK, but it is noteworthy the large percentage (42%) of project managers who, in their interventions, implement their own methodology adapted to the characteristics and needs of their organization (see Figure 2).

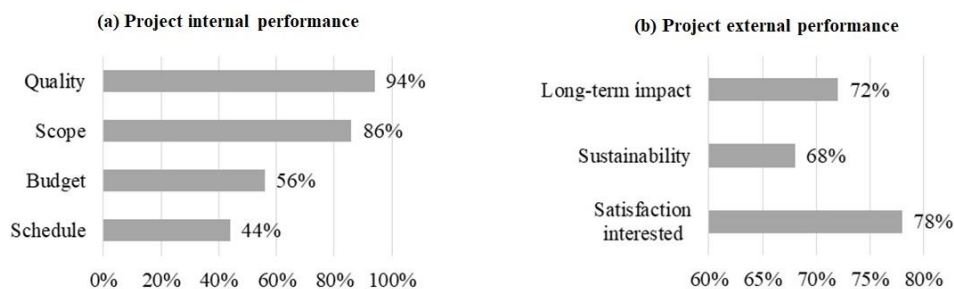


**Figure 2.** Degree of adoption of project management methodologies.

When inquiring about the usefulness of the project management methodology during the life cycle of the project, as illustrated in Figure 2, in the opinion of the project managers the greatest effort in the management and the greatest utility of the implemented project management methodology are perceived in the planning phase of the project, followed by the monitoring and control phase, and the project closure is the phase to which less management effort is devoted. Likewise, the results of the study indicate that the project managers in Colombia are more oriented to the implementation of methodologies that allow them to control the so-called iron triangle of the project, giving greater importance to budget management, significance, timeline and the quality of project deliverables, as shown in Figure 2.

### 3.3. Second research question

Factors related to compliance with basic restrictions such as budget, deadlines, deliverables and quality are considered as critical internal factors that determine the project success. Figure 3 shows the obtained results, from which it can be highlighted that in the opinion of the project managers it is frequent to find unsuccessful projects under the mentioned criteria; the variable that shows the worst performance is the program fulfillment, followed by the compliance with the budget and, while the variables with the best results are those related to compliance with the project deliverables and their quality requirements. In the opinion of the project managers who participated in the study, projects have better external performance in the Colombian context, having as criteria for evaluation of this category of success the long-term organizational impact, the project sustainability and the satisfaction of the groups of project stakeholders, as represented in Figure 3.



**Figure 3.** Internal and external performance of the projects in the Colombian context.

Tests of statistical independence were carried out to test if there is a relationship between the implementation of project management methodologies with the success in the project internal performance. The variable degree of adoption of project management methodologies results from calculating the general average of the ratings granted by the project managers to the use of each of the tools and methodologies considered in the questionnaire. Table 1 shows the obtained results. Considering a degree of significance of 5%, it can be affirmed that there is no significant relationship of statistical dependence between the degree of adoption of project management tools and methodologies and the project internal performance in terms of compliance with time, significance, quality and budget.

**Table 1.** Independence test between the adoption of tools and the project internal performance. This table is of own elaboration.

Critical success factor	Chi-square	p value
Time fulfillment	76.572	0.12015
Quality fulfillment	83.348	0.34122
Deliverable fulfillment	77.137	0.2891
Budget fulfillment	118.590	0.4567

Regarding the influence of the adoption of project management methodologies in the Colombian context in the successful external performance of the interventions, the results of this research with a significance of 5% allow concluding that there is not enough statistical evidence to accept that there is a relationship between both variables. The Chi-square values and the observed significance shown by the test can be seen in Table 2

**Table 2.** Independence test between the adoption of project management methodologies and the project external performance. This table is of own elaboration

Critical success factor	Chi-square	Observed significance
Beneficiary satisfaction	37.132	0.2755
Project's long-term sustainability	42.456	0.1863
Long-term impact on organizational objectives	77.235	0.3723

#### 4. Conclusions

The results of this empirical research applied to a representative sample of project managers in Colombia, allow concluding a high level of adoption of project management methodologies, which are significantly influenced by the PMI guidelines. It is evident that the Colombian market puts great pressure on the certifications of project managers. Likewise, the results show that the phases of the life cycle of the project with the greatest management effort are planning, monitoring and control. The project management methodologies implemented in Colombia are mainly oriented to the management of the project's iron triangle, that is, to guarantee the fulfillment of the budget, significance, timeline and quality of the deliverables of the project.

Nevertheless, despite the high degree of adoption of generally accepted project management methodologies, there are high indicators of project failure, being higher when evaluating internal performance (budget, timeline, significance and quality) than when evaluating external performance (satisfaction of project stakeholders, project sustainability and long-term impact on organizational objectives). The *p-value* results obtained by performing statistical independence tests allow us to affirm with 95% confidence that there is no dependence between the adoption of project management methodologies and the internal or external performance of the project.

#### References

- [1] Garel G 2003 Pour une histoire de la gestion de projet *Gérer et Comprendre* **74** 77-89
- [2] Pinto J K, Cubillos Vaellaneda J M 2015 *Gerencia de Proyectos: Cómo lograr una ventaja competitiva* (Pennsylvania: Pearson)
- [3] Shi Q 2011 Rethinking the implementation of project management: A value adding path map approach *International Journal of Project Management* **29** 295-302
- [4] Winter M, Smith C, Morris P and Cicmil S 2006 Directions for future research in project management: The main findings of a UK government-funded research network *International Journal of Project Management* **24** 638-49
- [5] Morris P, Crawford L, Hodgson D, Shepherd M and Thomas J 2006 Exploring the role of formal bodies of knowledge in defining a profession-The case of project management *International Journal of Project Management* **24** 710-21
- [6] Errihani S, Elfezazi S and Benhida K 2015 Adaptation and application of project management according to the PMBOK to a set of it projects in a public body *Journal of Theoretical and Applied Information Technology* **79** 191-202
- [7] British Standards Institution (BSI) 2010 *A guide to project management, BSI BS6079-1* (London: British Standards Institution)
- [8] Wirth I and Tryloff D Preliminary comparison of six efforts to document the project-management body of knowledge 1995 *International Journal of Project Management* **13** 109-18
- [9] Portny S 2010 *Project management for dummies* (New Jersey: John Wiley & Sons, Inc)
- [10] Ahlemann F, Teuteberg F and Vogelsang K 2009 Project management standards-Diffusion and application in Germany and Switzerland *International Journal of Project Management* **27** 292-303



- [11] Charvat J 2003 *Project management methodologies. Selecting, implementing, and supporting methodologies and processes for projects* (New Jersey: John Wiley & Sons)
- [12] Pharro R and Bentley C 2007 *The gover handbook of project management (processes and procedures)* ed J Rodney (London: Gover Publishing Limited)
- [13] Kerzner H 2009 *Project management-a systems approach to planning, scheduling, and controlling* (New York: John Wiley & Sons, Inc)
- [14] Morris P 2013 Reconstructing project management reprised: A knowledge perspective *Project Management Journal* **44(5)** 6-23
- [15] Ika L and Hodgson D 2014 Learning from international development projects: blending critical project studies and critical development studies *International Journal of Project Management* **32** 1182-1196
- [16] Milosevic D and Patanakul P 2005 Standardized project management may increase development projects success *International Journal of Project Management* **23(3)** 181-192
- [17] Turbit N 2005 Project management & software development methodology *The Project Perfect White Paper Collection* (Australia: The Project Perfect)
- [18] Hernández S, Fernández C and Baptista P 2010 *Metodología de la Investigación* (México: McGraw-Hill)
- [19] Patanakul P, Iewwongcharoen B and Milosevic D 2010 An empirical study on the use of project management tools and techniques across project life-cycle and their impact on project success *Journal of General Management* **3(35)** 41-65
- [20] White D and Fortune J 2002 Current practice in project management - an empirical study *International Journal of Project Management* **20(1)** 1-11
- [21] Arias F 2006 *El proyecto de investigación. Introducción a la metodología científica* (Caracas: Editorial Episteme)
- [22] Spiegel M and Stephens L 2009 *Estadística* (México: Mc Graw-Hill)