Validation of a Governance Alignment Model in Colombian Universities

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Abstract: A high percentage of Higher Education Institutions in Colombia develop their strategic processes with the incorporation of Information Technology (IT) projects, and many difficulties arise in their management, which have been studied in global research processes, which show relatively low percentages in the success of the projects. The objective of the research was to validate the Governance Alignment Model (GAM) with the purpose of generating the necessary credibility in Colombian universities for its implementation as a management tool that contributes to optimizing the performance of IT projects, based on the implementation of improvement or reinforcement actions that involve the variables of corporate governance, IT governance, project governance, project complexity, and project performance. For the development of the research, a characterization of the universities in Colombia was developed, collecting information in 64 of them through the completion of a survey by the Planning Heads and IT Directors. The model was validated through semi-structured interviews with study participants, analyzing performance, governance, and project complexity factors. From the validated and adjusted model, the guides were obtained for its practical application, generating opportunities for reinforcement and improvement in the universities of Colombia, through a methodological intervention tool that provides a series of specific recommendations that will contribute to the success of the projects, to the improvement of project governance and the generation of value in institutions.

Keywords: Project management; Governance; Project performance; Information technologies; Colombian universities.

Validación de un Modelo de Alineación de la Gobernanza en las Universidades de Colombia

Resumen: Un alto porcentaje de las Instituciones de Educación Superior en Colombia desarrolla sus procesos estratégicos con la incorporación de proyectos de Tecnologías de Información (TI), y en su gestión se presentan muchas dificultades, que han sido estudiadas en procesos de investigación global, las cuales evidencian unos porcentajes relativamente bajos en el éxito de los proyectos. El objetivo de la investigación fue validar el Modelo de Alineación de la Gobernanza (GAM) con el propósito de generar la credibilidad necesaria en las universidades colombianas para su implementación como una herramienta de gestión que contribuya a optimizar el desempeño de los proyectos de TI, a partir de la implementación de mejoras o acciones de refuerzo que involucran las variables de gobierno corporativo, gobierno de TI, gobierno de proyectos, complejidad del proyecto y desempeño del proyecto. Para el desarrollo de la investigación se elaboró una caracterización de las universidades en Colombia, recabando información en 64 de ellas a través del diligenciamiento de una encuesta por parte de los Jefes de Planeación y los Directores de TI. El modelo se validó a través de entrevistas semiestructuradas con los participantes en el estudio, analizando los factores de desempeño, gobernanza y

complejidad del proyecto. A partir del modelo validado y ajustado se obtuvieron las guías para su aplicación práctica, generando las oportunidades de refuerzo y de mejora en las universidades de Colombia, mediante una herramienta de intervención metodológica que aporta una serie de recomendaciones concretas que contribuirán al éxito de los proyectos, al mejoramiento de la gobernanza de los proyectos y a la generación de valor en las instituciones.

Palabras clave: Gestión de proyectos; Gobernanza; Desempeño del proyecto; Tecnologías de información; Universidades de Colombia.

Introduction

The need to address project management has become evident through the alignment of new elements linked to institutional governance, IT governance, project governance, project complexity and performance [1]. In this sense, a Governance Alignment Model (GAM) was developed, which was applied in the areas of Information Technology (IT) of the universities of Colombia, who face permanent challenges originated in political changes, economic, regulatory, and technological aspects of Colombian society and the global economy.

In this research, the model developed and applied in Colombian universities was validated, generating the conditions of reliability necessary for its institutional adoption and its use as a management tool that contributes to the fulfillment of strategic and tactical objectives and, in turn, to the value creation.

The research is of an applied type, based on the information provided by the IT directors of the Colombian universities and the GAM prepared using a conceptual model and a statistical model, which involved a factor analysis and the use of the main components function of the R statistical program.

Research objectives

This research aims to validate a Governance Alignment Model (GAM) built from the factors of project governance, IT governance, corporate governance, project complexity and project performance, defining the following specific objectives:

- Classify Colombian universities according to their size (large, medium, and small).
- Conduct semi-structured interviews with a representative group of IT directors, as a verification exercise.
- Validate the results obtained in the GAM using the information collected in the semi-structured interviews.
- Carry out the practical application of the GAM through a methodological intervention tool that produces opportunities for improvement and reinforcement in Colombian universities.

Theoretical framework

The model contemplates five factors that must be aligned to achieve better managerial management of institutional projects.

First, **corporate governance** is defined as the "structured way of providing control, direction and coordination through people, policies and processes to meet the strategic and operational objectives of the organization" [2]. [3] specifies that corporate governance comprises the value system, responsibilities, processes, and policies that meet the expectations of interested parties. Furthermore, [4] defined governance as the "framework for directing and empowering an organization through its established policies and practices and other relevant documentation". In this research, the definition of corporate governance was adopted as the framework that "regulates the processes of defining the strategic objectives of the organization, provides resources and controls the appropriate use of these resources, through people, policies and the processes, with the purpose of meeting the objectives of the organization and satisfying the expectations of the interested parties" [5].

Second, [6] explained that **IT governance** was much broader than IT administration and focuses on the execution and transformation of IT to meet current and future business demands. [7, 8] stated that IT governance is the IT-related decision-making structure and methodologies for planning, organizing, and controlling IT activities. Moreover, [9] also argued that IT governance places the structure around how IT strategies align with business strategy and, in this way, ensure that organizations continue to achieve their strategies and objectives, implementing ways to evaluate their performance. Based on empirical evidence, this research defined IT governance as the framework that "supports senior management decision making, responsible for shaping IT

strategy, delivering business value, managing IT risks, and managing performance, which focuses on the processes of obtaining, planning, directing and controlling IT resources, so that IT strategies are aligned with business strategies" [5].

Third, [2] defined **project governance** as the framework, functions, and processes that direct project management activities to create a unique product, service, or result and meet the organization's strategic and operational objectives. [10] stated that project governance is about choosing the right projects (to achieve the right objectives) and ensuring that project goals and outcomes are sustainable. [11] stated that the main objective of project governance is to declare control of projects and achieve business objectives. [12] defined project governance as a concern of those areas of corporate governance that are particularly related to project activities. In this research, project governance was defined as the framework that "guides project management activities, supports portfolio direction, has project sponsorship, and presents necessary reports, in order to create a unique product or service that contributes to meeting the objectives of the organization" [5].

Fourth, in this research the definition of **project complexity** was adopted as "the characteristic of a project or its environment, which makes its management difficult due to human behaviors, system behaviors and ambiguity" [13]. According to [14], when facing complexity, the PMBOK Guide and the Project Management Standard [15], the Program Management Standard [16] and the Portfolio Management Standard [17], provide an excellent starting point to solve the conditions of complexity generated by ambiguity, human behavior, and systems behavior.

Finally, **project performance** is closely associated with project success, which is generally measured as the achievement of scope, schedule, and cost outcomes; However, sometimes these components are insufficient. [15] indicates that professionals and academics have determined that project success must also be measured by considering the achievement of project objectives, satisfaction of stakeholder requirements, and compliance with governance criteria. In the work of [18], an empirical model was developed that showed the impact of IT governance and project governance on project performance. Furthermore, [19] developed empirical work, collected information from directors in various sectors in Colombia and found a new group of metrics in the project performance measurement categories, such as conflict management, communication, level of effort, work performed, changes and organization, among others. In this research, project performance was defined as the "measurement of the results of scope, schedule, costs, quality, risks, resources, procurement, communications, satisfaction of stakeholder requirements, compliance with the governance criteria and the integration of the project, through a set of criteria established in a timely manner" [5].

Methodology

The research was carried out in five stages.

First, the theoretical framework was developed by consulting scientific articles in the Scopus, Web of Science, and Science Direct databases. An **exploratory methodology** supported by bibliometric analyzes was used to identify international trends related to corporate governance, IT governance, project governance, project complexity and project performance.

Second, an instrument was designed and validated to obtain information, including the factors and variables of each of them. It was initially applied in five universities; The necessary adjustments were made and the final form was generated.

Third, the field work was carried out, sending the form via email to the planning heads or IT directors of the universities in Colombia; After five months of monitoring and communication, information was obtained from 64 university officials.

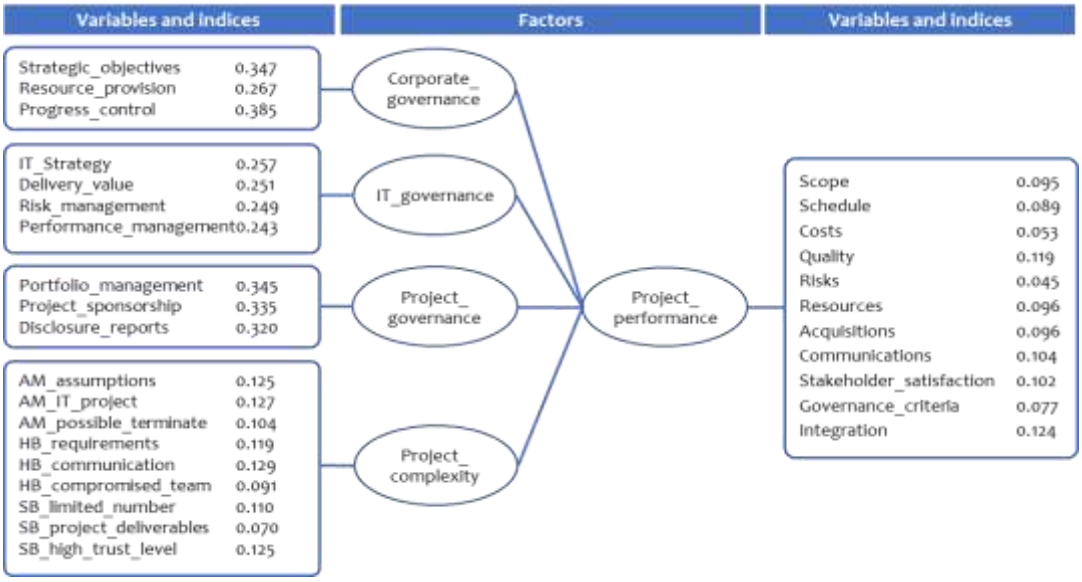
Fourth, the information was analyzed using the R statistical program and the GAM was developed through Factor Analysis. A **quantitative methodology** was used to analyze the data and define the model and **correlational methodology** to determine the alignment of the model factors.

Finally, the GAM was validated, based on expert judgment and the segmentation of universities into three types: large, medium, and small, taking as criteria the number of students and information from the Colombian Ministry of Education.

Results

With the information provided by the IT directors of the Colombian universities, the statistical study was carried out, through a Factor Analysis, using the principal components function of the R statistical software. Figure 1 shows the factors, variables and indices that represent the relative weight of each variable in its respective factor. Likewise, the existing relationships between the GAM factors are presented.

Figure 1. Governance Alignment Model for IT projects.



Source: Own elaboration.

Classification of Colombian universities

In Colombia, Higher Education Institutions (HEI) are those entities that have official recognition as providers of the public service of higher education in Colombian territory [20]. According to their academic nature, they are classified into 86 Universities, 37 Professional Technical Institutions, 54 Technological Institutions and 139 University Institutions or Technological Schools, for a total of 316 institutions [21]. With the purpose of validating the GAM, a segmentation of the universities was made by size, taking as a criterion the number of enrolled students; The result of this classification was: 37 medium-sized universities, 32 small universities and 17 large universities. The results of validation at one of the large universities are presented below. The results of the other universities analyzed correspond to the same presentation structure.

Validation of the GAM in large universities

Due to the confidentiality commitment acquired with the Colombian universities, each one was assigned an identifier. The results of the semi-structured interview carried out with the IT Director of University 22 are presented below. The methodological intervention was reviewed and the opportunities for improvement and reinforcement were analyzed, as seen in Tables 1 to 5. The improvement opportunities (highlighted in red) arise from questions in which the university achieved a lower evaluation than the average of the universities and reinforcement opportunities (highlighted in green) relate to questions in which the university achieved an evaluation higher than the university average. These conventions facilitate decision making and the allocation of necessary resources; It is recommended that improvement opportunities be given a higher priority compared to reinforcement opportunities.

According to the values obtained, in the case of University 22, decisions related to the Corporate Governance factor (Table 1) should focus on ensuring that the portfolio of new projects contains only projects of high value for the University, with solid business prospects.

Table 1. Methodological intervention in a large university – Corporative governance

Component	University 22	Average Universities	Difference	Action
Corporative governance	**8,50**	**7,66**		
The Superior Council defines and prioritizes the strategic objectives of the University	10	9,08	0,92	Reinforcement
The portfolio of new projects contains only projects of high value for the University	7	7,03	-0,03	Improvement
There are sufficient resources and infrastructure available to meet the strategic objectives of the University	10	7,06	2,94	Reinforcement
The breakdown of expenses (resources) in the project portfolio truly reflects the University's strategy	8	7,45	0,55	Reinforcement
The Superior Council obtains performance reports to monitor the use of resources of University projects	8	7,89	0,11	Reinforcement
The Superior Council applies processes, tools, techniques and quality standards to create University services over time	8	7,27	0,73	Reinforcement

Source: Own elaboration.

Table 2. Methodological intervention in a large university – IT governance

Component	University 22	Average Universities	Difference	Action
IT governance	**8,02**	**6,87**		
There are sufficient IT resources and infrastructure available to meet the required institutional strategic objectives	10	7,03	2,97	Reinforcement
The Superior Council knows the latest developments in IT from a commercial perspective	9	6,83	2,17	Reinforcement
End users are satisfied with the quality of service	7	7,56	-0,56	Improvement
The Superior Council has a vision on how and how much the University invests in IT compared to its competitors	9	6,38	2,63	Reinforcement
The inventory of IT risks relevant to the University is up to date	7	7,14	-0,14	Improvement
The Superior Council has a clear view of the main IT investments from a risk and return perspective	8	7,05	0,95	Reinforcement
The Superior Council regularly obtains IT performance reports that illustrate the value of IT from a business driver's perspective	6	6,45	-0,45	Improvement
The Superior Council obtains assurance on the achievement of IT objectives and the containment of IT risks	8	6,52	1,48	Reinforcement

Source: Own elaboration.

In relation to the IT Governance factor (Table 2), three opportunities for improvement were found, related to: generating mechanisms that allow increasing the satisfaction of end users with the quality of the service, updating the inventory of relevant IT risks for the University and generate in a timely and truthful manner the reports required by the Superior Council in which the value of IT is explained from the perspective of a commercial driver.

Regarding the Governance of the Project factor (Table 3), no opportunities for improvement were found; All variables would be subject to reinforcement opportunities, it is highlighted that the communication provided by the team members regarding the status of the IT project is timely and complete.

In relation to the project Complexity factor (Table 4), two opportunities for improvement were detected: generating strategies that limit the number of dependency relationships between the components of the IT project and increasing the level of confidence that the components that are going to interconnect the project work in a predictable way.

Table 3. Methodological intervention in a large university – Project governance

Component	University 22	Average Universities	Difference	Action
Project governance	**9,15**	**7,75**		
The projects in the University's portfolio are aligned with its business objectives and strategies	8	7,86	0,14	Reinforcement
Your University has the correct number of new product or service projects for its available resources (people, time and money).	9	6,72	2,28	Reinforcement
The project is supported by the administration of its University	9	8,44	0,56	Reinforcement
IT project resources are managed efficiently	9	8,22	0,78	Reinforcement
The communication you receive from team members (regarding the status of the IT project) is timely	10	7,59	2,41	Reinforcement
The communication you receive from team members (regarding the status of the IT project) is complete	10	7,72	2,28	Reinforcement

Source: Own elaboration.

Table 4. Methodological intervention in a large university – Project complexity

Component	University 22	Average Universities	Difference	Action
Project complexity	**7,30**	**7,06**		
Stakeholder requirements remain unchanged during the IT project	6	5,97	0,03	Reinforcement
There is open communication, collaboration and trust between stakeholders and the IT project team	8	7,61	0,39	Reinforcement
The senior management team is fully committed to the IT project	8	7,92	0,08	Reinforcement
There are a limited number of dependency relationships between IT project components	6	6,89	-0,89	Improvement
IT project deliverables will use only a few different technologies (e.g. electrical, mechanical, digital)	7	6,92	0,08	Reinforcement
There is a high level of confidence that the interconnected components of the project will function in a predictable manner.	7	7,53	-0,53	Improvement
Project assumptions and constraints remain stable throughout the IT project lifecycle	7	6,75	0,25	Reinforcement
The IT project has a manageable number of problems, risks and uncertainties	7	6,91	0,09	Reinforcement
An IT project activity may be terminated or postponed when there is evidence that achieving the desired outcome is not possible.	10	7,14	2,86	Reinforcement

Source: Own elaboration.

Finally, the Project Performance factor (Table 5) generated four improvement opportunities related to the scope of the project, the costs incurred during the project life cycle, the potential risks that may affect the project objectives, and the satisfaction of the interested parties.

Table 5. Methodological intervention in a large university – Project performance

Component	University 22	Average Universities	Difference	Action
Project performance	**8,59**	**7,74**		
Scope (work performed to deliver a product or service)	8	8,03	-0,03	Improvement
Schedule (activities linked to planned dates, durations, milestones and resources)	8	7,08	0,92	Reinforcement
Costs (payments incurred during the project life cycle)	6	7,98	-1,98	Improvement
Quality (degree to which a set of characteristics satisfies requirements)	9	8,25	0,75	Reinforcement
Risks (uncertain events that may have a positive or negative effect on the project objectives)	6	6,69	-0,69	Improvement
Resources (team members or physical resources needed to complete the project)	10	7,45	2,55	Reinforcement
Procurement (obtain the resources necessary to execute project activities)	10	7,75	2,25	Reinforcement
Communications (ensure that information management is timely and appropriate)	10	7,34	2,66	Reinforcement
Stakeholder satisfaction (meet stakeholder expectations)	8	8,08	-0,08	Improvement
Governance criteria (comply with the University's governance framework)	9	8,16	0,84	Reinforcement
Integration (compliance with the integration of all project variables)	8	7,81	0,19	Reinforcement

Source: Own elaboration.

Conclusions

In this research, the results of the validation of a GAM were presented, which aims to improve the success indicators in the management of IT projects and, in turn, improve the strategic position and operational performance of universities, contributing to the improvement of education in Colombia.

The differentiating seal of this research is achieved through the construction of a general statistical model, using Factor Analysis, the Principal Components function and Correlation Analysis, in such a way that it allows evaluating the behavior of the average of Colombian universities, the behavior of any of them according to the classification into large, medium, and small, and make the necessary comparisons.

The GAM makes it possible to detect opportunities for improvement that must be implemented in universities, which in turn requires the political will of the senior management of the universities, that is, the Superior Council and the Rectorate. This will must be translated into fundamental resources and guidelines for institutional improvement and the achievement of the objectives outlined in the Institutional Strategic Plan of each university.

Finally, as a future line of research, it is proposed to implement the GAM in the health sector in Colombia; In the State Health Companies (SHC) several components can be dimensioned: the process component (service provision), the organizational component (assurance) and the technological component (health technology). Its financial sustainability is analyzed based on each SHC [22].

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