

Copyright © 2011–2024. This material is presented to ensure timely dissemination of scholarly and technical work. Authors or other copyright holders retain copyright and all rights therein. All people copying this information must adhere to the terms and constraints invoked by each author's copyright. Usually, these works may not be reposted without the copyright holder's explicit permission. The following article is the **POST-PRINTS version**. An updated version will be available when the article is fully published. You may contact the authors directly for a copy if you do not have access. The current reference for this work is as follows:

Michelle René Lowry, Paul Benjamin Lowry, Sutirtha (Suti) Chatterjee, Gregory D. Moody, and Vernon J. Richardson (2024). "Achieving strategic alignment between business and information technology with information technology governance: The role of commitment to principles and top-leadership support" *European Journal of Information Systems (EJIS)* (accepted 06-Aug-2024) (DOI: [10.1080/0960085X.2024.2390998](https://doi.org/10.1080/0960085X.2024.2390998))

If you have any questions, want to request a copy of the final version of the article, or would like copies of other articles we've published, please contact any of us directly as follows:

- **Dr. Michelle René Lowry**
  - Accounting and Information Systems
  - Pamplin College of Business, Virginia Tech, Blacksburg, USA
  - Website: <https://acis.pamplin.vt.edu/directory/michelle-lowry.html>
  - E-mail: [michellel@vt.edu](mailto:michellel@vt.edu)
- **Prof. Paul Benjamin Lowry**
  - Business Information technology
  - Pamplin College of Business, Virginia Tech, Blacksburg, USA
  - Website: <https://sites.google.com/site/professorlowrypaulbenjamin/home>
  - System to request Paul's articles: [https://seanacademic.qualtrics.com/SE/?SID=SV\\_7WCaP0V7FA0GWWx](https://seanacademic.qualtrics.com/SE/?SID=SV_7WCaP0V7FA0GWWx)
  - E-mail: [Paul.Lowry.PhD@gmail.com](mailto:Paul.Lowry.PhD@gmail.com)
- **Prof. Sutirtha (Suti) Chatterjee**
  - Lee Business School
  - University of Nevada, Las Vegas
  - Website: <https://www.unlv.edu/people/sutirtha-chatterjee>
  - E-mail: [sutirtha.chatterjee@unlv.edu](mailto:sutirtha.chatterjee@unlv.edu)
- **Prof. Vernon J. Richardson**
  - Department of Accounting
  - University of Arkansas
  - Website: <https://walton.uark.edu/departments/accounting/directory/uid/vjricha/name/Vernon+J.+Richardson/>
  - E-mail: [vjricha@uark.edu](mailto:vjricha@uark.edu)

# **Achieving Strategic Alignment between Business and Information Technology with Information Technology Governance: The Role of Commitment to Principles and Top-Leadership Support**

**Michelle René Lowry\***

Assistant Professor

Accounting and Information Systems, Pamplin College of Business  
Virginia Polytechnic and State University, Blacksburg, VA, 24061, United States  
[michellel@vt.edu](mailto:michellel@vt.edu)

**Paul Benjamin Lowry**

Eminent Scholar and Suzanne Parker Thornhill Chair Professor

Business Information Technology Department, Pamplin College of Business  
Virginia Polytechnic Institute and State University Blacksburg, VA, 24061, United States  
[Paul.Lowry.PhD@gmail.com](mailto:Paul.Lowry.PhD@gmail.com)

**Sutirtha (“Suti”) Chatterjee**

Associate Professor of Information Systems

Department of Management, Entrepreneurship, and Technology, Lee Business School  
University of Nevada, Las Vegas  
[sutirtha.chatterjee@unlv.edu](mailto:sutirtha.chatterjee@unlv.edu)

**Gregory D. Moody**

Associate Professor, Lee Professor of Information Systems

Department of Management, Entrepreneurship, and Technology, Lee Business School  
University of Nevada, Las Vegas  
[gregory.moody@unlv.edu](mailto:gregory.moody@unlv.edu)

**Vernon J. Richardson**

Distinguished Professor of Accounting and the W. Glezen Chair

Department of Accounting, Sam M. Walton College of Business  
University of Arkansas  
[vrichardson@walton.uark.edu](mailto:vrichardson@walton.uark.edu)

**\*Corresponding author**

**Competing interests statement:** there are no relevant financial or non-financial competing interests to report.

**Grant funding:** No funding was received.

# Achieving Strategic Alignment between Business and Information Technology with Information Technology Governance: The Role of Commitment to Principles and Top-Leadership Support

## Abstract

IT governance (ITG) is crucial in achieving IT strategic alignment, but many organizations find this to be an elusive goal. We thus expand ITG into two components: ITG mechanisms and ITG principles. We propose that beyond the mere option of ITG mechanisms, organizations must fully embrace the broader “spirit” of ITG, which occurs when an organization is committed to ITG principles coupled with top leadership support. To test our theorization, we first developed and validated two new measures. We used the ITG framework of COBIT to create a measure of commitment to COBIT principles (CCP), and we found that CCP fully mediates ITG mechanisms’ relationship with strategic alignment. We thus illuminate a missing link between adopting ITG mechanisms and achieving strategic alignment by demonstrating the need to focus on ITG principles. We show that top leadership support for IT, including support at the board level, not only enhances CCP but also directly contributes to improved strategic alignment. Our study establishes that adopting ITG mechanisms is necessary but insufficient for achieving strategic alignment. Effective organizations go beyond implementing isolated ITG mechanisms; they fully embrace integrated COBIT-based principles, guided by a strong infusion of top leadership support, including board-level support.

**Keywords:** Information technology governance (ITG), strategic alignment, corporate governance, top leadership support for IT, COBIT, COBIT principles, latent construct measurement

## 1. Introduction

Research on contemporary organizations has highlighted two interrelated considerations necessary for achieving organizational success using information technology (IT): IT governance (ITG) and the alignment of the organization’s IT with its overall business strategy (i.e., IT *strategic alignment*, hereafter “strategic alignment”) (Peppard, 2020). ITG can be understood as the “decision rights and accountability framework used to ensure the alignment of IT-related activities with the organization’s strategy and

objectives” (Gregory et al., 2018, p. 1225). ITG guides the use of IT to create business value—an absolute necessity in contemporary IT-enabled organizations (Benaroch & Chernobai, 2017; Buchwald et al., 2014; Wu et al., 2015; Zhang et al., 2016). In practice, ITG is often implemented with the aid of an ITG framework, which can be defined as a principles-based set of best practices that guides an organization’s design, implementation, and improvement of its ITG system (Rubino & Vitolla, 2014). An ITG framework provides a set of principles and mechanisms for ITG. ITG mechanisms are operationalized structural, processual, and relational components of the ITG system (Wu & Saunders, 2016; Zhen et al., 2021). Notably, an effective ITG system requires the mechanisms to be in place (Wu et al., 2015), but ITG frameworks include both operational ITG mechanisms and principles that guide ITG design, implementation, and improvement (ISACA, 2012a).

*Strategic alignment*—the stated goal of ITG—can be defined as the extent to which there is a fit between the business strategy and IT strategy (Chan et al., 1997; Coltman et al., 2015; Queiroz, 2017; Tallon et al., 2016).<sup>1</sup> It has been argued that strategic alignment is how an organization achieves IT-enabled performance and sustainable competitive advantage (Gerow et al., 2014; Gerow et al., 2015; Sabherwal et al., 2019). Researchers have long theorized that ITG is crucial to achieving strategic alignment. For example, the literature investigating the link between ITG and strategic alignment has observed that adopting ITG leads to strategic alignment, which can, in turn, drive organizational success (Schlosser et al., 2015; Wu et al., 2015). Although this optimistic account of the role of ITG in influencing organizational success often holds,<sup>2</sup> this relationship should be scrutinized because it is frequently challenging to attain effective ITG (Tiwana et al., 2013). Despite the best intentions, many organizations often find it challenging to realize ITG’s promise of strategic value (Asgarkhani et al., 2017; Ranesh et al., 2022). Consequently, strategic alignment—and, ultimately, organizational performance—are compromised.

There is a clear need for more research on why ITG can fail to lead to strategic alignment. Our study addresses this research gap by problematizing the ITG→strategic alignment relationship. Focusing on this well-known relationship, we propose that four extant ITG and strategic alignment literature assumptions

must be reevaluated.

The first two assumptions relate to ITG and its mechanisms: the first is the conventional wisdom is that ITG is delivered through the *adoption* of ITG mechanisms (Huang et al., 2010; Tallon et al., 2013; Tiwana & Konsynski, 2009; Tiwana et al., 2013; Wu et al., 2015); and the second assumption is that such adoption, therefore, leads to strategic alignment (De Haes & Van Grembergen, 2009; De Haes et al., 2020b; Tiwana et al., 2013; Wu et al., 2015). Challenging these two assumptions, we argue that ITG is more than just a set of mechanisms: ITG can be decomposed into the structural components of ITG—its mechanisms—and ITG principles, which reflect the spirit of ITG; that is, the system’s underlying values and goals (DeSanctis & Poole, 1994). We also challenge the assumption that ITG mechanisms are sufficient for obtaining strategic alignment; instead, we posit that organizations can adopt all the fundamental ITG *mechanisms* discussed in the literature (Westphal & Zajac, 1994, 2001) and still fall short of attaining strategic alignment. Adopting ITG mechanisms is necessary but insufficient for achieving strategic alignment.

The third and fourth assumptions we question involve how top leadership support for IT (hereafter, top leadership support) relates to the ITG→strategic alignment relationship. We challenge the assumption that *IT management support is sufficient for achieving* strategic alignment (Boonstra et al., 2018; Bowen et al., 2007; De Haes & Van Grembergen, 2009; Huang et al., 2010). While we agree with prior research that shows the importance of executive support for ITG (Amarilli et al., 2023; Schlosser et al., 2015), we assert that the phenomenon of interest is enterprise-level *governance*, and in a governance context, boards should provide prominent ITG leadership. Consistent with our assertion, researchers have made normative calls for board involvement in ITG (Andriole, 2009; De Haes et al., 2020a; Huygh & Haes, 2020; Nolan & McFarlan, 2005), but ITG research has yet to address the effect of board support empirically.

The fourth assumption is that the adoption of ITG mechanisms automatically implies that top leadership embraces IT and implements ITG faithfully (Benaroch & Chernobai, 2017; Buchwald et al., 2014; Prasad et al., 2012; Wu et al., 2015). However, we incorporate top leadership support because ITG mechanism adoption alone might reflect the known phenomenon that organizations often take instrumental,

perfunctory, mechanical, or symbolic approaches to governance (Meyer & Rowan, 1977; Shi & Connelly, 2018). In challenging these related assumptions, we assert that top leadership support has a distinct influence on the ITG→strategic alignment relationship.

In summary, the primary challenge we identify in this research discourse is the absence of top leadership support and a unified understanding of the spirit of ITG. In such cases, organizations may superficially approach ITG symbolically, resulting in a limited realization of the extensive strategic potential inherent in ITG. Angst et al. (2017), for example, showed that healthcare organizations that mechanically adopted ITG mechanisms without meaningful integration experienced less effective IT security investments and infrastructure. Given this problematization, we formally raise our study's central research question:

**RQ.** How does ITG facilitate strategic alignment? Specifically, why can merely adopting ITG mechanisms fail to capture the organizational spirit or vision required for meaningful ITG implementation?

To address this question and thus augment the extant literature on ITG and strategic alignment, we identify two considerations that have escaped empirical scrutiny in the existing ITG literature (see Appendix A, Table A1). *First*, based on our problematization, we posit that commitment to ITG *principles* is crucial in ensuring that adopting ITG mechanisms eventually leads to strategic alignment. That is, although a perfunctory adoption of ITG mechanisms may satisfy the structural and instrumental requirements of ITG, it may fall short of realizing the actual objectives (or spirit) of ITG, including strategic alignment. The two aspects of ITG work together: ITG values and goals (ITG spirit) govern the implementation of the IT system, and the ITG mechanisms related to formal processes, decision-making, and communicative approach (Wu et al., 2015) are the structural features that support the governing objectives. Our study elaborates on the primacy of ITG principles and theorizes that *commitment* to those principles (i.e., faithfulness to the spirit of ITG) plays a vital role in ensuring that an organization realizes strategic alignment. Specifically, we use the COBIT (Control Objectives for Information and Related Technology) framework to investigate the role of meaningful engagement with ITG principles in an organization's pursuit of strategic alignment. COBIT is the "generally accepted framework for IT

governance” (De Haes et al., 2020c, p. 126), and commitment to its tenets encapsulates ITG principles (Hardy, 2006; Mangalaraj et al., 2014; Mazza & Azzali, 2018).

Our focus on commitment to COBIT principles (CCP) aligns with recent ITG research findings. Scholars have argued that “IT governance *principles* will guide the actual design and implementation of IT governance” and that “these *principles* will provide handholds to executive management in their responsibilities of putting in place and maintaining the organization’s IT governance arrangement” (De Haes et al., 2020a, p. 49, emphasis added). COBIT is one of the most powerful and common ITG frameworks (Joshi et al., 2018; Noor & Ghazanfar, 2016).<sup>3</sup> Thus, it is reasonable and pragmatic to emphasize the commitment to COBIT principles because this fosters a cohesive ITG vision among an organization’s leadership (De Haes et al., 2020c). Therefore, we focus on the degree to which organizations commit to COBIT principles and their underlying ethos. We demonstrate that although adopting ITG mechanisms can lead to CCP, CCP itself is the crucial antecedent to strategic alignment. Our study shows that adopting ITG mechanisms can lead to strategic alignment only when CCP is achieved; that is, CCP is a critical mediator in the relationship between adopting ITG mechanisms and achieving strategic alignment.

A *second* consideration is that top leadership support of IT (hereafter, “top leadership support”) is crucial to achieving strategic alignment once ITG mechanisms have been adopted. Importantly, our conception of *top leadership support* includes not only top management (C-level executives, such as the chief executive officer, chief operating officer, and chief information officer) but also the board of directors, the members of which are crucial stakeholders and decision-makers in the organization’s strategic and governance structures (Fama & Jensen, 1983; Hillman & Dalziel, 2003) especially concerning ITG (Andriole, 2009; Benaroch & Chernobai, 2017; Jewer & McKay, 2012). This is a crucial consideration because even when organizations adopt ITG mechanisms, a lack of top leadership support can hinder effective ITG and strategic alignment (Ang & Teo, 1997). Even when leaders recognize IT’s value, passive support may fail to overcome typical organizational user resistance (e.g., Kim & Kankanhalli, 2009). Support for IT implies that top leadership not only endorses the vision of an IT-enabled organization but

also actively participates in IT-related decisions and ITG initiatives. We argue that realizing strategic alignment requires aligned top leadership support because an organization is shaped by its views and actions.

Our focus on top leadership support reveals two gaps in how prior research—whether on ITG or IS more broadly—has used this construct. First, the relationship between top leadership support and commitment to specific ITG frameworks (such as COBIT), which we argue are necessary for attaining strategic alignment, has escaped the scrutiny of prior research. Second, top leadership support has been construed mainly as top-*management* support for IT (Elbanna, 2013; Kulkarni et al., 2017; Liang et al., 2007; Liu et al., 2015), yet boards lead corporate governance, including ITG and IT decision-making (Valentine et al., 2016). Thus, focusing only on top-management support for IT is myopic because it omits a vital leadership group (the board), which has a critical say in how organizations strategize and operate. We address this shortcoming by including the board of directors in the firm's top leadership.

In summary, our focus on CCP and its relationship with top leadership support reveals the contingencies that may lead to an instrumental (or symbolic) adoption of ITG mechanisms, a substantial contribution to the ITG literature. A review of contemporary research on ITG emphasized that ITG research neglects these two important considerations. However, these considerations are highly relevant because organizational IT can incorporate formal structures and mechanisms while not espousing the technology's *spirit* (i.e., the goals and values intended for the technology by the organization) (DeSanctis & Poole, 1994). The novelty of our study is that it disentangles the role of top leadership support and the role of commitment to ITG (COBIT) principles from the adoption of ITG mechanisms and, therefore, highlights the perils of mechanical or symbolic adoption of ITG mechanisms.

Our study proceeds as follows. In the literature review section, we discuss the conceptual foundations of ITG and its relation to strategic alignment. We also discuss the two organizational factors that play crucial roles in ensuring that adopting ITG mechanisms leads to strategic alignment—namely, CCP and top leadership support. We then develop our model and hypotheses. In the empirical section, we elaborate on



the survey development and analytical methods used to test the hypotheses and discuss the results. The paper concludes with a discussion of the study's contributions and implications.

## 2. Literature Review

In this section, we review the literature on ITG and what is known about ITG's relationship with strategic alignment. We then summarize the research that has indicated that the two under-investigated elements we identify above—meaningful commitment to ITG principles (i.e., COBIT principles) and top leadership support—may play a role in the ITG→strategic alignment relationship.

### 2.1. ITG and Its Mechanisms

ITG falls into the broader category of firm-level corporate governance. *Corporate governance* can be defined as “the determination of the broad uses to which organizational resources will be deployed and the resolution of conflicts among the myriad participants in organizations” (Daily et al., 2003, p. 371). Under the umbrella of the multifaceted structures of corporate governance, ITG can be understood as a system of governance over IT to achieve strategic alignment, which ultimately leads to the creation of business value (De Haes et al., 2020c).

ITG systems are based on principles that guide the design, implementation, and improvement of structural, processual, and communication-related elements. The structural, processual, and communication-related ITG mechanisms were conceptually defined by Wu et al. (2015): (1) *decision-making structure* is “the degree to which the organization has established organizational units and roles responsible for making IT decisions such as committees”; (2) *formal processes* represent “the degree to which the organization has established formal processes to monitor and ensure that IT policies are consistent with business needs”; and (3) *communication approach* is “the degree to which the organization has established channels to ensure proper communication and disseminate IT governance principles” (Wu et al., 2015, p. A6). Wu et al. presented these ITG mechanisms as prerequisites of effective ITG that have clear strategic benefits for a firm:

To implement IT governance effectively, a set of IT governance mechanisms is required to encourage congruence with the organizational mission, strategy, values, norms, and culture ... which in turn promotes desirable IT behaviors and governance outcomes (Weill & Ross, 2004). Hence, an organization's IT

governance mechanisms often indicate the sophistication of its management (both IT and business) capability. (Wu et al., 2015, p. 498)

The strategic implications and limitations of ITG mechanisms shape our study's original conceptualization and empirical examination.

## **2.2. Strategic Alignment and ITG Mechanisms**

The broader literature has often treated strategic alignment as an unwieldy meta-construct and has defined it in varying and inconsistent ways (Gerow et al., 2015). Notwithstanding the diverse conceptions of strategic alignment in extant research, the most prevalent understanding has been that strategic alignment represents the *intellectual alignment* between IT and organizational strategy (Gerow et al., 2015; Queiroz, 2017; Tallon et al., 2016; Wu et al., 2015). Our conception of strategic alignment builds on this understanding. Formally, *strategic alignment* can be defined as a “state of congruence” between an organization’s IT and business strategies (Sabherwal et al., 2019) and can be understood broadly as “the degree to which the information technology mission, objectives, and plans support and are supported by the business mission, objectives, and plans” (Reich & Benbasat, 1996, p. 56). The predominant view is that strategic alignment is foundational to fostering better organizational performance (Gerow et al., 2015; Kappelman et al., 2014; Renaud et al., 2016; Sabherwal et al., 2019). The literature has captured this alignment using multiple concepts, such as fit, harmony, fusion, or integration, but these concepts are often synonymous (Luftman et al., 2017). Strategic alignment has been predominantly understood as a holistic, organization-level construct that represents the realized state of congruence among product, quality, and marketing strategies (Hussin et al., 2002; Wu et al., 2015).

Strategic alignment is fundamentally grounded in normative principles. Prior studies have established the influence of ITG on strategic alignment (De Haes & Van Grembergen, 2009; Schlosser et al., 2015; Turel et al., 2017; Wu et al., 2015), and other research has alluded to this influence (Dawson et al., 2016; De Haes et al., 2020c; Van Grembergen & De Haes, 2010; Wilkin & Chenhall, 2010; Yudatama et al., 2017). Our study builds on these findings, but with a crucial distinction: Despite the common assumption that the mere adoption of ITG mechanisms ensures effective ITG (and thus the attainment of strategic

alignment), we posit that the mere adoption of ITG mechanisms is insufficient for fully realizing strategic alignment.

The crucial distinction here is between the adoption of mechanisms versus commitment to principles. Adoption (e.g., of rules supporting organizational operation) can be purely symbolic; such a symbolic adoption of rules often means that an organization just follows the “letter” of the rules but does not appreciate or work toward achieving the goals *for which those rules were defined in the first place* (i.e., the spirit of the rules). In such situations, although the organization has adopted those rules, it is not committed to the principles that motivate the proposed mechanisms (Wijen, 2014). However, adoption is necessary for commitment and downstream strategic alignment; we can thus view adoption as necessary but insufficient to achieve strategic alignment. This is a form of necessary but not sufficient causality (Van de Ven & Poole, 2005).

### **2.3. The Missing Considerations: Commitment to COBIT Principles and Top-Leadership Support**

Based on our formal problematization process (addressed in the Introduction and detailed in Appendix A), we consider CCP and top leadership support as two features of an ITG system that can influence whether adopting ITG mechanisms leads to a firm’s achievement of strategic alignment.

#### **2.3.1. Commitment to COBIT Principles**

Based on our review of the ITG literature, we conclude that adopting ITG *mechanisms* and a commitment<sup>4</sup> to ITG *principles* are distinct phenomena. That is, the governance practices that result from an organization’s adoption of ITG mechanisms may reflect either the organization’s full commitment to ITG *or* its symbolic/instrumental adoption of ITG.<sup>5</sup> In contrast to the symbolic adoption of ITG, a commitment to the principles espoused by ITG frameworks is more likely to result not only in a firm’s *adoption* of ITG mechanisms but also in its meaningful *implementation* of the practice of ITG through goal- and value-based integration within the organization’s existing structures, processes, and policies. This goal and value orientation of ITG principles reflects the *spirit of ITG*, that is, “the general intent with regard to values and goals underlying a given set of structural features” of ITG (DeSanctis & Poole, 1994, p. 126). Thus, the ITG spirit reflects the organization’s cohesive purpose regarding the values and goals underpinning the

adopted ITG mechanisms. Compared to a merely instrumental adoption of ITG mechanisms, a full commitment to the spirit of ITG is thus more likely to lead to a meaningful ITG implementation and the achievement of strategic alignment. Notably, this concept of ITG spirit encapsulates the call for ITG cohesiveness in Huang et al. (2010) because a cohesive ITG spirit enables “greater uniformity” of ITG reference frames. A more purposive ITG effort allows “greater consistency in the ‘what, where, how and why’ of IT-related decision making” (p. 298).

Because a commitment to ITG principles is more challenging than the mere adoption of ITG mechanisms, the mechanisms are often a starting point in implementing ITG. Although the adoption of governance mechanisms is the first stage of meaningful ITG implementation (Alreemy et al., 2016), specific findings in the literature indicate that adopting ITG mechanisms does not necessarily entail a commitment to ITG best practices. For example, Marnewick and Labuschagne (2011) noted that publicly listed companies in South Africa adopted the 2009 King Code of Governance for South Africa, Chapter 5, which lays out ITG principles; however, the employees of these organizations were unsure whether the governance principles were *actually* being followed. Likewise, Zaky et al. (2018) emphasized that although many firms adopt some form of ITG, they frequently fail to progress to an organizational commitment to ITG principles. Researchers should consider whether adopting ITG mechanisms has *led* to a commitment to the underlying philosophy of COBIT.

COBIT, at its core, is a principles-based representation of essential elements of ITG, including processes to be followed, activities to be undertaken, and practices to be formulated (Goul et al., 2018). COBIT organizes these elements under five principles: (1) meeting the needs of stakeholders, (2) end-to-end ITG of the organization, (3) implementing an integrated but continuously evolving ITG framework, (4) applying a holistic approach to ITG, and (5) ensuring that governance is sufficiently distinguished from management (ISACA, 2012b). These principles provide normative frames for an ITG system such that a firm committed to these principles can achieve the ultimate goal of IT-based value creation: balancing benefits, risk levels, and the use of resources (Alramahi et al., 2014; Mulgund et al., 2019). One of the stated

objectives of COBIT is strategic alignment (ISACA, 2012b); although IS researchers have alluded to this relationship, this link has yet to be empirically established (Mangalaraj et al., 2014; Mulgund et al., 2019). The spirit of ITG is thus reflected in the COBIT principles. It can be understood as an organization's purposive commitment to the principles and goals of ITG, the primary goal being strengthening strategic and innovative value.

### **2.3.2. Top-Leadership Support for IT**

Based on top-management-support research, we define *top leadership support for IT* as the effortful participation and involvement of both the board and executives in the organization's IT vision and strategy (Liu et al., 2015; Rai et al., 2009). As such, although top leadership support is not specific to ITG, it is foundational to and can strengthen an organization's commitment to ITG principles. Therefore, commitment to ITG principles concerns the principles-based implementation of ITG. In contrast, top leadership support concerns the degree of organizational-leader support for IT in general, which is likely to spill over into support for ITG.

Top leadership plays a crucial role in championing a firm's ITG principles. Research on organizational change has indicated that the change agents' support for initiatives leads a firm beyond instrumental-process change to actual firm-level change (Gondo & Amis, 2013). That is, top leadership championing IT leads firms beyond the mere adoption of ITG mechanisms—simply an instrumental process change—to organizational change through a principles-based approach to ITG.

Recent research on board and executive IT expertise has suggested that IT should be supported at the top levels of leadership because the board and top management jointly establish the ITG ethos and enable its infusion into every facet of the organization (De Haes et al., 2020a; Haislip et al., 2015; Valentine et al., 2016). Employee commitment comes only with top leadership support (Wang et al., 2019; Wilkin & Chenhall, 2020). However, such support can be elusive. An organization's top leadership may include board members who lack IT backgrounds (Adams et al., 2018), and this lack of technical expertise can further isolate the IT function and diminish ITG legitimacy. Valentine et al. (2016) evocatively captured the

challenge of securing top leadership support:

A majority of boards and senior executives know that technology is critical to their enterprises. However, only a relatively small number of boards worldwide have made the transition from an almost mono focus on finance and legal capability as a proxy for corporate governance to incorporating digital leadership into the new mix of the board's structure and capability profile. (p. 577)

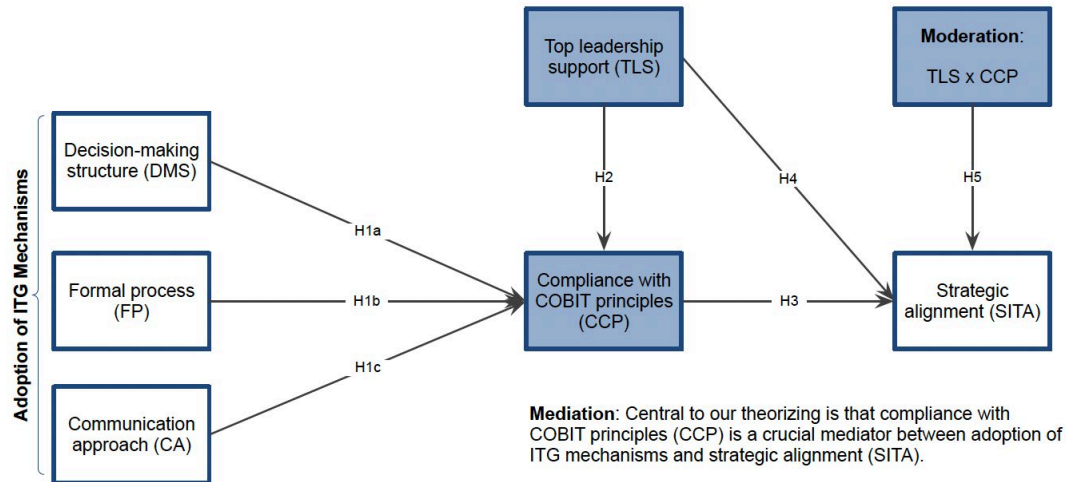
It is reasonable to conclude that if top leadership fails to emphasize IT, it may be difficult to achieve effective ITG. That is why, historically, many firms have lacked broad ITG integration due to the board's limited involvement in IT matters (Bart & Turel, 2010; De Haes & Van Grembergen, 2005; Huff et al., 2006; Jordan & Musson, 2004; Trites, 2004). From an analysis of increases in board IT experience after IT failure, Benaroch and Chernobai (2017) concluded that top leadership involvement contributes to "IT value-creation through better alignment of investments in IT resource strengths with business priorities" (p. 730). Top leadership support is foundational to promoting IT-enabled organizational learning and overcoming a firm's resistance to IT-enabled change (Wang et al., 2019; Yeow et al., 2018), thus facilitating increased commitment to established ITG principles, such as those of COBIT. We propose that top leadership support helps the organization move beyond the mere adoption of ITG mechanisms and toward a more meaningful implementation of ITG. When firms have top leaders who support IT, they are more likely to "adopt [an IT] practice substantively, integrating it into their core routines and processes," thereby facilitating positive outcomes (Angst et al., 2017, p. 896). Top leadership support, thus, leads to better CCP and strategic alignment.

### **3. Research Model and Hypothesis Development**

Our theorization centers on the two major constructs articulated above: CCP and top leadership support. We theorize that the adoption of ITG mechanisms leads to CCP (H1), that top leadership support influences CCP (H2), that both top leadership support and CCP influence strategic alignment (H3 and H4), and finally, that top leadership support also moderates the relationship between CCP and strategic alignment (H5).

**Figure 1** depicts the overall model.

**Figure 1.** Proposed Model of the Influence of ITG Mechanisms on Strategic Alignment



### 3.1. Effects of the Adoption of ITG Mechanisms on CCP

Recall that an organization can adopt three primary forms of ITG mechanisms: decision-making structure, formal process, and communication approach (Wu et al., 2015). We theorize that the adoption of these ITG mechanisms positively influences CCP. The essential nature of the COBIT framework allows us to infer that a firm that adopts ITG mechanisms is more likely to be committed to COBIT principles. However, as noted, this is not a tautological hypothesis—the mere adoption of ITG mechanisms is a necessary but insufficient condition for the emergence of CCP (Mohr, 1982).

Although the symbolic adoption of ITG mechanisms cannot give rise to CCP alone, adopting any of the three ITG mechanisms can help an organization strengthen its CCP. If an organization lacks the relevant decision-making structures, it will struggle to fully implement the COBIT principles, such as meeting stakeholders’ needs. The firm’s structure should provide for close connections between IT executives and top leadership such that an overall IT policy formulation can be envisioned. For example, an organization whose units are disconnected and that operates its IT functions in silos cannot envision an overall IT policy that meets the needs of all stakeholders; it will thus have a lower CCP than a firm that has envisioned such a policy. Formal processes can also facilitate CCP. Key ITG processes include continuously monitoring IT projects and resources, acquiring, developing, and implementing IT capabilities, and planning and organizing those IT investments (Leih, 2006); each activity enables CCP. Organizations with formal processes are better positioned to commit to the five COBIT principles. For example, formal processes

could be designed to embed ITG in all segments of the organization, thus facilitating the organization's end-to-end ITG. Alternatively, formal process development could enable a holistic approach to ITG. Finally, to achieve CCP, an organization should adopt appropriate and effective communication structures. A firm that adheres to COBIT principles communicates the values, needs, and guidelines in the COBIT framework across the organization. In discussing how firms can use COBIT to achieve strategic alignment, Rubino and Vitolla (2014) argued that “a company should *elaborate* ... all that information which corresponds to its own needs to satisfy the company's specific business needs” (p. 750, emphasis added). This highlights the need for a deliberate communication approach to realizing firm-level CCP.

We propose that adopting ITG mechanisms is the first step in developing an organization's commitment to ITG principles. DeSanctis and Poole (1994, p. 127) justify the direction of our hypothesis—ITG mechanisms precede CCP. That is, the spirit of a system can be fully realized only as part of the sensemaking process that follows the initial adoption (e.g., Griffith, 1999; Jaspersen et al., 2005). Notably, the spirit of ITG is consensus-oriented (i.e., based on a general commitment to and understanding of the underlying purpose and values of ITG) rather than regulation-oriented (i.e., oriented toward formal processes and structures) (Kude et al., 2018) and this consensus is part of the sensemaking process. In summary, it follows that an organization that adopts ITG mechanisms will be more likely to achieve CCP. Therefore, we hypothesize:

**H1.** The adoption of ITG mechanisms in an organization—specifically through (a) ITG decision-making structures, (b) formal ITG processes, and (c) ITG communication approaches—will positively influence the firm's CCP.

### **3.2. Effect of Top-Leadership Support on CCP**

Top-leadership support stimulates organization-wide commitment to governance initiatives (Bass & Avolio, 1994). As an ITG framework, COBIT presents governance processes that are “in the hands of the *board and the most senior management*” (De Haes et al., 2013, p. 321, emphasis added); thus, their support for IT dramatically increases the likelihood of the firm's commitment to COBIT principles (Mufti et al., 2018). Extending the notions of mutual understanding and engagement (Jenkin et al., 2019) to top



leadership support, when top leadership supports IT, they facilitate the proper diffusion of IT-related skills, competency, and work practices (Stafford et al., 2018), spreading awareness and knowledge of IT-intensive COBIT principles across the firm. In summary, “top leadership support is always a critical success factor in any ... [organizational] initiative” (Ramesh & Gerth, 2015, p. 312), including cultural and structural changes ushered in by an organization’s efforts to embrace COBIT. Based on the arguments presented, we hypothesize:

**H2.** Top leadership support will positively influence the organization’s CCP.

### **3.3. Effect of CCP on Strategic Alignment**

It has long been argued that, in an organizational context, adherence to the spirit of the IT system implementation can influence the system’s success (Chin et al., 1997; DeSanctis & Poole, 1994; Majchrzak et al., 2000).<sup>6</sup> We leverage this notion to posit that a firm’s CCP reflects the spirit of ITG better than a merely instrumental approach. In a firm that embraces COBIT principles, IT does not play a merely supporting role but is instead integrated with other corporate priorities. This embeddedness of IT in the organizational fabric has profound implications, and it facilitates the convergence of business perspectives and IT perspectives within a firm (e.g., De Haes et al., 2020c; Gregory et al., 2018). Thus, when organizations are committed to COBIT principles, they engage seriously with IT to align IT with business objectives (Fiss & Zajac, 2006; Gregory et al., 2018).

To summarize, an organization with a high CCP goes beyond a symbolic or instrumental adoption of ITG mechanisms. Instead, it engages in a strategic, integrative, and committed implementation of ITG in which business and IT leadership share a meaningful vision of the firm’s IT (Wu et al., 2015). In such an organization, business managers embrace the value of IT and leverage it to advance firm-level objectives—leading to a solid strategic alignment of business and IT (Marrone & Hammerle, 2017). COBIT was developed to promulgate “IT best practices, *align the IT objectives to the business objectives*, and ensure effective IT governance and management” (Mulgund et al., 2019, p. 67, emphasis added). Thus, it is unsurprising that CCP is crucial to achieving strategic alignment. We thus hypothesize:

**H3.** CCP will positively influence the organization's strategic alignment.

### **3.4. Effect of Top Leadership Support on Strategic Alignment**

Building on our problematization, proposing the need for both board and executive support, developed in Sections 1 and 2.3.2, we now turn to the effect of top leadership support on strategic alignment. In any organization, when top leadership understands the value of and supports IT, strategic alignment improves (Ang & Teo, 1997). Formally, when a firm experiences *top leadership support for IT*, such leadership will effectively articulate a vision that explains how IT can support the broader business objectives (De Haes et al., 2020a; Shao et al., 2016). By securing the buy-in and cooperation of organizational stakeholders—through leadership techniques such as incentives, stimulation, persuasion, and sense-giving—leaders highlight the need for business objectives to align with a firm's IT capabilities and vice versa (Awuku-Gyampoh & Dzisi, 2018; Jenkin et al., 2019; Shao, 2019).

The inference that top leadership support leads to improved strategic alignment also follows from the strategic management literature, especially strategic leadership theory (Finkelstein et al., 2009). According to strategic leadership theory, the cognitive values of organizational leaders are reflected in their activities, in which their leadership techniques facilitate a unified and aligned vision of all business components (including IT) by promoting cross-firm learning (Vera & Crossan, 2004). To achieve the desired level of business–IT alignment, top leaders (who support IT) take adequate measures to overcome organizational resistance (Kim & Kankanhalli, 2009). For example, because Alibaba's top leadership directed the firm's dynamic alignment between IT and business, Alibaba replaced its business strategy of e-commerce with one of big data and cloud computing (Shao, 2019). In a field study regarding digital strategy adoption, Yeow et al. (2018) provide similar evidence of the essential role of leadership support. A top leadership that supports IT continuously monitors IT capabilities and business objectives to steer the alignment of IT and business objectives (Huygh & Haes, 2020). We thus hypothesize:

**H4.** Top leadership support in an organization will positively influence the firm's strategic alignment.

### **3.5. The Moderating Effect of Top-Leadership Support for IT**

To achieve a strong CCP, organizations may need a catalyzing influence from top leadership, which we motivate in Section 2.3.2, which comprises both board and executive management. When top leadership supports IT, their support and optimism for IT diffuses throughout the firm, thus reinforcing the business value of IT (Elshandidy & Neri, 2015). Namely, the efficacy of CCP in achieving strategic alignment is likely positively moderated by top leadership support. This moderation is consistent with the transformational theory of leadership, which argues that leaders transform organizations by stimulating a change in beliefs and practices (Judge & Bono, 2000). Top leadership support can promote a compelling IT vision that accentuates the CCP's effect and helps the CCP achieve its strategic alignment. Therefore,

**H5.** Top leadership support will positively moderate the influence of the organization's CCP on the firm's strategic alignment.

## **4. Materials and Methods**

Our empirical study employed an approach based on engaged scholarship and iterative conceptual and measurement refinement and validation based on MacKenzie et al. (2011). We used the resulting measures to test the hypotheses.

### **4.1. Conceptual and Measurement Development with Preliminary Studies**

To further develop our conceptualizations, theory, model, and measurement, we grounded our research methodology in engaged scholarship by performing an extensive review of the relevant literature and engaging in several rounds of qualitative interviews and surveys with executives and academic experts, which informed multiple rounds of instrumentation development and empirical testing. Although we leveraged extant literature to develop our instrument, we took care to iteratively refine existing measures because it was essential to support our measurement of CCP and top leadership support pragmatically and conceptually in the context of ITG to ensure the acceptability of our measures to experts and practitioners, and to demonstrate that the measures had sufficient face and content validity. To create a strong model backed with valid measures, we followed MacKenzie et al.'s (2011) conceptual and measurement development approach, which outlines four major stages of content validity: conceptual development and

content validity, model specification, scale evaluation and refinement, and validation. To do so, we first conducted three small-scale preliminary studies with academic experts, PhD students, senior managers, and executives as participants. The first study was qualitative, open-ended interviews ( $n = 13$ ); the second study was a qualitative survey with open-ended questions that solicited feedback on concepts and proposed constructs ( $n = 12$ ), and the third study was a quantitative survey that asked participants to empirically rate and compare potential measures of constructs generated from the first two studies ( $n = 57$ ). A critical conceptual purpose of these studies was to understand better academic and practitioner perspectives on why ITG mechanisms—as defined and understood in the existing literature—lead or fail to achieve strategic alignment. Through such engagement, we identified the critical factors involved, specifically CCP, involvement of top leadership (e.g., the board, executives, senior managers), and other organizational aspects.

After developing the items with demonstrated content validity for CCP and top leadership support, we finalized our selection of measures that the literature showed to be valid; we further specified the model, refined the scales, and validated the measures. These measures specifically included ITG mechanisms and strategic alignment. Using these measures and extensive demographic variables and covariates, we then conducted a sizeable preliminary study ( $n = 402$ ) using an online panel to test these measures. In this fourth pilot study, we exclusively used a set of IT managers and non-IT managers to strengthen generalizability and validity across organizations. After refining the instrumentation, we conducted a similar study using an online panel with an entirely new set of participants ( $n = 458$ ) with a similar distribution of IT and non-IT managers; this provided test-retest validity and further instrument refinement.

#### **4.2. Study Design and Approach**

We conducted our final study after carefully developing our conceptual definitions and finalizing our instrumentation (as detailed in Appendix B). Like the preliminary studies, our final study involved a survey. Still, this time, we changed our online panel source to a market research firm specializing in market and academic research involving senior managers, executives, and board members. We worked with the firm

to commission a \$12,000 study of carefully filtered senior managers, executives, and board members (IT and non-IT) at publicly traded firms in the US. Following best practices, this was necessary to reach top executives and leadership across a convenience sample of large US firms.

Participation was confidential and based on informed consent. Working with the IRB and the research firm, we were allowed to ask the participants to identify the publicly traded firm they worked for voluntarily. We agreed that all the data would be aggregated and no company-identifying information would ever be released privately or publicly. We also followed the latest guidelines for increasing the quality of online panel data by applying advanced filters to the demographic questions, using attention-check questions, randomizing the order of presentation of the items, and checking for rushed responses (Lowry et al., 2016; Steelman et al., 2014). Following the leading guidelines developed by Podsakoff et al. (2003) and Schwarz et al. (2017), we included resentment as a marker variable so that we could test for potential common method bias (CMB).

### **4.3. Study Sample**

The participants were required to be 25 years of age or older, work for a publicly traded US firm (on NYSE, NASDAQ, or AMEX), have knowledge of how IT is used throughout their organization (regardless of their role), and be in a senior management or higher position (e.g., senior manager, executive, or board member). The market research firm invited a filtered set of 1,000 senior managers and executives from their research pool to participate. Of these, 383 read the terms of the study and expressed interest in participating, yielding a 38.3% initial participation rate. Sixty-four of these potential participants were disqualified because they did not meet the study requirements, did not complete the surveys, or failed attention traps, leaving 319 valid responses and an 83.3% completion rate.

All the study participants worked for large publicly traded firms, which were distributed as follows: NYSE (190), NASDAQ (108), and AMEX (21). The average total work experience of the respondents was 19.95 years (SD = 11.30). The average work experience in their current organization was 12.92 years (SD = 9.45). Of the participants, 196 were male, 116 were female, and 7 identified as “other” or did not report

their gender. The respondents' ages were distributed as follows: 25–29 years (34), 30–39 years (138), 40–49 years (78), 50–59 years (50), and 60+ years (19). The position level was distributed as follows: president or chief executive officer (33), other C-level IT executive (65), non-IT executive (121), senior manager (83), partner, managing consultant, or other management positions (10), and other (7). A total of 150 of the participants (47.0%) were currently serving on at least one corporate board. The people to whom they directly reported were distributed as follows: chief executive officer or president (95); chief operations officer or vice president of operations (115); chief financial officer or controller (30); chief marketing officer or vice president of marketing (10); chief information officer, chief technology officer, or director of IT (42); and other executive or senior manager type (27). Educational attainment was distributed as follows: high school (10), some university but not complete (10), two-year associate degree or its equivalent (12), four-year university degree (138), master's degree (120), PhD or some doctoral education (22), and not reported (7). **Table 1** shows the distribution of the represented industries.

## 5. Analyses and Results

We conducted factor, reliability, AVE, and multicollinearity analyses using STATA (version 17.0) to establish data quality and validity. We used CB-SEM, which is widely accepted in the methodology community because it enabled us to generate model fit statistics to compare our models.

**Table 1.** Distribution of the Participants' Industries ( $n = 319$ )

Industry	Freq.	%
1. Consumer Nondurables – Food, Tobacco, Textiles, Apparel, Leather, Toys	11	3.4
2. Consumer Durables – Cars, TVs, Furniture, Household Appliances	5	1.6
3. Manufacturing – Machinery, Trucks, Planes, Office Furniture, Paper, Commercial Printing	38	11.9
4. Oil, Gas, and Coal Extraction and Products	7	2.2
5. Chemicals and Allied Products	10	3.1
6. Business Equipment – Computers, Software, and Electronic Equipment	96	30.1
7. Telephone and Television Transmission	14	4.4
8. Utilities	2	6.0
9. Wholesale, Retail, and Some Services (Laundries, Repair Shops)	19	6.0
10. Healthcare, Medical Equipment, and Drugs	15	4.7
11. Finance, Banking, Insurance	55	17.2
12. Others – Mines, Construction, Buildings Management, Transportation, Hotels, Business Services, Entertainment	19	6.0
13. Others (not listed above)	21	6.6
Not reported	7	2.2
<b>Total</b>	<b>319</b>	<b>100.0</b>

Before analysis, we checked the convergent validity and discriminant validity of the constructs, relying on confirmatory factor analysis as a precursor step before analyzing the structural equation model (Gefen & Straub, 2005; Henseler et al., 2014; Henseler et al., 2016; Lowry & Gaskin, 2014). All outer model loadings exceeded the required standards and were highly significant, with each *t*-value above 10.0. **Table 2** summarizes the descriptive statistics and other reliability-related statistics.

Finally, to assess potential multicollinearity, we examined the outer and inner variance inflation factors (see Tables C1 and C2, respectively; all the factors were below the ideal threshold of 5.0 for reflective

**Table 2.** Reliabilities and AVEs

<b>Latent Construct</b>	<b><math>\alpha</math></b>	<b>AVE</b>	<b>CR</b>
Commitment to COBIT principles (CCP)	0.881	0.595	0.845
ITG mechanisms: Communication approaches (CA)	0.721	0.641	0.727
ITG mechanisms: Decision-making structures (DMS)	0.772	0.685	0.780
ITG mechanisms: Formal processes (FP)	0.806	0.717	0.805
Strategic alignment (SITA)	0.703	0.770	0.870
Top leadership support (TLS)	0.845	0.686	0.849
Resentment	0.898	0.765	

$\alpha$  = Cronbach's alpha; AVE = average variance extracted; CR = construct reliability

constructs). We thus concluded that our data exhibited high factorial validity, exhibited high reliability, and lacked multicollinearity. Table C3 summarizes the measurement model statistics.

### 5.1. Confirming Lack of Nonresponse Bias

A fundamental threat to our research design was the nonresponse bias of those who declined the invitation to participate; thus, we statistically confirmed that nonresponse bias was highly unlikely. The seminal literature on response bias in organizational surveys has shown that if there is a nonresponse bias among those who decline to participate, there will be significant differences in the demographic or model variables between the first and last 20% of the respondents. We grouped the early and late respondents using the method suggested by Lindner et al. (2001) and Radhakrishna and Doamekpor (2008). We compared all their primary responses using multivariate analyses of variance (MANOVAs) to determine if there were any differences. To test this possibility, we ran MANOVA tests of differences between the first and last 20% of the following demographic and model variables: age, position, number of employees, number of people who work under a person, education, gender, years of career, person to whom an employee reports

at the C-level or board level, membership on the board, resentment marker variable, ITG mechanisms, strategic alignment, CCP, and top leadership support. The overall MANOVA was insignificant at  $F_{(15, 98)} = 1.095$ , and no specific between-subjects effects were significant. We, therefore, concluded that there was little likelihood that our results were skewed by nonresponse bias.

## 5.2. Path Model Analyses

Given the high quality of our data, we proceeded to analyze the proposed model. We used the tool STATA (STATA/SE version 16.1) for our analysis. Per leading standards, our model fit statistics were adequate, indicating a good fit with the baseline model ( $X^2 (df) = 1,196.54 (341)$ ;  $X^2/df = 3.51$ ; RMSEA = 0.079; CFI = 0.925; TLI = 0.906; SRMR = 0.045; CD = 0.998) (Hair et al., 2005; Hoe, 2008).

Because our predicted model involved mediation with many covariates and controls, we produced three models to demonstrate the efficacy of the predicted model. Model 1 was an alternative unmediated model; Model 2 was our predicted mediation model without the covariates and controls; and Model 3 was our final predicted model with the covariates and controls. Table C4 summarizes the details of our analysis of the three models.

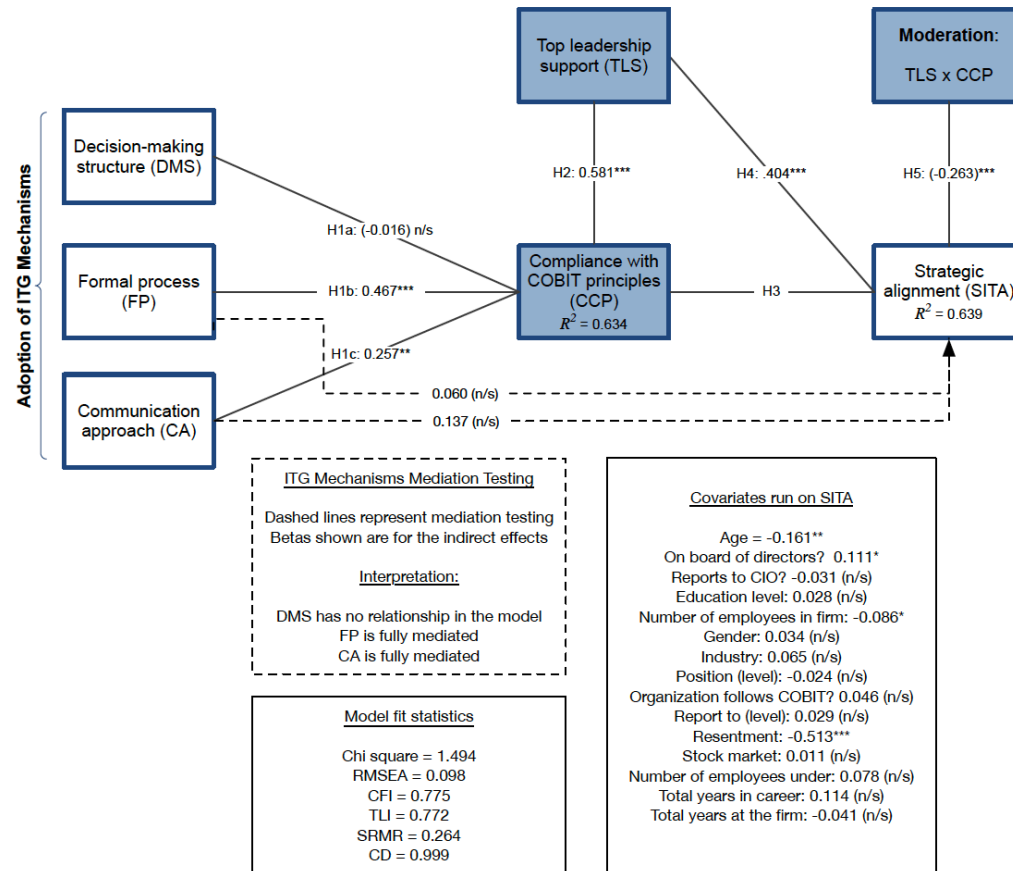
Model 1 tested the possibility that no mediation existed and that all the key constructs in our model (decision-making structure, formal process, communication approach, top leadership support, and CCP) directly predicted strategic alignment. The crucial finding here was that only CCP and top leadership support remained significant predictors of strategic alignment when all five constructs were used to predict strategic alignment; notably, this model's decision-making structure, formal process, and communication approach were nonsignificant.<sup>7</sup> These empirical results pointed to the critical roles of our predicted mediators.

Model 2 was the mediated model without covariates, and Model 3 was the final mediated model with covariates and the H5 moderation test (top leadership support \* CCP → strategic alignment). All the predicted results and mediation relationships yielded the same results in these two models; thus, we focus on explaining Model 3. The Model 3 results are depicted in **Figure 2**. Model 3 confirmed that most of our



hypotheses had the highest equation-level model fit (e.g.,  $R^2$ ) and the best overall path model fit statistics.

**Figure 2.** Final Path Model Analysis Results



\*\*\* =  $p < 0.001$ , \*\* =  $p < 0.010$ , \* =  $p < 0.05$ , n/s = not significant

Crucially, to produce Model 3, we also tested for mediation. The classical tests for mediation were developed by Baron and Kenny (1986) and Sobel (1982), but advances in computing power have allowed for the adoption of less biased methods. The bootstrapping method represents one such approach that has gained popularity (Hayes, 2009; MacKinnon, 2008). This method has several advantages (Vance et al., 2015): it has greater statistical power, allows for the direct measurement of direct versus indirect effects, and does not assume a normal distribution, as does the Sobel (1982) method. **Table 3** summarizes these results, which indicated that CCP fully mediated the formal process and communication approach and had no mediation relationship with the decision-making structure. However, we can pragmatically conclude that CCP fully mediated all three ITG mechanisms because all three had dramatically higher betas and were

highly significant in a direct effects model that did not include CCP and top leadership support.<sup>8</sup>

**Table 3.** Bootstrapped Confidence Interval Tests for Full and Partial Mediation for Model 3

Relationship	Mediator	Mediation Test ( <i>ab</i> )			Full/Partial Test ( <i>c'</i> )			Type of mediation
		[Indirect Effects]			[Direct Effects]			
		2.5% lower bound	97.5% upper bound	Includes zero?	2.5% lower bound	97.5% upper bound	Includes zero?	
DMS → SITA	CCP	-0.055	0.010	Yes	-0.055	0.010	Yes	None
FP → SITA	CCP	0.024	0.134	No	0.024	0.134	No	Full
CA → SITA	CCP	0.007	0.088	No	0.008	0.303	No	Full

DMS: decision-making structure, FP: formal process, CA: communication approach, SITA: strategic alignment.

In summary, decision-making structure was not associated with CCP (H1a rejected), but formal process and communication approach were positively associated with CCP (H1b and H1c supported). Top leadership support was also positively associated with CCP (H2 supported). CCP and top leadership support were positively related to strategic alignment (H3 and H4 supported, respectively). Finally, our positive moderation prediction of top leadership support and CCP on strategic alignment was not supported in that the interaction term was highly significant but negative (H5 rejected, reverse direction).

### 5.3. Testing for Common Method Bias

Recent empirical studies have shown that the adverse impact of CMB may be overstated, and both its prevention and detection are more feasibly performed than previously suggested (Fuller et al., 2016; Schwarz et al., 2017). However, because the proposed marker of resentment might serve better as a counter explanation than as a marker variable, we conducted three further assessments to determine whether CMB could have influenced our results despite the several precautions taken to ensure factorial validity, data quality, and minimal multicollinearity.

First, we conducted Harmon's single-factor model test, which has been criticized, starting with Podsakoff et al. (2003), for being insensitive to bias. Thus, if Harmon's test detects bias, then a serious problem exists; if it does not, one cannot rule out CMB. However, this test is still commonly used (Schwarz et al., 2017). We conducted factor analysis with principal components on the items, resulting in multiple components within the model. The largest component accounted for a mere 12.20% of the model's variance, suggesting a low likelihood of CMB, though its complete absence cannot be confirmed.

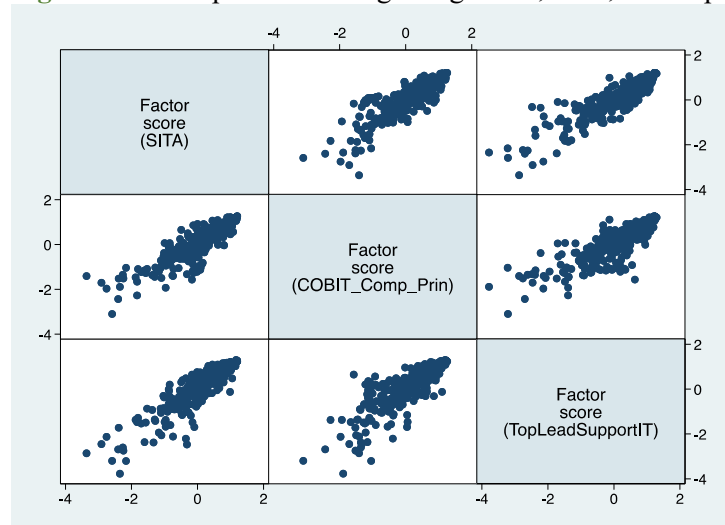
Second, we also examined the correlation matrix following Pavlou et al. (2007). The matrix did not have relationships near the threshold of 0.900 that would indicate serious CMB.

Third, we used resentment as a marker variable, following the approach by Williams and O'Boyle (2015). The average correlation between resentment and the other variables was -0.189, whereas the average correlation between the different model variables was 0.588. Although resentment may not be an ideal marker variable, its pronounced deviation from the direction of the other variables further supports the absence of significant CMB.

#### 5.4. Post Hoc Interaction Analysis

Given the model's significant and negative interaction term, we conducted a post hoc analysis to better understand the interaction's nature. As a first step, we determined whether the relationship of either CCP or top leadership support with strategic alignment was curvilinear. We did this in two ways. First, we examined the scatterplots of the primary constructs of the model (strategic alignment, CCP, and top leadership support; see **Figure 3**). As **Figure 3** shows, the

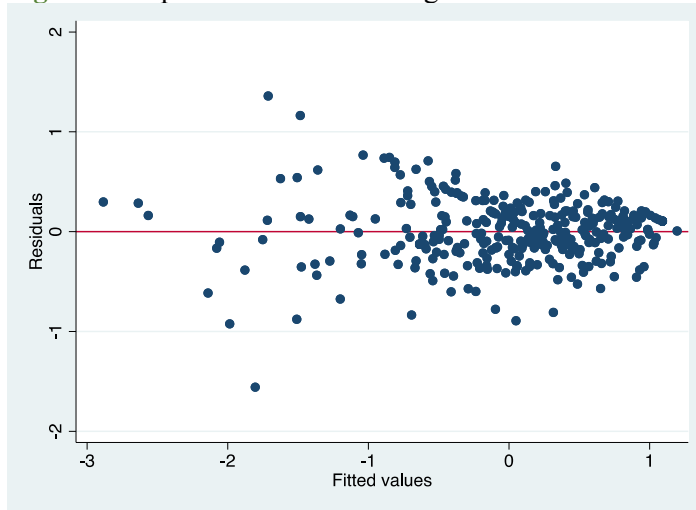
**Figure 3.** Scatterplots of Strategic alignment, CCP, and Top leadership support



The relationship between CCP and strategic alignment was curvilinear, with the left end of the scatterplot trending more upwards than it would have for a direct effect. Likewise, top leadership support did not continue its trend in a main direct effect, with the top portion of the scatterplot trending less positive than we would have expected. To further explore this, we determined the residuals against the fitted scores from

the model, shown in **Figure 4**, and indeed, a trend of curvilinearity between the variables was indicated.

**Figure 4.** Depiction of Residuals Against Fitted Values



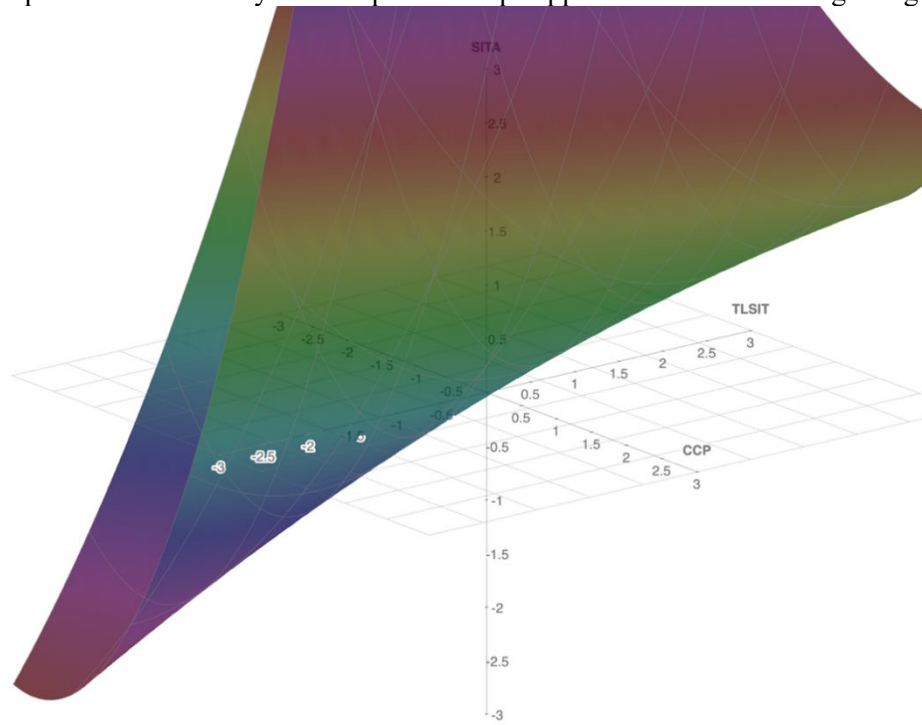
Having established potential curvilinearity in these variables, we tested for curvilinearity in our model following established procedures for polynomial regression analysis and response surface modeling (Edwards, 2002; Moody et al., 2017). We reanalyzed the results and included a squared term for the polynomial regression analysis for the CCP and top leadership support constructs. All the variables in the model were significant (see **Table 4**).

**Table 4.** Testing for Curvilinear Relationships in CCP and Top leadership support

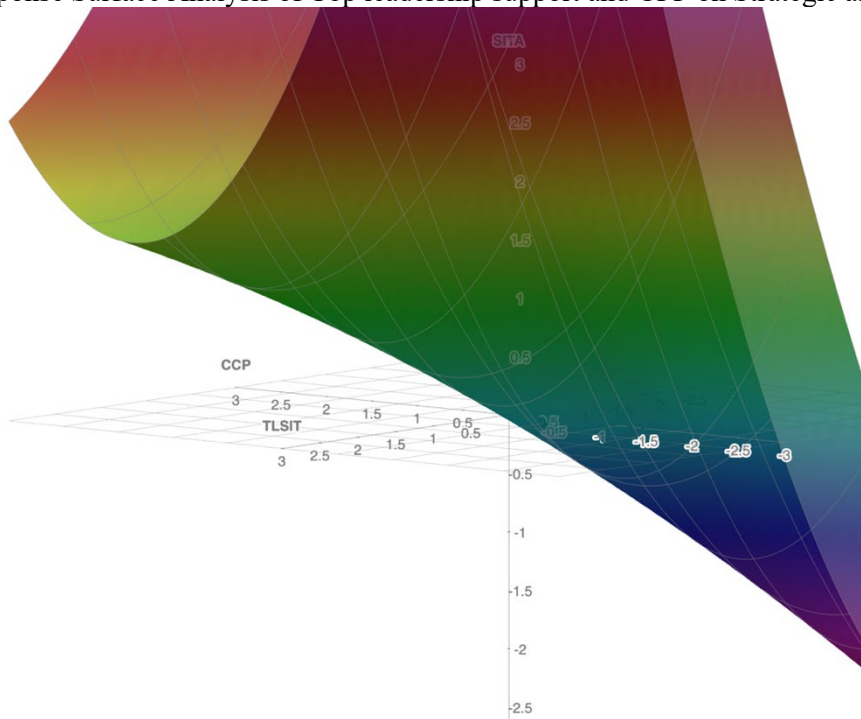
Pathway	Coef.	Std Error	Z / Sig.
CCP → Strategic alignment	0.540	0.075	7.20***
CCP <sup>2</sup> → Strategic alignment	0.508	0.103	4.92***
Top leadership support → Strategic alignment	0.366	0.097	3.78***
Top leadership support <sup>2</sup> → Strategic alignment	0.215	0.116	1.96*
CCP × Top leadership support → Strategic alignment	-0.737	0.161	-4.57***

These results indicated that each of the paths of CCP and top leadership support with strategic alignment were curvilinear, and this explained why the interaction between the two terms became significant and negative. **Figure 5a–c** illustrates the relationship between these three variables and their curvilinear terms using standardized data (i.e.,  $SITA = \beta_{CCP} + \beta_{TLS} + \beta_{CCP*TLS} + \beta_{CCP^2} + \beta_{TLS^2} + \epsilon$ ).<sup>9</sup> As the figures show, the lowest portion of the graph (corresponding to the lowest strategic alignment score) occurred when both CCP and top leadership support became more negative (recall that the data were standardized for these analyses and visualizations). Contrary to the results of the linear approach, equally positive and high

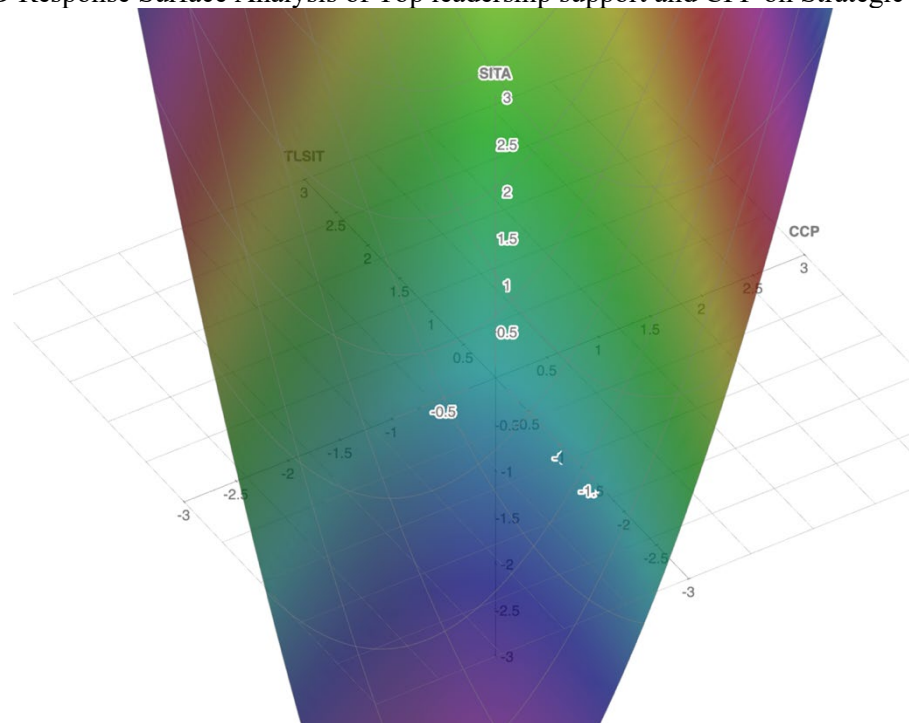
**Figure 5a.** 3D Response Surface Analysis of Top leadership support and CPP on Strategic alignment



**Figure 5b.** 3D Response Surface Analysis of Top leadership support and CPP on Strategic alignment



**Figure 5c.** 3D Response Surface Analysis of Top leadership support and CPP on Strategic alignment



levels of CCP and top leadership support did not result in the highest strategic alignment scores, which we expected in our linear prediction for H5. Instead, on average, the highest strategic alignment scores resulted either from a balance of high but not extreme levels of CCP and top leadership support, from higher CCP paired with lower top leadership support, or from the reverse, lower CCP paired with higher top leadership support. However, the lowest strategic alignment scores came from low CCP and low top leadership support (as expected).

## 6. Discussion

The practice of ITG is teeming with serious challenges for organizations, and one prominent conundrum that practitioners frequently encounter is the elusive nature of strategic alignment. ITG and strategic alignment are critical factors in an organization's successful use of IT. Further, ITG has been developed and promoted as a means by which firms can align their IT strategies with their business strategies, and empirical findings show that ITG mechanisms are associated with better strategic alignment and firm-level performance (Wu et al., 2015). However, many organizations find it difficult to fully implement ITG and thus experience IT failures or fall short of effective strategic alignment despite adopting recommended ITG

mechanisms (Jewer & McKay, 2012). Our study answers the call for research on how ITG can lead to strategic alignment and better firm performance (Chan & Reich, 2007; Jacobson, 2009) by investigating the role of ITG principles and top leadership support in pursuing strategic alignment. Previous research primarily relied on conceptualizing and measuring ITG through mechanisms alone (Wu et al., 2015); by contrast, our study takes a novel approach by breaking ITG into two distinct components: ITG mechanisms and ITG principles.

The basis of this novel addition is our contention that it is time for organizations to move beyond a mere adoption of ITG mechanisms and instead fully embrace the broader ethos or “spirit” of ITG. This profound shift is achievable when organizations wholeheartedly commit to ITG principles and is further enhanced by unwavering support from top leadership. To further unravel the intricate relationship between ITG and strategic alignment, we employed a series of qualitative and quantitative preliminary studies to develop and validate two novel measures: CCP and top leadership support. Next, we summarize our key findings and contributions to research and practice and discuss the limitations and research opportunities associated with our work.

### **6.1. Summary of Findings**

Directly informed by our problematization, this study investigates how ITG leads to strategic alignment. First, we validate prior findings (Wu et al., 2015) that ITG mechanisms are positively associated with strategic alignment. We then theoretically develop a more complex ITG event space, investigating whether CCP and top leadership support play a role in this relationship. Our findings support the conclusion that the ITG mechanisms of communication approach and formal process promote CCP and that CCP fully mediates the ITG mechanism→strategic alignment relationship. Further, top leadership support leads to both CCP and strategic alignment directly. However, surprisingly, we find a negative interactive effect on strategic alignment between CCP and top leadership support. In summary, CCP and top leadership support are vital determinants of strategic alignment, and the CCP fully mediates the previously documented ITG mechanism→strategic alignment relationship.

## 6.2. Contributions to ITG Research and Theory

Based on our problematization, conceptualization, and findings, we deliver novel conceptions within a more complex ITG event space, which we summarize here and further map to contribution benchmarks of Weber (2012), and Corley and Gioia (2011) in Appendix A, Tables A1–A3. First, we showcase that ITG is not merely defined in terms of structural aspects of decision-making, processes, and communication. Second, adopting ITG mechanisms is insufficient to achieve strategic alignment. We expand the notion of IT spirit to ITG and demonstrate how CCP fully mediates the ITG mechanism→strategic alignment relationship. Third, we reveal the importance of top leadership support involving management and board support, providing conceptual specificity for this construct. Finally, we demonstrate that adopting ITG mechanisms does not necessarily imply that top leadership supports IT. Below, we further discuss these novel insights for both research and theory.

**Unveiling the role of ITG principles in strategic alignment:** One of the key contributions of our research is revealing the critical role of ITG principles in achieving strategic alignment. Whereas previous research often focused on specific ITG mechanisms, our study emphasizes that effective ITG begins with the adoption of mechanisms—a view consistent with the extant literature’s understanding of ITG mechanisms and frameworks (Rubino & Vitolla, 2014; Wu & Saunders, 2016; Zhen et al., 2021), but it does not end there. We underscore that the mere adoption of these mechanisms falls short of achieving strategic alignment without a genuine commitment to the underlying ITG principles. This crucial finding advances the understanding of how and under what conditions ITG contributes to strategic alignment. Our study is the first to investigate *how* ITG leads to strategic alignment and why merely adopting ITG mechanisms can fail to capture the organizational spirit or vision of meaningful ITG implementation.

**Introducing ITG spirit:** Although research has shown that adherence to the spirit of IT-system implementations promotes implementation success (Chin et al., 1997; DeSanctis & Poole, 1994; Majchrzak et al., 2000), ITG studies have tended to emphasize collections of specific ITG mechanisms. We delve deeper into the spirit of ITG by considering the role of CCP in improving strategic alignment. Related



perspectives on commitment to the spirit of ITG include social dimensions of ITG (Chan & Reich, 2007) or “soft” governance (Smits & van Hillegersberg, 2018). Our findings that ITG principles mediate between ITG mechanisms and strategic alignment demonstrate that adherence to ITG spirit plays a decisive role in successful ITG deployment.

**Broadening the construct of commitment:** Our development of the CCP construct as a novel state (Weber, 2012) not only contributes to ITG research but also resonates with a wide range of fields, including management, organizational psychology, and industrial psychology. Commitment is a necessary construct that has been observed in several critical studies of ITG (e.g., Ali & Green, 2012; Alreemy et al., 2016; Prasad et al., 2010), and it has been extensively investigated in disciplines such as management and organization studies (e.g., Klein et al., 2022; Meyer et al., 2004; Organ, 1988; Podsakoff et al., 2009; Podsakoff et al., 2000). Organizational commitment has been an essential factor in industrial and organizational psychology since the 1970s because it underlies *organizational citizenship behaviors*, which are formally defined as voluntary commitments of an employee in an organization or company that go beyond their contractual tasks (Organ, 1988; Podsakoff et al., 2000). These commitment-related themes have been widely emphasized in IS organizational security research on the commitment of organizational insiders and employees (e.g., D'Arcy et al., 2009; Hanus & Wu, 2016; Hsu et al., 2015; Posey et al., 2015; Posey et al., 2013). Our focus on commitment should appeal to a wide range of fields, including but not limited to ITG, IS, security, management, organizational psychology, and industrial psychology. Given the pervasive evidence of the importance of commitment in various organizational settings, addressing this “commitment gap” in the ITG literature represents a substantial theoretical and empirical contribution.

**Infusion of top leadership support:** The findings regarding top leadership support challenge conventional notions and thus have two direct implications for ITG research. First, although ITG can be seen as an egalitarian initiative, our top leadership support findings show that leadership support for IT leads to an organization’s commitment to ITG principles and directly to strategic alignment. The influence of top-down governance on strategic alignment contradicts the characterization by Smits and van

Hillegersberg (2018) of the ITG performance orientation as “bottom-up”; however, our findings align with their notion of the importance of soft governance, that is, governance beyond structures and processes. Thus, our results counterbalance contemporary studies that extol the benefits of a decentralized ITG approach. Although our study cannot single-handedly resolve the argument regarding whether ITG should be developed in a top-down or bottom-up manner, it does point to the importance of centralized leadership support and commitment to ITG principles, both of which have a hierarchical and centralized orientation.

**Original measurement development:** Our study also contributes to the ITG literature in terms of original measurement development, which is a core product of and contribution to the theory required to advance any research discourse (Hassan et al., 2022; Hassan et al., 2019). Both CCP and top leadership support are grounded in prior work, but they are newly developed and validated for our study and provide new and concrete antecedents for strategic alignment. Given the prevalence of frameworks in various IS domains beyond ITG (e.g., SOC 2, HIPAA, Six Sigma, ISO/IEC 27001, NIST, ITIL), our CCP measure can be readily adapted to assess *principle-level commitment* to other frameworks beyond COBIT.

**Contributions to causality:** Although our study does not use experimentation, it does provide theoretical contributions to causality and limited empirical contributions to causality. Van de Ven and Poole (2005) discuss various forms of causality as follows: “that from which something was made (material cause); the pattern by which it is made (formal cause); that from which comes the immediate origin of movement or rest (efficient cause); and the end for which it is made (final cause)” (p. 1396). These distinct forms of causality can coexist within a theoretical framework (Lowry et al., 2019). In our study, these forms of causality of strategic alignment can be understood in multiple respects: (1) Adoption of the ITG mechanisms can be understood as the material cause of ITG, and ultimately strategic alignment originates from these mechanisms and their adoption; (2) The mediation by CCP can be understood as the formal cause, as that is the mechanism by which strategic alignment happens; (3) CCP and the moderation of top leadership support are the efficient causes because they capture the effectiveness or potency of ITG. Without these, the strategic alignment would not be realized; merely adopting ITG mechanisms is

insufficient—it also must be “effective” (Wilkin & Chenhall, 2020); and (4) as the final objective, strategic alignment is the final cause of everything in the model.<sup>10</sup>

### **6.3. Implications for Practice, Management, and Policy**

Should our findings broadly hold, they carry significant implications for practice, management, and governance policy, particularly in ITG, strategic alignment, COBIT, top leadership support, and corporate governance. These implications offer valuable insights for organizations seeking to optimize ITG practices and align IT strategies with broader business goals.

**Effective deployment of ITG:** Our findings underscore the importance of not just merely adopting ITG mechanisms but also committing to the underlying ITG principles. Practitioners should view ITG as a holistic endeavor where mechanisms and principles play vital roles. Specifically, our study suggests that embracing COBIT principles for ITG can substantially improve strategic alignment. This insight equips organizations with a tangible approach to ensure the alignment of business and IT strategies, ultimately creating business value. IBM’s history provides a further working case that supports these findings.<sup>11</sup>

**Enhancing the use of COBIT:** Our findings provide further theoretical and empirical support for the prevalent use of COBIT as an ITG framework. By demonstrating the mediating role of CCP between ITG mechanisms and strategic alignment, our study reinforces the value of COBIT in the context of ITG. This contributes to the promotion of COBIT as a significant ITG framework.

**Crucial role of top leadership support:** Top leadership support emerges as a critical factor in achieving strategic alignment. Organizations must recognize that top leadership support enables a commitment to ITG principles and directly enhances strategic alignment. This highlights the significance of upper-echelon support for IT initiatives, extending even to board-level involvement. Acknowledging and fostering top leadership support can be a strategic move for organizations seeking effective ITG. Microsoft’s history with leadership in IT provides an example case supporting these claims.<sup>12</sup>

**Addressing the risks of symbolic policy adoption:** We highlight the potential pitfalls of symbolic policy adoption in ITG. Although many studies in other IT contexts have used measures of top management

support, ITG research should include executives and the board of directors in such measures to capture IT governance better. Given the difficulty of involving the board of directors effectively, this is a crucial distinction (Andriole, 2009; De Haes & Van Grembergen, 2009); top leadership involvement continues to be a challenge because top leadership support may be related to knowledge of IT (De Haes & Van Grembergen, 2009), which is still lacking at the board level (Adams et al., 2018; Lowry et al., 2023). Our findings support the notion that ITG initiatives can fall victim to corporate bids for legitimacy, as predicted by institutional theory. This study thus offers a warning regarding the hazards of symbolic policy adoption, which are found in other forms of governance (Edelman, 1990; Westphal & Zajac, 1994; Wijen, 2014). Some organizations have likely adopted ITG mechanisms as a form of governance “window dressing”; ITG adoption often decouples formal ITG from the spirit of ITG (Meyer & Rowan, 1977), leading to less effective governance. Whether this decoupling is purposeful or a product of inadequate implementation, our central inferences hold that without adherence to ITG principles or top leadership involvement, ITG mechanisms may not lead to strategic alignment. Organizations should thus prioritize a top-down and holistic approach to ensure that ITG principles are embraced throughout the organization. GE provides an excellent case example of these points.<sup>13</sup>

**Policy considerations:** The implications of our study extend beyond individual organizations. Policymakers and regulatory bodies should consider the importance of fostering a conducive environment for ITG, including encouraging direct board involvement in the governance of IT.

**Relevance in the COVID-19 Era:** Our findings have particular relevance in the context of the COVID-19 pandemic. The pandemic has catalyzed a transformative shift toward remote, technology-mediated work arrangements. Organizations have realized the advantages of this new organizational form, even for traditionally centralized structures. Because the pandemic has been what punctuated equilibrium theory calls a “transformative rare event” or “revolutionary event” (Gersick, 1991), it is likely that many workplaces will not fully reverse this shift (Henningsson et al., 2021). More than ever, IT is the central connective tissue of new organizational forms, which are much more challenging to govern than traditional

forms. Arguably, this situation has increased the need for effective ITG; our theorization, conceptualization, and measurement can thus guide firms seeking to move from mechanical ITG adoption to meaningful ITG implementation that reflects the organization's values, vision, and strategy. Zoom not only facilitated this shift but is also an excellent example of the rewards of effective ITG.<sup>14</sup>

#### **6.4. Limitations and Future Research Directions**

Like any research endeavor, our study presents certain limitations that offer valuable insights into potential avenues for future research. Here, we address these limitations and propose compelling research opportunities:

**Self-reported measures:** Our research relies on self-reported measures subject to inherent limitations such as response bias and lack of causality. However, an interesting observation was the contrast between the views of IT professionals and non-IT participants regarding CCP. IT professionals tended to be more pessimistic, lending credibility to self-reported assessments in this context. Future research could explore the factors contributing to this disparity and investigate how differing perspectives impact ITG. Moreover, future research could employ more tightly controlled field experimentation. This approach allows for manipulating predictor variables, providing a more rigorous assessment of causal relationships in ITG and strategic alignment. For example, field researchers could manipulate variables like commitment to ITG principles and top leadership support—or create natural groupings of these—to assess their direct impact on IT strategic alignment.

**Limitations of CMB tests:** Although our study employed several tests to address CMB, we acknowledge their limitations, including not using an ideal marker variable. Nonetheless, our robust CMB assessment, the ULMC test, and other tests provide reasonable assurance that our findings do not result from CMB. Future research may develop more advanced methods for mitigating CMB and explore its effects in different research contexts. Our marker variable, resentment, displayed a strong negative association with strategic alignment. This result highlights the need to consider cultural or personal aspects that can undermine support for IT and leadership initiatives like CCP. Future research could explore the

intricate relationships between emotional factors, leadership, and ITG outcomes.

**Evolutionary dynamics of ITG:** Our model does not capture the evolutionary dynamics of ITG within organizations. Future studies could investigate the iterative influence of top leadership support and CCP on strategic alignment over time, using qualitative research to develop dynamic models or longitudinal data to quantify these relationships more precisely.

**Generalizability of our findings:** There are acknowledged limits to the level of generalizability that a single study can achieve (Lee & Baskerville, 2003, 2012), especially in light of scholarly discussion on statistical and practical significance (Mohajeri et al., 2020). However, we argue that it is possible to abstract learnings from this study that could be appropriate for other contexts and organizations, thus aiding generalizability (Sarker, 2016). Our findings are valuable and transferrable to current IS research with a degree of abstraction. For example, anchored on the concept of transferability (Sarker, 2016), we expect our CCP measure to be transferrable to other ITG frameworks or other IS frameworks with underlying principles, and future research can substantiate the importance of principle-based ITG implementations.

**Impact of ITG principles on IT agility:** Recent studies suggest potential negative consequences of ITG structures on IT agility. Future research can also delve into the effect of commitment to ITG principles on IT agility, as recent studies point to potential negative consequences of ITG structures or alignment on IT agility (Liang et al., 2017; Queiroz et al., 2022; Vaia et al., 2022), a phenomenon that a focus on ITG principles may mitigate. For further understanding, researchers can explore the relationship between ITG principles, like those in COBIT, and IT agility in various industries, develop a framework that organizations can use to strike a balance between governance and agility and conduct case studies in organizations that have successfully maintained agility while implementing robust governance structures.

**Substitutive relationship between CCP and top leadership support:** The surprising negative moderation findings between CCP and top leadership support raise intriguing questions about their potential substitutive relationship. Although CCP is rooted in principles, because it is tied to the COBIT framework, leaders may balk at the formality of such frameworks for achieving strategic alignment because the effective

use of frameworks may weaken a leader's ability to steer the organization nimbly or to lead by intuition, which is a familiar strategic practice of experienced leaders but also one that can be a troublesome decision-making paradigm in technology-based contexts in which the leaders lack deep expertise (Leybourne & Sadler-Smith, 2006; Miller & Ireland, 2005; Salas et al., 2010). Future research can explore the trade-offs between these factors in achieving strategic alignment and provide a deeper understanding of their interactions and curvilinearity. For example, researchers could analyze cases where high CCP coincides with low top leadership support and vice versa. They could then investigate how these trade-offs impact strategic alignment and decision-making paradigms in ITG.

## 7. Conclusion

Firms continue grappling with developing and sustaining competitive advantage through IT. ITG systems, including various ITG mechanisms, have provided firms with normative structures to pursue strategic alignment. Our study provides novel evidence of two key factors that can enable firms to achieve strategic alignment by embracing the spirit of ITG. Using COBIT as an ITG framework, we find that CCP fully mediates the effect of ITG mechanisms on strategic alignment; ITG mechanisms lead to strategic alignment only through CCP. We also provide compelling evidence of the impact of top leadership support on both CCP and strategic alignment; that is, boards of directors and executives play a crucial role in the success of ITG initiatives. In other words, ITG is unlikely to foster strategic alignment if it is only a middle-management affair. In providing novel insights into how ITG can lead to strategic alignment, our study presents new measures of CCP and top leadership support, which can contribute to practical assessments of effective ITG in contemporary organizations shifting toward remote, IT-mediated work. These findings can alert organizations to pitfalls that may undermine their pursuit of the business value of IT; that is, ITG implementations must include a principles-based approach and gain support from the board and the executive suite.

## 8. References

Adams, R. B., Akyol, A. C., & Verwijmeren, P. (2018). Director skill sets. *Journal of Financial Economics*, 130(3), 641-662. <https://doi.org/10.1016/j.jfineco.2018.04.010>

- Ali, S., & Green, P. (2012). Effective information technology (IT) governance mechanisms: An IT outsourcing perspective. *Information Systems Frontiers*, 14(2), 179-193. <https://doi.org/10.1007/s10796-009-9183-y>
- Alramahi, N. M., Barakat, A. I., & Haddad, H. (2014). Information Technology Governance Control Level in Jordanian Banks Using: Control Objectives for Information and Related Technology (COBIT 5). *European Journal of Business and Management*, 6(5), 194-206.
- Alreemy, Z., Chang, V., Walters, R., & Wills, G. (2016). Critical success factors (CSFs) for information technology governance (ITG). *International Journal of Information Management*, 36(6, Part A), 907-916. <https://doi.org/10.1016/j.ijinfomgt.2016.05.017>
- Amarilli, F., van den Hooff, B., & van Vliet, M. (2023). Business-IT alignment as a coevolution process: An empirical study. *The Journal of Strategic Information Systems*, 32(2), 101776. <https://doi.org/https://doi.org/10.1016/j.jsis.2023.101776>
- Andriole, S. J. (2009). Boards of directors and technology governance: The surprising state of the practice. *Communications of the Association for Information Systems*, 24(1), 22.
- Ang, J., & Teo, T. S. H. (1997). CSFs and sources of assistance and expertise in strategic IS planning: a Singapore perspective. *European Journal of Information Systems*, 6(3), 164-171. <https://doi.org/10.1057/palgrave.ejis.3000263>
- Angst, C. M., Block, E. S., D'arcy, J., & Kelley, K. (2017). When do IT security investments matter? Accounting for the influence of institutional factors in the context of healthcare data breaches. *MIS Quarterly*, 41(3), 893-916.
- Asgarkhani, M., Cater-Steel, A., Toleman, M., & Ally, M. (2017). Failed IT projects: Is poor IT governance to blame? Proceedings of the 28th Australasian Conference on Information Systems (ACIS 2017), Hobart, Australia.
- Awuku-Gyampoh, R. K., & Dzisi, S. (2018). A comparative corporate governance mechanism. *Journal of Public Administration and Policy Research*, 10(1), 1-6.
- Baron, R., & Kenny, D. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173-1182. <https://doi.org/10.1037/0022-3514.51.6.1173>
- Bart, C., & Turel, O. (2010). IT and the board of directors: An empirical investigation into the 'governance questions' Canadian board members ask about IT. *Journal of Information Systems*, 24(2), 147-172. <https://doi.org/10.2308/jis.2010.24.2.147>
- Bass, B. M., & Avolio, B. J. (1994). *Improving Organizational Effectiveness through Transformational Leadership*. Sage.
- Benaroch, M., & Chernobai, A. (2017). Operational IT failures, IT value-destruction, and board-level IT governance changes. *MIS Quarterly*, 41(3), 729-762.
- Boonstra, A., Yeliz Eseryel, U., & van Offenbeek, M. A. (2018). Stakeholders' enactment of competing logics in IT governance: polarization, compromise or synthesis? *European Journal of Information Systems*, 27(4), 415-433. <https://doi.org/10.1057/s41303-017-0055-0>
- Bowen, P. L., Cheung, M.-Y. D., & Rohde, F. H. (2007). Enhancing IT governance practices: A model and case study of an organization's efforts. *International Journal of Accounting Information Systems*, 8(3), 191-221. <https://doi.org/10.1016/j.accinf.2007.07.002>
- Buchwald, A., Urbach, N., & Ahlemann, F. (2014). Business value through controlled IT: Toward an integrated model of IT governance success and its impact. *Journal of Information Technology*, 29(2), 128-140. <https://doi.org/10.1057/jit.2014>.
- Chan, Y. E., Huff, S. L., Barclay, D. W., & Copeland, D. G. (1997). Business strategic orientation, information systems strategic orientation, and strategic alignment. *Information Systems Research*, 8(2), 125-150.
- Chan, Y. E., & Reich, B. H. (2007). IT alignment: what have we learned? *Journal of Information Technology*, 22(4), 297-315. <https://doi.org/10.1057/palgrave.jit.2000109>
- Chin, W. W., Gopal, A., & Salisbury, W. D. (1997). Advancing the theory of adaptive structuration: The



- Development of a scale to measure faithfulness of appropriation. *Information Systems Research*, 8(4), 342-367. <https://doi.org/10.1287/isre.8.4.342>
- Coltman, T., Tallon, P., Sharma, R., & Queiroz, M. (2015). Strategic IT Alignment: Twenty-Five Years on. *Journal of Information Technology*, 30(2), 91-100. <https://doi.org/10.1057/jit.2014.35>
- Corley, K. G., & Gioia, D. A. (2011). Building theory about theory building: what constitutes a theoretical contribution? *Academy of Management Review*, 36(1), 12-32. <https://doi.org/10.5465/amr.2009.0486>
- D'Arcy, J., Hovav, A., & Galletta, D. (2009). User awareness of security countermeasures and its impact on information systems misuse: A deterrence approach. *Information Systems Research*, 20(1), 79-98. <https://doi.org/10.1287/isre.1070.0160>
- Daily, C. M., Dalton, D. R., & Cannella, A. A. (2003). Corporate governance: Decades of dialogue and data. *Academy of Management Review*, 28(3), 371-382. <https://doi.org/10.5465/amr.2003.10196703>
- Dawson, G. S., Denford, J. S., Williams, C. K., Preston, D., & Desouza, K. C. (2016). An examination of effective IT governance in the public sector using the legal view of agency theory. *Journal of Management Information Systems*, 33(4), 1180-1208. <https://doi.org/10.1080/07421222.2016.1267533>
- De Haes, S., Caluwe, L., Huygh, T., & Joshi, A. (2020a). *Governing Digital Transformation: Guidance for Corporate Board Members*. Springer.
- De Haes, S., & Van Grembergen, W. (2005). IT governance structures, processes and relational mechanisms: Achieving IT/business alignment in a major Belgian financial group. 38th Hawaii International Conference on System Sciences,
- De Haes, S., & Van Grembergen, W. (2009). An exploratory study into IT governance implementations and its impact on business/IT alignment. *Information Systems Management*, 26(2), 123-137. <https://doi.org/10.1080/10580530902794786>
- De Haes, S., Van Grembergen, W., & Debreceny, R. S. (2013). COBIT 5 and enterprise governance of information technology: Building blocks and research opportunities. *Journal of Information Systems*, 27(1), 307-324. <https://doi.org/10.2308/isys-50422>
- De Haes, S., Van Grembergen, W., Joshi, A., & Huygh, T. (2020b). *Enterprise Governance of Information Technology: Achieving Alignment and Value in Digital Organizations* (Third ed.). Springer.
- De Haes, S., Van Grembergen, W., Joshi, A., & Huygh, T. (2020c). *Enterprise Governance of IT, Alignment, and Value* (Third ed.). Springer International Publishing. [https://doi.org/10.1007/978-3-030-25918-1\\_1](https://doi.org/10.1007/978-3-030-25918-1_1)
- DeSanctis, G., & Poole, M. S. (1994). Capturing the complexity in advanced technology use: Adaptive structuration theory. *Organization Science*, 5(2), 121-147. <https://doi.org/10.1287/orsc.5.2.121>
- Edelman, L. B. (1990). Legal environments and organizational governance: The expansion of due process in the American workplace. *American Journal of Sociology*, 95(6), 1401-1440. <https://doi.org/10.1086/229459>
- Edelman, L. B. (1992). Legal ambiguity and symbolic structures: Organizational mediation of civil rights law. *American Journal of Sociology*, 97(6), 1531-1576. <https://doi.org/10.1086/229939>
- Edwards, J. R. (2002). Alternatives to difference scores: Polynomial regression analysis and response surface methodology. In F. Drasgow & N. Schmitt (Eds.), *Advances in Measurement and Data Analysis* (pp. 350-400). Jossey-Bass.
- Elbanna, A. (2013). Top management support in multiple-project environments: an in-practice view. *European Journal of Information Systems*, 22(3), 278-294. <https://doi.org/10.1057/ejis.2012.16>
- Elshandidy, T., & Neri, L. (2015). Corporate governance, risk disclosure practices, and market liquidity: Comparative evidence from the UK and Italy. *Corporate Governance: An International Review*, 23(4), 331-356. <https://doi.org/10.1111/corg.12095>
- Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *The Journal of Law and*

- Economics*, 26(2), 301-325. <https://doi.org/10.1086/467037>
- Finkelstein, S., Cannella, S. F. B., Hambrick, D. C., & Cannella, A. A. (2009). *Strategic leadership: Theory and research on executives, top management teams, and boards*. Oxford University Press, USA.
- Fiss, P. C., & Zajac, E. J. (2006). The symbolic management of strategic change: Sensegiving via framing and decoupling. *Academy of Management Journal*, 49(6), 1173-1193. <https://doi.org/10.5465/AMJ.2006.23478255>
- Fuller, C. M., Simmering, M. J., Atinc, G., Atinc, Y., & Babin, B. J. (2016). Common methods variance detection in business research. *Journal of Business Research*, 69(8), 3192-3198. <https://doi.org/10.1016/j.jbusres.2015.12.008>
- Gefen, D., & Straub, D. W. (2005). A practical guide to factorial validity using PLS-Graph: Tutorial and annotated example. *Communications of the Association for Information Systems*, 16(5), 91-109.
- Gerow, J. E., Grover, V., Thatcher, J., & Roth, P. L. (2014). Looking Toward the Future of IT–Business Strategic Alignment through the Past. *MIS Quarterly*, 38(4), 1159-1186.
- Gerow, J. E., Thatcher, J. B., & Grover, V. (2015). Six types of IT-business strategic alignment: an investigation of the constructs and their measurement. *European Journal of Information Systems*, 24(5), 465-491. <https://doi.org/10.1057/ejis.2014.6>
- Gersick, C. J. (1991). Revolutionary change theories: A multilevel exploration of the punctuated equilibrium paradigm. *Academy of Management Review*, 16(1), 10-36. <https://doi.org/10.5465/amr.1991.4278988>
- Gondo, M. B., & Amis, J. M. (2013). Variations in practice adoption: The roles of conscious reflection and discourse. *Academy of Management Review*, 38(2), 229-247. <https://doi.org/10.5465/amr.2010.0312>
- Goul, M., Raghu, T. S., & St. Louis, R. D. (2018). APC Forum: Governing the Wild West of Predictive Analytics and Business Intelligence. *MIS Quarterly Executive*, 17(2), 157-183.
- Gregory, R. W., Kaganer, E., Henfridsson, O., & Ruch, T. J. (2018). IT Consumerization and the Transformation of IT Governance. *MIS Quarterly*, 42(4), 1225-1253.
- Griffith, T. L. (1999). Technology features as triggers for sensemaking. *Academy of Management Review*, 24(3), 472-488. <https://doi.org/10.5465/amr.1999.2202132>
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2005). *Multivariate Data Analysis*. Prentice-Hall.
- Haislip, J. Z., Masli, A., Richardson, V. J., & Sanchez, J. M. (2015). Repairing organizational legitimacy following information technology (IT) material weaknesses: Executive turnover, IT expertise, and IT system upgrades. *Journal of Information Systems*, 30(1), 41-70. <https://doi.org/10.2308/isy-51294>
- Hanus, B., & Wu, Y. A. (2016). Impact of users' security awareness on desktop security behavior: A protection motivation theory perspective. *Information Systems Management*, 33(1), 2-16. <https://doi.org/10.1080/10580530.2015.1117842>
- Hardy, G. (2006). Using IT governance and COBIT to deliver value with IT and respond to legal, regulatory and compliance challenges. *Information Security Technical Report*, 11(1), 55-61. <https://doi.org/10.1016/j.istr.2005.12.004>
- Hassan, N. R., Lowry, P. B., & Mathiassen, L. (2022). Useful products in information systems theorizing: A discursive formation perspective. *Journal of the Association for Information Systems*, 23(2), 418-446. <https://doi.org/10.17705/1jais.00730>
- Hassan, N. R., Mathiassen, L., & Lowry, P. B. (2019). The process of information systems theorizing as a discursive practice. *Journal of Information Technology*, 34(3), 198-220. <https://doi.org/10.1177/0268396219832004>
- Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, 76(4), 408-420. <https://doi.org/10.1080/03637750903310360>
- Henningson, S., Kettinger, W. J., Zhang, C., & Vaidyanathan, N. (2021). Transformative rare events:

- Leveraging digital affordance actualisation. *European Journal of Information Systems*, 30(2), 137-156. <https://doi.org/10.1080/0960085X.2020.1860656>
- Henseler, J., Dijkstra, T. K., Sarsted, M., Ringle, C. M., Diamantopoulos, A., Straub, D., Ketchen, D. J. J., Hair, J. F., Hult, G. T. M., & Calantone, R. J. (2014). Common beliefs and reality about PLS: Comments on Rönkkö and Evermann (2013). *Organizational Research Methods*, 17(2), 182-209. <https://doi.org/10.1177/1094428114526928>
- Henseler, J., Hubona, G. S., & Ray, P. A. (2016). Using PLS path modeling in new technology research: Updated guidelines. *Industrial Management & Data Systems*, 116(1), 2-20. <https://doi.org/10.1108/IMDS-09-2015-0382>
- Hillman, A. J., & Dalziel, T. (2003). Boards of directors and firm performance: Integrating agency and resource dependence perspectives. *Academy of Management Review*, 28(3), 383-396. <https://doi.org/10.5465/amr.2003.10196729>
- Hoe, S. L. (2008). Issues and procedures in adopting structural equation modelling technique. *Journal of Quantitative Methods*, 3(1), 76-83.
- Hsu, J. S.-C., Shih, S.-P., Hung, Y. W., & Lowry, P. B. (2015). The role of extra-role behaviors and social controls in information security policy effectiveness. *Information Systems Research*, 26(2), 282-300. <https://doi.org/10.1287/isre.2015.0569>
- Huang, R., Zmud, R. W., & Price, R. L. (2010). Influencing the effectiveness of IT governance practices through steering committees and communication policies. *European Journal of Information Systems*, 19(3), 288-302. <https://doi.org/10.1057/ejis.2010.16>
- Huff, S. L., Maher, P. M., & Munro, M. C. (2006). Information technology and the board of directors: Is there an IT attention deficit? *MIS Quarterly Executive*, 5(2), 55-68.
- Hussin, H., King, M., & Cragg, P. (2002). IT alignment in small firms. *European Journal of Information Systems*, 11(2), 108-127. <https://doi.org/10.1057/palgrave/ejis/3000422>
- Huygh, T., & Haes, S. D. (2020, December 13-16). *Towards a viable system model-based organizing logic for IT governance* International Conference on Information Systems (ICIS 2020), India.
- ISACA. (2012a). COBIT 5: A Business Framework for the Governance and Management of Enterprise IT. In: Information Systems Audit and Control Association.
- ISACA. (2012b). *COBIT 5: A Business Framework for the Governance and Management of Enterprise IT*. Information Systems Audit and Control Association.
- Jacobson, D. D. (2009, 5-8 Jan. 2009). Revisiting IT governance in the light of institutional theory. 2009 42nd Hawaii International Conference on System Sciences,
- Jaspersen, J., Carter, P. E., & Zmud, R. W. (2005). A comprehensive conceptualization of post-adoptive behaviors associated with information technology enabled work systems. *MIS Quarterly*, 29(3), 525-557.
- Jenkin, T. A., Chan, Y. E., & Sabherwal, R. (2019). Mutual understanding in information systems development: Changes within and across projects. *MIS Quarterly*, 43(2), 649-671. <https://doi.org/10.25300/MISQ/2019/13980>
- Jewer, J., & McKay, K. N. (2012). Antecedents and consequences of board IT governance: Institutional and strategic choice perspectives. *Journal of the Association for Information Systems*, 13(7), 581-617.
- Jordan, E., & Musson, D. (2004). Corporate Governance and IT Governance: Exploring the board's perspective. *SSRN Working Paper*. Retrieved April 19, 2017, from [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=787346](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=787346)
- Joshi, A., Huygh, T., De Haes, S., & Van Grembergen, W. (2018). An Empirical Assessment of Shared Understanding in IT Governance Implementation. Proceedings of the 51st Hawaii International Conference on System Sciences,
- Judge, T. A., & Bono, J. E. (2000). Five-factor model of personality and transformational leadership. *Journal of Applied Psychology*, 85(5), 751. <https://doi.org/10.1037/0021-9010.85.5.751>
- Kappelman, L., McLean, E., Johnson, V., & Gerhart, N. (2014). The 2014 SIM IT key issues and trends

- study. *MIS Quarterly Executive*, 13(4), 237-263.
- Kim, H.-W., & Kankanhalli, A. (2009). Investigating user resistance to information systems implementation: A status quo bias perspective. *MIS Quarterly*, 567-582.
- Klein, H. J., Solinger, O. N., & Dufлот, V. (2022). Commitment system theory: The evolving structure of commitments to multiple targets. *Academy of Management Review*, 47(1), 116-138. <https://doi.org/10.5465/amr.2018.0031>
- Kude, T., Lazic, M., Heinzl, A., & Neff, A. (2018). Achieving IT-based synergies through regulation-oriented and consensus-oriented IT governance capabilities. *Information Systems Journal*, 28(5), 765-795. <https://doi.org/10.1111/isj.12159>
- Kulkarni, U., Robles-Flores, J. A., & Popovič, A. (2017). Business intelligence capability: the effect of top management and the mediating roles of user participation and analytical decision making orientation. *Journal of the Association for Information Systems*, 18(7), 1. <https://doi.org/10.17705/1jais.00462>
- Lee, A. S., & Baskerville, R. L. (2003). Generalizing generalizability in information systems research. *Information Systems Research*, 14(3), 221-243. <https://doi.org/10.1287/isre.14.3.221.16560>
- Lee, A. S., & Baskerville, R. L. (2012). Conceptualizing generalizability: new contributions and a reply. *MIS Quarterly*, 36(3), 749-761.
- Leih, M. (2006). The impact of the Sarbanes-Oxley Act on IT project management. *Journal of Information Technology Theory and Application (JITTA)*, 8(3), 13-14.
- Leybourne, S., & Sadler-Smith, E. (2006). The role of intuition and improvisation in project management. *International Journal of Project Management*, 24(6), 483-492. <https://doi.org/10.1016/j.ijproman.2006.03.007>
- Liang, H., Saraf, N., Hu, Q., & Xue, Y. (2007). Assimilation of Enterprise Systems: The Effect of Institutional Pressures and the Mediating Role of Top Management. *MIS Quarterly*, 31(1), 59-87.
- Liang, H., Wang, N., Xue, Y., & Ge, S. (2017). Unraveling the Alignment Paradox: How Does Business—IT Alignment Shape Organizational Agility? *Information Systems Research*, 28(4), 863-879. <https://doi.org/10.1287/isre.2017.0711>
- Liu, G. H., Wang, E. T., & Chua, C. E. (2015). Leveraging social capital to obtain top management support in complex, cross-functional IT projects. *Journal of the Association of Information Systems*, 16(8), 707-737.
- Lowry, M., Vance, A., & Vance, M. D. (2023). Inexpert supervision: Field evidence on boards' oversight of cybersecurity. Available at SSRN 4002794.
- Lowry, P. B., D'Arcy, J., Hammer, B., & Moody, G. D. (2016). Cargo Cult' science in traditional organization and information systems survey research: A case for using nontraditional methods of data collection, including Mechanical Turk and online panels. *Journal of Strategic Information Systems*, 25(3), 232-240. <https://doi.org/10.1016/j.jsis.2016.06.002>
- Lowry, P. B., & Gaskin, J. (2014). Partial least squares (PLS) structural equation modeling (SEM) for building and testing behavioral causal theory: When to choose it and how to use it. *IEEE Transactions on Professional Communication*, 57(2), 123-146. <https://doi.org/10.1109/TPC.2014.2312452>
- Lowry, P. B., Zhang, J., Moody, G. D., Chatterjee, S., Wang, C., & Wu, T. (2019). An integrative theory addressing cyberharassment in the light of technology-based opportunism. *Journal of Management Information Systems*, 36(4), 1142-1178. <https://doi.org/10.1080/07421222.2019.1661090>
- Luftman, J., Lyytinen, K., & Zvi, T. b. (2017). Enhancing the measurement of information technology (IT) business alignment and its influence on company performance. *Journal of Information Technology*, 32(1), 26-46. <https://doi.org/10.1057/jit.2015.23>
- MacKenzie, S. B., Podsakoff, P. M., & Podsakoff, N. P. (2011). Construct measurement and validation procedures in MIS and behavioral research: Integrating new and existing techniques. *MIS Quarterly*, 35(2), 293-334.

- MacKinnon, D. P. (2008). *Introduction to Statistical Mediation Analysis*. Erlbaum.
- Majchrzak, A., Rice, R. E., Malhotra, A., King, N., & Ba, S. (2000). Technology adaptation: The case of a computer-supported inter-organizational virtual team. *MIS Quarterly*, 24(4), 569-600. <https://doi.org/10.2307/3250948>
- Mangalaraj, G., Singh, A., & Taneja, A. (2014). IT governance frameworks and COBIT-a literature review. Twentieth Americas Conference on Information Systems (AMCIS 2014), Savannah, GA.
- Marnewick, C., & Labuschagne, L. (2011). An investigation into the governance of information technology projects in South Africa. *International Journal of Project Management*, 29(6), 661-670. <https://doi.org/10.1016/j.ijproman.2010.07.004>
- Marrone, M., & Hammerle, M. (2017). Relevant research areas in IT service management: An examination of academic and practitioner literatures. *Communications of the Association for Information Systems*, 41(1), 23.
- Mazza, T., & Azzali, S. (2018). Information technology controls quality and audit fees: Evidence from Italy. *Journal of Accounting, Auditing & Finance*, 33(1), 123-146. <https://doi.org/10.1177/0148558X15625582>
- Meyer, J. P., Becker, T. E., & Vandenberghe, C. (2004). Employee commitment and motivation: A conceptual analysis and integrative model. *Journal of Applied Psychology*, 89(6), 991-1007. <https://doi.org/10.1037/0021-9010.89.6.991>
- Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology*, 83(2), 340-363. <https://doi.org/10.1086/226550>
- Miller, C. C., & Ireland, R. D. (2005). Intuition in strategic decision making: Friend or foe in the fast-paced 21st century? *Academy of Management Perspectives*, 19(1), 19-30. <https://doi.org/10.5465/ame.2005.15841948>
- Mohajeri, K., Mesgari, M., & Lee, A. S. (2020). When statistical significance Is not enough: Investigating relevance, practical significance, and statistical significance. *MIS Quarterly*, 44(2), 525-559. <https://doi.org/10.25300/MISQ/2020/13932>
- Mohr, L. B. (1982). *Explaining organizational behavior* (1st ed.). Jossey-Bass. <https://bac-lac.on.worldcat.org/oclc/1033061260>
- Moody, G. D., Lowry, P. B., & Galletta, D. F. (2017). It's complicated: explaining the relationship between trust, distrust, and ambivalence in online transaction relationships using polynomial regression analysis and response surface analysis. *European Journal of Information Systems*, 26(4), 379-413. <https://doi.org/10.1057/s41303-016-0027-9>
- Mufti, Y., Niazi, M., Alshayeb, M., & Mahmood, S. (2018). A readiness model for security requirements engineering. *IEEE Access*, 6, 28611-28631. <https://doi.org/10.1109/ACCESS.2018.2840322>.
- Mulgund, P., Pahwa, P., & Chaudhari, G. (2019). Strengthening IT governance and controls using COBIT: A systematic literature review. *International Journal of Risk and Contingency Management (IJRCM)*, 8(4), 66-90. <https://doi.org/10.4018/IJRCM.2019100104>
- Nolan, R., & McFarlan, F. W. (2005). Information Technology and the Board of Directors. *Harvard Business Review*, 83(10), 96-106.
- Noor, U., & Ghazanfar, A. (2016, 19-21 Sept. 2016). *A survey revealing path towards service life cycle management in COBIT 5* 2016 Eleventh International Conference on Digital Information Management (ICDIM),
- Organ, D. W. (1988). A restatement of the satisfaction-performance hypothesis. *Journal of Management*, 14(4), 547-557. <https://doi.org/10.1177/014920638801400405>
- Pavlou, P. A., Liang, H., & Xue, Y. (2007). Understanding and mitigating uncertainty in online exchange relationships: A principal-agent perspective. *MIS Quarterly*, 31(1), 105-136. <https://doi.org/10.2307/25148783>
- Peppard, J. (2020). Rethinking the concept of the IS organization. In R. D. Galliers, D. E. Leidner, & B. Simeonova (Eds.), *Strategic Information Management: Theory and Practice (5th Edition)* (Vol. 28, pp. 76-103). Routledge.

- Podsakoff, N. P., Whiting, S. W., Podsakoff, P. M., & Blume, B. D. (2009). Individual-and organizational-level consequences of organizational citizenship behaviors: A meta-analysis. *Journal of Applied Psychology, 94*(1), 122-141. <https://doi.org/10.1037/a0013079>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*, 879-903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Podsakoff, P. M., MacKenzie, S. B., Paine, J. B., & Bachrach, D. G. (2000). Organizational citizenship behaviors: a critical review of the theoretical and empirical literature and suggestions for future research. *Journal of Management, 26*(3), 513-563. [https://doi.org/10.1016/S0149-2063\(00\)00047-7](https://doi.org/10.1016/S0149-2063(00)00047-7)
- Posey, C., Roberts, T. L., & Lowry, P. B. (2015). The impact of organizational commitment on insiders' motivation to protect organizational information assets. *Journal of Management Information Systems, 32*(4), 179-214. <https://doi.org/10.1080/07421222.2015.1138374>
- Posey, C., Roberts, T. L., Lowry, P. B., Bennett, R. J., & Courtney, J. F. (2013). Insiders' protection of organizational information assets: Development of a systematics-based taxonomy and theory of diversity for protection-motivated behaviors. *MIS Quarterly, 37*(4), 1189-1210. <http://www.jstor.org/stable/43825787>
- Prasad, A., Green, P., & Heales, J. (2012). On IT governance structures and their effectiveness in collaborative organizational structures. *International Journal of Accounting Information Systems, 13*(3), 199-220. <https://doi.org/10.1016/j.accinf.2012.06.005>
- Prasad, A., Heales, J., & Green, P. (2010). A capabilities-based approach to obtaining a deeper understanding of information technology governance effectiveness: Evidence from IT steering committees. *International Journal of Accounting Information Systems, 11*(3), 214-232. <https://doi.org/10.1016/j.accinf.2010.07.013>
- Queiroz, M. (2017). Mixed results in strategic IT alignment research: a synthesis and empirical study. *European Journal of Information Systems, 26*(1), 21-36.
- Queiroz, M., Tallon, P. P., & Coltman, T. (2022). How do shared IT applications influence agility? Theory and evidence of a convex relationship. *Journal of Management Information Systems, 39*(4), 1089-1115. <https://doi.org/10.1080/07421222.2022.2127452>
- Rai, A., Brown, P., & Tang, X. (2009). Organizational assimilation of electronic procurement innovations. *Journal of Management Information Systems, 26*(1), 257-296. <https://doi.org/10.2753/MIS0742-1222260110>
- Ramesh, V., & Gerth, A. B. (2015). Design of an integrated information systems master's core curriculum: a case study. *Communications of the Association for Information Systems, 36*(1), 16.
- Ranesh, M. M. A., Samuel, S. J., Natchadalingam, R., & Jeyanthi, P. (2022). Information technology (IT) governance framework with artificial neural network and balance scorecard to improve the success rate of software projects. 2022 6th International Conference on Electronics, Communication and Aerospace Technology,
- Reich, B. H., & Benbasat, I. (1996). Measuring the Linkage between Business and Information Technology Objectives. *MIS Quarterly, 20*(1), 55-81. <https://doi.org/10.2307/249542>
- Renaud, A., Walsh, I., & Kalika, M. (2016). Is SAM still alive? A bibliometric and interpretive mapping of the strategic alignment research field. *The Journal of Strategic Information Systems, 25*(2), 75-103. <https://doi.org/10.1016/j.jsis.2016.01.002>
- Rubino, M., & Vitolla, F. (2014). Internal control over financial reporting: opportunities using the COBIT framework. *Managerial Auditing Journal*.
- Sabherwal, R., Sabherwal, S., Havakhor, T., & Steelman, Z. (2019). How does strategic alignment affect firm performance? the roles of information technology investment and environmental uncertainty. *MIS Quarterly, 43*(2), 453-474.
- Salas, E., Rosen, M. A., & DiazGranados, D. (2010). Expertise-based intuition and decision making in organizations. *Journal of Management, 36*(4), 941-973.

- <https://doi.org/10.1177/0149206309350084>
- Sarker, S. (2016). Building on Davison and Martinsons' Concerns: A Call for Balance between Contextual Specificity and Generality in IS Research. *Journal of Information Technology*, 31(3), 250-253. <https://doi.org/10.1057/s41265-016-0003-9>
- Schlosser, F., Beimborn, D., Weitzel, T., & Wagner, H.-T. (2015). Achieving social alignment between business and IT—an empirical evaluation of the efficacy of IT governance mechanisms. *Journal of Information Technology*, 30(2), 119-135. <https://doi.org/10.1057/jit.2015.2>
- Schwarz, A., Rizzuto, T., Carraher-Wolverton, C., Roldán, J. L., & Barrera-Barrera, R. (2017). Examining the impact and detection of the "urban legend" of common method bias. *SIGMIS Database*, 48(1), 93–119. <https://doi.org/10.1145/3051473.3051479>
- Shao, Z. (2019). Interaction effect of strategic leadership behaviors and organizational culture on IS-Business strategic alignment and Enterprise Systems assimilation. *International Journal of Information Management*, 44, 96-108. <https://doi.org/10.1016/j.ijinfomgt.2018.09.010>
- Shao, Z., Feng, Y., & Hu, Q. (2016). Effectiveness of top management support in enterprise systems success: a contingency perspective of fit between leadership style and system life-cycle. *European Journal of Information Systems*, 25(2), 131-153. <https://doi.org/10.1057/ejis.2015.6>
- Shi, W., & Connelly, B. L. (2018). Is regulatory adoption ceremonial? Evidence from lead director appointments. *Strategic Management Journal*, 39(8), 2386-2413. <https://doi.org/10.1002/smj.2901>
- Smits, D., & van Hillegerberg, J. (2018). The continuing mismatch between IT governance maturity theory and practice: a new approach. *Procedia Computer Science*, 138, 549-560. <https://doi.org/10.1016/j.procs.2018.10.075>
- Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Ed.), *Sociological Methodology* (pp. 290-312). American Sociological Association.
- Stafford, T., Gal, G., Poston, R., Crossler, R. E., Jiang, R., & Lyons, R. (2018). The Role of Accounting and Professional Associations in IT Security Auditing: An AMCIS Panel Report. *Communications of the Association for Information Systems*, 43(1), 27.
- Steelman, Z. R., Hammer, B. I., & Limayem, M. (2014). Data collection in the digital age: innovative alternatives to student samples. *MIS Quarterly*, 38(2), 355-378.
- Tallon, P., Queiroz, M., Coltman, T. R., & Sharma, R. (2016). Business process and information technology alignment: construct conceptualization, empirical illustration, and directions for future research. *Journal of the Association for Information Systems*, 17(9), 563–589. <https://doi.org/10.17705/1jais.00438>
- Tallon, P. P., Ramirez, R. V., & Short, J. E. (2013). The information artifact in IT governance: toward a theory of information governance. *Journal of Management Information Systems*, 30(3), 141-178. <https://doi.org/10.2753/MIS0742-1222300306>
- Tiwana, A., & Konsynski, B. (2009). Complementarities between organizational IT architecture and governance structure. *Information Systems Research*, 21(2), 288-304. <https://doi.org/10.1287/isre.1080.0206>
- Tiwana, A., Konsynski, B., & Venkatraman, N. (2013). Special issue: Information technology and organizational governance: The IT governance cube. *Journal of Management Information Systems*, 30(3), 7-12. <https://doi.org/10.2753/MIS0742-1222300301>
- Trites, G. (2004). Director responsibility for IT governance. *International Journal of Accounting Information Systems*, 5(2), 89-99. <https://doi.org/10.1016/j.accinf.2004.01.001>
- Turel, O., Liu, P., & Bart, C. (2017). Board-Level Information Technology Governance Effects on Organizational Performance: The Roles of Strategic Alignment and Authoritarian Governance Style. *Information Systems Management*, 34(2), 117-136. <https://doi.org/10.1080/10580530.2017.1288523>
- Vaia, G., Arkhipova, D., & DeLone, W. (2022). Digital governance mechanisms and principles that enable agile responses in dynamic competitive environments. *European Journal of Information*

- Systems*, 31(6), 662-680. <https://doi.org/10.1080/0960085X.2022.2078743>
- Valentine, E., De Haes, S., & Timbrell, G. (2016). The board's role in the governance of enterprise information and technology. In R. Leblanc (Ed.), *The Handbook of Board Governance: A Comprehensive Guide for Public, Private and Not-for-Profit Board Members* (pp. 574-596). Wiley.
- Van de Ven, A. H., & Poole, M. S. (2005). Alternative approaches for studying organizational change. *Organization Studies*, 26(9), 1377-1404. <https://doi.org/10.1177/0170840605056907>
- Van Grembergen, W., & De Haes, S. (2010). A research journey into enterprise governance of IT, business/IT alignment and value creation. *International Journal of IT/Business Alignment and Governance (IJITBAG)*, 1(1), 1-13.
- Vance, A., Lowry, P. B., & Eggett, D. (2015). A new approach to the problem of access policy violations: Increasing perceptions of accountability through the user interface. *MIS Quarterly*, 39(2), 345-366.
- Vera, D., & Crossan, M. (2004). Strategic leadership and organizational learning. *Academy of Management Review*, 29(2), 222-240. <https://doi.org/10.5465/amr.2004.12736080>
- Wang, N., Liang, H., Ge, S., Xue, Y., & Ma, J. (2019). Enablers and inhibitors of cloud computing assimilation: an empirical study. *Internet Research*, 29(6), 1344-1369. <https://doi.org/10.1108/INTR-03-2018-0126>
- Weber, R. (2012). Evaluating and developing theories in the information systems discipline. *Journal of the Association for Information Systems*, 13(1), 1-30. <https://doi.org/10.17705/1jais.00284>
- Weill, P., & Ross, J. (2004). *IT Governance: How Top Managers Manage IT Decision Rights for Superior Results*. Harvard Business School Press.
- Westphal, J. D., & Zajac, E. J. (1994). Substance and Symbolism in CEOs' Long-Term Incentive Plans. *Administrative Science Quarterly*, 39(3), 367-390. <https://doi.org/10.2307/2393295>
- Westphal, J. D., & Zajac, E. J. (2001). Decoupling policy from practice: The case of stock repurchase programs. *Administrative Science Quarterly*, 46(2), 202-228. <https://doi.org/10.2307/2667086>
- Wijen, F. (2014). Means versus ends in opaque institutional fields: Trading off compliance and achievement in sustainability standard adoption. *Academy of Management Review*, 39(3), 302-323. <https://doi.org/10.5465/amr.2012.0218>
- Wilkin, C. L., & Chenhall, R. H. (2010). A review of IT governance: A taxonomy to inform accounting information systems. *Journal of Information Systems*, 24(2), 107-146. <https://doi.org/10.2308/jis.2010.24.2.107>
- Wilkin, C. L., & Chenhall, R. H. (2020). Information Technology Governance: Reflections on the Past and Future Directions. *Journal of Information Systems*, 34(2), 257-292. <https://doi.org/10.2308/isys-52632>
- Williams, L. J., & O'Boyle, E. H. (2015). Ideal, nonideal, and no-marker variables: The confirmatory factor analysis (CFA) marker technique works when it matters. *Journal of Applied Psychology*, 100(5), 1579-1602. <https://doi.org/10.1037/a0038855>
- Wu, S. P.-J., Straub, D. W., & Liang, T.-P. (2015). How information technology governance mechanisms and strategic alignment influence organizational performance: Insights from a matched survey of business and IT managers. *MIS Quarterly*, 39(2), 497-518.
- Wu, Y. A., & Saunders, C. S. (2016). Governing the fiduciary relationship in information security services. *Decision Support Systems*, 92, 57-67. <https://doi.org/10.1016/j.dss.2016.09.008>
- Yeow, A., Soh, C., & Hansen, R. (2018). Aligning with new digital strategy: A dynamic capabilities approach. *The Journal of Strategic Information Systems*, 27(1), 43-58. <https://doi.org/10.1016/j.jsis.2017.09.001>
- Yudatama, U., Nazief, B., & Hidayanto, A. N. (2017). Strategic decisions in the implementation of Information Technology Governance to achieve business and information technology alignment using analytical hierarchy process. *Information Technology Journal*, 16(2), 51-61.
- Zaky, A. H. M., Ragab, A. A., Soliman, M. M., & Ragheb, M. A. (2018). Information technology



- governance effectiveness in organizations. *The Business & Management Review*, 9(3), 281-289.
- Zhang, P., Zhao, K., & Kumar, R. L. (2016). Impact of IT governance and IT capability on firm performance. *Information Systems Management*, 33(4), 357-373. <https://doi.org/10.1080/10580530.2016.1220218>
- Zhen, J., Xie, Z., & Dong, K. (2021). Impact of IT governance mechanisms on organizational agility and the role of top management support and IT ambidexterity. *International Journal of Accounting Information Systems*, 40(March), Article: 100501. <https://doi.org/10.1016/j.accinf.2021.100501>

---

<sup>1</sup> This definition and our operationalization align with the intellectual alignment aspect of strategic alignment, which fits well with the ITG definition and measurement we build on, as detailed by Wu et al. (2015).

<sup>2</sup> For instance, IBM saved over US\$12 billion by strategically updating its supply chain systems. Likewise, the US Homeland Security Department's consolidated ID cards and automated checkpoint systems allowed more than 1.7 million vehicles and 2.5 million travelers' identities to be validated in the first week of the system rollout.

<sup>3</sup> Although extant research considers COBIT the dominant ITG framework and is commonly adopted, no studies cite actual adoption rates; 68.7 percent of our participants indicate their organizations adopt COBIT.

<sup>4</sup> See Table A1 for an elaboration of *commitment* in the literature and its relation to the ITG spirit.

<sup>5</sup> A similar decoupling of adopted mechanisms from actual practice and leadership is theorized in institutional theory and illustrated in other organizational governance contexts (Edelman, 1990, 1992; Westphal & Zajac, 1994, 2001).

<sup>6</sup> Other perspectives on the spirit of ITG include the social dimensions of ITG (Chan & Reich, 2007) or "soft" governance (Smits & van Hillegersberg, 2018).

<sup>7</sup> Before analyzing Model 1, we validated Wu et al.'s (2015) finding that decision-making structure, formal process, and communication approach are significant and strong predictors of SITA when they are the only predictors in the model and only when combined as one second-order measure ( $\beta = 0.687$ ,  $z = 18.77^{***}$ ; SITA  $R^2 = 0.472$ ). However, Wu et al. performed their analysis with PLS, not with CB-SEM. We report the following results when decision-making structure (DMS), formal process (FP), and communication approach (CA) are run as first-order constructs that directly predict SITA:  $\beta_{DMS} = 0.070$ ,  $z = 0.76$  ns;  $\beta_{FP} = 0.385$ ,  $z = 4.44^{***}$ ;  $\beta_{CA} = 0.487$ ,  $z = 5.37^{***}$ ; SITA  $R^2 = 0.390$ .

<sup>8</sup> In addition to controlling for industry in our presented analyses (which was nonsignificant), we reran the entire model, excluding the subsample of respondents from the largest industry (BusEq). In brief, no direction of a relationship changes, nor its significance, and each outcome is within 10 percent of the full sample results; thus, we determine that this particular industry segment is not unduly influencing the results, and we present the results for the full sample.

<sup>9</sup> The 3D response surface analysis charts were produced at <https://www.math3d.org/>. The equation was:  $0.540x + 0.508x^2 + 0.366y + 0.215y^2 - 0.737xy - 0.038$ . Notably, the equation includes extrapolations of strategic alignment outside of three standard deviations and reflects high CCP and low top leadership support or vice versa; by contrast, there were no cases with high CCP and low top leadership support or vice versa. Thus, the upward wings are outside our data range and provide exciting avenues for future investigation.

<sup>10</sup> The concept of final causality indicates that "phenomena are influenced by the ends to which they are tending" (Van de Ven & Poole, 2005, p. 1397). A final cause is not a generative mechanism but more of an objective for which everything else exists (ibid). Thus, a final cause is not a "cause" per se, as causality is typically understood. Instead, it should be thought of as the reason we have other factors in the first place. For example, strategic alignment is the reason why scholars and practitioners are interested in ITG in the first place. The goal of achieving strategic alignment is why organizations invest in ITG.

<sup>11</sup> We offer IBM's transformation journey as a prime example of the significance of embracing ITG principles alongside mechanisms. In the early 2000s, IBM faced challenges aligning its IT strategies with business goals. They recognized that the mere adoption of ITG mechanisms was insufficient. IBM decided to commit to ITG principles inspired by industry best practices, including COBIT. By prioritizing a holistic view of ITG, they transformed their ITG approach. As a result, IBM achieved remarkable IT strategic alignment and became a global leader in IT solutions and services. Their case underscores that adopting ITG mechanisms alone would not have propelled them to success;

---

their commitment to ITG principles, including COBIT, played a pivotal role in their journey.

<sup>12</sup> We argue that Microsoft's success in achieving strategic alignment can be primarily attributed to its strong top leadership support. Under the leadership of Bill Gates and, subsequently, Satya Nadella, Microsoft emphasized the strategic importance of IT. The board of directors actively supported IT initiatives, recognizing that IT was not just a support function but a driver of innovation and business growth. This top-down approach to ITG fostered a holistic culture of commitment to ITG-related principles. It not only improved Microsoft's strategic alignment but also enabled Microsoft to remain at the forefront of the industry, including leading in generative AI with large-language models.

<sup>13</sup> General Electric (GE) exemplifies effective operationalization of ITG principles through COBIT implementation. The top leadership at GE, including the board, actively supported COBIT implementation and ensured that ITG principles were embraced uniformly throughout this conglomerate with diverse businesses. This top-down approach, combined with a commitment to COBIT principles, led to significant improvements in SITA across GE's diverse portfolio of businesses. This embrace of operational and governance excellence also facilitated radical choices to obtain their strategic advantage through differentiation, such as exiting major businesses that GE originally founded (e.g., appliances division and lighting).

<sup>14</sup> As noted, the COVID-19 pandemic abruptly accelerated the adoption of remote work, emphasizing the need for effective ITG to sustain this transition. One notable case is Zoom Video Communications. As organizations shifted to remote work, Zoom's platform became essential for connectivity and collaboration. Zoom's success hinged on effective ITG that ensured their services' scalability, security, and reliability. Their commitment to ITG principles and top leadership support enabled them to meet the increased demand during the pandemic effectively. Without this commitment, an organization cannot be nimble enough to rapidly adapt and scale its business operations and services in response to radical, unexpected changes in market conditions (i.e., market shocks).

## Online APPENDIX A. Problematization and Contributions of Our Research

Based upon the well-known problematization approach proposed by Alvesson and Sandberg (2011), we present the detailed problematization of our research in Table A1.

**Table A1. Problematization of Our Research**

#	Prominent Assumptions in ITG Research	Example Studies	Our challenge to those assumptions	How our study answers the challenge of assumptions
1	ITG is delivered through mechanisms related to decision-making structures, formal processes, and communication approaches	(Bradley et al., 2012; Buchwald et al., 2014; Huang et al., 2010; Tallon et al., 2013; Tiwana & Konsynski, 2010; Tiwana et al., 2013; Wu et al., 2015; Xue et al., 2011)	<p>Researchers and practitioners alike have represented that ITG is delivered through a collection of formal mechanisms (e.g., Tiwana et al., 2013; Wu et al., 2015). Whereas these mechanisms are indeed important, we argue that they are incomplete as they only represent an outward, mechanistic form of ITG without fully reflecting two missing and interrelated components: (1) the purpose or spirit of ITG for an organization and (2) the organization members' commitment to this purpose or spirit. ITG spirit can be understood in terms of the concept of the spirit of IT, which is “the general intent concerning values and goals underlying a given set of structural features [of IT]” (DeSanctis &amp; Poole, 1994, p. 126). Building upon this notion of the spirit of IT, the spirit of ITG is the overall purpose an organization has in mind in terms of the values and goals underpinning the set of ITG formal mechanisms that they are trying to implement. Notably, the spirit of ITG is consensus-oriented—that is., a general belief and understanding of the true purpose, values, or principles of ITG—rather than a regulation-oriented approach (i.e., an understanding of ITG in terms of formal processes and structures) (Kude et al., 2018).</p> <p>Not only is a shared sense of the purpose or spirit of ITG crucial to an organization, but it is equally or more important that the members of the organizations reflect a commitment to its intended spirit of ITG. Yet, extant ITG research overlooks this crucial concept, even though commitment is fundamental to successful</p>	<p>We implement and measure ITG mechanisms as has been established in the extant literature (Wu et al., 2015). To these, we add commitment to ITG (COBIT) principles (CCP) as a key missing construct from the literature that should be considered. CCP represents the organization’s members’ commitment to the spirit of the purpose of an organization’s ITG. We programmatically position COBIT because it is the best-known ITG framework, and commitment to its principles encapsulates ITG principles (Hardy, 2006; Mangalaraj et al., 2014; Mazza &amp; Azzali, 2018).</p> <p>Based on adding CCP to the known nomological network of ITG mechanisms, we empirically demonstrate that the adoption of ITG mechanisms is distinct from the commitment to ITG principles represented by CCP. Thus, we demonstrate through the study that there is a much deeper underpinning to delivering ITG than merely rolling out a set of mechanisms. Instead, organizations must also have a shared understanding of the spirit of ITG and a commitment to it, which can be pragmatically measured through CCP, one of our unique contributions to the literature.</p> <p>Our study shows that effective ITG truly happens when the organization understands the purpose of ITG, which can be understood as a realization of the spirit of ITG. In our study, the fact that the spirit of ITG has been realized is reflected in the construct commitment to COBIT principles (CCP).</p>

#	Prominent Assumptions in ITG Research	Example Studies	Our challenge to those assumptions	How our study answers the challenge of assumptions
			<p>government. <i>Commitment</i> is a necessary construct observed in several fundamental studies on IT governance (e.g., Ali &amp; Green, 2012; Alreemy et al., 2016; Prasad et al., 2010). Commitment has been widely emphasized in IS organizational security research that has highlighted the importance of the commitment of organizational insiders and employees (e.g., D'Arcy et al., 2009; Hanus &amp; Wu, 2016; Hsu et al., 2015; Posey et al., 2015; Posey et al., 2013). Beyond the IS literature, commitment is an important concept that has been well-investigated in disciplines such as management and organization studies (e.g., Klein et al., 2022; Meyer et al., 2004; Organ, 1988; Podsakoff et al., 2009; Podsakoff et al., 2000).</p> <p>In summary, an organization can attempt to deliver ITG by adopting a set of ITG mechanisms; however, such an approach will fall short as mechanistic or perfunctory if it is not coupled with (1) a shared understanding of the underlying values and principles reflected in the spirit of ITG for the organization, and (2) an organization-wide commitment to the spirit of ITG or its principles (Huber et al., 2017).</p>	
2	Adoption of ITG mechanisms is sufficient to achieve strategic alignment	(De Haes & Van Grembergen, 2009; De Haes et al., 2020b; Tiwana et al., 2013; Wu et al., 2015)	<p>Building on the challenge in #1 and extending the argument, we argue the adoption of ITG mechanisms. However, being an essential facet of ITG is not necessarily the defining aspect of successful ITG that will lead to strategic alignment. Instead, the defining aspect of ITG is a <i>commitment</i> to ITG principles, reflected in CCP, and this crucial missing component is more likely to create strategic alignment.</p> <p>Commitment to ITG principles implies that the organization has a cohesive ITG spirit. ITG success is contingent upon organization-level collective action (Constantinides &amp; Barrett, 2015), which necessitates that the organization goes beyond a symbolic adoption</p>	<p>In challenging assumption #2, we build off assumption #1, wherein we demonstrate that the adoption of ITG mechanisms is distinct from commitment to ITG principles represented by CCP. For assumption #2, we show that adopting the ITG mechanism is insufficient to achieve strategic alignment. Our empirical results show that adopting ITG mechanisms does not directly affect strategic alignment but is <u>fully mediated</u> by the commitment to ITG (COBIT) principles. In this way, our study delivers a vital piece of the theoretical puzzle of achieving strategic alignment, which has been argued to be challenging to achieve (Chan &amp; Reich, 2007). This is crucial because, without the addition of the novel CCP mediator, ITG mechanisms are shown to have a direct</p>

#	Prominent Assumptions in ITG Research	Example Studies	Our challenge to those assumptions	How our study answers the challenge of assumptions
			<p>of ITG and embraces a more profound commitment to ITG principles (such as COBIT). Effective ITG requires appreciating and infusing ecosystem-wide values (Huber et al., 2017). In such a situation, organizations develop individual choices and willful commitment to ITG—a pivotal point in ITG success (Leclercq-Vandelannoitte &amp; Bertin, 2018). In contrast, if the ITG mechanisms are adopted only symbolically or instrumentally, there is little chance that there will be organization-wide buy-in or commitment to the ITG spirit or principles, thus undermining ITG’s goal of fostering strategic alignment.</p>	<p>positive relationship with strategic alignment. This can thus mislead research and practice on the theoretical constructs involved and incorrectly infer that ITG mechanisms are sufficient.</p> <p>By expanding notions of spirit to ITG, we help reframe the findings of Huang et al. (2010), wherein they theorize that ITG communication policies improve congruence in frames of references on IT use. We propose that ITG spirit, pragmatically conceptualized and measured through CCP, is an essential element of ITG that improves strategic alignment. Conversely, suppose the commitment to ITG principles or the spirit of ITG is absent in the organization. In that case, there will be an increased likelihood of ITG misalignment (Gregory et al., 2018), and strategic alignment will be more challenging.</p>
3	Only managerial support of IT is necessary to achieve strategic alignment through effective ITG	(Boonstra et al., 2018; Bowen et al., 2007; De Haes & Van Grembergen, 2009; Huang et al., 2010)	<p>Managerial support of IT is essential to achieving effective ITG. Still, we argue that ITG leadership includes managerial and board leadership, another missing piece of the ITG literature. While other studies of management support investigate aspects of an IS system, such as ERP system implementation success (Liang et al., 2007; Rai et al., 2009) Our study focuses on organization-wide IT governance and strategic alignment. The leadership support for IT that is relevant for the governance of IT and strategic alignment should involve top management and the board of directors. The board and top management jointly form the ITG vision and ethos and enable its infusion into every facet of the organizational fabric. This is why there have been many calls for board involvement in ITG (e.g., Andriole, 2009; De Haes et al., 2020a; Nolan &amp; McFarlan, 2005)—a perspective that aligns with our challenge.</p> <p>The weakness in the present literature is that although</p>	<p>Based on our arguments of assumption #3, we enrich the literature by defining and measuring top leadership support for IT (top leadership support) as effortful participation and involvement of both the board and executives in the organization’s IT vision and strategy (Liu et al., 2015; Rai et al., 2009). We empirically demonstrate that both board and executive support for IT load onto the same construct of top leadership support, and this construct is distinct from both ITG mechanisms and commitment to ITG principles (CCP). In fact, given the salience of the construct commitment to COBIT principles (CCP), the value of top leadership support for IT is exhibited because it significantly influences CCP.</p> <p>By focusing on the value of top leadership support for IT and its influence on CCP, we demonstrate that the assumption that executive support is fundamental to effective ITG is an incomplete formulation of leadership support.</p>

#	Prominent Assumptions in ITG Research	Example Studies	Our challenge to those assumptions	How our study answers the challenge of assumptions
			<p>a few papers normatively state that boards should be involved in ITG, most extant studies of ITG focus on managerial involvement. For instance, in their interview-based field study, Bowen et al. (2007) extensively discuss management involvement in ITG but are silent about board involvement. Similarly, discussions of IT steering committees as a major governance mechanism implicitly focus on management support of IT initiatives (Huang et al., 2010; Prasad et al., 2010). In the literature, <i>top management</i> does not include the board of directors, yet boards lead corporate governance, including ITG and IT decision-making (Valentine et al., 2016). Historically, many firms have lacked broad ITG integration due to the limited involvement of the board in IT matters (Bart &amp; Turel, 2010; De Haes &amp; Van Grembergen, 2005; Huff et al., 2006; Jordan &amp; Musson, 2004; Trites, 2004).</p> <p>Given these arguments, we propose that <i>top leadership support</i> includes not only top management (C-level executives, such as the CEO, COO, CIO, and CMO) but also the board of directors, the members of which are crucial stakeholders and decision-makers in an organization's strategic and governance structures (Fama &amp; Jensen, 1983; Hillman &amp; Dalziel, 2003)—primarily as such structures are related to ITG (Andriole, 2009; Benaroch &amp; Chernobai, 2017; Jewer &amp; McKay, 2012). This is no minor consideration because, despite adopting ITG mechanisms, an organization may have top leadership that fails to fully appreciate and support the value of IT in the organization and the salience of IT in organizational strategy, and such support can be crucial for effective ITG (Ang &amp; Teo, 1997). Low leadership support can thwart more effective ITG implementation and the achievement of strategic alignment. Even if top</p>	

#	Prominent Assumptions in ITG Research	Example Studies	Our challenge to those assumptions	How our study answers the challenge of assumptions
			<p>leaders appreciate the value of IT to the organization, they may not actively support it, even though this support may be necessary for overcoming typical organizational user resistance (e.g., Kim &amp; Kankanhalli, 2009). Support for IT thus implies that top leadership has bought into the vision of an IT-enabled organization and demonstrates its support for IT through <i>active involvement</i> in IT-related decisions and ITG initiatives.</p>	
4	<p>Adoption of ITG mechanisms automatically implies that the top leadership embraces IT and implements ITG faithfully</p>	<p>(Benaroch &amp; Chernobai, 2017; Buchwald et al., 2014; De Haes &amp; Van Grembergen, 2009; Prasad et al., 2012; Prasad et al., 2010; Wu et al., 2015)</p>	<p>Extant ITG studies often tacitly assume that when an organization adopts ITG mechanisms, the top leadership necessarily supports IT. We challenge the assumption that the adoption of ITG mechanisms implies that there is top leadership support for IT. For example, Wu et al. (2015) emphasize how ITG mechanisms facilitate knowledge sharing, and assume that executives support IT initiatives and are enthusiastically involved in the systematic infusion of ITG principles, vision, and ethos to construct the organizational ITG bricolage. While this may be true for some firms, institutional theory predicts that firms often mimic peers due to institutional pressures to appear legitimate (Meyer &amp; Rowan, 1977); thus, ITG mechanisms can be adopted symbolically without underlying leadership support for IT. Symbolic governance mechanism adoptions are endemic in organizations (Westphal &amp; Zajac, 1994, 2001), and thus allow for a decoupling between formal structures and the spirit of ITG.</p> <p>Suppose the top leadership has little interest in or support of IT. In that case, it can be inferred that they will have a perfunctory role in adopting and implementing ITG mechanisms, thus compromising the overall ITG spirit crucial to achieving strategic alignment (see challenge 3).</p>	<p>In addressing assumption #4, we provide conceptual and empirical evidence that top leadership support is separate from adopting ITG mechanisms, CCP, and strategic alignment. Our model shows that the mere adoption of ITG mechanisms does not necessarily imply that the ITG spirit has been realized, nor does it mean that top leadership supports IT.</p> <p>Our model investigates whether top leadership support influences our central construct: commitment to COBIT principles (CCP). By capturing commitment to ITG principles, CCP captures the extent to which the spirit of ITG has been infused within the organization. By linking top leadership support for IT to CCP, we empirically demonstrate a need to separately consider top leadership's role in realizing successful ITG. Our study's results highlight that if top leadership support for IT is weak, commitment to ITG principles (i.e., CCP) will be weakened, thus compromising strategic alignment.</p> <p>Our model demonstrates the need to adopt ITG mechanisms with top leadership support to realize CCP and achieve strategic alignment.</p>

#	Prominent Assumptions in ITG Research	Example Studies	Our challenge to those assumptions	How our study answers the challenge of assumptions
			Instead, we argue that top leadership should understand the value of IT and demonstrate strong support for IT and that TSLIT should be studied as a critical missing component of extant ITG—strategic alignment models.	

We follow Weber’s (2012) guidance on developing and evaluating theories, and thus, we map fundamental aspects of good theory to demonstrate how our study contributes beyond the existing literature. The table’s contents draw upon our problematization and the review of existing studies in Table A.

**Table A2. Evaluating and Mapping our Study to Theoretical Contribution using the Approach of Weber**

Evaluative Aspects of a Theory	Contributions of our theory beyond the existing literature
Construct(s)	We propose a fundamentally new construct, which is the keystone of our theoretical contribution. That is a commitment to COBIT principles (CCP). As discussed in the problematization, CCP is a construct that answers our main challenges to the existing ITG literature.
Association(s)	Table D.1 above shows that the associations we investigate are novel. Drawing upon the value of CCP to extend our understanding of ITG, we propose new associations such as adopting IT mechanisms → CCP and top leadership support → CCP. Because CCP is absent in the existing literature, yet a valuable construct (as per our problematization), theoretical relationships developed around CCP are significant additions to the literature.
State(s)	In our conception – quite different from the existing literature – effective ITG is a combination of formal structures, processes, and mechanisms and a deep infusion of the spirit of ITG. Expressed through CCP, which reflects the level of organizational commitment to ITG principles and an exhibition of the realization of the spirit of ITG, our study moves beyond existing research, which is incomplete in considering only structures, processes, and mechanisms as key to ITG delivery.  In other words, effective ITG is a composite state and not a monolithic one (as has been considered in prior literature).
Event Space	There are three ways in which our study constructs a new event space. First, it argues that for effective ITG, three events must occur: <ol style="list-style-type: none"> <li>1. The formal adoption of ITG mechanisms, structures, and organizational processes.</li> <li>2. The organization’s members must have a commitment to ITG principles (i.e., CCP), which is a demonstration that the organization shares a vision and values related to its ITG spirit and</li> <li>3. Top leadership support of IT is a crucial enabler to both CCP and strategic alignment.</li> </ol> <p>Existing ITG literature is confined chiefly to #1 and rarely to #3. However, conceiving of a study based on all three events is absent in the ITG literature. Our more comprehensive model of how ITG leads to strategic alignment opens the ITG event space for further investigation.</p>



Novelty	From a novelty perspective, our study has new constructs, associations, states, and event space. We demonstrate that they are helpful considerations and show, through our literature review in Table D.1 above, that they have yet to be addressed in prior literature.
---------	--

In their seminal article in the *Academy of Management Review*, Corley and Gioia (2011), provide a 2X2 matrix (along the dimensions of originality and utility) on which to judge a study's contribution. In Table A3, we apply their framework and showcase how our study substantially contributes to the ITG literature.

**Table A3. Establishing a Substantial Theoretical Contribution: Originality and Utility**

<b>Establishing a Substantial Theoretical Contribution Beyond Existing ITG Literature</b>			
<b>Originality</b>	<i>Revelatory</i>	<p>Informed by our problematization, we deliver the following revelations with practical ITG implications</p> <ol style="list-style-type: none"> <li>1. We showcase that ITG is more than merely defined in terms of structural aspects of decision-making, processes, and communication. In seeking effective ITG, practitioners should view ITG as a holistic endeavor where both mechanisms and principles play vital roles. To avoid a symbolic governance approach, our findings provide practical guidance in illustrating how ITG mechanisms and commitment to ITG principles work jointly for strategic alignment.-</li> <li>2. We present a revelatory take that challenges common knowledge, implying that adopting ITG mechanisms automatically means top leadership supports it. Our study cautions practitioners that this is not necessarily the case.</li> <li>3. Because boards have many demands on their time, our empirical evidence that their support enhances CCP and strategic alignment is salient to their decisions on allocating their limited bandwidth.</li> </ol>	<p>The primary usefulness of our study—in terms of informing future research—can be delineated as follows:</p> <ol style="list-style-type: none"> <li>1. We advance conceptual specificity to effective ITG by decomposing ITG into ITG mechanisms and commitment to ITG principles. In so doing, we draw attention to the limitation of proxying ITG mechanisms for effective ITG.</li> <li>2. By applying the IT spirit concept to the ITG event space, we conceptualize commitment to ITG principles as reflecting an organization’s ITG spirit.</li> <li>3. We develop a helpful construct, CCP, which future researchers can use to investigate the level of ITG embracement. Even though CCP is conceptualized around COBIT, the essence of this construct is transferrable to other ITG frameworks with minor adaptations.</li> <li>4. We deliver an instrumental insight: commitment mediates the relationship between adopting ITG mechanisms and strategic alignment. Therefore, we provide an essential mediator for achieving strategic alignment that future research can build upon and extend (e.g., investigate other potential mediators) to provide deeper insights into ITG phenomena.</li> <li>5. We advance conceptual specificity concerning upper-echelon support by conceptually and empirically demonstrating that board and management support are critical elements of top leadership support for IT.</li> <li>6. We conceptually and empirically demonstrate that top leadership support is not in lockstep with ITG mechanism adoption and that top leadership support is an essential element in the ITG-strategic alignment relationship.</li> </ol>
	<i>Incremental</i>	<p>Our findings provide further theoretical and empirical support for the prevalent use of COBIT as an ITG framework. Our study reinforces the value of COBIT in the context of ITG and thus supports the promotion of COBIT as a significant ITG framework.</p>	Not Applicable
		<i>Practically useful</i>	<i>Scientifically useful</i>

	<b>Utility</b>
--	----------------

## Online APPENDIX B. Survey Details and Measures for Final Data Collection

**Introduction.** We invite you to participate in an online survey about information technology (IT) governance. The primary purpose of this research is to learn about your organization's IT governance (ITG) practices so that we can find ways to improve ITG in general. We sincerely appreciate your help in serving the global IT community. Our aim is to gather and provide high-quality information that simply is not currently available. Thus, your confidential participation is important.

To qualify for this research, you need to be 25 years or older. You also need to be a senior manager or executive who works in information technology (IT) or have a good understanding of the service and governance of IT in their firm because of your duties in marketing, finance, operations, and so forth. You also must work for a company that is publicly traded on one of the three major stock exchanges in the United States (the location of your company's headquarters does not matter; it need not be a US-based company).

Please answer carefully and honestly. Participation is voluntary. Your responses to this survey are confidential. No company-specific data will be reported or released; likewise, no personal or individual-level information will be reported or released. That is, your identity will not be obtained in this survey. All data will be reported anonymously and reported in an aggregate form.

The survey should take about 15 minutes to complete. Please respond to all the survey questions. You may stop the survey at any time.

Please keep in mind that this is a carefully constructed scientific survey and there are specific reasons for each question. Thus, please pay close attention and answer to the best of your ability. Filters and mechanisms have been implemented to reject respondents who answer carelessly or untruthfully. You will only receive compensation if you complete the entire survey honestly.

The project has been approved by the Institutional Review Board at X. (The remainder of the institutional board wording has been redacted to protect blind peer review).

Your participation in this survey indicates your informed consent and your agreement to honestly participate to provide your valuable, confidential responses.

Demographics:

Please complete the following required confidential demographic information so that we can combine your responses with the responses from other participants for additional insights.

To quickly go to the next question, simply press the TAB key.

**Table B1. Demographic questions**

Covariate Description (Variable Name)	Prompts, Items, Filter Logic, Notes, and Frequencies [Count, %]
Listed?  (n/a)	<p><b>Prompt:</b> Is your company a publicly traded firm that is listed on one of the three major US stock markets? (NYSE, NASDAQ, or AMEX)?</p> <p>[Filter logic: If they select “no,” they will be bumped out of the survey]</p> <p>Note: everyone in the remaining sample entered “yes,” so this is meaningless for data analysis and thus not used as a covariate.</p>
Which stock market is the company listed on?  (stock_market)	<p><b>Prompt:</b> On which US stock market is your company listed?</p> <ul style="list-style-type: none"> <li>• NYSE [190, 59.6%]</li> <li>• NASDAQ [108, 33.9%]</li> <li>• AMEX [21, 6.6%]</li> <li>• Other [0, 0%]</li> </ul> <p>[Filter logic: If they select “Other,” they will be bumped out of the survey]</p>
Company name  (n/a)	<p><b>Prompt:</b> Please enter your full company’s name [this will not be reported to anyone and will be removed, but allows us to perform valid anonymized, aggregated analysis; it is strictly confidential]:</p>
Stock ticker  (n/a)	<p><b>Prompt:</b> Please enter your company’s valid stock ticker symbol</p> <p>Note: This is not reported in the analysis but was used to validate the company’s name.</p>
Age range of participant  (age)	<p><b>Prompt:</b> Indicate your age range:</p> <ul style="list-style-type: none"> <li>• Under 25 [0, 0%]</li> <li>• 25–29 [34, 10.7%]</li> <li>• 30–39 [138, 43.3%]</li> <li>• 40–49 [78, 24.5%]</li> <li>• 50–59 [50, 15.7%]</li> <li>• 60 and above [19, 6%]</li> </ul> <p>[Filter logic: if they select “under 25”, they will be bumped out of the survey]</p>

Covariate Description (Variable Name)	Prompts, Items, Filter Logic, Notes, and Frequencies [Count, %]
<p>In IT-related job or have substantial knowledge of IT?</p> <p>(n/a)</p>	<p><b>Prompt:</b> Do you currently lead or work for your organization's IT (information technology) department or do you have knowledge of how IT is used, applied, or governed at your organization? (yes/no)</p> <ul style="list-style-type: none"> <li>• no</li> <li>• yes</li> </ul> <p>[Filter logic: If they select “no,” they will be bumped out of the survey]</p> <p>Note: everyone in the remaining sample entered ‘yes,’ so this is meaningless for data analysis and thus not used as a covariate.</p>
<p>Level of position</p> <p>(position)</p>	<p><b>Prompt:</b> Which of the following best describes your position/title?</p> <ul style="list-style-type: none"> <li>• (1) CEO / President [33, 10.3%]</li> <li>• (2) Executive (IT related; e.g., CIO, CTO ) [65, 20.4%]</li> <li>• (3) Executive (non-IT related; e.g., CFO) [121, 37.9%]</li> <li>• (4) Senior manager (IT related) [3, 0.9%]</li> <li>• (5) Senior manager (non-IT related) [80, 25.1%]</li> <li>• (6) Manager, supervisor / Team leader (IT related) [10, 3.1%]</li> <li>• (7) Manager, supervisor / Team leader (non-IT related) [0, 0%]</li> <li>• (8) Contractor / Consultant [0, 0%]</li> <li>• (9) Employee (non-management) [0, 0%]</li> <li>• (10) Other _____ [0, 0%]</li> </ul> <p>[filter logic: if they select 7 through 10, they will be bumped out of the survey, as the study is only targeting managers who have IT experience (or non-IT senior managers) and higher]</p>

Covariate Description (Variable Name)	Prompts, Items, Filter Logic, Notes, and Frequencies [Count, %]
Company's Industry  (industry)	<p><b>Prompt:</b> Select the industry below that most closely matches your company's industry.</p> <ul style="list-style-type: none"> <li>• (NoDur) Consumer NonDurables—Food, Tobacco, Textiles, Apparel, Leather, Toys [11, 3.4%]</li> <li>• (Durbl) Consumer Durables—Cars, TVs, Furniture, Household Appliances [5, 1.6%]</li> <li>• (Manuf ) Manufacturing—Machinery, Trucks, Planes, Office Furniture, Paper, Commercial Printing [38, 11.9%]</li> <li>• (Enrgy) Oil, Gas, and Coal Extraction and Products [7, 2.2%]</li> <li>• (Chems) Chemicals and Allied Products [10, 3.1%]</li> <li>• (BusEq) Business Equipment—Computers, Software, and Electronic Equipment [96, 30.1%]</li> <li>• (Telcm) Telephone and Television Transmission [14, 4.4%]</li> <li>• (Utils) Utilities [2, 0.6%]</li> <li>• (Shops) Wholesale, Retail, and Some Services (Laundries, Repair Shops) [19, 6.0%]</li> <li>• (Hlth) Healthcare, Medical Equipment, and Drugs [15, 4.7%]</li> <li>• (Money) Finance, Banking, Insurance [55, 17.2%]</li> <li>• (Other) Other—Mines, Construction, Buildings Management, Transportation, Hotels, Business Services, Entertainment [19, 6.0%]</li> <li>• None of the above (please describe) [21, 6.6%]</li> </ul>
Organization size by number of employees  (employees)	<p><b>Prompt:</b> Approximately how many people are employed in your entire organization (all locations)?</p> <ul style="list-style-type: none"> <li>• 1–99 [2, 0.6%]</li> <li>• 100–499 [12, 3.8%]</li> <li>• 500–999 [36, 11.3%]</li> <li>• 1,000–2,499 [64, 20.1%]</li> <li>• 2,500–9,999 [85, 26.6%]</li> <li>• 10,000 or more [113, 35.4%]</li> </ul>
Level of education of participant  (education)	<p><b>Prompt:</b> Indicate your highest level of education completed:</p> <ul style="list-style-type: none"> <li>• Grade school or some high school [0, 0%]</li> <li>• Completed high school [10, 3.1%]</li> <li>• Some community college, technical school, or university but did not complete [10, 3.1%]</li> <li>• Completed technical school or a community college [12, 3.8%]</li> <li>• Completed a university or bachelor's degree [138, 43.3%]</li> <li>• Completed a post-graduate degree, Master's [120, 37.6%]</li> <li>• Completed a doctoral degree or Ph.D. [22, 6.9%]</li> </ul>

Covariate Description (Variable Name)	Prompts, Items, Filter Logic, Notes, and Frequencies [Count, %]
Gender of participant	<p><b>Prompt:</b> What is your gender?</p> <ul style="list-style-type: none"> <li>• Male [196, 61.4%]</li> <li>• Female [116, 36.4%]</li> <li>• Other [7, 2.2%]</li> </ul>
Total years work experience in participants' career  (years_career)	<p><b>Prompt:</b> Using the sliders, indicate your years of work experience, as follows:</p> <p>Years of work experience for your entire career . . . [19.95 average years]</p>
Total years participant has been employed at organization  (years_org)	<p><b>Prompt:</b> Years of work experience only at your current organization [12.92 average years]</p>
Position to whom participant reports?  (report)	<p><b>Prompt:</b> To whom do you directly report?</p> <ul style="list-style-type: none"> <li>• CEO/President [206, 64.6%]</li> <li>• COO (Chief Operating Officer), VP of Operations [83, 26.0%]</li> <li>• CFO (Chief Financial Officer) or Controller [21, 6.6%]</li> <li>• CIO (Chief Information Officer) and other [9, 2.8%]</li> </ul>
On board of directors?	<p><b>Prompt:</b> Do you currently serve on your organization's board of directors?</p> <ul style="list-style-type: none"> <li>• No [162, 50.8%]</li> <li>• Yes [150, 47.0%]</li> </ul>
Number of employees participant directly manages?  (work_under)	<p><b>Prompt:</b> Approximately how many people <u>report directly to you</u> in your entire organization (all locations)?</p> <ul style="list-style-type: none"> <li>• None [0, 0%]</li> <li>• 1–99 [133, 41.7%]</li> <li>• 100–499 [50, 15.7%]</li> <li>• 500–999 [39, 12.2%]</li> <li>• 1,000–2,499 [37, 11.6%]</li> <li>• 2,500–9,999 [33, 10.3%]</li> <li>• 10,000 or more [20, 6.3%]</li> </ul> <p>[filter logic: if 'none' was chosen, they were bumped out]</p>



<b>Covariate Description (Variable Name)</b>	<b>Prompts, Items, Filter Logic, Notes, and Frequencies [Count, %]</b>
Organization practices COBIT?  (prac_COBIT)	<p><b>Prompt:</b> Does your organization use COBIT for the governance and management of enterprise IT?</p> <p>Note: Control Objectives for Information and Related Technology (COBIT) is a framework created by ISACA for information technology (IT) management and IT governance. It is a supporting toolset that allows managers to bridge the gap between control requirements, technical issues, and business risks.</p> <ul style="list-style-type: none"> <li>• Yes [219, 68.7%]</li> <li>• No [61, 19.1%]</li> <li>• Not sure [39, 12.2%]</li> </ul>
Resentment (Velicer et al., 1985)  [resent; used as marker variable to show lack of common-methods bias in survey data]	<p><b>Prompt:</b> Enter the degree to which you agree with the following statements:</p> <ul style="list-style-type: none"> <li>• At times I feel I get a raw deal out of life.</li> <li>• When I look back on what's happened to me, I can't help feeling really resentful.</li> <li>• Other people always seem to get the breaks that I do not get.</li> <li>• I dislike the fact that the events in my life are often not fair.</li> </ul> <p>7-point Likert-type scale on agreement; last item added to push for four items</p>

Unless otherwise noted, all null / non-response values are entered as “#” for null.

**Table B2. IT Governance Questions**

<b>Second-order construct</b>	<b>First-order Construct</b>	<b>Prompts and Items</b>	<b>Source(s) and scaling</b>
Adoption of IT governance mechanisms (formative, second order) (ITG mechanisms)	ITG mechanisms: Decision-making structures <sup>1</sup>	<p><b>Prompt:</b> For each of the following IT governance practices, please indicate your degree of agreement in terms of the extent of implementation within your company.</p> <p>DMS1. Our company has a steering committee at the executive or senior management level responsible for determining IT development prioritization. [ITM1]</p> <p>DMS2. Our company has a steering committee composed of business and IT people focusing on prioritizing and managing IT projects. [ITM8]</p>	<p>All directly replicated from Wu et al. (2015); 7-point Likert-type on agreement</p> <p>1=strongly disagree 2=disagree 3=somewhat disagree 4=neither agree nor disagree 5=somewhat agree</p>

Second-order construct	First-order Construct	Prompts and Items	Source(s) and scaling
that the organization adopts to govern IT, via its decision-making structure, formal processes, and communication approach.		<p>DMS3. The CIO has a direct reporting line to the CEO or COO or CFO, or another executive. [modified ITM9]</p> <p>Survey logic: If the CIO has c-level direct reporting line, we will then follow up with the following exploratory item because Banker et al. showed that whom they report to matters:</p> <p>[itg_cio_report] Prompt: To whom does the CIO directly report: CEO, COO, CFO, other (explain _____).</p> <ul style="list-style-type: none"> <li>• 1=CEO</li> <li>• 2 =COO</li> <li>• 3=CFO</li> <li>• 4=other</li> </ul>	6=agree 7=strongly agree For DMS3: (Banker et al., 2011)
	ITG mechanisms: Formal processes <sup>2</sup>	FP1. Our company has established a formal prioritization process for IT investments and projects in which business and IT are involved. [ITM3]	
		FP2. Our company has established formal processes to define and update IT strategies. [ITM7]	
		FP3. Our company has established formal processes to govern and manage IT projects. [ITM10]	
	ITG mechanisms: Communication approaches <sup>3</sup>	CA1. The CIO is a full member of the executive committee. [ITM2]	
		CA2. Our company has a committee at the board of directors' level to ensure that IT is a regular agenda item for the board of directors. [ITM5]	
Commitment to COBIT principles (CCP)	n/a	COBIT1. "We have a formal process in which we clearly identify the needs of all stakeholders in respect to IT." [Principle 1: Meeting stakeholders' needs]	Authors developed based on COBIT principles and literature and multiple preliminary studies for content and construct validity (ISACA, 2012; Mangalaraj et al., 2014).
		COBIT2. "We have a comprehensive scorecard (or assessment process) for the entire IT environment that allows us measure whether we are meeting stakeholder needs." [Principle 1: Meeting stakeholders' needs]	
		COBIT3. "We treat information and related technologies as assets or capabilities that need examination along with other assets in the enterprise." [Principle 2: covering the enterprise end-to-end]	
		COBIT4. "We use COBIT 5 as the overarching framework for governance and management of enterprise IT." [Principle 3: applying a single integrated framework]	
		COBIT5. "We have defined the organizational units and roles that are	

Second-order construct	First-order Construct	Prompts and Items	Source(s) and scaling
		responsible for making IT decisions and for enabling contacts between business and IT management decision-making functions.” [Principle 4: enabling a holistic approach]	
		COBIT6. “We have formalized and institutionalized strategic IT decision making and IT monitoring procedures and policies to ensure that day-to-day outcomes are consistent with goals.” [Principle 4: enabling a holistic approach]	
		COBIT7. “We strongly differentiate between the structures and processes of IT governance and IT management.” [Principle 5: separating governance from management]	
Top-leadership support of IT (TLS)	n/a	TLS1: The IT steering committee has a direct and substantial working relationship in communicating with the board of directors.	Authors developed based on literature and multiple preliminary studies for content and construct validity (Liu et al., 2015)
		TLS2: The CIO clearly articulates a vision for IT’s role, and the other executives buy into the vision.	
		TLS3: The CEO clearly expresses how IT supports the company’s strategy.	
		TLS4: The board cogently communicates how IT supports the company’s strategy.	
Strategic IT alignment (SITA)  Definition: The degree to which IT initiatives and strategies are directly aligned with the firm’s strategy, especially in terms of product orientation, quality orientation, and market orientation.	SITA: Product-oriented strategic alignment <sup>4</sup>	[survey logic: those who are IT people are asked the items starting with “IST”; those who are not are asked the items starting with “BST”]  <b>BST4.</b> We attempt to be ahead of our competitors in introducing new products. <b>IST4.</b> Our current systems enable us to introduce new products earlier than our competitors. <b>BST5.</b> We attempt to be ahead of our competitors by offering a wide range of products. <b>IST6.</b> Our current systems enable our company to diversify our products.	Original items from Hussin et al. (2002), but used as formative and as adopted by Wu et al. (2015) <sup>5</sup> ; 7-point Likert-type on agreement  1=strongly disagree 2=disagree 3=somewhat disagree 4=neither agree nor disagree 5=somewhat agree 6=agree 7=strongly agree
		<b>BST3.</b> We attempt to be ahead of our competitors by ensuring that our products are distinctively different from our competitors. <b>IST2.</b> Our current systems help us to distinguish our products from those of competitors.	
	SITA: Quality-oriented strategic alignment <sup>6</sup>	<b>BST2.</b> We attempt to be ahead of our competitors by focusing on the quality of products rather than price. <b>IST3.</b> Our current systems allow us to improve the quality of our products.	
		<b>BST6.</b> We constantly improve the efficiency of our production process. <b>IST5.</b> Our current systems help improve the efficiency of our production process.	
		<b>BST7.</b> We attempt to be ahead of our competitors by providing quality service to our customers. <b>IST7.</b> Our current systems enable our company to provide quality customer	

Second-order construct	First-order Construct	Prompts and Items	Source(s) and scaling
	SITA: Market-oriented strategic alignment 7	service. <b>BST8.</b> We attempt to be ahead of our competitors by intensive marketing of our products. <b>IST8.</b> Our current systems enable us to embark on an intensive marketing of our products. <b>BST9.</b> We attempt to achieve growth by expanding into new markets. <b>IST9.</b> Our current systems assist us in identifying new markets.	

Notes. The following prompts were given for these materials:

Instructions: The primary purpose of this research is to learn about your firm’s IT governance (ITG) practices. While ITG is hard to define succinctly, the IT Governance Institute says, “Effective IT governance helps ensure that IT supports business goals, maximizes business investment in IT, and appropriately manages IT-related risks and opportunities.”

Warning: although many of these questions might appear to be related, each one has a scientific purpose. Thus, please carefully read and respond to each question individually.

## Online APPENDIX C. Analysis Support Details

### Multicollinearity

**Table C1.** Outer VIFs

Latent constructs	Items	Outer VIFs
CA	ITGM: CA1	1.366
	ITGM: CA2	1.428
	ITGM: CA3	1.494
CCP	CCP_1	1.926
	CCP_2	2.060
	CCP_3	1.751
	CCP_4	1.735
	CCP_5	1.978
	CCP_6	2.095
	CCP_7	1.915
DMS	ITGM: DMS1	1.683
	ITGM: DMS2	1.735
	ITGM: DMS3	1.438
FP	ITGM: FP1	1.736
	ITGM: FP2	1.859
	ITGM: FP3	1.671
SITA: PA	IST4 BST4	1.559
	IST6 BST5	1.521
	IST2 BST3	1.387
SITA: QA	IST3 BST2	1.942
	IST5 BST6	1.784
	IST7 BST7	1.709
SITA: MA	IST8 BST8	1.415
	IST9 BST9	1.415
TLS	TLS1	2.038
	TLS2	1.591
	TLS3	2.030
	TLS4	2.001
Resentment	resent_1	2.876
	resent_2	3.010
	resent_3	3.660
	resent_4	1.835

CA = ITG mechanisms (ITGM); Communication approaches; CCP = commitment to COBIT principles; DMS = ITGM: Decision-making structures; FP = ITGM: Formal processes; SITA: MA = SITA: market-oriented; SITA: PA = SITA: product oriented; SITA: QA = SITA: quality-oriented; TLS = top leadership support

**Table C2.** Inner VIFs

Latent Construct	Inner VIF
Commitment to COBIT principles (CCP)	2.887
ITGM: Communication approaches (CA)	3.109
ITGM: Decision-making structures (DMS)	2.658
ITGM: Formal processes (FP)	3.242
SITA: market-oriented	1.986
SITA: product oriented	n/a
SITA: quality-oriented	2.461
Top leadership support (TLS)	2.755
Resentment	1.475

**Table C3.** Measurement Model Statistics

Variable	Mean	SD	1	2	3	4	5	6	7	8	9
1. CIO report	n/a	n/a	n/a								
2. CCP	5.584	.950	-.083	<b><u>.769</u></b>							
3. CA	5.922	.900	-.083	.621	<b><u>.801</u></b>						
4. DM	5.958	.971	-.119	.511	.730	<b><u>.829</u></b>					
5. FP	5.986	.913	-.169	.646	.719	.699	<b><u>.849</u></b>				
6. SITA: MA	5.676	1.043	-.118	.566	.513	.441	.449	<b><u>.878</u></b>			
7. SITA: PA	5.705	.960	-.112	.606	.506	.404	.477	.703	<b><u>.812</u></b>		
8. SITA: QA	5.916	.944	-.072	.629	.548	.475	.568	.604	.707	<b><u>.854</u></b>	
9. TLS	5.714	1.066	-.115	.686	.612	.540	.567	.621	.658	.667	<b><u>.826</u></b>

Underlined and bolded numbers down the diagonal of the correlation matrix are the square roots of the AVEs; CA = ITGM: Communication approaches; CCP = commitment to COBIT principles; DMS = ITGM: Decision-making structures; FP = ITGM: Formal processes; SITA: MA = SITA: market-oriented; SITA: PA = SITA: product oriented; SITA: QA = SITA: quality-oriented; TLS = top leadership support

**Table C4.** Final Path Model Analyses

	Model 1: Nonmediated model			Model 2: Mediated model			Model 3: Mediated model with covariates and H5 moderation test		
Paths tested	$\beta$	<i>t</i> -statistic	<i>p</i> -values	$\beta$	<i>t</i> -statistic	<i>p</i> -values	$\beta$	<i>t</i> -statistic	<i>p</i> -values
H1a. DMS → CCP	n/a	n/a	n/a	-0.106	-1.36	0.173	-0.106	-1.37	0.170
H1b. FP → CCP	n/a	n/a	n/a	0.467	6.37	0.000	0.467	6.36	0.000
H1c. CA → CCP	n/a	n/a	n/a	0.257	2.78	0.005	0.257	2.79	0.005
H2. TLS → CCP	n/a	n/a	n/a	0.580	9.99	0.000	0.581	10.02	0.000
H3. CCP → SITA	.370	4.75	.000	0.180	1.82	0.069	0.206	2.22	0.027
H4. TLS → SITA	.649	10.64	.000	0.640	8.29	0.000	0.404	4.86	0.000
H5. TLS × CCP → SITA	n/a	n/a	n/a	n/a	n/a	n/a	-0.263	-5.79	0.000
Alt. CA → SITA	.177	1.94	.053	n/a	n/a	n/a	n/a	n/a	n/a
Alt. DMS → SITA	-.028	-0.35	.730	n/a	n/a	n/a	n/a	n/a	n/a
Alt. FP → SITA	.111	1.30	.194	n/a	n/a	n/a	n/a	n/a	n/a
Indirect effects. CA → SITA	n/a	n/a	n/a	0.175	1.94	0.051	0.137	1.68	0.094
Indirect effects. DMS → SITA	n/a	n/a	n/a	-0.029	-0.38	0.706	0.044	0.63	0.529
Indirect effects. FP → SITA	n/a	n/a	n/a	0.138	1.50	0.132	0.060	0.68	0.495
<b>Covariates and controls</b>									
age → SITA	n/a	n/a	n/a	n/a	n/a	n/a	-0.161	-2.84	0.004
board → SITA	n/a	n/a	n/a	n/a	n/a	n/a	0.111	2.03	0.042
CIO_report → SITA	n/a	n/a	n/a	n/a	n/a	n/a	-0.031	-0.70	0.484
education → SITA	n/a	n/a	n/a	n/a	n/a	n/a	0.028	0.73	0.467
employees → SITA	n/a	n/a	n/a	n/a	n/a	n/a	-0.086	-2.03	0.043
gender → SITA	n/a	n/a	n/a	n/a	n/a	n/a	0.034	0.87	0.383
industry → SITA	n/a	n/a	n/a	n/a	n/a	n/a	0.065	1.65	0.099
position → SITA	n/a	n/a	n/a	n/a	n/a	n/a	-0.024	-0.51	0.608
prac_COBIT → SITA	n/a	n/a	n/a	n/a	n/a	n/a	0.046	0.86	0.387
report → SITA	n/a	n/a	n/a	n/a	n/a	n/a	0.029	0.49	0.624
resentment → SITA	n/a	n/a	n/a	n/a	n/a	n/a	-0.513	-7.42	0.000
stock market → SITA	n/a	n/a	n/a	n/a	n/a	n/a	0.011	0.28	0.779
work under → SITA	n/a	n/a	n/a	n/a	n/a	n/a	0.078	1.54	0.122
years_career → SITA	n/a	n/a	n/a	n/a	n/a	n/a	0.114	1.55	0.122
years_org → SITA	n/a	n/a	n/a	n/a	n/a	n/a	-0.041	-0.69	0.493
SITA variance predicted (R <sup>2</sup> )		0.602			0.665			0.639	
CCP variance predicted(R <sup>2</sup> )		n/a			0.633			0.634	
<b>Model Goodness-of-fit statistics</b>									
Chi square		1,644			1,366			1,494	
RMSEA		0.109			0.097			0.098	

CFI		0.734			0.790			0.775	
TLI		0.709			0.768			0.752	
SRMR		0.312			0.260			0.264	
CD		1.000			0.999			0.999	

Alt. = alternative paths tested to test viability of the alternative, nonmediated model (Model 1) versus the mediated model that we theorize to exist (Model 2).;  
SRMR = standardized root mean square residual



## Appendix References

- Ali, S., & Green, P. (2012). Effective information technology (IT) governance mechanisms: An IT outsourcing perspective. *Information Systems Frontiers*, 14(2), 179-193. <https://doi.org/10.1007/s10796-009-9183-y>
- Alreemy, Z., Chang, V., Walters, R., & Wills, G. (2016). Critical success factors (CSFs) for information technology governance (ITG). *International Journal of Information Management*, 36(6, Part A), 907-916. <https://doi.org/10.1016/j.ijinfomgt.2016.05.017>
- Alvesson, M., & Sandberg, J. (2011). Generating research questions through problematization. *Academy of Management Review*, 36(2), 247-271.
- Andriole, S. J. (2009). Boards of directors and technology governance: The surprising state of the practice. *Communications of the Association for Information Systems*, 24(1), 22.
- Ang, J., & Teo, T. S. H. (1997). CSFs and sources of assistance and expertise in strategic IS planning: a Singapore perspective. *European Journal of Information Systems*, 6(3), 164-171. <https://doi.org/10.1057/palgrave.ejis.3000263>
- Banker, R. D., Hu, N., Pavlou, P. A., & Luftman, J. (2011). CIO reporting structure, strategic positioning, and firm performance. *MIS Quarterly*, 35(2), 487-504. <https://doi.org/10.2307/23044053>
- Bart, C., & Turel, O. (2010). IT and the board of directors: An empirical investigation into the 'governance questions' Canadian board members ask about IT. *Journal of Information Systems*, 24(2), 147-172. <https://doi.org/10.2308/jis.2010.24.2.147>
- Benaroch, M., & Chernobai, A. (2017). Operational IT failures, IT value-destruction, and board-level IT governance changes. *MIS Quarterly*, 41(3), 729-762.
- Boonstra, A., Yeliz Eseryel, U., & van Offenbeek, M. A. (2018). Stakeholders' enactment of competing logics in IT governance: polarization, compromise or synthesis? *European Journal of Information Systems*, 27(4), 415-433. <https://doi.org/10.1057/s41303-017-0055-0>
- Bowen, P. L., Cheung, M.-Y. D., & Rohde, F. H. (2007). Enhancing IT governance practices: A model and case study of an organization's efforts. *International Journal of Accounting Information Systems*, 8(3), 191-221. <https://doi.org/10.1016/j.accinf.2007.07.002>
- Bradley, R. V., Byrd, T. A., Pridmore, J. L., Thrasher, E., Pratt, R. M., & Mbarika, V. W. (2012). An empirical examination of antecedents and consequences of IT governance in US hospitals. *Journal of Information Technology*, 27(2), 156-177. <https://doi.org/10.1057/jit.2012.3>
- Buchwald, A., Urbach, N., & Ahlemann, F. (2014). Business value through controlled IT: Toward an integrated model of IT governance success and its impact. *Journal of Information Technology*, 29(2), 128-140. <https://doi.org/10.1057/jit.2014>
- Chan, Y. E., & Reich, B. H. (2007). IT alignment: what have we learned? *Journal of Information Technology*, 22(4), 297-315. <https://doi.org/10.1057/palgrave.jit.2000109>
- Constantinides, P., & Barrett, M. (2015). Information infrastructure development and governance as collective action. *Information Systems Research*, 26(1), 40-56. <https://doi.org/10.1287/isre.2014.0542>
- Corley, K. G., & Gioia, D. A. (2011). Building theory about theory building: what constitutes a theoretical contribution? *Academy of Management Review*, 36(1), 12-32. <https://doi.org/10.5465/amr.2009.0486>
- D'Arcy, J., Hovav, A., & Galletta, D. (2009). User awareness of security countermeasures and its impact on information systems misuse: A deterrence approach. *Information Systems Research*, 20(1), 79-98. <https://doi.org/10.1287/isre.1070.0160>
- De Haes, S., Caluwe, L., Huygh, T., & Joshi, A. (2020a). *Governing Digital Transformation: Guidance for Corporate Board Members*. Springer.
- De Haes, S., & Van Grembergen, W. (2005). IT governance structures, processes and relational mechanisms: Achieving IT/business alignment in a major Belgian financial group. 38th Hawaii

- International Conference on System Sciences,
- De Haes, S., & Van Grembergen, W. (2009). An exploratory study into IT governance implementations and its impact on business/IT alignment. *Information Systems Management*, 26(2), 123-137. <https://doi.org/10.1080/10580530902794786>
- De Haes, S., Van Grembergen, W., Joshi, A., & Huygh, T. (2020b). *Enterprise Governance of Information Technology: Achieving Alignment and Value in Digital Organizations* (Third ed.). Springer.
- DeSanctis, G., & Poole, M. S. (1994). Capturing the complexity in advanced technology use: Adaptive structuration theory. *Organization science*, 5(2), 121-147.
- Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *The Journal of Law and Economics*, 26(2), 301-325. <https://doi.org/10.1086/467037>
- Gregory, R. W., Kaganer, E., Henfridsson, O., & Ruch, T. J. (2018). IT Consumerization and the Transformation of IT Governance. *MIS Quarterly*, 42(4), 1225-1253.
- Hanus, B., & Wu, Y. A. (2016). Impact of users' security awareness on desktop security behavior: A protection motivation theory perspective. *Information Systems Management*, 33(1), 2-16. <https://doi.org/10.1080/10580530.2015.1117842>
- Hardy, G. (2006). Using IT governance and COBIT to deliver value with IT and respond to legal, regulatory and compliance challenges. *Information Security Technical Report*, 11(1), 55-61. <https://doi.org/10.1016/j.istr.2005.12.004>
- Hillman, A. J., & Dalziel, T. (2003). Boards of directors and firm performance: Integrating agency and resource dependence perspectives. *Academy of Management Review*, 28(3), 383-396. <https://doi.org/10.5465/amr.2003.10196729>
- Hsu, J. S.-C., Shih, S.-P., Hung, Y. W., & Lowry, P. B. (2015). The role of extra-role behaviors and social controls in information security policy effectiveness. *Information Systems Research*, 26(2), 282-300. <https://doi.org/10.1287/isre.2015.0569>
- Huang, R., Zmud, R. W., & Price, R. L. (2010). Influencing the effectiveness of IT governance practices through steering committees and communication policies. *European Journal of Information Systems*, 19(3), 288-302. <https://doi.org/10.1057/ejis.2010.16>
- Huber, T. L., Kude, T., & Dibbern, J. (2017). Governance practices in platform ecosystems: Navigating tensions between cocreated value and governance costs. *Information Systems Research*, 28(3), 563-584. <https://doi.org/10.1287/isre.2017.0701>
- Huff, S. L., Maher, P. M., & Munro, M. C. (2006). Information technology and the board of directors: Is there an IT attention deficit? *MIS Quarterly Executive*, 5(2), 55-68.
- Hussin, H., King, M., & Cragg, P. (2002). IT alignment in small firms. *European Journal of Information Systems*, 11(2), 108-127. <https://doi.org/10.1057/palgrave/ejis/3000422>
- ISACA. (2012). *COBIT 5: A Business Framework for the Governance and Management of Enterprise IT*. Information Systems Audit and Control Association.
- Jewer, J., & McKay, K. N. (2012). Antecedents and consequences of board IT governance: Institutional and strategic choice perspectives. *Journal of the Association for Information Systems*, 13(7), 581-617.
- Jordan, E., & Musson, D. (2004). Corporate Governance and IT Governance: Exploring the board's perspective. *SSRN Working Paper*. Retrieved April 19, 2017, from [https://papers.ssrn.com/soL3/papers.cfm?abstract\\_id=787346](https://papers.ssrn.com/soL3/papers.cfm?abstract_id=787346)
- Kim, H.-W., & Kankanhalli, A. (2009). Investigating user resistance to information systems implementation: A status quo bias perspective. *MIS Quarterly*, 567-582.
- Klein, H. J., Solinger, O. N., & Dufлот, V. (2022). Commitment system theory: The evolving structure of commitments to multiple targets. *Academy of Management Review*, 47(1), 116-138. <https://doi.org/10.5465/amr.2018.0031>
- Kude, T., Lazic, M., Heinzl, A., & Neff, A. (2018). Achieving IT-based synergies through regulation-oriented and consensus-oriented IT governance capabilities. *Information Systems Journal*, 28(5), 765-795. <https://doi.org/10.1111/isj.12159>

- Leclercq-Vandelannoitte, A., & Bertin, E. (2018). From sovereign IT governance to liberal IT governmentality? A Foucauldian analogy. *European Journal of Information Systems*, 27(3), 326-346. <https://doi.org/10.1080/0960085X.2018.1473932>
- Liang, H., Saraf, N., Hu, Q., & Xue, Y. (2007). Assimilation of Enterprise Systems: The Effect of Institutional Pressures and the Mediating Role of Top Management. *MIS Quarterly*, 31(1), 59-87.
- Liu, G. H., Wang, E. T., & Chua, C. E. (2015). Leveraging social capital to obtain top management support in complex, cross-functional IT projects. *Journal of the Association of Information Systems*, 16(8), 707-737.
- Mangalaraj, G., Singh, A., & Taneja, A. (2014). IT governance frameworks and COBIT-a literature review. Twentieth Americas Conference on Information Systems (AMCIS 2014), Savannah, GA.
- Mazza, T., & Azzali, S. (2018). Information technology controls quality and audit fees: Evidence from Italy. *Journal of Accounting, Auditing & Finance*, 33(1), 123-146. <https://doi.org/10.1177/0148558X15625582>
- Meyer, J. P., Becker, T. E., & Vandenberghe, C. (2004). Employee commitment and motivation: A conceptual analysis and integrative model. *Journal of Applied Psychology*, 89(6), 991-1007. <https://doi.org/10.1037/0021-9010.89.6.991>
- Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology*, 83(2), 340-363. <https://doi.org/10.1086/226550>
- Nolan, R., & McFarlan, F. W. (2005). Information Technology and the Board of Directors. *Harvard Business Review*, 83(10), 96-106.
- Organ, D. W. (1988). A restatement of the satisfaction-performance hypothesis. *Journal of Management*, 14(4), 547-557. <https://doi.org/10.1177/014920638801400405>
- Podsakoff, N. P., Whiting, S. W., Podsakoff, P. M., & Blume, B. D. (2009). Individual-and organizational-level consequences of organizational citizenship behaviors: A meta-analysis. *Journal of Applied Psychology*, 94(1), 122-141. <https://doi.org/10.1037/a0013079>
- Podsakoff, P. M., MacKenzie, S. B., Paine, J. B., & Bachrach, D. G. (2000). Organizational citizenship behaviors: a critical review of the theoretical and empirical literature and suggestions for future research. *Journal of Management*, 26(3), 513-563. [https://doi.org/10.1016/S0149-2063\(00\)00047-7](https://doi.org/10.1016/S0149-2063(00)00047-7)
- Posey, C., Roberts, T. L., & Lowry, P. B. (2015). The impact of organizational commitment on insiders' motivation to protect organizational information assets. *Journal of Management Information Systems*, 32(4), 179-214. <https://doi.org/10.1080/07421222.2015.1138374>
- Posey, C., Roberts, T. L., Lowry, P. B., Bennett, R. J., & Courtney, J. F. (2013). Insiders' protection of organizational information assets: Development of a systematics-based taxonomy and theory of diversity for protection-motivated behaviors. *MIS Quarterly*, 37(4), 1189-1210. <http://www.jstor.org/stable/43825787>
- Prasad, A., Green, P., & Heales, J. (2012). On IT governance structures and their effectiveness in collaborative organizational structures. *International Journal of Accounting Information Systems*, 13(3), 199-220. <https://doi.org/10.1016/j.accinf.2012.06.005>
- Prasad, A., Heales, J., & Green, P. (2010). A capabilities-based approach to obtaining a deeper understanding of information technology governance effectiveness: Evidence from IT steering committees. *International Journal of Accounting Information Systems*, 11(3), 214-232. <https://doi.org/10.1016/j.accinf.2010.07.013>
- Rai, A., Brown, P., & Tang, X. (2009). Organizational assimilation of electronic procurement innovations. *Journal of Management Information Systems*, 26(1), 257-296. <https://doi.org/10.2753/MIS0742-1222260110>
- Tallon, P. P., Ramirez, R. V., & Short, J. E. (2013). The information artifact in IT governance: toward a theory of information governance. *Journal of Management Information Systems*, 30(3), 141-178. <https://doi.org/10.2753/MIS0742-1222300306>
- Tiwana, A., & Konsynski, B. (2010). Complementarities between organizational IT architecture and governance structure. *Information Systems Research*, 21(2), 288-304.

- <https://doi.org/10.1287/isre.1080.0206>
- Tiwana, A., Konsynski, B., & Venkatraman, N. (2013). Special issue: Information technology and organizational governance: The IT governance cube. *Journal of Management Information Systems*, 30(3), 7-12.
- Trites, G. (2004). Director responsibility for IT governance. *International Journal of Accounting Information Systems*, 5(2), 89-99. <https://doi.org/10.1016/j.accinf.2004.01.001>
- Valentine, E., De Haes, S., & Timbrell, G. (2016). The board's role in the governance of enterprise information and technology. In R. Leblanc (Ed.), *The Handbook of Board Governance: A Comprehensive Guide for Public, Private and Not-for-Profit Board Members* (pp. 574-596). Wiley.
- Velicer, W. F., Govia, J. M., Cherico, N. P., & Corriveau, D. P. (1985). Item format and the structure of the buss-durkee hostility inventory. *Aggressive Behavior*, 11(1), 65-82. [https://doi.org/10.1002/1098-2337\(1985\)11:1<65::AID-AB2480110108>3.0.CO;2-H](https://doi.org/10.1002/1098-2337(1985)11:1<65::AID-AB2480110108>3.0.CO;2-H)
- Weber, R. (2012). Evaluating and developing theories in the information systems discipline. *Journal of the Association for Information Systems*, 13(1), 1-30. <https://doi.org/10.17705/1jais.00284>
- Westphal, J. D., & Zajac, E. J. (1994). Substance and Symbolism in CEOs' Long-Term Incentive Plans. *Administrative Science Quarterly*, 39(3), 367-390. <https://doi.org/10.2307/2393295>
- Westphal, J. D., & Zajac, E. J. (2001). Decoupling policy from practice: The case of stock repurchase programs. *Administrative Science Quarterly*, 46(2), 202-228. <https://doi.org/10.2307/2667086>
- Wu, S. P.-J., Straub, D. W., & Liang, T.-P. (2015). How information technology governance mechanisms and strategic alignment influence organizational performance: Insights from a matched survey of business and IT managers. *MIS Quarterly*, 39(2), 497-518.
- Xue, L., Ray, G., & Gu, B. (2011). Environmental uncertainty and IT infrastructure governance: A curvilinear relationship. *Information Systems Research*, 22(2), 389-399. <https://doi.org/10.1287/isre.1090.0269>

---

<sup>1</sup> “The degree to which the organization has established organizational units and roles responsible for making IT decisions such as committees” (Wu et al., 2015, p. A6)

<sup>2</sup> “The degree to which the organization has established formal processes to monitor and ensure that IT policies are consistent with business needs” (Wu et al., 2015, p. A6).

<sup>3</sup> “The degree to which the organization has established channels to ensure proper communication and disseminate IT governance principles” (Wu et al., 2015, p. A6).

<sup>4</sup> “The alignment between IS strategy and business strategy in product development” (Wu et al., 2015, p. A6).

<sup>5</sup> Strategic alignment is “the degree of coherence between realized business strategy and realized IT strategy” (Wu et al., 2015, p. A6).

<sup>6</sup> “The alignment between IS strategy and business strategy in terms of quality and production efficiency” (Wu et al., 2015, p. A6).

<sup>7</sup> “The alignment between IS strategy and business strategy regarding marketing activities” (Wu et al., 2015, p. A6).