Optimizing Business Value via IT Governance Mechanisms: An Examination of SMEs in Southern Minas Gerais, Brazil

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Abstract: IT, increasingly recognized as a vital contributor to competitive advantage, plays an indispensable role in augmenting business value. Effective implementation of IT Governance (ITG) mechanisms, comprising structures of responsibility, control processes, communication protocols, and decision rights, has been found to foster alignment between IT and business objectives. Such alignment is particularly critical for Small and Medium-sized Enterprises (SMEs), where the amplified business value can be realized. Yet, SMEs often grapple with challenges in implementing ITG, owing to resource constraints, communication hurdles, resistance to change, and technological complexity. The present study delves into this complex dynamic within a medium-sized industry located in southern Minas Gerais, Brazil, investigating the deployment of ITG mechanisms as a means to enhance business value through IT. An interpretivist approach characterizes the qualitative, inductive study, drawing on a case study to probe the links between ITG mechanisms, IT capabilities, and business value. Four hypotheses are put forth in the discourse, shedding light on the intricate relationships that these elements share. The findings indicate that ITG mechanisms exert a positive impact on IT business value, albeit with identifiable weaknesses and potential areas for enhancement. More effective alignment between IT and business can be achieved by addressing these shortcomings, thereby mitigating risks such as demotivation among IT professionals and resistance to change.

Keywords: IT governance; ITG mechanisms; IT-business alignment; IT business value; IT governance implementation; IT capabilities

1 Introduction

Rapid evolution in the field of Information Technology (IT) has redefined its role within organizations. No longer viewed merely as operational support [1, 2], IT is now acknowledged as a driver of competitive advantage and a significant factor in enhancing business value [3]. IT Governance Mechanisms (ITGM) play a critical role in this transition, serving as a significant contributor to business-IT value [4].

IT Governance can be established using a range of frameworks, processes, relational mechanisms [4, 5], and communication channels [6], facilitating a multifaceted, holistic approach to IT management. The concept of IT business value (ITBV) is framed as the impacts on organizational performance, enabled by information technology at both operational and strategic levels [7, 8], including improvements in efficiency and competitive edge [9].

Thus, IT Governance encompasses an assortment of mechanisms such as responsibility and relational structures, control processes, communication, and decision rights, all of which are required to work in synergy to manage technical, social, and informational aspects (IT/IS artifacts) within the organization's business strategies [10]. Central to ITG is the alignment between business and IT (BITA), a crucial element in improving the value of IT to the business [4].

Achieving BITA is a complex undertaking [11], influenced by market fluctuations, advancing technology, and evolving business strategies [11, 12]. The alignment of IT with business goals and strategies has been identified as pivotal to a company's success, with IT playing a key role in bolstering business processes [5, 12]. IT governance mandates the engagement of business and IT stakeholders in formal discussions, focusing on reviewing priorities and resource allocation - a crucial factor in enabling or inhibiting the business-IT alignment [11].

This alignment is particularly important for small and medium-sized enterprises (SMEs) [13, 14], as it allows them to effectively leverage technology to drive their business goals and secure a competitive advantage in the market [15, 16]. Despite prior research suggesting a positive correlation between greater application of IT Governance Mechanisms in organizations and enhanced IT-Business Alignment and organizational performance [17], more recent studies propose that IT-driven organizational performance is mediated by IT Capabilities (ITC) [18].

IT Capabilities can be viewed as a two-pronged approach [1, 2, 19]: (i) Focusing on internal capabilities (internal orientation – IO), which typically do not add value to the organization through IT. ERP systems are examples of internally focused IT resources; they integrate operations and internal data to increase efficiency and reliability; (ii) Focusing on external practices (external orientation – EO), aimed at developing the business through IT. Examples of IT capability EO are those that support market competitiveness, customer demands, e-commerce, or Customer Relationship Management systems [2, 19]. A model to elucidate these relationships could be represented as ITGM -> BITA -> ITC -> ITBV [1, 2, 19].

Despite the vital importance of achieving BITA and developing ITCs in SMEs, they often face challenges [20]. Resource constraints, including financial and human capital, can hinder technology infrastructure investments and the hiring of skilled IT personnel [21]. SMEs may lack the required IT expertise, making technology requirement assessment difficult [22, 23]. Furthermore, communication barriers and collaboration challenges between IT and business teams can impede alignment efforts [6, 24]. Resistance to change [25], inadequate strategic planning, and the complexity of technology choices also pose significant hurdles [26], along with scalability and flexibility constraints [27].

In light of these discussions, the present study aims to address the following research question: How did a medium-sized industry in the south of Minas Gerais (Brazil) implement IT Governance mechanisms to enhance IT business value? The objective is to examine the implementation of IT Governance Mechanisms within the medium-sized industry located in southern Minas Gerais, with the aim of enhancing its IT business value.

Consequently, four hypotheses are proposed:

H1 – Higher degrees of ITG mechanisms exert a positive influence on IT IO capabilities.

H2 – Higher degrees of ITG mechanisms exert a positive influence on IT EO capabilities.

H3 – IT IO capabilities enhance existing practices and reduce overhead costs.

H4 – IT EO capabilities augment IT distinctive capabilities.

A qualitative methodology was employed in this study. Data were collected using open-ended questions on an online form, with analyses conducted via Content Analysis.

2 Methodology

A qualitative methodology characterized by an inductive logic and interpretivist epistemology, implemented through a case study, was adopted in this study. The case study methodology was chosen, owing to its capacity for rendering comprehensive, context-rich insights into the phenomena under investigation. These qualitative methods are particularly adept at encapsulating the intricacies and subtleties inherent in organizational processes and perspectives.

Ethical considerations were paramount, with the study undergoing an exhaustive review process and subsequent approval from the Research Ethics Council (CEP). Authorization for the study was granted under the Certificate of Ethical Appraisal Presentation (CAAE) 40374920.0.0000.5111, and these ethical approval details can be retrieved from the Brazilian Government Platform at https://plataformabrasil.saude.gov.br/.
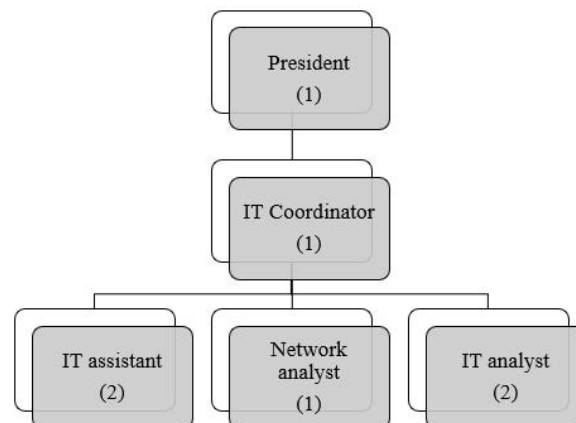
Figure 1. Hierarchical structure of the IT sector

Note: This figure was prepared by the authors.

The case study was conducted within a medium-sized metallurgical industry situated in the southern region of Minas Gerais, located in southwestern Brazil. This industry, established in 1991, operates a modern 20,000 m^2 industrial park fitted with advanced processes for the development and manufacturing of kitchen, baking, and refrigeration equipment. Over the years, the company has gained a leadership position in multiple market segments and boasts a world-class plant. An engineering and technician team is tasked with developing solutions in alignment with contemporary market trends. Notably, the Information Technology (IT) sector is instrumental in the company's overall development.

The IT sector within the organization includes a coordinator tasked with managing the sector, and a team comprising two IT analysts, one network analyst, and two IT assistants. The hierarchical structure of the IT sector is visually represented in Figure 1.

The position of the IT sector, directly linked to the President/CFO in the organization's hierarchical structure, ensures that the sector has unrestricted access to the organization's principal decision-maker, thus indicating the existence of IT Governance mechanisms (e.g., Structural and Decisional).

Table 1. Interview script

Construct	Questions	Who Answered the Question
Relational and communication ITGM	In your opinion, is IT seen by users as a technical or strategic resource within the organization?	
	Do you believe that this vision is the same as that of the organization's management?	
	Do communication channels exist in the organization for the dissemination of IT actions, policies, andor results? How is this communication made? How often? Would you change anything in this process?	
	What training do you believe an IT professional should attend associated with IT resources? How often should this training occur?	
	In your perception, is Information Technology an element that can generate value for the business? Can IT be a factor of competitive differential for the organization, in your opinion? How could this happen?	Coordinator and employees of the IT sector
	Do the sectors of the organization exchange information among themselves with the objective of having new ideas and changing current practices? How does this happen?	
	In your opinion, what practices that promote integration between IT professionals and business professionals should be applied in the organization? How could they be applied?	
	In your perception, how do you see the organization's decision-making body (strategic level decision makers) regarding proactive attitudes and commitment? How do you perceive these practices?	
Normative ITGM	Are there IT policies formally institutionalized in the organization?	
Structural ITGM	Is there an IT professional who participates in the strategic decisions of the organization? Does this professional participate in all meetings of this nature?	
	Do steering committees exist in the organization? How are they composed and what are the backgrounds of each member? How many meetings are held each month? Are there external members on the committee or board?	
Decisional ITGM	Who makes the IT decisions on technical issues? Who participates in the decisions?	
	Who makes the IT decisions on strategic business issues? Who participates in the decisions?	
	Who makes the IT decisions on strategic business issues? Who participates in the decisions?	
	Are there any influence or opinions from sector managers on IT decisions, either technical or strategic? If yes, how does this occur and on what kind of decisions?	
	Are the strategic decisions in the organization based on qualitative or quantitative metrics? Or are they based on the experience or "feeling" of those involved?	
	What kind of tool is used to guide the decisions?	
	How are the projects selected for the IT area? Who proposes these projects and how is the prioritization of these projects established?	
ITC IO	Which IT practices have higher priority? Those associated with internal processes or those associated with customers, suppliers, and other stakeholders external to the organization?	Coordinator and employees of the IT sector CFO
ITC EO	In your perception, is Information Technology an element that can generate value for the business? If yes, in what way? If your answer is "No", could you explain?	CFO
	In your opinion, can IT be an asset of competitive differential for the organization? How could this happen?	

Note: This table was prepared by the authors.

Data were collected using an interview script (Table 1), designed based on relevant literature concerning IT Governance mechanisms [4, 28, 29]. Given the limitations imposed by the COVID-19 pandemic and participant availability, an electronic questionnaire was devised using the Google Forms tool. The interview script consisted of open-ended questions to facilitate an in-depth exploration of the research subject. The data obtained from these interviews underwent Content Analysis [30], enabling the identification of emergent themes and patterns.

The interviews were conducted during the period from August to September 2020, providing a snapshot of the participants' perspectives and experiences during the pandemic's initial stages, a period that significantly impacted the role of IT within organizations.

3 Results

The study incorporated the participation of seven individuals with diverse roles and varying lengths of experience in their jobs at the time of the interviews. Table 2 enumerates the study participants according to their ID, gender, role, time in the role, and academic background.

Table 2. Interviewees participating in the study

ID	Gender	Role	Time in the Role	Academic Background
E1	Masculine	CFO	20 years	Graduation in Accounting Sciences. Specialization in Business Management.
E2	Feminine	IT Coordinator	2 years	Degree in Information Systems. Specialization in Project Management.
E3	Masculine	IT Analyst	5 years	Degree in Information Systems.
E4	Masculine	IT Analyst	4 years	Degree in Information Systems.
E5	Masculine	IT Assistant	1 year	Degree in Information Systems.
E6	Masculine	IT Assistant	5 years	Degree in Business Administration.
E7	Masculine	Network Analyst	3 years	Degree in Information Systems. Specialization in IT Management and Governance.

Note: This table was prepared by the authors.

As depicted in Table 2, a vast majority of the interviewees (6) possessed between one to five years of experience in their roles. Only the CFO of the organization, noted as E1, has an experience spanning 20 years. In the realm of IT, all five professionals hold degrees in Information Systems, with E2 and E7 having specialized in Project Management and IT Management and Governance respectively.

Notably, E1 is accountable for the management of the financial and accounting departments, along with the development of processes and procedures. E1 oversees the organization's administrative and financial support functions and aids E2, who directs the IT team's activities. E2 is tasked with the identification and evaluation of technological solutions to enhance processes, implementation planning for system projects, and the monitoring of business and customer needs.

The IT team, in contrast, is charged with the design, planning, installation, configuration, and management of computer networks, as well as the organization's ERP (Enterprise Resource Planning). They are also tasked with dimensioning system requirements, specifying its architecture, selecting development tools, and coding applications.

E1 noted the value of Information Technology for the business, stating that it enables company growth on a scale far greater than traditional business models, with a global reach. E1 further emphasized that in the digital transformation era, Information Technology is the primary value driver for companies, citing the significance of IT for companies such as Uber, iFood, Amazon, and Airbnb.

From this testimony, it is discernible that IT can augment business value by enabling the development of capabilities with a global reach. E1, a key decision-maker within the organization, maintains the view that the organization employs both structural and relational ITG mechanisms. This observation receives further substantiation when considering E2's testimony. Decisions regarding IT within the organization are made by an IT Committee, comprised of top management members and E2. Thus, the existence of both structural and relational ITG mechanisms is evident.

In the context of the organization's key decision-makers, ITG mechanisms are associated with interaction practices [4]. The presence of an IT professional with decision-making authority, who partakes in the decision-making process alongside senior management, plays a pivotal role in aligning IT with the business [11, 31, 32].

E2 noted the fundamental role of IT in supporting the company's operations. Its strategic alignment with the business enables competitiveness, scalability, adaptability to changes, rapid response to the market, and fosters a culture of innovation. This focus on developing IT capabilities with external guidance (ITC EO) is perceived to bring more value to the business compared to internally oriented IT-based capabilities – ITC IO [2]. This external

guidance has a significant impact on the competitive advantage of SMEs, resulting in revenue growth and increased profitability [1, 2, 19].

Further, E2 emphasized the importance of involving the IT Committee in strategic decision-making, noting how it underscores the value of the IT sector to the business. This viewpoint reinforces the necessity of granting structural power to the key IT decision-maker within the strategic decision-making process and the importance of establishing a structure, such as an IT Committee, to encourage collaboration between the IT department and senior management. Previous studies conducted in large corporations have underscored the significance of involving the IT sector in decision-making processes and the benefits of having a committee that engages key decision-makers to facilitate the strategic alignment between IT and the business [33].

However, it is noteworthy that there have been recent shifts in practices from large organizations, where they were initially implemented in the early 2000s, to medium-sized organizations [34]. This phenomenon is believed to be linked to a shift in perspective, particularly among SME owners, directors, or CEOs, regarding the role of IT in business [31]. IT is no longer seen merely as an operational support function but is recognized as a strategic enabler [1].

Yet, the perception of IT as a strategic sector seems to be limited to a subset of the organization's employees, as evidenced by the following statements:

"I believe that most companies consider IT as a support function." (E3)

"I think both users and management view IT as a technical resource." (E4)

"From a technician's standpoint, many organizations, particularly in manufacturing, see IT as a support area for maintaining operational efficiency. This is the prevailing view among users and management." (E5)

"Yes, I think the management has started to see IT differently, especially during the pandemic." (E6)

"The perception of IT varies based on education levels. Higher-educated users tend to view it as a strategic resource. The management predominantly sees it as strategic as well, but this perspective can change with shifts in the business, particularly within the market." (E7)

These statements indicate a clear disparity in the perception of IT between senior management and IT employees. This discrepancy is likely due to the absence of effective relational ITG mechanisms that would communicate the strategic role of IT across all hierarchical levels of the organization [6, 24]. The operational perspective held by IT employees can result in demotivation in carrying out their tasks or create resistance to changes aimed at aligning IT with the overall business objectives [12, 20].

In some testimonies, it is evident that the perception of IT has undergone a significant shift due to the COVID-19 pandemic. E6 stated: "The pandemic has led to a greater appreciation and understanding of technology, facilitating faster and more effective decision-making".

During the pandemic, the role of IT underwent a significant transformation, becoming essential for maintaining business continuity. The pandemic revealed the need for various measures to be implemented by IT professionals. For example, they had to prepare the infrastructure to handle new traffic patterns and increased remote access, as well as utilize collaborative tools effectively. Additionally, the importance of cybersecurity has been heightened due to the increased reliance on technology.

Another noteworthy aspect observed during this time was the customization of ERP systems. There was a surge in requests for customization, although not all of them were executed by the internal IT team. Many of these customizations were supported by the software manufacturer. This scenario exemplifies the necessity to address factors requiring changes that align IT with the overall business objectives. Such alignment is crucial for maintaining consistency in processes and implementing mechanisms that generate value for the business.

This analysis of the results reveals the complexity of the role of IT in an organization, especially in the context of a crisis such as the COVID-19 pandemic. It underscores the need for a strategic alignment between IT and business objectives, achieved through both structural and relational ITG mechanisms. Moreover, it highlights the importance of fostering a shared understanding of the role of IT among all members of the organization to facilitate this alignment and leverage IT for enhanced business performance.

4 Discussion

The first hypothesis (H1) posits a positive influence of higher levels of IT governance mechanisms on internally oriented IT-based capabilities (ITC IO). An inference can be drawn from the data that ineffective relational ITG mechanisms contribute to an operational viewpoint held by IT employees. As observed in the accounts of E3, E4, and E5, IT is primarily regarded as a technical resource or a support function. Such a perception suggests the absence of ITG communication mechanisms [6], which could potentially shape the perception of IT-business value. Communication of the business value of IT could be amplified through formal pathways, with the aim of relaying decisions, ITG processes, and desirable behaviors throughout the organization [6, 35].

When ITC IO capabilities are not sufficiently backed by ITG mechanisms, a demotivation among IT employees may be observed, or resistance to changes intended for aligning IT with business objectives could be encountered [25].

Reduced levels of ITG mechanisms might result in a limited understanding of IT's strategic role across all hierarchical organization levels [35–37]. Consequently, the organization might fail to capitalize on the potential value and competitive advantages that could result from effective ITC IO capabilities [2, 19].

The second hypothesis (H2) posits a positive influence of higher levels of IT governance mechanisms on externally oriented IT-based capabilities (ITC EO). From E2's (IT Coordinator) account, it is apparent that the organization acknowledges the strategic significance of IT in supporting business operations and fostering a culture of innovation. E2 underscores the need for structural power for the key IT decision-maker [35, 38] and the establishment of an IT Committee to facilitate collaboration between the IT department and senior management [4, 36].

With the effective implementation of ITG mechanisms, it is possible to enhance ITC EO capabilities [1, 2]. The involvement of the IT Committee in strategic decision-making underscores the importance of the IT sector for the organization and its contribution to operations. This collaboration and strategic alignment allow the organization to utilize IT as a strategic enabler, contributing to competitiveness, scalability, adaptability to changes, and rapid response to the market [1, 2, 19]. The external guidance provided through ITG mechanisms can contribute to improved ITC EO capabilities, leading to a greater ability to develop IT capabilities with a global reach and generate value for the business [1, 2, 19].

The third hypothesis (H3) posits that ITC IO capabilities enhance existing practices and reduce overhead costs [2, 19]. These capabilities enable the organization to refine its existing practices, rendering them more efficient and effective [1, 2].

By leveraging ITC IO capabilities, the organization can reduce overhead costs. Through the development of abilities in areas such as system requirements dimensioning, specifying architecture, choosing development tools, and coding applications, operational efficiency can be enhanced. This enhanced efficiency can lead to cost savings by reducing waste, increasing productivity, and eliminating redundant or manual processes [1, 2, 19].

The fourth hypothesis (H4) posits that ITC EO capabilities enhance IT distinctive capabilities. ITC EO capabilities enable the organization to align IT with the overall business objectives and foster a culture of innovation [1, 2, 19]. By leveraging external guidance through ITG mechanisms and strategic alignment with the IT Committee, distinctive capabilities in the IT sector or through it can be developed.

Distinctive IT capabilities refer to unique strengths or competitive advantages that IT can confer on the organization [2, 19]. These capabilities extend beyond operational efficiency and support the organization in achieving its strategic goals. With improved ITC EO capabilities, such as identifying technological solutions, planning system implementation projects, and monitoring business and customer needs, the organization can differentiate itself from competitors and effectively adapt to market changes [1, 2, 19]. ITC EO capabilities enable the organization to develop innovative solutions, explore new business opportunities, and stay ahead in the digital landscape [27, 39, 40].

This discussion emphasizes the complexity of IT's role within an organization and the intricate relationship it has with various aspects of business operations. It highlights the importance of IT governance mechanisms and the role they play in shaping the perception of IT within the organization, influencing both internally and externally oriented IT capabilities. The findings also underline the significance of aligning IT capabilities with business objectives to leverage IT for enhanced business performance. The need to foster a shared understanding of the strategic role of IT among all members of the organization is further underscored, especially in light of the increasing importance of IT in today's digitally driven business landscape.

5 Conclusions

The central research question that shaped this study was: How has a medium-sized industry in the southern region of Minas Gerais, Brazil, implemented IT Governance mechanisms to enhance the business value of IT? The aim of the research was to analyze the deployment of IT Governance Mechanisms to augment IT business value within this medium-sized industry. The findings of the study suggest a positive influence of ITM mechanisms on the IT business value. Weaknesses and areas of potential improvement were identified, pinpointing opportunities to render the alignment of IT with business more effective and to mitigate risks associated with demotivation or resistance to change among IT professionals.

In the case studied, IT Governance is evident, yet there exist opportunities for expansion. While elements and practices aligned with market references are present within the organization, a clear opportunity to enhance ITG mechanisms stands out. The understanding of the IT governance concept by top management, represented by the IT Committee, primarily reflects an internal focus on IT management and the improvement of internal processes. This characterization underscores the challenge of comprehending the broader role of IT Governance and its mechanisms. The focus on processes suggests an operational support role for IT, minimizing risks to the firm's productive activities. The extension of internally oriented IT capabilities may be an initial step towards enabling IT to serve as a new source of revenue or support innovations within the organization (externally oriented IT capabilities).

The analyses suggest a disparity in the perception of IT roles between top management and IT sector employees. This difference can be attributed to the absence of relational/communication ITG mechanisms that effectively

communicate the strategic role of IT to all hierarchical levels of the organization. Consequently, an operational perspective of IT among IT employees may arise, leading to demotivation in task execution or resistance to changes aimed at aligning IT with the overall business objectives.

In terms of recommendations for practitioners, it is suggested that the senior management members who form the IT Committee and the IT Coordinator align strategic information with the IT team and invest in training. This alignment is crucial to bridge the gap between the strategic vision of IT held by senior management and that of IT employees, ultimately leading to the realization of business value. For academia, it is believed that this study contributes to the literature discussing how IT drives business value, a field of study that, though extensive, is still developing, especially in the wake of the COVID-19 pandemic that accelerated Digital Transformation in firms.

Despite the rigorous adherence to scientific research practices, the study has limitations that should be acknowledged. The study was limited to a single case, and generalizations cannot be made. The group of interviewees was restricted to the industry CFO and IT professionals, and the perceptions of other directors were not captured. Future research could statistically test the hypotheses presented in this study. Qualitative studies based on multiple cases could deepen the understanding of how IT mechanisms can enhance the business value of IT.

Author Contributions

Ana Luiza Moreira Duarte Maia: Conceptualization, Formal analysis, Research, Data processing, Writing - original version, Visualization, Resource acquisition.

Rodrigo Franklin Frogeri: Conceptualization, Methodology, Validation, Formal analysis, Data treatment, Resources, Writing - review and editing, Project administration.

Data Availability

Ana Luiza Moreira Duarte Maia, & Rodrigo Franklin Frogeri. (2023). Dataset of the paper IT Governance Mechanisms as a Source to Enhance IT Business Value: A case study in an Industry in the South of Minas Gerais (Brazil) (Version 1) [Data set]. Zenodo. https://doi.org/10.5281/zenodo.8122011

Conflicts of Interest

None of the authors of this paper has a financial or personal relationship with other people or organizations that could inappropriately influence or bias the content of the paper. We specifically state that "No Competing interests are at stake and there is No Conflict of Interest" with other people or organizations that could inappropriately influence or bias the content of the paper.

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