Qualitative Analysis About the Use of Frameworks and Best Practices for Project Management, A Systematic Literature Review

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Abstract

Project management is a very important factor for success or failure, about 12% of projects in the industry were destined to fail according to studies by the Project Management Institute. Therefore, it is relevant to know the scientific/technological evolution about the use of good practices, models and trends in project management that lead to a successful implementation result to identify relevant findings that allow improving specific work approaches. This article presents a systematic literature review that analyzes 98 articles in English language within the period from 2011 to 2021 from three main databases of high relevance (Scopus, Taylor & Francis and SpringerLink), where a taxonomy involves the type of article, the origin, the validation methods, business unit, the level of implementation of the proposals and the degree of new approaches for reference frameworks is analyzed.

The results and findings of this article will allow to detect areas of opportunity that contribute to indicators of scientific production at the academic level and allows for future approaches to be made in the manufacturing industry of the bajio area in Mexico, adapting frameworks models according to their requirements.

Keywords
Program management, Framework, Project.

1. Introduction

The project life cycle are the phases or stages that a project goes through from its beginning to its end. A project phase is defined as the set of project activities, logically related, culminating in the completion of one or more deliverables, these can be sequential, iterative, or overlapping (Project Management Institute, 2017).
According to () projects are divided into different phases to make administration and control more efficient. Together, these phases are called the project life cycle. According to (Turkulainen, et al., 2014) the first research on project management is between 1930 and 1950 where the terms of projects and programs were used as oneself. Likewise, the author emphasizes focusing on the basic terms of program and project management, as well as the differences between them, describing the definition of program as a set of projects, aimed at concentrating all the activities required to achieve a set of important benefits.

It is important to know more about the evolution of project management the methodologies used, fields of application and generation of new knowledge and good practices that allow to better guide future research better founded applications. That is why this article offers a review of the systematic literature through a qualitative analysis that discusses the methodological and technical diversity used over a period of 10 years in the field of program management and the use of frameworks. Likewise, its purpose is to identify areas of opportunity and know the fields that are often under this analysis, analyzing the results obtained through research and generating a graph that allows us to visualize the data in a clear and precise way, facilitating the reader's understanding of this work.

This document comprises 5 sections of great importance, starting with the introduction in Section I, followed by the Literature Review shown in section 2, Section 3 describes the systematic methodology used for the preparation of this article. Section 4 presents the results in the data collection providing the information in section 5, which shows the results and findings in the 98 articles analyzed, ending in section 6 where this research work is concluded.

1.1 Objectives
The objective of this work is to develop a systematic process using a proposed taxonomy that allows to know advances, identifying findings and areas of opportunity in the use of models or frameworks of reference for project management as part of best practices and information is outlined for the approach of tropicalized proposals to the requirements of different industrial areas that require it.

2. Literature Review
The importance of project management to keep proper control is a topic that has been studied over time, where various tools have been obtained, for example, Henry Gantt popularized in 1910, a similar graph in the United States that he elaborated with the aim of representing how much time the workers of a factory spent working on a specific task (Martins 2022) what we currently recognize as the Gantt chart.
The above shows that knowledge is important to solve specific challenges, same knowledge part of the shared contribution of information on the success or failure cases in the application of ideas, models or tools, such is the case of (Martinsuo & Hoverfält, 2018), who presents an empirical review on programs and their management, identification of repetitive patterns in the research domains and the underlying theories, as well as revealing avenues for future research, the aim is to identify the distinctive and current character of program management as a form of multi-project organization, through analysis providing relevant and feasible proposals for future research in program management. In the same way as mentioned (Miterev et al. 2015), it must be understood that, coupled with frameworks, program managers must have an ability to improvise and adapt to constant conditions of change, have a skill in relationship building and stakeholder management, as well as possess more sophisticated leadership competencies than project managers. It is important to note that within the systematic review process carried out, no more information is detected on the development of a qualitative literature review on project management models like the proposal.

In this literature review, the use of different theories was found that develops a proposal such as (Galbraith 1973) in which the theory of Organizational information processing studies how the organization should be structured and how it can acquire, use and process information, to manage the uncertainty it faces in its environment and operate efficiently and effectively. The Structural contingency theory, which studies how organizational structures, management, leadership, and decision-making should be differentiated based on the nature of the internal and external environment in different contingency factors Focuses on finding the right approach for each situation or context (Donaldson 2001). Theory of resource and capability-based view, which studies organizations as pools of resources (or capabilities) and how the organization might use the resources to achieve competitive advantage in the industry. Focuses on finding and developing unique resources that differentiate the organization from the competition (Grant 1991). The Agency theory that studies how directors and agents operate to achieve mutual benefits. It focuses on agency problems and their solutions (Eisenhardt 1989). The Actor-network theory which studies how networks of human and non-human actors are formed and maintained to achieve objectives. It focuses on the study of social situations through social forces in the work network (Latour 2005)

3. Methods
This literature review is carried out with relevant contributions in the scientific-technological field, reaching a systematic work approach for auditable processes, that is, obtaining the same results if the methodological process described is replicated. From an analytical point of view, a literature review is a systemic, explicit, and reproducible

approach to achieve an identification, evaluation, and interpretation of the existing body of documents analyzed and differs from traditional reviews by being systematic, clear, and easy to understand.

Therefore, this section specifically describes the methodological procedure carried out for this article, which is divided into three main phases: A) data collection, B) data analysis and C) synthesis and classification framework.

3.1 Data collection.

To obtaining the initial compendium of articles for the analysis process, it is necessary to develop the following steps:

1. Research question. This question provides focus and direction, which is what is the progress of academic research in relation to the development and use of frameworks for the development of new projects?

2. Search for contributions. In this step, the selection of three databases is considered, such as SCOPUS, Taylor & Francis and SpringerLink, as they are repositories with the largest number of articles cited, availability of recent contributions and research related to the topic of interest. In all three cases, the proposed keywords, "Program management", "Framework" and "Project" are entered, having as search criteria the analysis of only scientific articles published in English during the period from 2011 to 2021.

Classification and evaluation of results. In this step, all the articles found are collected and ordered under the criteria of the researcher for better access at the time of analysis, thus forming the collection of data or articles. Subsequently, it is analyzed under a proposed classification or taxonomy according to the research question, which is detailed in section C, which corresponds to Synthesis and classification framework

3.2 Data Analysis

After the search and collection of articles in reliable databases, a reference template is made with the help of a spreadsheet that facilitates the classification, as proceeded in (Pérez-Salazar, et al., 2016), evaluating specific fields according to (Mayring, 2014) guidance for the development of a qualitative content analysis perspective, where the year of publication is considered, type of article, area of knowledge, Journal, and country of publication, adding other criteria such as the method of solution, validation technique, business line or area of application, level of implementation and approval for solution of new projects in accordance with research needs.

3.3 Synthesis and Framework of Classification

The classification framework for this article is segmented into two important parts with the aim of differentiating the relevant classification, in the first part the items of the general descriptive analysis consisting of year of publication, source of publication, area of knowledge, country of publication and type of document of the data collection are detailed. The second part details the areas of descriptive analysis on the use of reference frameworks and project management, where the solution methodology and research method are found. The classification framework is described as follows:

3.3.1. Year of publication, source, sub-area of knowledge and country.

In each of the contributions of the data collection, the year in which the publications have been made within the established period is detected, which corresponds to the year 2011 to December 2021. Likewise, the source of publication or Journal where the article was registered and the country of origin are detected, in order to see the impact of scientific journals and the publication trend in related articles in the subject of study.

3.3.2. Type of document.

According to the descriptive analysis in the systematic literature review proposed by (Crossan & Apaydin, 2010) scientific articles can be classified according to their methodological perspective, obtaining theoretical articles, literature review, articles with empirical approach that build a theory, and articles with empirical approach that prove a theory.

For this work, theoretical articles are considered those that only present a discussion of specific topics without the conception of any frame of reference or model to follow and consequently do not have validation of any kind. Literature Review type articles are considered to be anyone who specifies a number of articles reviewed to show a trend, scientific contribution or to address new research. In the case of articles that contain a frame of reference from

experimentation, surveys or discussions, previous models and was validated or not with a case study or scientific technique, it is considered as an Empirical contribution to the construction of theory. If only one application of existing method or implementation of some technique is presented in real problems and no referential models are proposed, then the contribution is considered as Empirical application of theory, because they only apply proposals, techniques, or tools already existing and are limited to only evaluating the application. Research on Meta-analysis is detected using meta-search engines or meta-data in the development of research.

3.3. 3. Area of knowledge.
According to (Anon., s.f.), it indicates that technical contributions are classified according to the thematic content they address in research, where it can be classified into computer science, engineering, decision sciences, business and management, mathematics, multidisciplinary, social sciences, chemical engineering, arts and humanities, economics and finance, materials sciences, agriculture and biological sciences, astronomy, environmental sciences, psychology, and planetary sciences

3.3. 4. Research method.
This section identifies the research methods carried out by the authors to validate the proposals made in each of the articles detected. It is worth mentioning that the most used sections in the academic area are: simulation, case study, statistical validity and experimentation.

3.3.5. Area of application.
It is the classification and identification of the area of the productive sector in which each of the articles analyzed was applied, such as the areas of engineering, communications technology, construction, among others.

3.3. 6. Level of implementation.
The level of implementation demonstrates the scope of the proposal or solution described in the article.

4. Data Collection
The search in the databases generated significant results, which are made up of, SCOPUS that had a result of forty-three (43) articles, Taylor & Francis database there was a result of eight (8) articles and for the SpringerLink database of forty-eight (48) articles, generating a total of one hundred and one (101) articles that make up the collection of data analysis
It is important to note that there was no exclusion of articles due to duplicity, however, three articles were discriminated against for not being faithful to the search criteria, two for language and one for lack of information. In summary, the final compendium that is evaluated and classified amounts to ninety-eight (98) articles, which represents the definitive collection of analysis.

5. Results and Discussion
This section presents the result of the classification of the collection of articles analyzed to provide relevant descriptive information that demonstrates the importance of the application of frameworks in project management. The results of the proposed methodological framework are presented below.

5.1 Publication Year
According to the trend graph in **Figure 1** it can be argued that, in the years of 2013, 2015, 2019 and 2020 the number of contributions is higher than the average, which corresponds to 9 articles per year. From 2013 to 2018 there is a downward trend in related contributions, the same situation that recovers in 2019 and 2020 but a decrease of 14 contributions to 8 in a single year is perceived in 2021.
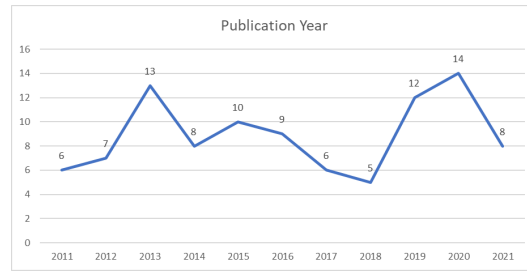
Figure 1. Trend of publication of data obtained in the period 2011 to 2021

In the same way, it can be glimpsed based on the data obtained, that the year of 2020 is the year with the highest number of contributions, with a total of fourteen publications, which shows a noticeable increase in research on the management of programs, reference framework and projects, compared to the years 2018 and 2019, even though the year of 2020 was extremely difficult and there were strong effects on the world economy due to the SARS COV-2 virus pandemic.

5.2 Knowledge area

Figure 2 shows the areas of knowledge present in the literature review, where the area of knowledge with the greatest contribution in the articles analyzed is Business, Management, and Accounting with a total of 26 articles of the 98 in analysis, managing to argue that the main focus for the investigation of management processes is focused on the administration of financial businesses. Similarly, the area of Computer Science occupies the second place as the most common area of knowledge, having a total of 15 articles; in the third position is the area of knowledge Environmental Sciences with a total of 13 articles referring to this area of knowledge.
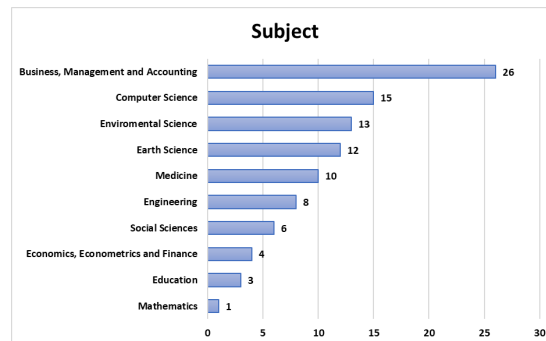

Figure 2. Numbers of articles published by subject area

The area of Business, Management and Accounting represents a total equivalent of 27% of the total publications analyzed, being the area with the greatest opportunity to obtain knowledge, followed by computer science, representing 15% and in third place the area of environmental sciences with a representation of 13%.

5.3 Ranking Results by Country

To make evident the participation of countries in the contribution of work related to project management, the origin of the contributions collected is analyzed to determine which country is the one that has had the most attention on the development of management plans, **Figure 3** proposes a graph that manages in percentage the participation rate for each country.
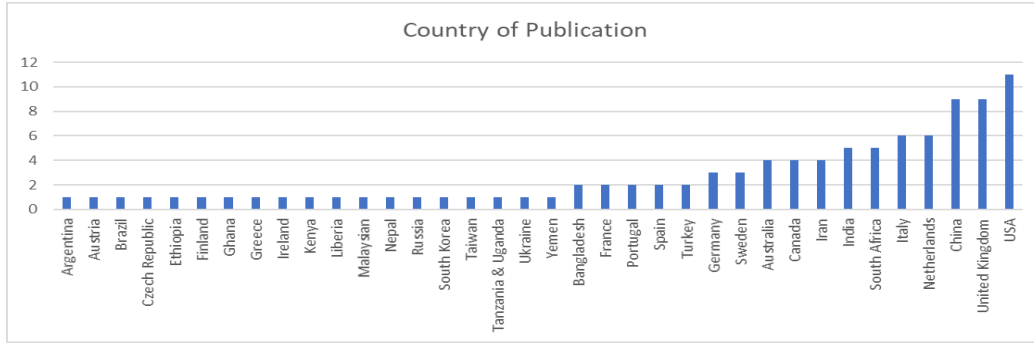
Figure 3. Participation result by country

In **Figure 4**, a representation on the geographical map can be observed with the total number of publications within the analyzed period, based on the percentage obtained during the segregation of contribution.
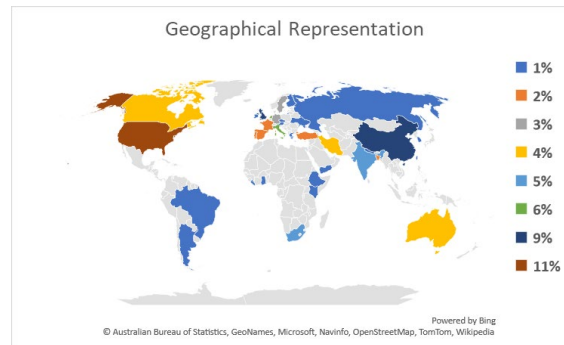

Figure 4. Geographical representation of publications

With the above, it can be observed that the United States represents the country with the highest contribution of articles published in the period range described above, with a total of 12.1% which is represented by 12 contributions of the 98 publications reviewed.

The second place is occupied by the United Kingdom in conjunction with China with a total contribution of 9 articles, which represents 9.1% of the total contributions. Thirdly, we can also observe that the number of contributions contains the same amount of articles by the Netherlands and Italy, with a total of 6 articles, which are equivalent to 6.1%, followed by South Africa and India with a total of 5 articles representing 5.1% each of the total population. Then we can see the other countries such as Canada with a total of 4 articles, Germany with 3 publications and France with 2, these being a sample only of the classification and position in which they are located.

5.4 Classification Results by Document Type

The results of the classification show in **Figure 5** that the most popular type of document in the analysis of the data collection are articles of the Literature Review type, with a contribution of 40 articles, which represent 41% of the total publications.
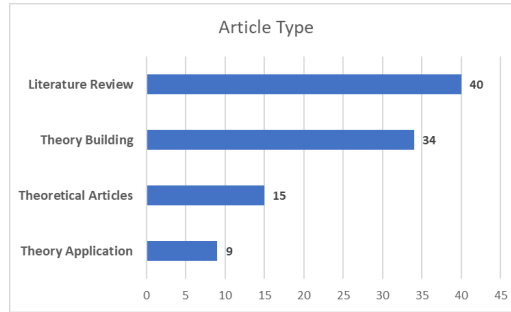

Figure 5. Number of Articles per Type

The above precedent that there is a need for greater contribution to apply existing methods or generate new models according to the needs or conditions of the problems and areas of application. However, the interest on the part of the scientific community in researching contributions in project management for the various purposes that the authors define is also relevant.

5.5 Research Method

The research method is the procedure that the researcher uses to test his theory. As we can see in **Figure 6,** the Case Study method is the most used with a total of 75 contributions of the 98 analyzed, which represents 77% of the total articles.
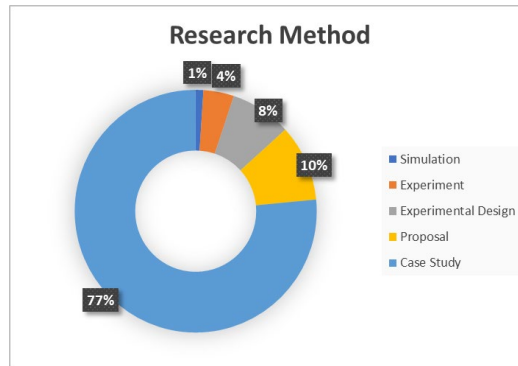
Figure 6. Research Method.

5.6 Application Area

The results of the application areas that have a greater contribution in the research on team management, as shown in **Figure 7**, is the environment area with a total of 23 contributions, followed by IT with 18 articles and in third place the engineering area.
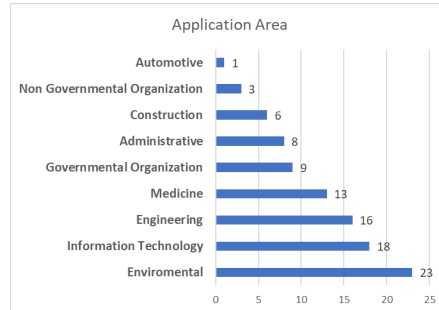
Figure 7. Area of Application

5.7 Level of Implementation

The level of implementation is the graphic representation that shows us the number of articles that indicate the level at which the contribution or research had as scope. We can observe that 44% of articles reached a level of proposal, that is, the author or authors indicated to us what their methodology or framework was, without reaching a practical result. **Figure 8** shows us the result of the research.
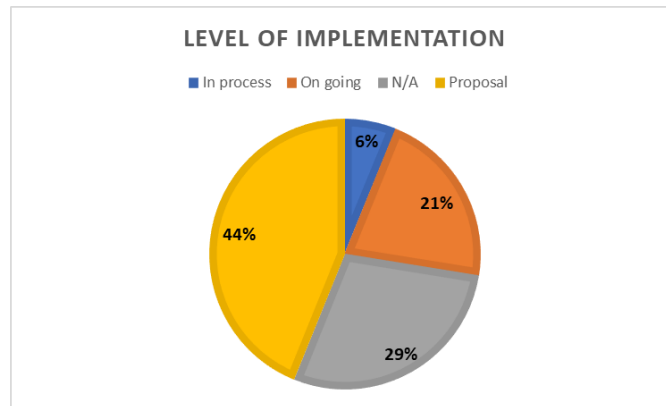
Figure 8. Level of Implementation.

We can summarize that, only, 6% of the contributions had a practical exercise, as well as the proof of this, in the same way, we observe that 21% of the proposed contributions are in a stage of execution / validation.

6. Conclusion

The development of this review of systematic literature related to the management and administration of projects in the scientific and technological field, allows us to have an overview of their evolution over 10 years, where it is possible to identify areas of opportunity on fields of study of greater relevance, as well as the behavior and use of certain research techniques; mainly the results obtained guide the construction of new proposals for both research and technical application, as the indices of application of reference frameworks for solving particular problems are glimpsed.

As part of the results of this analysis, we can highlight the great diversity of areas of implementation on the management and administration of processes, the search period shows us that the most recent contributions have been focused on relevant issues with the environment, followed by information technologies. It is even detected that in Mexico there is no significant progress in the management and administration of projects, as well as the proposal of published frameworks that can be used under the characteristics and needs of the projects of the Mexican industry, thus leaving a great area of opportunity for research and the creation of articles that allow to offer a more tropicalized approach. In this same context, it can be noted that a large part of the contributions tends to use case studies as a means of validation for the proposed approaches, taking as a reference that (United States) contributes to a greater extent with relevant publications.

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Biographies

Alberto de Jesús Rodríguez-Cuellar, graduated from the Technological Institute of Aguascalientes as a Mechanical Engineer in 2013, developing professionally as a manufacturing engineer specialized in metal mechanics, with more than 8 years of experience in the development of metal assemblies in soft tolling processes within the company of Flex LTD Aguascalientes in Metal Fab area. He has participated in the development of more than 10 projects in the medical and industrial sector, developing activities and the necessary skills for project management. In 2021 being the year in which he has served as coordinator of technical activities for the fulfillment of the activities.

He is currently focused on professional and personal growth, pursuing a master's degree in Management and Administration of Engineering Projects at CIATEQ A.C. Aguascalientes, forming part of the generation of students from 2020 to 2022.

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