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Modern Management In The Control Of Resources In The Construction Sector

Palacios-Alvarado Wlamyr^a ¹, Luna-Pereira, Henry Orlando ^b, Caicedo-Rolon, Alvaro Junior ^c

^{an} PhD in Business Administration, productivity and competitiveness research group, Orcid: <https://orcid.org/0000-0002-0953-7598>, E-mail: wlamyrpalacios@ufps.edu.co, Universidad Francisco de Paula Santander, Cúcuta – Colombia

^b PhD in Business Administration, Director Director of investigación & Desarrollo Regional IDR Group, Orcid: <https://orcid.org/0000-0003-2741-9170>, Email: henryorlandop@ufps.edu.co, Universidad Francisco de Paula Santander.

^c Doctor in Engineering, emphasis in Industrial Engineering, Director of productivity and competitiveness research group, Orcid: <https://orcid.org/0000-0002-3651-3364>, E-mail: alvarojuniorcr@ufps.edu.co, Universidad Francisco de Paula Santander, Cúcuta, Colombia.

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Abstract

The objective of this investigation is establishing the impact of project management in infrastructure works. The methodology used is based on various sources of secondary information through databases in indexed articles, published theses, related to public and private infrastructure projects, In conclusion, it is important to take into account the different methodologies and strategies of project management, which are designed to be fulfilled in a certain period of time, and thus avoid delays in the execution of a project, guaranteeing the quality and standards offered to the client, as well as allowing a constant evaluation of all the counterparts involved in the execution of the project.

Keywords: Project management;, Infrastructure; Works; Management system.

1. Introduction

The progress of society, city or community in particular is reflected in the different public and private projects in infrastructure works for which public-private partnerships are required for its execution to enter service for which project was conceived. Then, productivity and efficiency of infrastructure projects is essential to determine and establish the way in which countries will deal with global trends taking into account the rapid growth of humanity, which generates new requirements in the field of new technology openings and new practices of management to ensure the material and input for projects and logistics with which they are handled. (R S Alonso et al. 2020)

Infrastructure projects are distinguished by their difficulty, even more when talking about large-scale projects, long execution time of various stages, this is comprised from design to delivery, as well as a

¹ Corresponding author.

E-mail address: wlamyrpalacios@ufps.edu.co

huge mass of resources required for implementation (economic, material and human). (Arrieta, Espejo, and Perez 2013).

On the other hand, it is important to highlight the role of infrastructure investment in economic growth, which has been extensively analyzed in the economic literature, (see below). Economies need well-developed telecommunications, energy or infrastructure networks to expand their domestic markets and be internationally competitive, however, it is not only the quantity of physical infrastructure available that matters, but also its quality, a requirement that extends to the provision of the resulting services. (Bittencourt et al. 2013).

Along the same lines, the most relevant aspect of infrastructure development is its contribution to the amplification of a country's economic structure, which reveals the direct relationship between the territorial design and organization of production and distribution systems, on the one hand, and configuration of infrastructure, on the other. So that, national space, is also an indispensable requirement for the international connectivity of countries and their economies. (Bittencourt et al. 2013).

Therefore, there are three effects on the total return on investment in the infrastructure sector. First, infrastructure as a final product contributes directly to GDP formation through transportation, drinking water supply, electricity production, wastewater and communication services. Second, infrastructure investment creates externalities for production and overall levels of economic investment, which accelerates long-term growth. Third, infrastructure investment indirectly affects other inputs in the production process and the productivity of the firm. (Jhon Arquimides Reynaga Soto 2015)

Investment projects can refer to practically any area of human activity, whether public or private. In public institutions, the project is what makes possible the realization or implementation of a development plan. When referring to the category of projects, it refers to a sector that belongs to socioeconomic activities, and these projects are divided into economic, social and service infrastructure projects. Another way of distinguishing projects is by their nature, which means that they can be used to install or implement an integrated set of operational or production assets, or a combination of the latter. (Monroy Ramírez and Niño Valbuena 2014).

2. Method

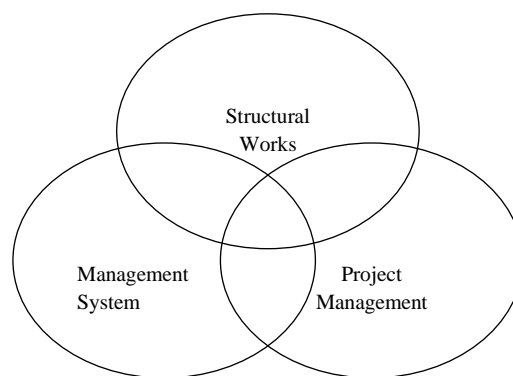
Infrastructure projects are a delicate issue when applying or executing a project, due to the magnitude that can be handled in terms of all kinds of resources, such as human, economic, material and territorial resources. One of the methods that are currently being applied to carry out a good organization are megaprojects of infrastructure, which comprehensively evaluate the performance of the operation and maintenance (O&M).

Mega infrastructure projects are a kind of national strategic projects that have a profound impact on politics, economy, science and technology, society, environment and other fields. In addition, they are basic platform and environmental guarantee for the sustainable socio-economic development of a country, hence, these are divided into two varieties of infrastructure, which are, for example, economic infrastructure (e.g, transportation project, public works, urban utilities project) and social infrastructure (e.g., education, culture and health facilities). So that, infrastructure refers to the system of public utilities established for the purpose of ensuring the normal development of national or regional economic and social activities, improving the living environment of human beings and overcoming natural obstacles. (Chen, Xiang, Jia, et al. 2022) says that China is one of the fastest growing countries in infrastructure, in 2020, China's infrastructure investment exceeded 18.5 trillion yuan, with 139,000 km

of railways, IMPs are characterized by large scale of investment, long construction cycle, complex construction technology and far-reaching impact, then this program should be measured by indicators.

The methods for infrastructure project risk management are diverse, these are necessary to improve implement the project, which propose a risk management framework to control risks. First, a comprehensive risk index system is established using the Delphi method. Second, a three-dimensional model including probability, loss and controllability is employed for risk assessment in which the analytical hierarchy process method is used for weight determination and the gray fuzzy method is employed for evaluation. Finally, the risks are assigned to the different participants and corresponding countermeasures are proposed, Infrastructure, which mainly includes charging stations and charging points, plays an important role in infrastructure projects (Wu et al. 2018),

Figure 2. Thematic Density Graph.



To collect information, it was necessary to design search equations, which were constructed by means of the key terms and the main topic of the article. The test equations were used until only four search equations were defined, since these were the ones that provided information for the present review.

SEARCH EQUATIONS

Ec. Bq₁ = project management + infrastructure Works

Ec. Bq₂ = Infrastructure works + developments

Ec. Bq₃ = management system + infrastructure

Ec. Bq₄ = impact on society + infrastructure

Databases established for the use of the above equations are ScienceDirect and Google Scholar. In these databases, all the bibliography of the present study was collected, in order to contribute with data and knowledge of different authors, in relation to the main topic, once the bibliographic articles were chosen, the documentary matrix was designed, this consists of consolidating all the general information of each of the bibliographic articles that were cited, such as, matrix fulfilled the objective of providing an order for the use of the information, then we proceeded to carry out an analysis of each of the articles, giving usefulness to important information of the bibliographic authors, as well as, giving a sense and structure of this article, based on the information used.

3. Results

3.1. Projects.

Regarding the definition of a project, (Villalta Paredes 2018) reference the following: According to Baca (2013) a project is the search for multiple solutions in an intelligent way to the approach of a problem, which aims to facilitate and achieve the goals outlined in a more effective way. It should be taken into account that an investment project is exposed to multiple factors of success and failure, which can directly affect the useful good or service that the project will produce for society.

According to the. (Villalta Paredes 2018) "a project is a temporary effort undertaken to create a unique product, service, or result" (p.72)

According to these definitions, projects are the answer to solve, supply, expand, improve, among others, the different social needs that arise day by day as a result of the advances in different fields of knowledge and that require the design and execution of viable and measurable projects in the time horizon, which implies the construction of different types of infrastructure that in turn contribute to improve the productivity of a certain region and therefore, that of a country.

In the same vein, infrastructure productivity is a key factor in determining how countries respond to global trends with increasing rates of urbanization, economic openness, market globalization, and technical innovation in production and logistics. (Arrieta, Espejo, and Perez 2013).

That is, for a given project to be carried out and respond efficiently to the purpose for which it was planned and structured to respond to a specific need of the community and the different social demands that require civil engineering projects among which we can mention, urban planning, roads, health, education, power generation, sports and cultural centers among others that must meet quality parameters in terms of design, materials, environmental impact, costs, These are fundamental aspects in all types of projects so that they fulfill the social function for which they were designed and planned, and that through their execution and start-up in the established times, they begin to function in an effective and efficient manner, in order to avoid the large number of unfinished, poorly planned and structured projects that finally end up in considerable economic losses, environmental degradation and affectation of the community where they are located. (Gonzalo and López n.d.)

As mentioned in the previous paragraphs, according to the different demands that exist in different communities, regions and countries, different types of projects are required and structured, whether public or private, or under the modality of public-private partnerships that allow the realization of civil engineering projects, different methodologies are taken into account according to the particular needs of each project.

According to (Sánchez Serna, A., Martínez, A., Del Río Cortina 2017) In general terms, project management methodologies provide a framework from which to establish a set of aspects that contribute to project success, such as the configuration of goals, the establishment of organizational sequences, the development of control processes and the dynamics of the project within the organization. organizational strategy The development of the decomposition of the inherent activity.

Thus, the PMBOK proposes a methodology applicable to any type of project (Arrieta et al. 2013). It suggests general issues to be addressed according to the characteristics of the type of project and sponsoring organization, focusing on the tripartite limits of scope, schedule and budget, emphasizing project closure based on compliance and commitment to deliverables within a framework of value

creation, in terms agreed in scope, with limited approaches to sustainability and impact parameters. (Monroy Ramírez and Niño Valbuena 2014).

3.2. Infrastructure projects

The term must be analysed and formalized, where (Kobylkin et al. 2020) establishes that this a process of execution of a number of engineering activities that are managed for the optimization of resources and time, to create a product, using different factors such as Iot, energy, education, transportation, social environment and security.

Infrastructure projects are executed to achieve a drawn objective and goals organizations, meeting the strategic objectives, execution time and cost, companies are increasingly concerned to reduce the percentage of unfulfilled projects due to improper management, since through this can be obtained various benefits and a broader value of the project (Silvius and Schipper 2016) the strategic value of any project is considered or determined on the basis of various social, ecological and economic dimensions (Control, Performance, and Contexts 2008) benefits, value and value creation may imply different things for the project contractor and for the client, however (Winter and Szczepanek 2008) this can be fulfilled by proper planning of the different phases of the project or product life cycle, which makes or generates that the project contractor and the client can be involved in the project life cycle. (Labuschagne and Brent 2005) The sustainability of a project can be understood from different perspectives, since as it is mentioned (Marcelino-Sádaba, González-Jaen, and Pérez-Ezcurdia 2015) sustainability in the business of projects of any kind refers to the process and delivery time and the quality of the project itself, which has the least number of nonconformities.

3.3. Internet of Things (IoT) in infrastructure projects

The global scope of the Internet of Things (IoT) is massive and growing exponentially across different industry sectors, those in the emerging digital world have recently witnessed the proliferation and impact of IoT-enabled devices, according to (Nord, Koohang, and Paliszkiwicz 2019) IoT has provided new opportunities in the technology arena, while raising the level of concern, but in order to talk more about IoT one must know what it means, (Ricardo S. Alonso et al. 2020) defined that the Internet of Things (IoT) refers to the connection of multiple heterogeneous objects such as machines, vehicles or buildings with electronic devices such as sensors and actuators through different communication protocols to collect and extract data, the IoT serves as a basis for research and development of solutions in smart homes, smart cities, Industry 4.0, logistics and transportation , energy efficiency, healthcare or agriculture furthermore (Ray 2017) states that it refers to machine-to-machine (M2M) communications which is a crucial component of the recent growth of the digital market, this complements it (Khanna and Kaur 2019) because it has defined it as the global information infrastructure of society, which provides advanced services through the interconnection of things (physical and virtual) based on existing and evolving information and communication technologies, but what objective or purpose does the IoT have, this explains it (Bittencourt et al. 2018) IoT aim to perform the following tasks: it is to connect and communicate thousands of devices to take full advantage of their applications and transform the collected data into information knowledge. Although a look of new applications is enabled by the IoT, this is also a source of further heterogeneity: different applications also have different requirements, which must be satisfied by the IT system that must meet the IT system that combines IoT devices with their applications as is a clear example (Minoli, Sohraby, and Occhiogrosso 2017) that mentions architectures for intelligent buildings. that offers different opportunities to revolutionize the connectivity in buildings of a large number of devices, which have the ability to face different adversities in the field of intelligent building, since through these applications solutions to problems can be established by

mathematical models through the deterministic variables that can yield the IoT-based systems can support these requirements organically. In particular, power over Ethernet (PoE), as part of an IoT-based solution, can support these requirements in an organic way.

3.4. Project Management

A project is usually bounded by several phases and milestones, which structure the project during its life cycle, depending on the phase model, a different number of phases corresponding to different objectives, actions, tasks, and activities may be used. In addition, the name and activities of each phase can be interpreted in multiple ways by different users, project management as a whole has a structure which contains a beginning and an end. During the initiation phase, a situation analysis is performed defining general requirements, objectives, context, scope and risks, several options are proposed and a solution is chosen for the start of any type of project, in this case infrastructure projects are governed by this same way of working, the following stages consist of the implementation of the objectives set, such as project release, phase release and finally the final evaluation of the project. (Croxatto and Greub 2017) It has been widely recognized that the justification for a project should be based on the long-term benefits that will accrue after the project is delivered, and these arguments are often discussed in the context of value. Infrastructure projects can be seen as a class of policy interventions that provide essential services to broad user groups and the public, so the value of infrastructure projects to society is difficult to measure. (Zerjav, McArthur, and Edkins 2021) The Asian Infrastructure Investment Bank (AIIB) is the newest multilateral development bank (MDB) with 83 member countries to date, with a focus on Asian infrastructure development, such as hydropower, road and rail infrastructure, with more than 106 approved projects related to energy, finance, transport and many other projects. (Shao, Tan-Mullins, and Xie 2021).

3.5. Project management in infrastructure works

Sustainability is becoming increasingly important in project delivery, Sustainable project management is particularly relevant for infrastructure projects that cause lasting changes in the community and involve multiple stakeholders with different expectations, to perform good project management control, This is where, for example, the terms of performance indicators come in, which can measure by parameters the results of any type of project, in this case, infrastructure projects, which are types of negotiations that usually handle quite large budgets, due to the volume of activities and resources that are handled. (Kivilä, Martinsuo, and Vuorinen 2017)

One of the most important factors in infrastructure systems or projects globally, is without discussion time, Time is an especially critical performance indicator in this context, delays are a critical problem for complex projects, as they lead to both cost overruns and profit shortfalls. Delays will increase both fixed costs (due to extended requirements for equipment, site sheds and cranes) and variable costs, due to increased and prolonged resource requirements, For these reasons, numerous studies have investigated the causes of time overruns on construction projects, Changes have problematic effects, in part because they exacerbate cost increases and profit shortfalls, However, changes are inevitable in construction projects due to a variety of factors that can occur unexpectedly, the previous concept of project management, which mainly involves control-centric practices based on planning, monitoring and exploitation, is no longer as efficient as before, requiring a more flexible definition to accept and manage changes instead of avoiding them. (Eriksson, Larsson, and Pesämaa 2017) The cost of equity is a key data used by regulators to set allowable rates of return and determine regulated tariffs. Regulators around the world typically use a single factor model to estimate the cost of equity, the Capital Asset Pricing Model (CAPM) and the Fama-French three-factor and five-factor models to estimate the cost of

equity for the Indian power and infrastructure sectors, although a study finds that the projected costs are always lower than the reasonable rate of return set by the respective regulator, hence the projections should always be set so that the investment variance parameter is high, but not exceeding what can be economically spent. (Patrucco, Moretto, and Knight 2021) In the case of infrastructure projects, this is a potential key to achieve an optimal financial performance, where the control of resources for materials, labor and others, as well as the management and control of suppliers are another important point to take into account to manage a good management of resources for infrastructure projects, since they are the ones that ultimately provide all the necessary resources for the development of the project, While supplier performance measurement systems (SPMS) provide a key tool for buyers to govern supplier relationships and performance, they can have a detrimental impact on trust and commitment when they are perceived as a simple means of control, in order to assess the impact of a systematic approach to supplier performance measurement on project performance (i.e. cost, time and quality). (Patrucco et al. 2021).

3.6. Risk management in infrastructure works

The term infrastructure generally covers all physical assets, such as machinery, equipment, buildings, furniture, vehicles, raw materials, products in process, tools, etc., and other important factors related to the production or growth of a project, and other important factors that are related to the production or growth of a project, therefore the risks in an infrastructure project are high, it is necessary to apply methods to protect the returns on infrastructure investments, since it is expected that by 2040 there will be a need for infrastructure investment of 94 trillion dollars worldwide, Infrastructure projects proved to be very resilient during the recent global financial crisis (GFC) in terms of risk-adjusted returns for investors. However, while this suggests that infrastructure is an attractive asset class for private investors, it does not automatically guarantee return on investment, which is why infrastructure projects are complex endeavors and include specific uncertainties and interdependencies among a large number of stakeholders. (Demirel, Leendertse, and Volker 2022).

In some countries, there are types of risks related to terrorism, which attack infrastructure around the chaos caused by people, whether they are citizen protests or even guerrillas on some occasions, Terrorism has had a substantial impact on both business interests and decisions in Latin America, Western Europe, the Middle East and North Africa, Attacks on infrastructure, in particular, are a major concern of the state and require both government and private sector intervention, this risk factor also affects commercial movement with entities, such as IPP projects are infrastructure developments in which all or part of the capital is provided by private investors. Traditionally, IPP projects have been constrained by national security concerns and the resulting perceived erosion of sovereignty, IPPs are a type of concession-oriented public-private partnership, in which a financially and organizationally independent entity is temporarily created by a consortium of companies, called sponsors, who work closely together to ensure the successful execution and completion of the project. (Jiménez and Lupton 2021) While there are numerous benefits associated with establishing a social risk management system for large infrastructure projects, such as discovering potential risks early, managing social risks innovatively, minimizing the occurrence of social conflicts, ensuring the smooth implementation of large projects and maintaining social stability, to implement such risk management systems in infrastructure activities, it is necessary to use a case study approach through a detailed description and critical analysis of the situation, in order to promote solution objectives. (Shi et al. 2015).

Another of the great risks that have or that are presented in infrastructure projects, are errors or delays in planning, as this leads to more time in development activities and therefore, more expenses, ie, cost

overruns of those already budgeted financially, Infrastructure project systems in themselves can cover very long periods of time from conception to completion, Some of these projects, such as transportation projects, for example, so it is important that the planning issues of a large-scale project be carried out in a precise manner so that these types of problems do not occur when having to extend the schedules of infrastructure projects, which is why it is important that the planning of large-scale projects be carried out in a precise manner so that these types of problems do not occur when having to extend the schedules of infrastructure projects. (Sözüer and Spang 2014) This is why large infrastructure construction projects are prone to risks, due to the complexities and uncertainties that can generate such large infrastructure works that often depend on a variety of factors that ultimately always affect the schedule of activities, these also depend on how the projects are organized, Risk management elements that are common in large infrastructure projects include: Multi-layered relationships, Cost, time and safety, Procurement and contracts, Environmental and social concerns, Construction innovation, Economic return. (Guo et al. 2014).

3.7. Infrastructure works

Public infrastructure systems (e.g., energy, water/wastewater, telecommunications, and transportation) function as arteries of modern urban communities, as they provide vital services to meet social and economic needs, the management of such infrastructure projects is perceived as particularly challenging and risky due to their inherently complex interdependence and dynamic nature, In addition to all those aspects that such a subject matter encompasses, such as having a schedule of activities and projected budgets for the completion of the work, they require substantial resources, broad scopes of work and diverse specialized expertise, and must be profitably spread over large land areas, analysis of the socio-economic outcomes that can impact the population and attract large public and private sector participation. (Gondia, Ezzeldin, and El-Dakhakhni 2022a). For this reason, the construction industry is recognized as one of the key drivers of economic growth. Currently, public spending on infrastructure makes up a large proportion of the total GDP expenditure of each country, such as Taiwan, which is currently investing heavily in infrastructure growth and is one of the best growing countries in the world, Even so the investment of this country is not so high compared to other countries, such as the population of China, which invests 13% of the total GDP of the country, I feel that of Taiwan just 4%, infrastructure projects mostly require a fairly high investment, so you need trained and experienced people to lead such activities, this is where associations such as PPP (public-private partnerships) appear. These PPP infrastructure projects attract not only large construction companies, but also lenders and investors, such as financial institutions and sovereign wealth funds, to the project. (Kokkaew et al. 2022) A public-private partnership (PPP) can also be defined as "a long-term contract between a private partner and a government entity for the provision of a public good or service, in which the private partner assumes significant management responsibilities and risks, and remuneration is linked to performance. (Navalersuph and Charoenngam 2021).

3.8. Impact of infrastructure development on the population

The impact of technological changes in the state of energy infrastructure and all surrounding infrastructure are fundamental to the economic and social development of the world, Infrastructure has been positioned by the World Bank Group as an essential agent of change and transformation to meet the challenges of achieving sustainable economic development and the Sustainable Development Goals (SDGs), the evolution of technology application in infrastructure, practically starts from the second industrial revolution, where existing energy transportation and sales markets, as well as energy infrastructure, were developed, in the third industrial revolution the energy sector is the most conservative constraint on the national economy and it is currently projected that the globalization of

the world and the launch of large-scale supranational infrastructure and energy projects will lead to a worldwide increase in trade, both in monetary and physical volume. (Shabalov et al. 2021).

Public infrastructure systems (e.g., power, water/wastewater, telecommunications, and transportation) function as arteries of modern urban communities, as they provide vital services to meet social and economic needs. Industry-standard and commercially available software tools widely used for project management and control typically employ the critical path method (CPM) and Monte Carlo analysis. The former is commonly used to plan, schedule and control the duration of project tasks, resource allocation and costs, while the latter is used to enable further probabilistic modeling and risk analysis of early results in order to quantify the reliability levels associated with such results, thus ensuring better control of operational infrastructure in a systematic manner, however it should be noted that when managing very complex infrastructure systems, there are 3 limitations. The first one consists of tools that are not specially designed to visualize and analyze contractor-related interdependencies, the second one is that current tools can reveal duration predictions and project completion budgets only after periodic schedule updates, and the third limitation is that such tools leave managers to rely solely on themselves. (Gondia, Ezzeldin, and El-Dakhakhni 2022b)..

3.9. Evolution of construction systems in infrastructure works

Changes in construction projects are inevitable, to minimize the impact of changes in a project, it is imperative to implement change management, which is of great importance and impact in the construction industry or infrastructure works projects, the industry on the subject of infrastructure works is one of the mentors that build greatly to the economy of any country. Changes generally occur at any stage of a project due to various causes from different sources and have considerable impacts, therefore at present, infrastructure systems must adapt to such consequences, as is the fact of applying change management to achieve a good adaptability. (Hwang and Low 2012).

The evolution or changes in infrastructure systems, have also delivered on the theme of agri-food, which have undergone massive transformations worldwide in recent decades. In those long-term transformation processes, they have evolved from socio-technical contexts to new ones, thus improving or achieving economic and market developments, technological advances, environmental impacts, population growth, dietary changes or social demands. STS scholars have also paid attention to how devices, organizations and other tools that function as boundary elements interact and evolve over time. As mentioned above, they inferred that beyond a certain point, boundary elements could expand, envelop the communities they link and become a "boundary infrastructure (Vilas-Boas, Klerkx, and Lie 2022) For the evolution of project management, there are also new ideas on program management, such as Mega-program management to balance multiple objectives, Stakeholder knowledge and integration to create complex projects. Financial planning and structuring as an essential ingredient for the materialization of large projects, extreme project management, contingent risk management, and Contingent risk management (Vilas-Boas et al. 2022).

3.10. Anti-corruption in infrastructure works projects

More than half of the world's population lives in urban areas, and this number is expected to increase to around 70 % by 2050, the increase in urban population, automatically forces the infrastructure of the different places that increases the population, also end up increasing and improving, in order to ensure a quality of service to the entire community, the procurement process of such essential services and other infrastructure related projects is susceptible to corrupt practices (Owusu, Chan, and Wang 2021). One of the most influential factors for the achievement of infrastructure projects, without any doubt is

the fact that there are corrupt people who want to take advantage of the high economic resources that move during the execution of large infrastructure projects, regardless of how clean a city may seem, it can be contaminated by hidden forms of corruption, so it is necessary to implement or promote organizations that ensure the economic resources of a country or city, there is the organization ACM (effectiveness of anti-corruption measures), It could be said that the model developed is the first measurement tool to evaluate and predict the effectiveness of ACMs used in the planning, contracting, execution and management of infrastructure projects, MCAs are internal and external tools or strategies stipulated to mitigate (in the short and medium term) and extirpate (in the long term) the incidence and proliferation of corruption. These systems are developed to curb the negative constructs of corruption, which include the causes of corruption and corruption risk indicators. (Owusu, Chan, Yang, et al. 2020)Therefore, the effectiveness of infrastructure projects, which are executed when they are free of correction, are much more efficient, faster and economically much cheaper, thus obtaining more efficient results from corruption-extinguishing measures (CSMs) in planning, procurement and project management. (Owusu, Chan, and Hosseini 2020)

3.11. Innovative infrastructure projects

The development of infrastructure in a city or in a whole country, is a very useful and efficient way to invest the capital of a population structure, as this itself will achieve great things for the quality of life of each of the people who make up the population, the application of infrastructure in a city or country is diverse, ranging from pedestrian walkways, structural development of production for commercial movement or for priority services such as drinking water, One of these is for example the water infrastructure, which is an active element of construction in any place, currently Iraq is constantly in conflict due to the lack of water in most homes, causing rebellions and violent protests, which is why it is essential to maintain a good project management to improve infrastructure, (Mason 2022)For example, one of the best applications of infrastructure for the improvement of water transport, such as river water, linear parks along waterways have been designed to mitigate flooding or to improve the quality of storm water, such projects are used because of the great importance of water today, Because of its excessive consumption and also because climate change and increasing urban density continue to pose serious challenges to the management of valuable water resources, linear parks along waterways have historically been designed to mitigate flooding or improve storm water quality, this aqueduct control system is known as the Torrens River Linear Park (RTLTP). For some time now, watercourses have been reduced to suitable sites for waste discharge, improving the infrastructure system to achieve better stormwater control. (Ibrahim, Bartsch, and Sharifi 2020)Green infrastructure is emerging as a holistic stormwater management strategy that can also deliver multi-sectoral benefits. Urban storm water infrastructure has traditionally been designed to capture and convey rainfall-induced runoff through a network of curbs, gutters, drains and pipes, collectively known as grey infrastructure, One solution gaining momentum worldwide is green infrastructure (GI) (a network of decentralized storm water management practices can capture and infiltrate rainfall where it falls, thereby reducing storm water runoff and improving the health of surrounding waterways), which has the benefit of preserving water for future use. (Gordon et al. 2018).

In terms of land infrastructure, there is for example one of the most efficient projects for population transport, e.g., is the high-speed railroad, of the Milan-Bologna corridor in northern Italy, The results suggest overall positive effects for the NUTS 3 provinces directly exposed to the program (Gordon et al. 2018).

3.12. Management system

Project management must treat safety not only as a key performance indicator, but also as an important measure of project success or failure, safety at work that can be encompassed by a management system, is an element that must be taken into account for a successful project management, not only to avoid additional costs generated by the damages caused to human talent and company assets, but also because a deficiency in the industrial safety and occupational health standards in a project can lead to the disqualification of the good name and prestige of a company due to the lack of attention to safety issues. (Nunhes, Ferreira Motta, and de Oliveira 2016) In each ISO standard, it is common for the effective implementation of a management system to follow up on the results, commitments and policies of top management.

Within the different systems that can exist in the industry and project management according to (Heras Saizarbitoria, Bernardo, and Casadesús 2007) the combination of the same in a single one are considered integration as "a process of joining different specific management systems into a single and more effective integrated management system". For (Ruiz Rodríguez, Andrea Integración de los sistemas de gestión de calidad and Batista Pérez 2018). The specific objectives of the research article have been fully developed and form an essential part of this paper, and the literature review covers previous research that can be compared with the case study information, and an analysis of the institutional and theoretical sources that have completed a review as possible.

An integrated management system describes the combination of several management systems to form a single system, such as a quality management system (according to ISO 9001), an environmental management system (according to ISO 14001) and a health and safety management system (according to ISO 14001). According to the current ISO 45001, in short, the adoption of standardized systems has proliferated in these areas and the reference standards used are more compatible with each other. (Cabrera et al. 2015).

In 2011, the integration of management systems was proposed by Fraguera, Carral, Iglesias, Castro and Rodriguez as "the need for a new corporate culture", referring to the global economy, groups of countries and the "European Union".

This paper focuses on the context of public entities of the state order in the financial sector, where three ISO management systems applied separately are identified, the need and opportunity to integrate them, as it is currently generating duplication of work and resistance of staff. mentioned above, its integration of management systems can bring benefits to entities (Fraguera Formoso et al. 2011). in relation to:

[...] Improve the efficiency of internal operations and communications, increase the agility of decision-making processes, improve the quality of goods and services produced or rendered, and increase the reliability of products and processes (p. 1236).

3.13. Infrastructure works management system

Works and management systems go hand in hand since, as evidenced in the project called "A methodology to identify sustainability indicators in the management of construction projects applied to infrastructure projects in Spain". (Fernández-Sánchez and Rodríguez-López 2010) through the project called "a methodology to identify sustainability indicators in the management of construction projects applied to infrastructure projects in Spain" determines that in order to carry out any project it is essential to develop a set of sustainability indicators based on the different risk management standards, in order

to find an adequate balance between all the actors involved in the project. (Glasbergen and Driessen 2005). when he mentions that each infrastructure is a cost center that in turn goes hand in hand with a specific administrative and social context, which if not properly managed can have a negative impact on the goals set such as delivery times, unit cost per project, which is why the author emphasizes strategic planning, which goes hand in hand with a substantive and process management, in order to comply with the above mentioned the project applied 3 cases which were as follows. 1) the improvement of the use of existing roads, 2) the adequate selection of material deposits, and 2) the construction of new access roads.

Management systems are developed on an ideal of minimizing costs and obtaining results. (Frangopol and Liu 2007) The author states that maintenance and management are fundamental for a satisfactory performance in a project, however he establishes that it does not guarantee the success of the project since it must be based on other factors such as inspection, audits to have a continuous cycle of improvement, it is for this reason that the author establishes the management planning for civil infrastructure in order to counteract the deterioration, emphasizing optimization tools, through traditional algorithms, including mathematical programming, heuristic algorithms that follow the principle of survival of the fittest, creating a maintenance network focused on bridges and buildings that would allow the preservation of the different infrastructure projects that the company had.

The management of construction and infrastructure projects has encountered a variety of problems such as incompetent contractors with inadequate tools for their work, poor estimates of the sector, changes in the environment and inefficient management, this has caused many companies related to the field of construction and engineering has led them to conduct a thorough analysis of its internal organizational structure and evaluate the various external factors that intervene in the projects to be more competitive and achieve the best results in the projects under implementation.

4. Discussion

The impact of project management in infrastructure works is enormous because it becomes an essential tool as a solution to multiple problems that may arise in the implementation of the project unlike projects that do not have adequate management, as this may have artificial intelligence either through the internet of things or machine learning that are new trends worldwide, which allows to collect georeferenced data to monitor transport times and compliance of these, plus you can evaluate in a more accurate way the performance that is being presented by cost center (construction project), In addition, based on the information collected, studies can be made to carry out reforms for continuous improvement to obtain better results in contrast to its competitors, it is for this reason that as a team we consider the importance of this topic and the impact it has on the decision making of a project that can indirectly or directly affect the completion of the project, but not only this in itself but also the potential ability to affect external factors to the project such as the environment.

In order to approach the subject in a better way and to understand how the information is derived from the topic, the following mind map was created.

Figure 3. Mental Map

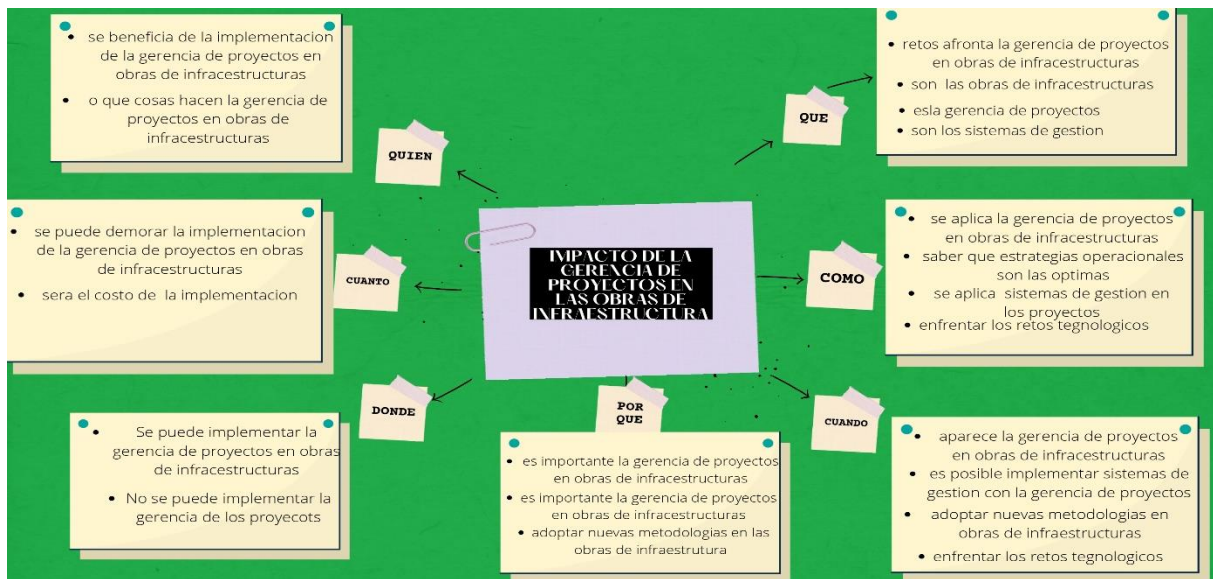
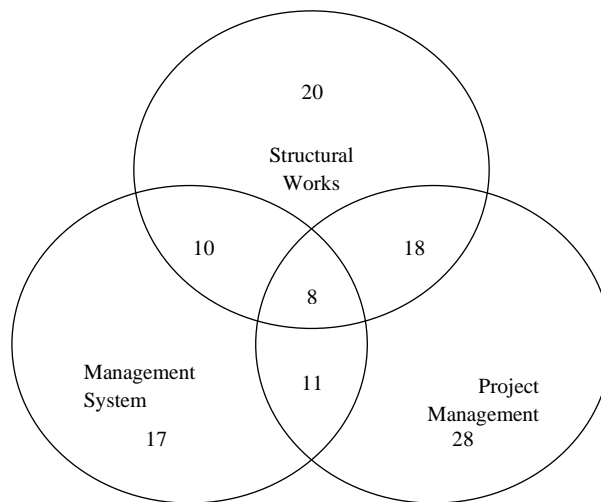


Figure 4. Methodological graph



Within the thematic density, key sets were established to ensure the direct relationship of the articles with the topic being addressed, this allows the selection and extraction of quality information, since these sets are fundamental pieces for the elaboration of search equations, for example; For example, for the key word Structural works, 20 articles were used, where these define and deepen this topic, and so on with each of the other sets, the number of articles that are related to each of the key sets are as follows; Management system, a total of 17, and finally, there were 28 articles related to the word Project management, giving a total for the database, of 58 articles.

Table 1. Search Equations

Search Equations	Quantity	%
Ec. Bq ₁ = project management + infrastructure Works	29	50%
Ec. Bq ₂ = Infrastructure works + developments	16	28%
Ec. Bq ₃ = management system + infrastructure	3	5%
Ec. Bq ₄ = impact on society + infrastructure	10	17%

58	100,0%
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The amount of documentation obtained for the preparation of the article was collected through the established search equations, as can be seen in the table, it can be seen that two search equations were a key piece in the research since they allowed the collection of a greater source of quality information that would guarantee the preparation of a product in accordance with a quality article.

Within the research was used in great depth, the ScienceDirect database of free use for any user, this database contributed 84.7% of the total referenced articles, being one of the best databases for research and collection of articles.7% of the total number of articles referenced, being one of the best databases for research and collection of articles, each of the articles collected from this database, handle the English language, because this language is one of the most used around the world, using the search equations in English, the results within the database were extensive, providing a large number of articles that greatly enrich the research, where the information collected ranges from 2014 to 2021.

Table 2. Databases

Data Bases	Quantity	%
Google academic	1	1,72%
ScienceDirect	57	98,28%
	58	100,00%

The collection of information allows for a more detailed analysis to see the growth of publications regarding the topic addressed year after year it can be seen evidenced that the topic on infrastructure systems is a topic that each year is of greater interest, since, in 2022, most of the articles can be largely, as shown in the following table:

Table 3. Chronology of publications

Databases	2005	2007	2008	2009	2010	2011
ScienceDirect	1	2	2	1	1	1
Google academic	1					
	2	2	2	1	1	1
	2012	2014	2015	2016	2017	2018
Databases	1	2	4	5	6	5
ScienceDirect						
Google academic	1	2	4	5	6	5
	2019	2020	2021	2022	Quantity	%
Databases	4	4	6	12	57	98,28%
ScienceDirect					1	1,72%
Google academic	4	4	6	12	58	100,00%

The research mainly used articles in English since this language is where a greater amount of documentary information on the subject is found, at the time of searching in the different databases, large quantities of results can be obtained, or a variety of articles to obtain information, this because most of the articles are in English, this being the universal language today, therefore, the use of English was essential for the collection of information, below is a table describing the percentage in volume of the articles depending on the language with which they worked:

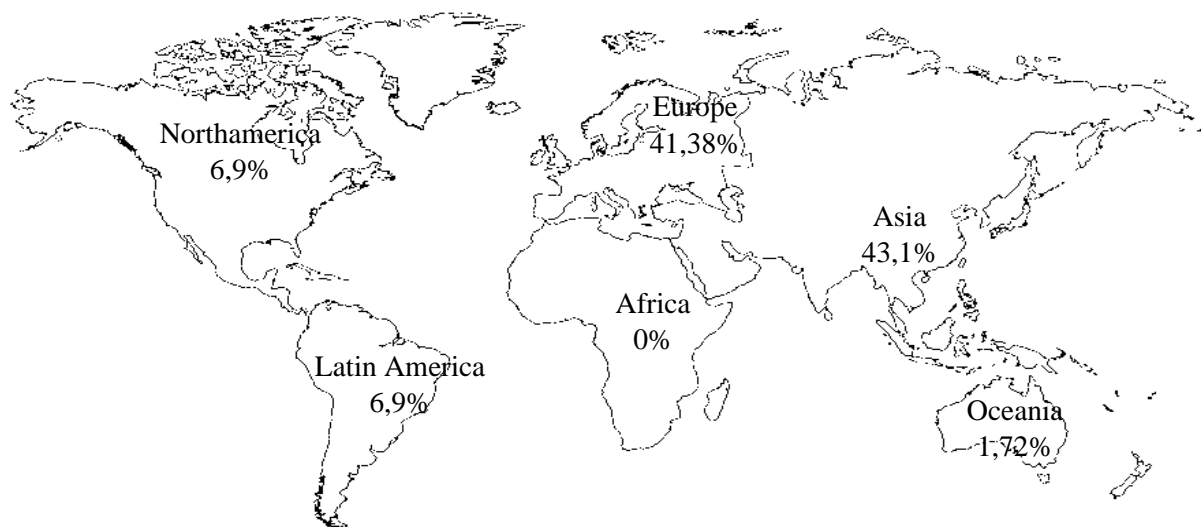
Table 4. Language Density

Idiom Criteria	Quantity	%
Spanish	1	1,72%
English	57	98,28%
	58	100,00%

As can be seen in the following table and graph, the regions most interested in the application of project management in infrastructure works are Asia and Europe, this is due to the fact that they are regions that are in search of territorial development in terms of infrastructure, in fact Europe and Asia are the continents with the greatest infrastructural development in the world.

Table 5. Geographic density

Region	Quantity	%
Oceania	1	1,72%
Asia	25	43,10%
Europe	24	41,38%
Latin America	4	6,90%
North America	4	6,90%
	58	100,00%

Figure 4. Geographic density

5. Conclusions

Project management is contributing significantly in the area of construction of modern infrastructure works in favor of real time decision making, which guarantees better results in the projects, compliance with short, medium and long term goals with lower production costs, in addition to producing higher quality products, The application of the different tools analyzed in this article allows to identify the deterministic variables that intervene in the execution of the project, which allows to evaluate and make decisions in a more accurate way that guarantee the fulfillment of goals, based on control and follow-up methods that have the potential capacity to be analyzed and with these results a continuous cycle of improvement can be carried out.

The analysis focuses on the PMBOK guidelines as one of the most widely used tools for the management of development projects at the international level, applying its general approach to the design of buildings and construction projects and the different methodologies used in project management are not widely used in construction and infrastructure sector projects, because it is presented in a general way and does not specify the needs and particularities for projects of this nature, however, if a more thorough analysis is made, good practices for the development of infrastructure projects can be identified.

The specific objectives of the research article have been fully developed and form an essential part of this paper, and the literature review covers previous research that can be compared with the case study information, and an analysis of institutional and theoretical sources that have completed a review.

Project Management can directly influence the improvement of the living conditions of people living in poverty and extreme poverty, and indirectly on the other hand, to achieve the timely delivery of goods/infrastructure to the beneficiary groups, manage the monitoring process, economic dynamization that meets to contribute to the sustainable development of the population, that is, by the state dictating the public value of this segment.

The documentary review that was carried out from the thematic density sets and the four search equations allowed the analysis of 59 documents collected from 4 academic and research databases among which the highest participation was ScintDirect with 98.28% where the predominant language within the different articles used in the research was English with 98%. In addition to this, it can be observed that the region most interested in the topic is Asia since it wants to be at the forefront of the mega construction works with proper project management, but closely followed by Europe, then it is analyzed that in the timeline during the period from 2005 to 2022 the growth in the number of publications of articles was increasing since the topic is becoming of great interest due to the multiple benefits of good management of the different projects on site.

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Title in Turkish

Özet

Bu araştırmanın amacı, altyapı çalışmalarında proje yönetiminin etkisini ortaya koymaktır. Kullanılan metodoloji, kamu ve özel altyapı projeleriyle ilgili indeksli makalelerdeki veri tabanları, yayınlanmış tezler aracılığıyla çeşitli ikincil bilgi kaynaklarına dayanmaktadır. Sonuç olarak, belirli bir süre içinde yerine getirilmek üzere tasarlanmış farklı proje yönetimi metodolojilerini ve stratejilerini dikkate almak ve böylece bir projenin yürütülmesinde gecikmeleri önlemek, müşteriye sunulan kalite ve standartları garanti etmek ve projenin yürütülmesinde yer alan tüm meslektaşların sürekli olarak değerlendirilmesine izin vermek önemlidir.

Anahtar Kelimeler: Proje yönetimi, Altyapı, İşler, Yönetim sistemi.

AUTHOR BIODATA

Insert here author biodata.