ISBN: 978-628-95207-8-1. ISSN: 2414-6390. Digital Object Identifier: 10.18687/LACCEI2024.1.1.1497

Key factors that influence the integrated management of portfolios, programs, and projects in organizations

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***Abstract*– Integrated portfolio, program and project management is a key tool for the success of organizations. This article highlights its objectives and the relevant theoretical foundations, the factors that influence its correct implementation, such as the use of Information Systems, improving the level of maturity of portfolio management to increase the probability of success. In addition, information is provided on obstacles that may arise in the implementation of management.**

This article provides a useful guide to understand the context in which integrated management of portfolios, programs and projects can be applied in organizations and make the most of the resources and tools available to achieve strategic objectives.

Keywords Portfolio Management, Program Management, Project Management, Project Information Systems, Organizational Maturity.

I. Introduction

Companies and society in general tend to associate the term project with any activity that is generated within an organization. This association is correct when they focus on the solution of a need or with the purpose of obtaining a series of benefits [1]. However, in most cases they are confusing daily activities or larger scope efforts with projects, thus causing interference between the use of resources and components that, managed in a joint and organized manner, allow the strategic objectives of the companies to be met.

For the correct application of project management in organizations, it is necessary to carry out program management, which is responsible for managing projects in such a way that allows them to take advantage of each other, the resources, and tools they have at their disposal.

The purposes generated by each program are directed by the portfolios, which are responsible for managing each set of programs with their respective projects in search of allowing the company to meet its strategic objectives in the best possible way. This is the main reason why which organizations create these project portfolios with the purpose of implementing, renewing their strategy and coordinating projects [2].

A successful portfolio implementation process is a key element for organizations to achieve positioning and presence in the labor market where it is developed. For this, it is necessary that there be a strong relationship between the strategic objectives to be met and the internal and external context of the organization [3].

For this reason, achieving a correct implementation of portfolios in an organization that manages an acceptable level of organizational maturity will contribute to each resource being used by each of the projects that belong to a set of programs. This entire joint process is essential to achieve not only that the organization's objectives are met but that they are met efficiently and appropriately, generating a reduction in operational and investment costs.

The main objective of this article is to provide a useful guide to understand the context in which integrated portfolio, program and project management can be applied in organizations and make the most of the available resources and tools to achieve strategic objectives. Furthermore, the article seeks to address the relevant theoretical foundations, the factors that influence its correct implementation and the challenges that may arise in the process. It also focuses on the importance of program and project management to achieve the organization's strategic objectives and how the correct implementation of portfolios can contribute to efficiency and reduction of operational and investment costs.

The article is structured in two main parts, the first presents the theoretical perspective of portfolio, program, and project management, which includes the foundations and key elements of this management. The second part addresses the factors that influence the correct implementation of integrated management, such as the use of information systems and improving the level of portfolio management maturity and provides information on the obstacles that may arise in the implementation. of integrated management. Additionally, the article addresses key factors that directly influence overall management effectiveness, carefully managed to optimize the delivery of individual projects, and ensure the achievement of strategic objectives.

II. Theoretical Perspective

In this section we provide a short description of the main theoretical aspects related with program and portfolio management.

Organizations that implement correct portfolio, program and project management must clearly know the elements that make it up, because it is the first step to avoid making the mistake of confusing the different components of portfolio management [4]. This confusion was present both in academic

Digital Object Identifier: (only for full papers, inserted by LACCEI).
ISSN, ISBN: (to be inserted by LACCEI).
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literature and in practice [5], causing an incorrect classification of the concepts of portfolios, programs and projects, as well as their way of organizing and managing [6] [7].

A project is defined as a temporary effort with a beginning and an end, which is carried out in order to create a unique product, service or result, where one or more stakeholders can be related [8] [9] [10].

Projects in organizations are not ideas that simply arise out of the air and that must be carried out without a clear purpose or objective, because every project generates an expenditure of resources and time for any person or organization, the decision to start a project must respond to a need that must be satisfied or the benefits that this would generate, these needs can have different origins as shown in Fig. 1.

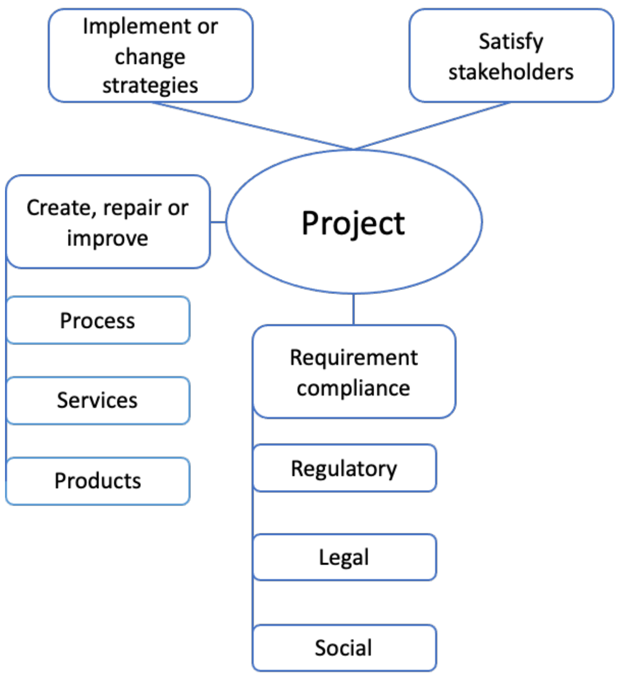

Fig. 1. Project initiation context.
Own design based on the PMBOK® Guide 6th Edition. 2017

PMBOK [13] defines a program as the associated, articulated, and managed set of projects focused on the fulfillment of a common and unique objective for each project and that in this way provide organizations with benefits that could only be achieved in this way and not with the result of independently managed projects.

A portfolio according to [8], is a set of components of programs, projects or operations managed as a single group sharing information and resources, to meet strategic objectives, these components have the characteristics of being measurable, classifiable and can be prioritize.

The components of the portfolio are in constant competition for the use of resources, resources that are in most scenarios limited. As indicated by Stephen Jenner [14], who states that portfolios make use of the organization's resources by grouping and planning their correct use and assignment to projects, giving an integrated approach. To mediate this constant competition for resources, organizations must determine and choose the option that allows them to have a correct optimization of the use of resources to achieve a balance of the components of the portfolio and not affect some by supporting others.

Fig. 2 sketch the relationship between projects, programs, and portfolios.

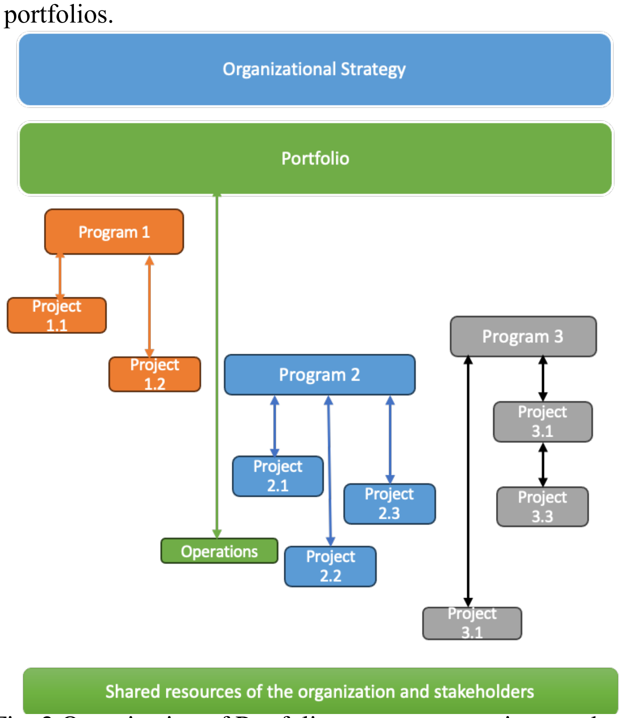

Fig. 2 Organization of Portfolios, programs, projects and resources.
Own design based on the PMBOK® Guide 6th Edition. 2017

The use of portfolio management in an organization is something that must be applied in a controlled and efficient way to bring the expected benefits. As indicated by Platje [15] in her studies applied to different multi-project organizations, where an important improvement was found since the implementation of project portfolios began. But if the portfolios are poorly managed, it can cause negative and harmful effects for the organization, where the programs and projects in the portfolio will suffer from limitations and imbalance in the use of resources and with this an imbalance in the fulfillment of their objectives, affecting the emergence of new projects that could result from current ones [16].

To prevent organizations from making the mistake of poorly managing their portfolios, it is important to be clear about the good practices that have been created for these activities, which give us the steps to follow for managing portfolios, programs and projects that allows for efficient use of each of these elements, to meet the scope of the organization's strategic objectives.

As highlighted in [12], only knowledge of the standards is not a guarantee of success in projects and punctual compliance with the company's strategic objectives, and it indicates that the purpose of this correct coordination is to eliminate any obstacle or element that is not necessary and that causes an increase in execution times, operational cost overruns and deviation from the main objectives of the projects and the organization in general.

For this reason, it is important that the portfolio management is responsible for the efficient management of the resources necessary for each project and carries out a constant monitoring process of each activity, which allows the correction of any change or alteration that generates a cascade effect in the programs and therefore in the direction of the portfolio that diverted the fulfillment of the strategic objectives. Control is done as a constant task for each project and program, because when there is a constant review of the events and factors in which the project is immersed, it is easier to understand the environment, prevent or create strategies to mitigate risks that can start with a project, but end up affecting the entire portfolio itself, causing negative effects mainly in time and resources.

According to [12], the use of programs to manage projects is not always necessary, because the portfolio and the projects are connected by their goals and resources.

This entire process of implementing portfolios, programs and projects generates a learning process in the organization that builds solid relationships between projects and programs, optimizes resources, and improves the knowledge and skills required to face uncertainty. All this enhances the progress, learning of the teams, of the project, achieving the development of new, stronger systems [17].

An example of this efficient management through portfolio coordination strategies can be consulted in [18]. In this study, on portfolio management applied to cryptocurrency investment projects, improvement in investment results and a decrease in exposure risk were achieved.

III. Key factors for the integrated management of portfolios, programs and projects

Facing this challenge of implementing correct portfolio, program and project management involves understanding and addressing a series of key factors that directly influence the effectiveness of global management. These factors, carefully managed, not only optimize the delivery of individual projects, but also ensure strategic alignment, efficient resource allocation and maximization of benefits for the organization. Next, we will explore some of the critical factors that must be considered to achieve successful integrated management in the field of portfolios, programs, and projects.

A. The constant uncertainty in the management and implementation of portfolios in organizations

Considering that one of the main tasks of portfolio management in an organization is to seek balance in the use of resources and seek compliance with the company's strategic objectives, this task cannot be achieved only by considering the management of programs, resources, activities, and resources, you must also deal with unforeseen events, obstacles and risks.

These unforeseen events occur in all contexts, especially in projects, causing changes in the original plans and designs. According to the research of [19] and [20] they indicated that these changes in designs are among the main causes of cost overruns and delays in projects. These unforeseen events considered as uncertainty, mostly contractors indicated that they are operational that are transferred to strategic or contextual uncertainties to the sponsor [21].

For this reason, the concept of management in the field of project management was initially considered “organization”. This concept has expanded to the ability of a person or organization to face and emerge successfully from subtle or greater impact risks. This ability is today the axis that identifies management, which due to changes in perspective focuses on knowing how to “play” with the complexity of events, understanding, adapting and in the best of cases avoiding having to face them. For this reason, correctly managing a portfolio, program or project means knowing how to live with uncertainty and supervise each process taking these factors into account without deviating from the goal of achieving the organization's strategic objectives [22].

This constant uncertainty that the project manager must face in his work, where success in the application of project portfolio management in the organizations he leads does not depend only on the application of the standards, schedule, or project offices of the organization. Nor is the correct use of standards, tools and methods considering a guarantee of success due to the risks involved. That at any time obstacles may arise for its correct execution, and it is due to this uncertainty that the management of portfolios, programs and projects requires the use of tools that strengthen processes and seek to minimize future risks. Because every project is always vulnerable to situations that cannot be controlled, that is why project managers seek to increase the possibility of success with good practices, technology, tools, and models not as a guarantee of total success but as a way of mitigating risks and increase the chances of success.

In addition, changes must be considered, because systems change, permanent and temporary organizations change, operations, projects, programs, and portfolios are at the mercy of internal and external factors that can generate changes [23].

Consequently, organizations must have the flexibility and ability to adapt to new circumstances that may arise from constant uncertainty. Therefore, they must be strengthened to manage changes effectively, allowing an agile response to unforeseen events that arise. Studies have shown time and time again that effective change management and leadership significantly influence rates of successful project implementation [24][25].

B. Information systems for portfolio, program, and project management

Technology plays an important role as a success factor for the correct implementation of good practices in projects. As support, project information systems emerge, which are defined by Jaafari and Manivong [26] as systems that extract and manage all the information that is produced during the life cycle of a project, thereby facilitating its conclusion. , especially in highly complex projects, which are under a high level of uncertainty and immersed in market, time or money limitations.

These information systems are crucial tools that can help increase the chances of success of a project because they allow work to be planned, facilitate the control and monitoring of tasks, encourage the supervision of each activity and, above all, increase the probability that activities are completed within established deadlines, involving the right people, and reducing budget deviations [27].

Studies have been carried out that demonstrate the benefits of these systems, such as the study developed by Pellerin et al in [28], in which they obtained quantified data from 21 engineering projects that were executed by the organization to perform the respective statistical tests. These tests demonstrated that there was a strong correlation between project performance and the use of the information system. Compared to other projects, it was observed that projects with lower performance showed significantly lower levels of system utilization and those with higher software use had higher CPI (Cost Performance Index) and project performance.

Among these systems are Project Portfolio Management Information Systems (PPMIS), designed directly to support portfolio, program, and project management processes, which theoretically provide the assurance of helping to improve quality of the portfolio management and performance process [29].

In 2020, Alexander Kock [29] carried out a study in search of verifying the benefits of the application of PPMIS in portfolio management, he carried out a study on a sample of 181 project portfolios, which demonstrated that the application of PPMIS. The result of this research indicates that a relationship was found between its use and the improvement of the quality of the processes and the success of project portfolios of most of the companies evaluated. The study showed that the benefits of the PPMIS are considered practical and not only theoretical, since these were "empirically observable in a large sample", with which this study was responsible for verifying that the PPMIS are considered generators of positive conditions when processes come from definition, formalization, and organizational maturity.

It is for this reason that in portfolio management a great synergy and benefits can be generated between the associated projects and programs and all the technological investment that is made, this must be taken advantage of to obtain continuous improvements in the processes [30]. Emphasizing that the maximum exploitation of this technological investment is achieved when the organization's processes have a certain level of maturity that allows mitigating the margin of uncertainty of each project and the portfolio itself.

C. Organizational maturity level

This maturity in processes is a fundamental piece in the application of PPMIS or any information technology, standard, theory, or model that wishes to be applied in an organization. Any organization needs a solid level of maturity and monitoring of each process because otherwise applying these tools would not have added value nor would it generate the expected benefits, it would only be an unnecessary waste of resources.

Considering the level of uncertainty in which each project of an organization is immersed, it is necessary that the maturity of all the internal processes of an organization be considered a key piece of continuous improvement. As stated previously, this prepares the organization to deal with unexpected events in the best way. If an organization has a high level of maturity in its processes, the level of success of the projects that oversee Portfolio Management and Management of the organization's programs increases, thus minimizing risks and increasing the scope of the projects. This entire continuous and improved process is what allows the expected benefits to be achieved that lead to the fulfillment of the organization's goals.

The benefits that an organization can achieve through the correct use of portfolio, program and project management, and an increase in the level of maturity of the organization encompasses much more than just meeting the objectives of the projects on time and with the objective of minimal expenditure of resources. It is necessary that through this entire process the organization begins to adopt a level of automation of each process, so that for each project its execution is easier, its cost reduction and increasingly shorter time in meeting the requirements.

Doloi, H., & Baradari, I. in [31], obtained the following aggregate data on the impact of the application of portfolio management according to a survey conducted with 80 companies from different cities in the countries of the United States of America and Australia:

- 56% of the cases considered the positive impact on meeting the project's time and budget a success.
- 36% of cases believed that the success of the projects developed was increased and saw the positive impact of meeting time and budget requirements.
- 90% considered that the success rate of the projects will be increased and the organization will obtain benefits.
- More than 46% consider that there is a positive impact on the fulfillment of the project's goals and objectives.

But not everything is considered good in the portfolio application, respondents indicated the following disadvantages.

- 45% consider that applying portfolio management does not generate positive impact when seeking to innovate in their projects.
- 38% consider that applying portfolio management does not help achieve user satisfaction.

From the data obtained in the research, it is considered that the application of portfolio management had a positive impact on the projects in a percentage between 55% and 92.5%, thus considering that portfolio management is a key piece in increasing the success rate of projects.

For [31], the results of their study indicate that the relationship between a high project success rate depends on the level of maturity of portfolio management, improving the level of portfolio management maturity is the best way to increase the probability of success.

IV. Conclusions

The integrated management of portfolios, programs and projects is revealed as an essential element for the effective achievement of the strategic objectives of an organization, acting as the catalyst that maximizes the use of available resources and tools. The strategic introduction of portfolios within the organizational structure not only allows for efficient allocation of resources and individual project components, but also infuses significant value into each initiative. This value translates into a palpable improvement in operational efficiency, as well as a significant reduction in operational costs and investments.

To raise the success rate of projects, it is imperative to go beyond the mere application of standards; It is about understanding and addressing a series of key factors that directly impact the effectiveness of management. Effective uncertainty management stands as a crucial component, as business environments are subject to unforeseen changes. The ability of organizations to flexibly adapt to such transformations becomes a critical determinant of long-term success.

The effective exploitation of information systems emerges as another essential pillar. Integrated portfolio, program and project management not only depends on the amount of information available, but on the ability to transform that data into actionable insights. The implementation of robust information systems and the training of personnel to take full advantage of these tools become differential elements.

The harmonious meshing of these factors must be built on a solid foundation of organizational maturity. Maturity not only refers to the ability to apply processes and tools, but also to the ability to continuously learn and constantly improve. A mature organization has the flexibility to adapt to unexpected changes, the resilience to manage uncertainty, and the agility to continually optimize information systems.

In summary, the integrated management of portfolios, programs and projects is presented as an indispensable instrument for organizational success. Its correct implementation demands not only the application of standards, but also the deep understanding and addressing of crucial factors. In this context, the management of uncertainty, adaptability to change, the exploitation of information systems and the strengthening of organizational maturity are the pillars that support the effectiveness and achievement of the organization's strategic objectives.

References

[1] T. Williams, Vo, H. Bourne, M. Bourne, P. Bourne, T. Cooke-Davies, R. Kirkham, G. Masterton, P. Quattrone y J. Valette, “A cross-national comparison of public project benefits management practices – The effectiveness of benefits management frameworks in application”, The Manage. Operations, Vol 31. n° 8, pp. 644–659, septiembre de 2019, https://doi.org/10.1080/09537287.2019.1668980

[2] M. Martinsuo y J. Geraldi, “Management of project portfolios: Relationships of project portfolios with their contexts”, Int. J. Project Manage., Vol. 38, # 4, 2020, pp. 441-453, marzo de 2020, https://doi.utb.elogim.com/10.1016/j.ijproman.2020.02.002.

[3] J. Lampel, H. Mintzberg, J. Quinn y S. *Ghosal, The strategy process. Concepts, contexts, cases, 5ta ed. Pearson, 2013.*

[4] S. Pellegrinelli, “What’s in a name: ¿Project or programme?”, *Int. J. Project Manage*., vol. 29, n.º 2, pp. 232–240, febrero de 2011, https://doi.org/10.1016/j.ijproman.2010.02.009

[5] J. Geraldi, S. Teerikangas y G. Birollo, “Project, program and portfolio management as modes of organizing: Theorising at the intersection between mergers and acquisitions and project studies”, *Int. J. Project Manage*., marzo de 2022, https://doi.org/10.1016/j.ijproman.2022.03.005

[6] M. Lycett, A. Rassau y J. Danson, "Program management: A critical review." *Int. J. Project Manage*., vol. 22, n° 4, pp. 289–299, mayo de 2004, https://doi.org/10.1016/j.ijproman.2003.06.001

[7] H. Maylor, T. Brady, T. Cooke-Davies y D. Hodgson, “From projectification to programmification”, *Int. J. Project Manage*., vol. 24, n.º 8, pp. 663–674, noviembre de 2006, https://doi.org/10.1016/j.ijproman.2006.09.014

[8] Project Management Institute, *Guía de los fundamentos para la dirección de proyectos (Guía del PMBOK)*, 6a ed. Pennsylvania: Project Manage. Inst., 2017.

[9] L. L. A. Dzul, “Los costes de la calidad en el diseño de proyectos de construcción: un enfoque de procesos”, doctoral thesis, Univ. Politec. Catalunya, 2009, http://hdl.handle.net/10803/6850

[10] L. L. A. Dzul, S. Gracia-Villar y M. González-Benítez, “Propuesta metodológica para la medición y seguimiento de los costes de la calidad en el diseño de proyectos”. Afinidad, vol. 66, pp. 540, 2009, https://raco.cat/index.php/afinidad/article/view/276775.

[11] M. Campos Luque, “Liberty”, proyecto de grado, Univ. de La Laguna, Facultad de Bellas Artes, Tenerife, 2014.

[12] B. Bravo-Díaz, L. Dzul-López, S. Gracia-Villar y F. Fernández-Díez, "Coordination between project management levels: Portfolio, program and project.", *Dyna*, vol. 84, n° 5, pp. 421-428, junio de 2009

[13] Project Management Institute, *Guía de los fundamentos para la dirección de proyectos (Guía del PMBOK)*, 3ra ed. Pennsylvania: Project Manage, Inst., 2004.

[14] Stephen Jenner, C. K. Management of Potfolios. Office of Government Commerce, 2011.

[15] A. Platje, H. Seidel y S. Wadman, “Project and portfolio planning cycle”, Int. J. Project Manage., vol. 12, n.º 2, pp. 100–106, mayo de 1994, https://doi.org/10.1016/0263-7863(94)90016-7

[16] R. Cooper, S. Edgett y E, Kleinschmindt, “Portfolio management for new producto”. 2nd ed. New York: Perseus Books. 2001, ISBN: 0-7382-0514-1.

[17] B. de Groot, W. Leendertse y J. Arts, “Learning across teams in project-oriented organisations: the role of programme management”, *Learn. Org., ahead-of-print, ahead-of-print*, agosto de 2021, https://doi.org/10.1108/tlo-06-2020-0118

[18] E. F. E. A. Mills y K. Zeng, “Portfolio management strategies of cryptocurrencies”, *Int. J. Appl. Decis. Sci*., vol. 14, n.º 1, p. 43, 2021, https://doi.org/10.1504/ijads.2021.112928

[19] K. Aynur, U. Serdar, and N. Tuncbilekli. “Causes of delays in construction projects in Turkey.” *J. of Civil Engineering and Manage.*, Vol. 18, pp. 426–35, 2012, https://doi.org/10.3846/13923730.2012.698913.

[20] M. Aslam, E. Baffoe-Twum y F. Saleem. “Design Changes in Construction Projects – Causes and Impact on the Cost”, *Civil Engineering Journal*, Vol 5, No° 7, pp. 1647-1655, julio de 2019, https://doi.org/10.28991/cej-2019-03091360.

[21] R. Shabani, T. Ahmed, A. Johansen, O. Torp y D. Farsani, “Uncertainty management in the design phase of road projects”, *Procedia Computer Science*, Vol. 219, pp. 1969-1976, 2023, https://doi.org/10.1016/j.procs.2023.01.497.

[22] J. Machicao. ¿Una nueva gestión de proyectos y portafolios para entornos complejos e inciertos?, Univ Continental de Ciencias e Ingeniería, Huancayo, febrero de 2022. doi:10.13140/RG.2.2.33298.12486.

[23] N. Luhmann*, Social system*. Stanford, Stanford University Press, CA,1995

[24] Gilley, A., Godek, M., Gilley, J.W., 2009. Change, resistance, and the organizational immune system. SAM Adv. Manag. J. 4–10 (Autumn)

[25] Jones, R.A., Jimmieson, N.L., Griffiths, A., 2005. The impact of organizational culture and reshaping capabilities on change implementation success: the mediating role of readiness for change. J. Manag. Stud. 42 (2), 361–386.

[26] A. Jaafari y K. Manivong, “Towards a smart project management information system”, *Int. J. Project Manage*., vol. 16, n.º 4, pp. 249–265, agosto de 1998, https://doi.org/10.1016/s0263-7863(97)00037-9

[27] L. Teixeira, A. R. Xambre, J. Figueiredo y H. Alvelos, “Analysis and Design of a Project Management Information System: Practical Case in a Consulting Company”, Procedia Comput. Sci., vol. 100, pp. 171–178, 2016, https://doi.org/10.1016/j.procs.2016.09.137

[28] R. Pellerin, N. Perrier, X. Guillot y P.-M. Léger, “Project Management Software Utilization and Project Performance”, Procedia Technol., vol. 9, pp. 857–866, 2013, https://doi.org/10.1016/j.protcy.2013.12.095

[29] A. Kock, B. Schulz, J. Kopmann y H. G. Gemünden, “Project portfolio management information systems’ positive influence on performance – the importance of process maturity”, Int. J. Project Manage., vol. 38, n.º 4, pp. 229–241, mayo de 2020, https://doi.org/10.1016/j.ijproman.2020.05.001

[30] V. K. A. Parry y M. L. Lind, “Alignment of Business Strategy and Information Technology Considering Information Technology Governance, Project Portfolio Control, and Risk Management”, Int. J. Inf. Technol. Project Manage., vol. 7, n.º 4, pp. 21–37, octubre de 2016, https://doi.org/10.4018/ijitpm.2016100102

[31] H. Doloi, "Impact of Applying Project Portfolio Management on Project Success." *The J. Of Modern Project Manage*, pp.64-73, septiembre de 2013, https://doi:10.19255/19