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Critical success factors in IT governance: A quantitative study in the Colombian financial sector

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Abstract

Purpose: The purpose of this study is to highlight the level of adoption of governance frameworks and best practices in Information Technology (IT) in the Colombian financial sector. It emphasises aspects such as value creation, strategic alignment between IT and business, and the most widely accepted processes.

Design/methodology/approach: A questionnaire was used as a data collection tool, targeting employees of Colombian financial institutions. The objective was to identify the most widely used IT governance frameworks, the characteristics of strategic alignment, the most widely implemented processes, and the main barriers to their adoption.

Findings: The analysis reveals that the Colombian financial sector perceives clear value generation from adopting IT governance frameworks and best practices. Key elements of strategic alignment between business areas and IT are identified, as well as the processes with the highest level of implementation.

Research limitations/implications: Although the instrument was applied to a significant number of entities, it did not cover the entire sector. In addition, most of the respondents work in IT areas, which could introduce some bias in the results. To mitigate this effect, the findings were compared to similar previous studies, thus validating the trends observed.

Practical implications: The results can serve as a guide for financial and non-financial organisations interested in advancing maturity models for the implementation of frameworks and best practices in IT governance.

Originality/value: The study identifies the most widely accepted governance frameworks and detects gaps in the alignment between IT and businesses. This facilitates the definition of improvement actions that guide strategic IT objectives towards the results expected by organisations. It also offers guidance on the processes that according to the experience of various entities, generate the most value, considering the resource constraints faced by organisations in adopting these practices.

Keywords: Strategic alignment, Frameworks for IT governance, Value delivery, Service

Jel Codes: M15

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1. Introduction

Information Technology (IT) services face constant pressure to be more efficient, faster and more economical, forcing organisations to adopt practices that guarantee the quality and value of their operations (Leopoldi, 2015). With these aims in mind, IT governance has established itself as an essential component for evaluating, directing and controlling technological processes, ensuring alignment with strategic business objectives. Performance indicators have become key tools for monitoring goal achievement and value creation (Ibrahim & Abdessamad, 2019).

However, there is ongoing debate in the literature about how to ensure that technological practices bring real value to businesses. Rodríguez and Rodríguez (2015) raise fundamental questions: How can IT activities be aligned with strategic objectives? How do IT governance models relate to criteria of excellence to ensure the delivery of value? These questions are complemented by others that are equally relevant: Which are the most widely used IT governance frameworks in the financial sector? How mature are organisations in adopting these frameworks? What barriers and critical factors influence their implementation? These issues reflect the need for IT governance to demonstrate its ability to integrate technologies for strategic compliance, using communication and measurement as critical success factors.

This study addresses these debates in the context of Colombia, an environment that is particularly relevant due to its high level of regulation, growing digitalisation and technological dependence. In Colombia, financial institutions are regulated by the Financial Superintendency, with the mission to ensure the stability of the financial system, market transparency and consumer protection (Financial Superintendency of Colombia, n.d.). This regulatory context requires high levels of control and governance over information technologies, given that the sector depends critically on the availability, integrity, and security of technological systems. The growing digitisation of financial services, together with the pressure to comply with regulatory standards and address cybersecurity risks, makes adopting robust IT governance frameworks aligned with international best practices essential.

Models such as COBIT, ITIL, ISO/IEC 38500, ISO/IEC 20000, TOGAF, and Val IT (Bakshi, 2017; Srinivasan, 2020) are widely recognised for providing guidelines for efficient IT management. However, the simultaneous implementation of these frameworks in financial institutions can lead to ambiguity, incompatibility and additional costs (Pardo, 2012), posing a strategic challenge for the sector. In a sector where consumer confidence and business continuity are critical factors, optimising the integration and application of these frameworks not only contributes to regulatory compliance but also strengthens operational resilience, reduces technological risks and improves competitiveness in the face of digital transformation.

Despite the widespread use of IT governance frameworks, empirical evidence on their effectiveness in the Colombian context is scarce, particularly in the financial sector. The existing literature focuses on describing the frameworks and their theoretical benefits, but not on evaluating their real impact in terms of strategic alignment, organisational maturity and value creation. Likewise, there is a knowledge gap as to which frameworks are most widely adopted by financial institutions in Colombia, the level of maturity achieved, the processes considered most relevant and the main barriers to their implementation. This lack of information limits the ability of organisations to make informed decisions about adopting and managing these frameworks, representing a critical gap in applied research.

To address this gap, a survey was designed and administered to 12 financial institutions in Colombia, supplemented by a literature review of similar studies. The main objective was to evaluate the value contributed by IT governance frameworks in the Colombian financial sector, using the Strategic Alignment Maturity Model (SAMM) as an analytical framework to measure three key areas: governance, partnership, and value. In doing so,

the study contributes to the literature on two levels: (i) theoretically and managerially, by broadening the understanding of the role of IT governance as a mechanism for strategic alignment and value creation in a competitive environment (Ince, 2015) such as that of highly regulated and digitised financial organisations; and (ii) empirically, by providing evidence on the maturity and effectiveness of IT governance frameworks in a little-explored context such as Colombia.

2. Review of the Existing Literature

Information Technology (IT) governance has become an essential component of organisational strategy, especially in regulated and technology-dependent sectors such as finance. Various reference frameworks, including COBIT, ITIL and ISO/IEC 38500, have been developed to ensure that IT is aligned with business objectives, risk management and value generation. These frameworks establish principles and practices that enable the definition of policies and responsibilities, and ensure the fulfilment of strategic objectives through the effective and efficient use of IT.

In Colombia, the adoption of these frameworks has been studied. Sánchez-Bustos (2010) proposed a model that integrates best practices for IT management in a financial institution, combining elements of COBIT, ITIL and ISO/IEC 20000. The aim is to develop a coherent, efficient system that can be adapted to the specific characteristics of the Colombian financial sector. The model emphasises strategic alignment between IT and businesses, proposing a governance system that facilitates informed decisions, efficient resource allocation and continuous performance evaluation. It also addresses risk management through mechanisms to identify, assess and mitigate threats that affect the continuity and security of technological services, a critical aspect in the financial sector due to the need to guarantee the confidentiality, integrity and availability of information. Implementation is proposed in phases: diagnosis of the current state, definition of objectives, design of processes and structures, technological implementation, and continuous evaluation. This gradual approach reduces risks and maximises benefits.

Complementarily, Coronado-Cabrera (2010) analysed a leasing subsidiary in Colombia, highlighting the adaptation of international frameworks to the local context. The entity created committees and an IT strategy integrated into strategic planning, which improved role definition and risk management, increasing operational efficiency and responsiveness to regulatory changes. The author emphasises the need for flexible frameworks, adapted to organisational culture and internal processes, avoiding the rigid application of international models.

Recent studies agree on the need for hybrid models that combine international standards with contextual adaptations. Elmobark, El-ghareeb and Elhishi (2023) compared ITIL and COBIT in different industries, concluding that their effectiveness depends on the type of organisation and level of digital maturity. Haes and van-Grembergen (2015) point out that the strategic value of IT governance is achieved when frameworks are synchronised with the operational logic of the business, which in regulated sectors requires constant regulatory and technical updating.

From a critical perspective, Bednarčíková (2022) warns that many organisations adopt frameworks such as ITIL or ISO/IEC 20000 solely to meet requirements, without embracing their principles, which creates a gap between theory and practice. Müller and de-Lichtenberg (2018) call this "symbolic compliance": partial implementation for audits, without real integration into processes. This produces manuals and policies that are not applied, reducing the value generated and discouraging strategic investments. Moudoubah, El-Yamami, Mansouri & Qbadou (2021) add that isolated implementation by IT teams, without involving business units, reinforces an instrumental vision focused on certifications, not strategic alignment or sustainable value.

In Latin America, this disconnection is accentuated by resource constraints, high staff turnover, and hierarchical cultures (Llave & Ramón, 2018), which hinder participatory ownership. Therefore, studies should analyse not only formal adoption, but also actual ownership, monitoring mechanisms, and institutional capacities that condition effectiveness.

Recent research has highlighted the importance of cybersecurity in the financial sector. Orellana-Cabrera and Álvarez-Galarza (2022) proposed an IT governance framework focused on cybersecurity for the banking sector, combining the COBIT 2019 and NIST Cybersecurity Framework (CSF) standards. This approach seeks to

provide a structure to assess the level of maturity in cybersecurity and strengthen risk management from a comprehensive perspective that encompasses both IT governance and specific cybersecurity management.

The model is based on COBIT 2019, which establishes a lifecycle for the implementation of IT governance with phases such as: 'Where are we now?', 'Where do we want to be?' and 'How do we get there?'. These phases permit an assessment of the current situation, the definition of objectives and the planning of actions to achieve the desired level of maturity. By integrating NIST CSF, key functions are incorporated: Identify, Protect, Detect, Respond and Recover, facilitating comprehensive cyber risk management.

This study highlights the fact that the joint implementation of COBIT 2019 and NIST CSF allows cybersecurity profiles to be established that are tailored to the needs of each entity. This includes identifying critical assets, assessing risks, and defining controls to mitigate threats. It also emphasises continuous improvement through regular review and updating of strategies, taking into account technological developments and emerging threats.

Meanwhile, Corredor, Amón-Salinas and Zhindón-Mora (2019) analysed the Colombian financial sector's growing dependence on information technologies, which increases the complexity of maintaining business continuity in the face of emerging threats. They point out that risk management is often based on standards such as NTC-ISO 27005 and NTC-ISO 31000, but the diversity of global criteria makes their adoption difficult due to a lack of clear methodologies and technological tools. To address this issue, they propose a web-based system for risk analysis under these standards, which facilitates risk identification and assessment, allowing for more efficient implementation of preventive and corrective measures. According to the authors, its adoption would improve incident response capabilities and strengthen organisational resilience.

Other studies highlight challenges in implementing IT governance in the Colombian financial sector. Martínez-Jiménez (2021) identifies resistance to change and a lack of digital skills as the main obstacles. He argues that the Fourth Industrial Revolution (4IR) requires not only the adoption of emerging technologies, but also a profound cultural transformation. Organisations must encourage openness to change and provide training in digital skills, as adaptation is key to the success of technological initiatives. Martínez stresses that technologies such as artificial intelligence, the Internet of Things and automation will not be effective without a cultural change that values innovation and continuous improvement. He recommends investing in training to develop digital skills and promote proactive attitudes towards learning, which will enable organisations to take advantage of the opportunities offered by the 4IR and remain competitive. He also highlights the active role of leaders in promoting a flexible, collaborative culture, with effective communication and staff participation to overcome cultural barriers.

A recent line of debate questions the universal applicability of traditional frameworks such as COBIT or ITIL in the face of more agile approaches such as DevOps, SAFe or adaptive governance models. Luna, Costa, de-Moura, Novaes, M.A., & and do-Nascimento (2014) point out that the rigidity of traditional frameworks can hinder innovation in uncertain environments. Smits and van-Hillegersberg (2019) criticise maturity models for simplifying organisational dynamics, ignoring cultural and political factors that influence strategic alignment. These approaches suggest reconceptualising IT governance as a dynamic and negotiated process rather than a rigid regulatory system.

Finally, there remains an empirical gap in the systematic and quantitative assessment of the level of adoption of governance frameworks in the Colombian financial sector. Although studies such as Sánchez-Bustos (2010) and Coronado-Cabrera (2010) analyse practical applications from qualitative perspectives, there are few studies with representative data that measure specific processes, maturity levels and recurring barriers. This shortcoming limits the formulation of models adjusted to the national reality and makes it difficult to generate evidence-based recommendations.

Accordingly, this study seeks to bridge that gap by offering an empirical evaluation based on Luftman's SAMM model, applied to officials from several entities in the Colombian financial sector. Through the analysis of domains such as governance, partnership, and value creation, it seeks to contribute to the identification of relevant patterns in the practical implementation of frameworks such as ITIL, COBIT, and ISO/IEC 38500, as well as the processes considered critical by organisations and the main difficulties they face when attempting to

adopt them. The results not only allow for a comparison of theoretical expectations with institutional practice but also provide valuable input for proposing lines of improvement adjusted to real contexts. Thus, this study contributes to reducing the gap between normative knowledge and the operational application of IT governance in the Colombian financial context, with both academic and strategic implications for future research and policy formulation.

In general terms, this review highlights three key gaps in the literature: first, the scarcity of quantitative studies that permit the systematic measurement of the level of adoption of IT governance frameworks in the Colombian financial sector; second, the lack of analysis of the most widely implemented processes; and third, the limited exploration of hybrid models that combine international frameworks with effective local adaptations. In response to these gaps, this study not only provides an empirical basis grounded in field data but also proposes a framework for analysis that can be replicated and contrasted in other similar organisational contexts.

3. Methodology

The study adopts a quantitative methodology with an exploratory-descriptive scope, carried out with the help of SPSS version 25 software. It is a non-experimental, cross-sectional study that seeks to characterise the level of adoption of governance frameworks and IT best practices in organisations in the Colombian financial sector. This methodological choice is based on the need to empirically examine the maturity of the implementation of these frameworks, as well as the barriers perceived by the actors responsible for their management, without intervening or manipulating the variables studied.

3.1. Development of the Data Collection Instrument

The questionnaire was structured into two main sections. The first section included six demographic items, in order to characterise the respondents and contextualise the results. According to Dobosh (2017), this type of question allows the researcher to obtain a clear picture of who participated in the study, which is essential to adequately describe the sample and justify, as far as possible, the generalisation of the findings to a wider population. To this effect, the fact that participants from different financial institutions were included, representing nearly 30% of the country's active banking institutions, strengthens the external validity of the instrument used.

The second section consisted of 21 questions specifically geared towards the objectives of the study. Of these, 18 were taken and adapted from previous peer-reviewed research, while three items were designed by the authors based on a theoretical review and contextual requirements of the Colombian financial sector. Below is a general description of the publications and characteristics of the studies from which the questions used were extracted and validated, in order to support their methodological and theoretical relevance within the framework of this analysis.

Source publication of questions	Type of study
Assessing Business-IT Alignment Maturity Jerry Luftman	Based on the SAMM model, identifies the level of alignment between IT and business areas.
Maturity Level Assessment of IT Governance in Academic Management System. Based on COBIT 4.0 Framework PO and AI Domain. Case Study STMIK Riki Riki	Using COBIT 4.0, assesses whether the IT governance model applied to a growing academic institution contributes to decision-making and risk management.
Using IT governance and COBIT to deliver value with IT and respond to legal, regulatory and compliance challenges Gary Hardy	Based on various statistical exercises developed by the IT Governance Institute and its own research, determines the level of contribution that COBIT generates in aspects of risk and requirements associated with compliance.
Enterprise Governance of Information Technology Achieving Alignment and Value, Featuring COBIT 5 Steven De Haes , Wim Van Grembergen	Takes various cases from the industry to validate strategic alignment between IT and business areas, considering value delivery.

Table 1. Source documents for survey questions

As part of the instrument, three questions were added by the authors, specifically designed to identify three aspects: first, the frameworks or best practices in IT governance adopted by the participating entities; second, the processes with the highest degree of implementation; and third, the main perceived barriers to their adoption. These items were designed following the methodological recommendations for item drafting proposed by Medina, Rojas and Bustamante (2023) on the drafting of closed instruments, combining categorical options with the possibility of open-ended responses, in order to reduce bias, ensure comparability, and capture relevant contextual elements. The structure of the questionnaire was supervised and approved by the directors of the research process, who hold doctorates.

From a statistical point of view, a classification was established between independent and dependent variables. Independent variables include: the implementation of processes within the framework of an IT governance model, the existence of strategic IT planning, the definition of shared metrics between IT and the business, the prioritisation of governance processes, and the existence of service level agreements. Dependent variables include: the degree of alignment between IT and the business, the level of maturity in the implementation of frameworks or best practices, the perception of value generation as a result of such adoption, continuous improvement in IT services, and the level of effective relationship between IT and the business units.

3.2. Population and Sample

The population covered by this study consists of approximately 15,000 employees working in information technology departments at 30 financial institutions in Colombia. This information is based on the official report on the number of banks published by the Financial Superintendency (Superintendencia Financiera de Colombia, n.d.), the Asobancaria Human Capital report (Asobancaria, 2021), and the 2022 IT labour market report (Hireline, 2022).

Due to the size of the population and budgetary and resource constraints, the sample for this study was selected using non-probabilistic convenience sampling, deviating from the ideal probabilistic method (Hernández-Sampieri, Fernández-Collado & Baptista-Lucio, 2014). Of the 30 organisations initially contacted, 48 individuals from 12 of these organisations participated in the study (Table 2).

		Frequency	Percentage	Valid percentage	Accumulated Percentage
Valid	Entity 6	1	2.1	2.1	2.1
	Entity 10	1	2.1	2.1	4.2
	Entity 8	3	6.3	6.3	10.4
	Entity 3	1	2.1	2.1	12.5
	Entity 7	3	6.3	6.3	18.8
	Entity 5	1	2.1	2.1	20.8
	Entity 12	13	27.1	27.1	47.9
	Entity 1	8	16.7	16.7	64.6
	Entity 9	2	4.2	4.2	68.8
	Entity 4	1	2.1	2.1	70.8
	Entity 11	10	20.8	20.8	91.7
	Entity 12	4	8.3	8.3	100.0
	Total	48	100.0	100.0	

Table 2. Distribution of participants by banking institution

This type of sampling is appropriate in exploratory research, where the main objective is to obtain relevant information from actors with direct knowledge of the phenomenon being studied. In this case, the participants were mainly involved in IT, which ensured that their responses were aligned with the study's objectives: to evaluate the adoption of IT governance frameworks and their strategic alignment with the business.

The inclusion of 12 entities represents 40% coverage of the institutional universe, which is significant for qualitative and exploratory studies. In addition, the sample size allowed for exploratory factor analysis, a statistical technique that requires a minimum number of observations to identify underlying patterns in the data and validate the structure of the factors analysed. This analysis helped to strengthen the interpretation of the results and identify key dimensions in the adoption of IT governance frameworks.

Although the results are not intended to be generalised to the entire population, the sample used permits the identification of common trends, perceptions, and practices within a representative group of the sector. To reinforce the validity of the findings, they were compared with similar previous studies, which confirmed the trends observed and increased the reliability of the conclusions.

3.3. Data Collection

The questionnaire was specifically designed to measure the level of adherence and maturity in the implementation of IT governance frameworks. It was developed using the Strategic Alignment Maturity Model (SAMM) proposed by Luftman as an analytical framework, focusing on three of its six domains: governance, partnership and value. The application of the model made it possible to explore key elements such as the level of alignment between IT and business, the perception of value generated from the adoption of IT governance frameworks, the nature and consistency of the metrics used in both IT and businesses, the processes considered strategic within the applied frameworks, as well as the most common barriers faced by organisations when implementing these models.

Starting with question 7 of the questionnaire, each element was designed to correspond to a specific domain in the SAMM model, thus facilitating a clear organisation of the data collected. The distribution by domain is presented in Table 3, grouping the questions according to the domains. This systematisation was essential to ensure consistency between the conceptual framework and the results obtained in the study.

	Demographics	Government	Association	Value	Barriers
Question number	1	7	18	22	27
	2	8	19	23	
	3	9	21	24	
	4	10		25	
	5	11		11	
	6	12			
		13			
		14			
		15			
		16			
		17			
		19			
		20			
		26			

Table 3. Classification of questions related to the dimensions of the SAMM model

3.4. Validation and Reliability of the Instrument Used

Applying Cronbach's alpha coefficient to the designed instrument, to measure its reliability, a value of 0.896 was obtained, calculated from a sample of 48 respondents and considering 20 of the 22 proposed questions. This result indicates a high level of internal consistency according to Celina-Oviedo and Campo-Arias (2005). The indicator is widely used in social and management research to assess the homogeneity of the items that make up a questionnaire, ensuring that they consistently measure the same construct (Tavakol & Dennick, 2011). This supports the reliability of the questionnaire and confirms that the selected items consistently measure the construct analysed, complying with the standards accepted in exploratory studies.

Furthermore, an exploratory factor analysis (EFA) was performed to determine whether there were measurement factors in the instrument and to identify them, which provided greater consistency and validity. The KMO (Kaiser-Meyer-Olkin) obtained from this analysis was 0.758. A value greater than 0.7, which demonstrates that the EFA is adequate for the sample. In addition, Bartlett's sphericity test had a p-value (0.001) that was less than 0.05, indicating that the correlation matrix of the instrument's questions was different, i.e., there are several factors for the model.

Table 4 indicates that six factors were found, since only eigenvalues greater than 1 in the total column of the Initial Eigenvalues field were accepted. It can also be seen that the cumulative explained variance up to the sixth factor is 75%, which represents an acceptable result.

Component	Initial self-values			Sums of the squared loads from the extraction		
	Total	% variance	% accumulated	Total	% variance	% accumulated
1	8.567	38.940	38.940	8.567	38.940	38.940
2	2.538	11.536	50.475	2.538	11.536	50.475
3	1.691	7.688	58.164	1.691	7.688	58.164
4	1.455	6.612	64.776	1.455	6.612	64.776
5	1.216	5.529	70.305	1.216	5.529	70.305
6	1.061	4.823	75.128	1.061	4.823	75.128
7	0.932	4.234	79.362			
8	0.723	3.285	82.647			
9	0.660	2.998	85.645			
10	0.567	2.578	88.223			
11	0.522	2.371	90.594			
12	0.441	2.005	92.599			
13	0.385	1.751	94.350			
14	0.277	1.259	95.609			
15	0.220	1.002	96.611			
16	0.206	0.936	97.547			
17	0.171	0.778	98.325			
18	0.124	0.564	98.889			
19	0.108	0.489	99.378			
20	0.060	0.272	99.650			
21	0.055	0.251	99.900			
22	0.022	0.100	100.000			

Extraction method: principal component analysis.

Table 4. Total explained variance

Table 5 presents a matrix of rotated components, showing that items were grouped into six underlying components through principal component analysis (PCA) with Varimax rotation.

	Component					
	1	2	3	4	5	6
Item7					0.769	
Item8	0.502					
Item9	0.733					
Item10	0.645					
Item11	0.601					
Item12	0.846					
Item13	0.806					
Item14	0.790					
Item15	0.768					
Item16	0.771					
Item17					-0.646	
Item18						0.734
Item19			0.581			
Item21					-0.663	
Item21a		0.814				
Item21b		0.860				
Item21c		0.830				
Item21		0.884				
Item22				0.868		
Item23				0.598		
Item24			0.695	0.547		
Item25			0.663			

Extraction method: principal component analysis.

Table 5. Rotated component matrix (the rotation converged in 10 iterations)

Interpretation of this table is based on identifying the items with the highest loadings (numerical values) in each column or component. A high loading (generally greater than ±0.5) indicates a strong association of the item with that component. Accordingly, the concise interpretation of the groups of items by component is listed below:

- **Component 1:** Strongly defined by items 8, 9, 10, 11, 12, 13, 14, 15 and 16.
- **Component 2:** Consists of the following items: 21a, 21b, 21c and 21d.
- **Component 3:** Groups the items 19, 24 and 25.
- **Component 4:** Groups the items 22 and 23.
- **Component 5:** Groups the items 7, 17 and 21. It is noteworthy that items 17 and 21 have negative loadings, suggesting an inverse relationship with this component.
- **Component 6:** Defined solely by item 18.

In summary, the analysis reduced the original set of items to six main factors or dimensions, and the items grouped under each component measure a similar construct or concept.

4. Description of the Results

In relation to the first specific objective, which sought to identify the most widely implemented frameworks and best practices in Colombian financial institutions for IT governance, the data reveals a clear preference for the use of ITIL, which accounts for the highest proportion of adoption at almost double that of COBIT, which ranks second. In an intermediate position is the use of ISO 38500 and ISO 20000, while TOGAF and, to a lesser extent, ISO 27000, show more limited application, as illustrated in Figure 1.

This preference seems to be related to the ability of these models to integrate functionally into organisational processes, promoting more efficient management that is aligned with the strategic objectives of the entities.

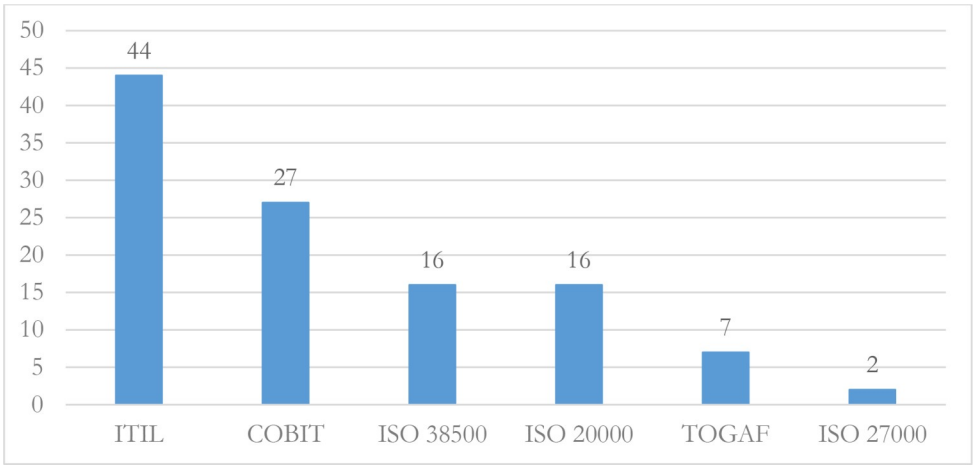

Figure 1. Most used frameworks and best practices

From an organisational perspective, the implementation of ITIL is perceived as a structural transformation that drives greater collaboration between departments and promotes the standardisation of IT services, aligning them with corporate strategy. In the Colombian context, its adoption is particularly notable in the financial sector, reflecting a growing awareness of the importance of integrating IT as a strategic asset for competitiveness.

The use of COBIT is related to strengthening IT performance control, monitoring and evaluation mechanisms, reinforcing its position as a globally accepted framework for technology governance. In terms of strategic planning, Figure 2 shows that an inter-organisational vision predominates, followed by business and tactical-functional approaches. To a lesser extent, planning appears as a process limited to specific purposes or integrated inside and outside the company. This distribution shows that although there is progress towards broader and more collaborative approaches between organisations, planning models focused on the company or specific areas still carry significant weight. Therefore, this overview suggests a transition stage, where traditional practices coexist with more mature initiatives that seek to articulate IT planning not only within the organisation, but also in relation to its ecosystem of stakeholders.

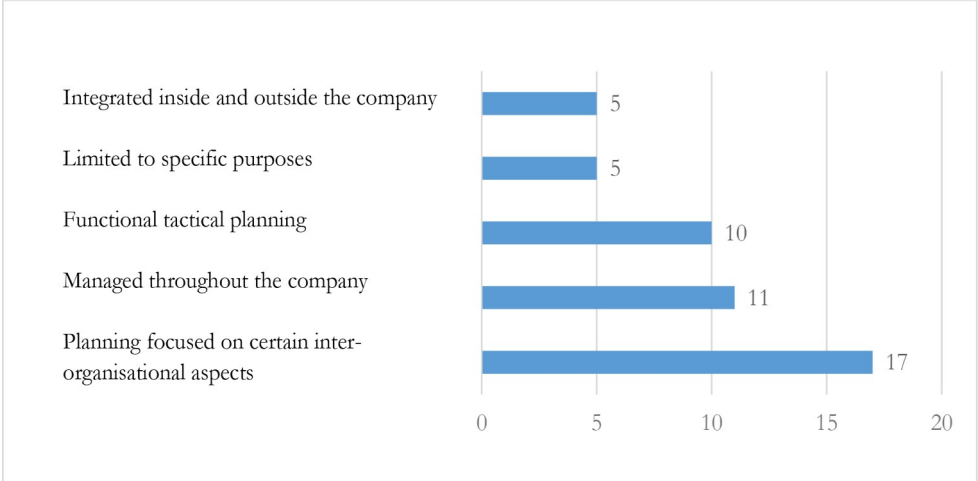

Figure 2. Characteristics of the strategic IT plan

Regarding the second specific objective, focused on identifying key processes for IT governance, analysis of the results shows that the entities surveyed attach greater importance to IT operations management, change

management and information security, followed by processes related to availability, incident and problem management, monitoring and capacity management, and finally knowledge management. Only a small percentage referred to processes other than those listed, confirming a pattern of focus on practices that ensure operational continuity, service stability, and risk mitigation, as shown in Figure 3.

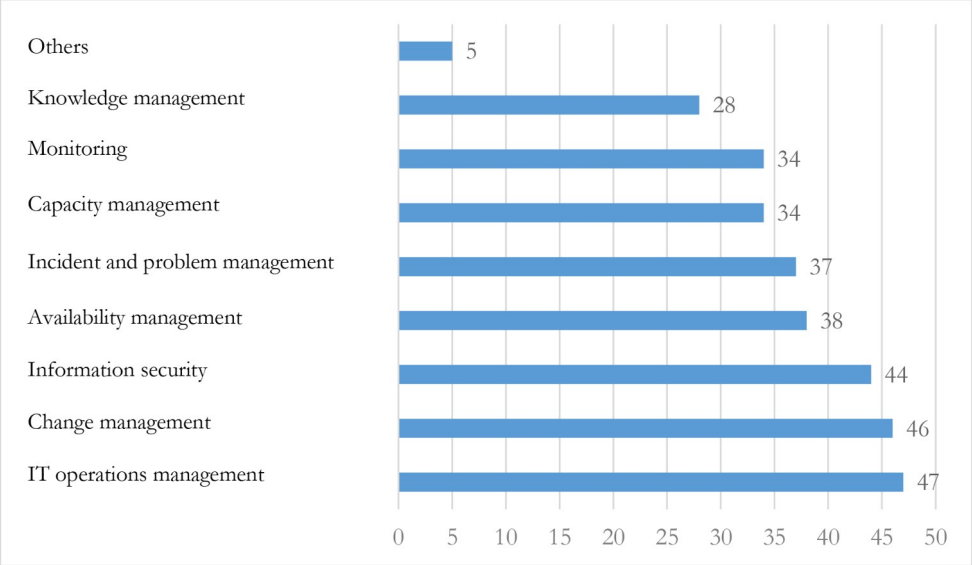

Figure 3. Key processes for IT governance

This prioritisation suggests that institutional efforts are focused primarily on ensuring the reliability and availability of systems, which are critical aspects for the financial sector. At the same time, the importance attributed to information security reflects a growing sensitivity to cyber risks and the need to strengthen data protection mechanisms. However, processes such as knowledge management, which are at a lower level of implementation, indicate an opportunity for improvement in terms of systematising learning and organisational innovation.

Additionally, the results show that there are internal differences in the perception of IT governance depending on the role that each employee performs, which may be associated with factors such as hierarchical structure, organisational culture or the level of training in IT frameworks, which influence the way in which processes are prioritised and applied. Taken together, these elements show that technology governance does not depend solely on the adoption of frameworks and best practices, but also on institutional maturity and the ability to integrate risk management, security, and innovation into a coherent and sustainable organisational culture.

During the analysis, references to additional standards such as ISO/IEC 27001 and ISO/IEC 31000 also emerged. Although these were not directly selected in the survey, they appear to be relevant frameworks for security and risk management. However, in terms of knowledge about the use of resources allocated to IT, Figure 4 shows that a significant majority of participants (30 mentions) claim to have information about the investments made, while 14 indicated that they were unclear about this and 4 stated that they were completely unaware. These results suggest that although there is a relatively high level of transparency, significant gaps remain in communication and resource monitoring, limiting the consolidation of fully effective IT governance. The presence of a group that claims to not have sufficient information highlights the need to strengthen accountability mechanisms and internal disclosure channels to ensure that IT investment decisions are understood and valued by all stakeholders.

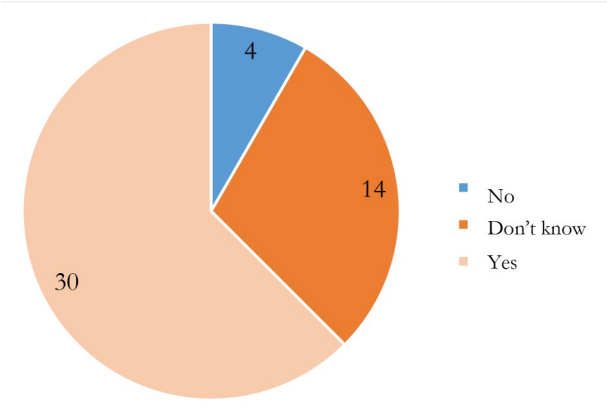

Figure 4. Clear overview of key IT investments from a risk and return perspective

In terms of IT's contribution to business growth, the results are mostly positive, as shown in Figure 5, where 73% of respondents rated this contribution between 4 and 5, reflecting a high degree of recognition of the strategic role of IT in organisations. However, 25% rated it at an intermediate level (3) and there was one isolated case with a low rating (2), indicating that although there is a generally favourable assessment, challenges remain in consolidating the perception of IT as a cross-cutting enabler and not just an operational one. This trend suggests that organisations are making progress in articulating technological capabilities and business objectives, although the presence of intermediate assessments reveals opportunities for improvement in terms of strategic alignment, communication of the value generated and consolidation of sustainable competitive advantages.

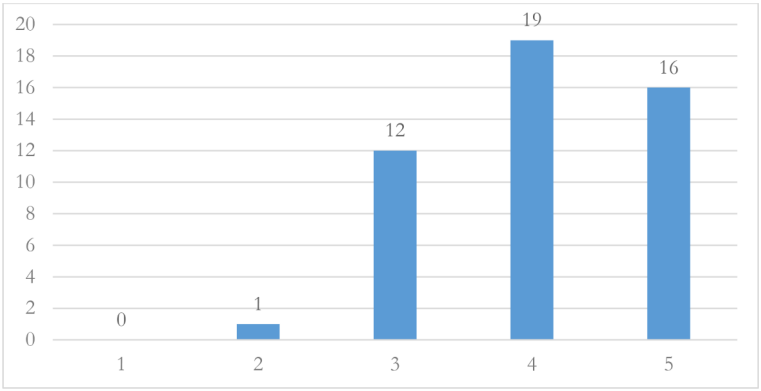

Figure 5. Effective use of IT to grow the business (1 low rating, 5 high rating)

Considering the obstacles identified in the implementation of IT governance models, Figure 6 shows that the main challenge highlighted by respondents is the cost of implementation and adoption, which highlights that budgetary constraints continue to be one of the most significant barriers to progress in this type of initiative. Secondly, it is difficult to easily appreciate the generation of value, which reflects the need to strengthen mechanisms for measuring and communicating the impact of IT governance on organisational results. The lack of management support also appears to be a limiting factor, as without the commitment of senior management, it is difficult to ensure the sustainability of efforts. Finally, the scant mention of coordination problems between areas and functions suggests that this aspect is not a priority concern for most entities.

These findings are consistent with patterns observed in other contexts, where the viability of IT governance models depends not only on available resources, but also on institutional commitment and the ability to demonstrate tangible results, reinforcing the importance of integrating a strategic and long-term vision into their adoption.

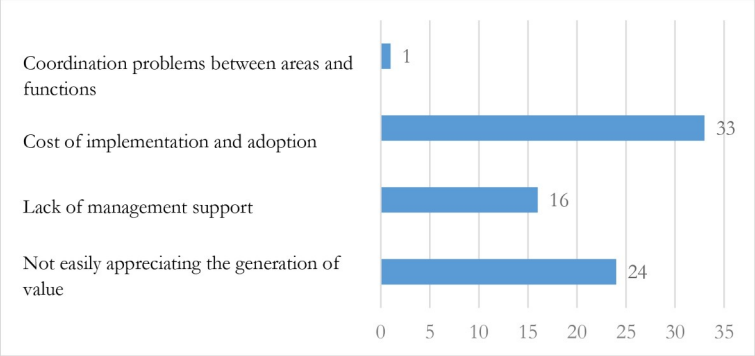

Figure 6. Barriers to implementing a framework for IT governance

With regard to the third specific objective, focusing on the use of metrics, Figure 7 shows that the indicators used in organisations are mainly oriented towards traditional financial aspects and analysis of the profitability of information technology. To a lesser extent, the metrics extend to assessing the impact on other stakeholders, including external ones, while only a few participants indicated an emphasis on cost efficiency or purely technical indicators unrelated to the business.

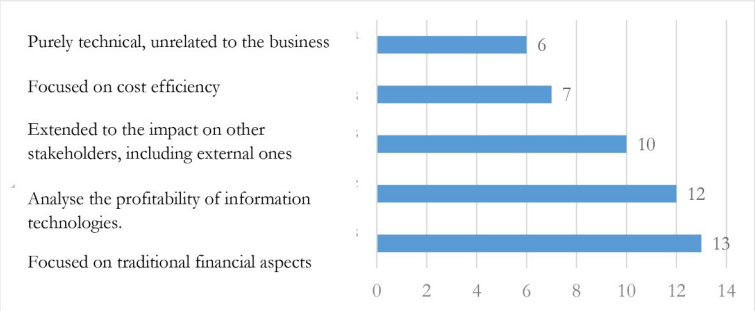

Figure 7. Scope of the metrics used by IT

These findings show that although progress is being made towards integrating metrics that link IT to financial results, there is still a gap in the adoption of indicators that capture the strategic and relational value of technology, especially with regard to the impact on external stakeholders and the generation of organisational value beyond cost. The focus on traditional metrics can limit the visibility of IT's real contribution to strategic objectives, compromising the ability to demonstrate its role as an enabler of competitive advantages, highlighting the need to move towards the construction of integrated dashboards and joint feedback mechanisms between technical and business areas, which permit the alignment of financial, operational and strategic metrics, thus consolidating a culture of evaluation based on evidence and oriented towards long-term results.

On the other hand, Figure 8 shows that business metrics are mainly oriented towards the customer and the functional side of the business, while financial aspects and the impact on other external stakeholders receive similar but secondary attention. In contrast, only a minimal proportion of metrics unrelated to information technology were identified, confirming that technological infrastructure continues to be perceived as marginal within evaluation systems. These results suggest that although customer-centric and business-centric approaches have been incorporated, a fragmented view of IT's contribution persists, limiting the construction of comprehensive dashboards that holistically represent institutional performance. This disconnect makes it difficult to recognise the cause-and-effect relationships between technological processes and strategic outcomes, reducing the ability of organisations to implement continuous improvement mechanisms based on reliable data.

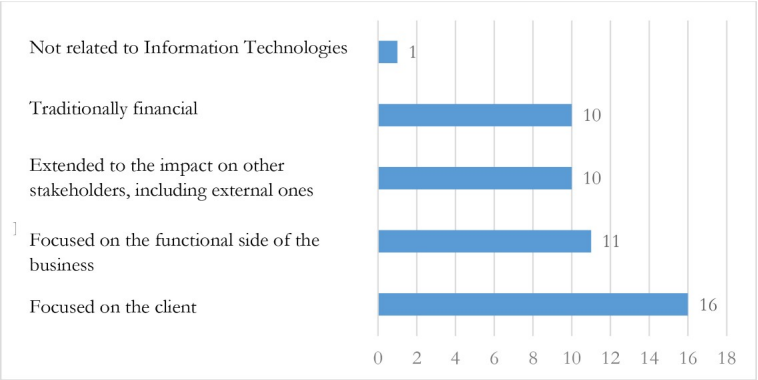

Figure 8. Scope of the metrics used by the business

Consequently, moving towards the explicit inclusion of technological metrics in corporate dashboards is a priority, so that, not only is understanding of overall performance broadened, but also a systemic vision of the organisation can be consolidated, which is essential to compete in dynamic and highly demanding environments.

However, when analysing Figures 1 to 8 together, it is clear that although Colombian financial institutions have made progress in adopting reference frameworks such as ITIL and COBIT, as well as in consolidating key processes focused on operational continuity and information security, significant challenges remain in terms of strategic alignment and value creation. On the one hand, organisations are showing progress in standardising and controlling their practices, which strengthens the reliability of technological services; however, the presence of barriers associated with high implementation costs, the difficulty in demonstrating tangible benefits and the lack of managerial support limit the sustainability of these initiatives and reflect the need for greater institutional commitment.

In terms of metrics, both IT-oriented and business-oriented metrics tend to prioritise financial and functional indicators, with a growing emphasis on the customer, but with little integration of metrics that clearly show the strategic impact of Information Technology. This fragmentation makes it difficult to establish links between technological processes and organisational results, which reduces the ability of entities to build comprehensive dashboards that support decisions based on reliable data. In this regard, the overall picture suggests that strengthening IT governance in the Colombian financial sector depends not only on the technical adoption of frameworks and processes, but also on the consolidation of a systemic vision that integrates metrics, leadership and organisational learning, thus enabling true strategic use of technology.

4.1. Review of Results Related to Previous Studies

Table 6 shows how the review of previous studies revealed significant similarities with the results obtained.

Authors	Document	Points of agreement with the study conducted
Moudoubah, El-Yamami, Mansouri & Qbadou	From IT service management to IT service governance: An ontological approach for integrated use of ITIL and COBIT frameworks (2021)	The authors agree on the importance of generating value through the adoption of frameworks such as COBIT and ITIL, coinciding on key processes such as incident management, change management and security management, among others, highlighting the importance of SLAs (Service Level Agreements). They also point out the importance of generating value from investment in these types of processes, noting that it is sometimes difficult to appreciate their significance and function.
Elmobark, El-ghareeb & Elhishi	Measuring and evaluating frameworks for IT Service quality in the IT industry: A comparative study (2023)	The study evaluated and confirmed how the most widely accepted frameworks on the market (ITIL and COBIT) contribute to quality delivery within the industry, considering various sectors, including finance, highlighting their contribution to customer satisfaction, risk mitigation, continuous improvement, compliance aspects, and alignment between IT and business. It highlights the complexity and resource requirements for adopting these models.

Authors	Document	Points of agreement with the study conducted
Bednarčíková	Use of frameworks, norms and standards in information technology service management (2022)	The study highlights the implementation of IT governance frameworks based on the need to support business objectives through IT management. To this end, it evaluates different frameworks, identifying ITIL, ISO/IEC 20000 and COBIT as the most widely adopted, helping organisations to become more competitive, efficient and profitable. The study is based on research conducted by Invesis Learning in 2021 on IT management worldwide, evaluating 380 companies. Among the conclusions, it shows that the implementation of IT governance frameworks is common in customer service, and financial and human resources companies, among others.

Table 6. Similar previous studies and their results

5. Discussion

The results obtained by applying the SAMM model reveal relevant patterns in the level of strategic alignment between information technology (IT) and business within the Colombian financial sector. In terms of governance, partial implementation of frameworks and best practices was observed, with a predominance of frameworks such as ITIL and COBIT, but with varying levels of maturity depending on the type of entity. This heterogeneity can be explained, in part, by differences in organisational capabilities, resource availability and management commitment. When comparing these findings to those of Sánchez-Bustos (2010) and Coronado-Cabrera (2010), there is agreement on the need to adapt reference frameworks to the specific context of each institution, thus reinforcing the importance of flexible and scalable models in IT governance practice.

Regarding the partnership axis, the results indicate a persistent gap in integration between business and technology areas, both in joint planning and in the use of shared metrics. This situation is in line with Martínez-Jiménez (2021), who identifies resistance to change and a lack of digital skills as critical barriers to achieving an organisational culture geared towards digital transformation. In this study, these barriers are also reflected in respondents' perceptions of the difficulty of establishing joint metrics or effective service level agreements. This suggests a need to strengthen cross-functional communication mechanisms and change management capabilities.

With regard to the value axis, although entities recognise improvements in operational efficiency and services, the results show weak formalisation of strategies aimed at measuring the value generated by IT. This weakness is also highlighted by Orellana-Cabrera and Álvarez-Galarza (2022), who propose strengthening cybersecurity governance through structured models that integrate risk management and value generation. The low adoption of frameworks that incorporate formalised risk analysis, such as the NIST CSF, could be limiting the sector's ability to justify and optimise its technology investments from a strategic perspective.

Finally, the study identifies common barriers such as a lack of trained personnel, a weak corporate governance culture, and the difficulty of adapting international frameworks to local realities. These barriers coincide with those raised by Corredor et al. (2019), who highlight the complexity faced by Colombian organisations when implementing risk analysis standards due to the lack of accessible and contextualised methodological approaches. Overall, the results of this research reaffirm the importance of promoting greater integration between IT and business, not only from a technical perspective, but also from an organisational and strategic one.

5.1. Practical Theoretical Implications

At a theoretical level, the findings confirm the relevance of the SAMM model as a tool for assessing the maturity of strategic alignment in emerging environments. However, there is a clear need to adjust its indicators to reflect the particularities of the Colombian financial sector, which is characterised by high levels of regulation, rapid technological dynamics and cybersecurity requirements. This contribution constitutes a starting point for future research aimed at developing hybrid models that integrate dimensions of organisational maturity, corporate culture, change management, and robust digital security practices, thereby strengthening IT governance in highly complex contexts.

5.2. Practical Implications

From a practical perspective, the results allow us to formulate recommendations aimed at strengthening IT governance in the Colombian financial sector. These include the effective integration of technological capabilities into institutional strategic planning, the establishment of shared metrics that facilitate alignment between IT and business areas, and the strengthening of leadership in digital transformation projects. Likewise, the importance of developing organisational competencies to proactively manage change, minimising risks associated with technology adoption, is emphasised. Similarly, the gradual implementation of frameworks that incorporate risk management components, such as COBIT 2019 or NIST, not only contributes to the mitigation of vulnerabilities, but also facilitates the justification of technological investments to senior management and regulatory bodies, generating greater confidence in strategic decision-making.

5.3. Limitations and Future Lines of Research

The limitations of this study stem directly from the use of non-probabilistic convenience sampling, as this methodology introduces selection bias, since the sample was not obtained randomly, which affects the representativeness of the sample with respect to the total population of financial organisations in Colombia. As a result, it is difficult to generalise the findings to the entire population of financial institutions in the country. Furthermore, dependence on the availability of organisations and their participants created a risk of partial or incomplete coverage, limiting the scope of the information collected.

Despite these methodological limitations, it is important to note that the main objective of this study was to illustrate and describe the level of adoption of IT governance practices in a particular and difficult-to-access sector such as the Colombian financial sector. Therefore, although the findings are not representative at a national level, they do provide a valuable detailed and qualitative snapshot of the current state of IT governance in the participating organisations. In this regard, the results are useful for initial understanding and for identifying trends and areas of opportunity in this market segment, serving as a solid basis for future research. We recommend the use of probabilistic sampling and mixed approaches that combine quantitative analysis with case studies, expanding the coverage and depth of the information.

This research opens the possibility of future lines of inquiry. We propose developing longitudinal studies to observe the evolution of IT-business alignment, as well as research exploring the impact of cybersecurity and regulatory compliance on value creation. It is also important to evaluate the effectiveness of hybrid models that integrate traditional frameworks and agile approaches, and to analyse the return on investment in IT governance initiatives to strengthen strategic decision-making in the Colombian financial sector.

6. Conclusions

This study evaluated the level of adoption of governance frameworks and IT best practices in Colombian financial sector entities, using three pillars of the SAMM model as a basis: governance, partnership, and value. The findings show partial implementation of recognised frameworks such as ITIL, COBIT and ISO/IEC 38500, together with marked heterogeneity in their application and maturity. Despite advances in terms of operational efficiency and process management, significant gaps remain in the integration between IT and business, as well as in the formal measurement of the value generated by technological investments.

These findings offer valuable insights not only for academic reflection, but also for the formulation of public policies aimed at strengthening digital governance in Colombia, such as: the recognition of patterns of partial adoption; the identification of differentiated levels of maturity; evidence of gaps in the integration of IT-business metrics; and weaknesses in value measurement mechanisms. This characterisation of current practices could be used by entities such as MinTIC and the Financial Superintendency as a baseline for sectoral interventions, incentive design, and regulatory adjustments that promote more effective adoption of governance frameworks.

On a practical level, the results also offer valuable insights for IT leaders, digital transformation managers, and institutional planning units in financial institutions, providing empirical evidence of which are the main organisational weaknesses in IT-business integration, which processes are most mature, and which barriers

prevent advanced levels of governance from being achieved. This can translate into improvement plans, more focused internal audits, and capacity building in value and risk management.

Additionally, the findings are transferable to other strategic sectors in the country, such as health, education, and public services, which face similar challenges in adopting IT governance frameworks and could benefit from comparative studies or adaptations of the SAMM model.

These results suggest that the level of strategic alignment between IT and business in the Colombian financial sector is still in its infancy in critical areas such as the definition of joint metrics, coordination in strategic planning, and risk-based governance. Despite the widespread use of international frameworks, their application does not always translate into mature management, suggesting the need for contextual adjustments and greater efforts at organisational appropriation.

From an empirical perspective, this research contributes to closing a gap identified in the national academic literature by providing systematised evidence on the maturity of strategic alignment in the financial sector, overcoming the fragmented view of previous studies focused on specific cases. It also allows for a cross-sectional characterisation of the factors that explain differences in adoption levels, such as resource availability, organisational culture, and senior management commitment.

Finally, the study opens a future agenda for applied research, which could include longitudinal studies on the evolution of IT-business alignment, qualitative research that delves deeper into internal organisational dynamics, and comparative analyses between sectors. The inclusion of cybersecurity, technological sustainability and regulatory compliance as additional variables may enrich the design of more comprehensive models to strengthen IT governance in the country.

Declaration of Conflicting Interests

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Annex 1

Questions	Identified Variable	Research Source
Section 1 - Population classification		
1. What type of organisation do you belong to?	Type of Organization	The Authors
2. What is the economic sector of the company?	Sector	
3. How many employees does the company you work for have?	Number of Employees	
4. Which city is the company mainly located in?	City	
5. What area do you work in?	Business sector	
6. What kind of role do you have in the organisation?	Role	
Section 2 - Implementation maturity level frameworks		
7. Does your organisation use any frameworks or best practices for IT governance? (select all that apply)	Implementation of processes within a framework or best practices for IT governance	The Authors
ITIL		
COBIT		
ISO 38500		
ISO 20000		
TOGAF		
Other		
8. There is a strategic plan for Information Technology (0 Poor - 5 Excellent)	Aligning IT and Business	Assessing Business-IT Alignment Maturity Jerry Luftman - Stevens Institute of Technology
9. The processes for Information Technology, its organisations (areas) and their relationships are defined (0 Poor - 5 Optimal).	Strategic Planning	Maturity Level Assessment of IT Governance in Academic Management System. Based on COBIT
10. Human resources are managed using Information Technology (0 Poor - 5 Excellent)	Process prioritisation	

Questions	Identified Variable	Research Source
11. Quality is managed using Information Technology (0 Poor - 5 Excellent)	Continuous improvement in IT services	4.0 Framework PO and AI Domain. Case Study STMIK Buddhi Poster Riki Riki Universitas Buddhi Dharma
12. Information technology risks are assessed and managed (0 Poor - 5 Excellent)	Continuous improvement in IT services	
13. Projects are managed using Information Technology (0 Poor - 5 Excellent)	Process prioritisation	
14. The use and operation of Information Technology services is enabled [Service deployment, transition, and support] (0 Poor - 5 Excellent)	Process prioritisation	
15. Information technology resources are managed [Maintenance, support, monitoring, updates, etc.] (0 Poor - 5 Excellent)	Process prioritisation	
16. Changes within IT are managed (0 Poor - 5 Excellent)	Process prioritisation	
Section 3 - Strategic alignment between business and information technology		
17. Does senior management ensure that adequate IT resources, infrastructure and skills are available to meet the company's strategic objectives?	IT Investment Management	Using IT governance and COBIT to deliver value with IT and respond to legal, regulatory and compliance challenges Gary Hardy
Yes		
No		
Don't know		
18. What statement would you use to describe the relationship between IT and the business?	Mutual understanding between IT and business, and the rigidity of protocol	Enterprise Governance of Information Technology Achieving Alignment and Value, Featuring COBIT 5 Second Edition Steven De Haes, Wim Van Grembergen
The business and IT do not understand each other (Level 1)		
The business and IT have a limited understanding of each other (Level 2)		
There is a good understanding between the business and IT (Level 3)		
There is an improved and managed alignment process (Level 4)		
There is complete alignment, integrating strategic planning for the business and IT (Level 5)		
19. The IT strategic plan	Role of IT in strategic business planning	Assessing Business-IT Alignment Maturity Jerry Luftman Stevens Institute of Technology
It is limited to specific purposes (e.g. projects or initiatives).		
It is functional tactical planning. (Scope covers specific IT processes).		
It is focused planning, some of which is inter-organisational (interaction with part of the business).		
Managed across the entire company.		
Integrated inside and outside the company.		
Section 4 - Generating Value from Information Technology		
20. Does the business have a clear view of major IT investments from a risk and return perspective?	Budget control and IT investment management	Using IT governance and COBIT to deliver value with IT and respond to legal, regulatory and compliance challenges Gary Hardy
Yes		
No		
Don't know		

Questions	Identified Variable	Research Source
21. What is the influence of IT governance on your business considering the following measures of success?	Perception of IT value by the business	Enterprise Governance of Information Technology Achieving Alignment and Value, Featuring COBIT 5 Second Edition Steven De Haes Wim Van Grembergen
a. IT profitability (1 not important – 5 very important)		
b. Effective use of IT to grow the business (1 not important - 5 very important)		
c. Effective use of IT for the utilisation of your assets (1 not important – 5 very important)		
d. Effective use of IT to increase business flexibility (1 not important - 5 very important)		
Section 5 – Generation of metrics		
22. Information Technology metrics (what approach do they take?)	Implementation of metrics in IT	Assessing Business-IT Alignment Maturity Jerry Luftman Stevens Institute of Technology
They are purely technical, unrelated to the business.		
They focus on cost efficiency.		
They focus on traditional financial aspects.		
They analyse the profitability of information technology.		
They extend to the impact on other stakeholders, including external ones.		
23. Business metrics (What approach do they take?)		
They are not related to information technology.	Implementation of business metrics involving IT	Assessing Business-IT Alignment Maturity Jerry Luftman Stevens Institute of Technology
They focus on the functional side of the business.		
They are traditionally financial.		
They are customer-focused.		
They extend to the impact on other stakeholders, including external ones.		
24. Service agreement levels in the business (What approach do they take?)	Service Level Agreement	
They occur sporadically.		
They are technical and functional.		
They are beginning to appear throughout the business.		
They exist throughout the business.		
25. Continuous Improvement (If it exists, at what level?)	Continuous improvement in IT services	
None		
Minimal		
Occasional		
Frequent		
Part of the routine		
Section 6 - Key processes within IT governance and barriers to implementing a governance framework		
26. Which processes within the IT governance framework do you consider to be key success factors? (select all that apply)	Process prioritisation	The Authors
IT operations management		
Change management		
Information security		
Monitoring		

Questions	Identified Variable	Research Source
Incident and problem management		
Availability management		
Knowledge management		
Capacity management		
Other		
27. What are the main obstacles you have encountered when implementing IT governance frameworks or best practices? (tick all that apply)		The Authors
Implementation and adoption costs	IT Investment Management	
Lack of management support	Relationship and trust model	
Value creation is not easily appreciated	Business perception of IT value	
Other		

Table 1. Survey conducted