Effects of Strategic IS on Competitive Strategy and Performance

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Effects of Strategic Information Systems on Competitive Strategy and Performance

Abstract

Purpose - This study argues that strategic information systems (SIS) are necessary for organizations' survival and corporate performance in turbulent economic environments. Applying Miles and Snow's strategy typology, this study explores how SIS supports business strategy and corporate performance.

Methodology - This study uses quantitative survey data from 389 Brazilian companies during economic crises and analyzes the data using structural equation modeling.

Findings - There is strong evidence that SIS promotes capacity and flexibility to create competitive strategies in response to environmental changes. SIS significantly and positively predicts firms' use of prospector strategies, reducing the need to sacrifice efficiency for innovation. SIS can predict corporate performance more strongly than firms' strategic orientations can.

Practical implications - The results provide organizations with insights into how SIS enables strategic planning processes to create competitive strategy and improve performance during economic turbulence.

Value - This research demonstrates SIS's positive effects during economic turbulence on competitive strategy and performance, revealing that corporate performance is influenced more by SIS (strategic process) than strategic orientation (content). Hence, this study fills a research gap in the information systems strategy literature by contributing new insights about SIS.

Keywords: Strategic information systems, IS strategy, IT/IS business value, corporate performance, strategic orientation, balanced scorecard.

Paper type: Research paper

1. Introduction

Several studies have demonstrated that creating business strategy value requires effective use of strategic information systems (SIS) (Chan & Huff, 1992; Chen, Mocker, Preston, & Teubner, 2010; Marabelli & Galliers, 2017; Newkirk, Lederer, & Srinivasan, 2003; Philip, 2007; Teo & King, 1997; Wang & Byrd, 2017). Recognizing that SIS is widely utilized, Chen *et al*. (2010) and Merali *et al*. (2012) suggest that conceptions emerging from the SIS literature both differ from and complement each other regarding contextual elements of the SIS process, content, desired impact, and alignment.

Understanding the importance of SIS streams and the infeasibility of examining them all, this study focuses on SIS as use of information systems (IS) to support the *process* and *content* of business strategy in complex environments. According to Newkirk and Lederer (2006) and Singh *et al.* (2002), SIS supports all strategic planning processes, such as strategic awareness, situation analysis, strategy conception, strategy formulation, and strategy implementation/control planning; moreover, SIS enables the content of business strategies and influences corporate performance (Chan & Reich, 2007; Chan, Sabherwal, & Thatcher, 2006; Marabelli & Galliers, 2017; Whittington, 2014).

Strategic planning is a systematic process for establishing strategies geared toward providing firms with competitive advantages and improving corporate performance in certain environmental conditions (Grant, 2003; Hill, Jones, & Schilling, 2014; Wolf & Floyd, 2017; Yoshikuni & Jeronimo, 2013). Several typologies describe strategic planning (Mintzberg, Ahlstrand, & Lampel, 2009), the most famous being Porter's (1986) typology of generic strategies and Miles and Snow's (Miles, Snow, Meyer, & Coleman, 1978) typology of strategic behaviors. Porter's (1986) typology presents types of cost leadership and differentiates broad and segmented targets (focus). In other words, Porter's perspectives classify strategy based on the extremes of innovation and efficiency, but it cannot measure the strategy's ambidexterity. Miles and Snow's (Miles et al., 1978) typology can test the trade-off between innovation and efficiency using the analyzer strategic orientation archetype (strategy's

ambidexterity) and firms without a strategic orientation, such as the reactor typology. Thus, the use of their typology is prioritized in this study.

Given today's global marketplace and increasingly complex economy, SIS is critical to many organizations' survival, and business managers consistently rank it among the top IS management issues (Whittington, 2014). Brazilian managers assume that information technology/information systems (IT/IS) can strengthen corporate performance (Meirelles, 2016), and Brazilian firms spent 7.6% of their revenue on IT/IS solutions to address and adapt to economic turbulence.

Thus, the study sought to fill research gaps in the IS strategy literature by contributing new insights about SIS (Chen et al., 2010; Newkirk & Lederer, 2006; Peppard, Galliers, & Thorogood, 2014; Whittington, 2014). Specifically, SIS must incorporate strong planning capabilities to help organizations effectively adapt to changing factors—internal and external—to enable strategic orientation (Miles et al., 1978). Furthermore, SIS affects corporate performance (as measured by the balanced scorecard) (Kaplan & Norton, 1992, 2008) during extreme economic turbulence.

2. Theoretical framework

This section describes the factors investigated with regard to SIS, strategic orientation, and corporate performance.

2.1 Strategic information systems

This study adopted the framework of IT/IS business value (Kohli and Grover, 2008; Melville *et al*., 2004) for how IT/IS resources are applied within strategic business processes to improve performance. According to Whittington (2014), SIS is used as an IT/IS application to promote strategy-as-practice in order to support deliberate managerial planning for strategic positioning and performance; that is, technology applications enable strategic practice to develop and execute content

strategies. Arvidsson, Holmström and Lyytinen (2014) investigate SIS embedded in strategy practices, enabling a firm to analyze diverse scenarios and increase the speed of strategy development, to explore emergent strategy grounded in the activities of multiple organizational sub-communities in which firms develop specific and original strategy content. Thus, many strategizing practices by SIS, from strategy formulation to strategy communication, enable orientation strategy to gain corporate performance, and show that business strategy process is inseparable from the influence of information systems on content strategies (Whittington, 2014).

SIS is defined as a portfolio of IS applications supporting an organization's business plans (Sabherwal & Chan, 2001) to enable the process and content of business strategy to achieve its objectives. These applications include operational support systems, business collaboration systems, management IS, and decision support systems (Laudon & Laudon, 2006; O'Brien & Marakas, 2007; Sabherwal & Chan, 2001; Singh et al., 2002). According to Mentzas (1997), Newkirk and Lederer (2006), and Yoshikuni and Jeronimo (2013), SIS supports the strategic planning process by enabling strategic awareness through disseminating strategic objectives/goals for every organization; making it possible to map the external environment's opportunities and threats when analyzing the general environment in which a company exists; designing strategy by aligning internal resources—technological, people, and organizational—to utilize opportunities and mitigate threats; selecting and formulating strategies to develop new business processes leveraged by IT/IS resources; and implementing and monitoring business strategies by supporting change processes, execution, and control of action plans.

Recently, research has been intensifying on the creation of business value through IS and IT resources (Marabelli & Galliers, 2017; Melville, Kraemer, & Gurbaxani, 2004; Merali et al., 2012). Effective use of IS in business strategy processes is considered a key factor for chief information officers and chief executive officers (Anwar & Hasnu, 2016; Philip, 2007). SIS studies seek to guide

research in this theoretical framework (Chan & Huff, 1992; Earl, 1993; Ein-Dor & Segev, 1978; King, 1978; Lederer & Salmela, 1996; Teo & King, 1997) and clarify how effective use of IS contributes to strategic planning processes and sharing of organizational perspectives to maintain and achieve corporate objectives (Chen et al., 2010; Jääskeläinen & Luukkanen, 2017; Mentzas, 1997; Newkirk et al., 2003; Newkirk & Lederer, 2006; Philip, 2007).

Top managers define strategic objectives to provide the basis for developing strategic planning practices (Bernado, Anholon, Novaski, Silva, & Quelhas, 2017; Hill et al., 2014). SIS enables organizational collaboration competency to promote effective utilization and management of relevant stakeholder groups' inputs into the SIS process (Philip, 2007; Segars & Grover, 1999). Effective SIS use facilitates communication with and monitoring of employees, which helps determine whether objectives are being met (Jääskeläinen & Luukkanen, 2017; Karpovsky & Galliers, 2015; Segars, Grover, & Teng, 1998). SIS promotes collaboration at all organizational levels, including top management, in internal and external SIS processes to improve the effectiveness of the strategic planning process (Newkirk & Lederer, 2006; Yeh, Lee, & Pai, 2012). Managers use strategic IS to organize planning teams and obtain strategic commitment from top management to improve its effectiveness in performing tasks and achieving communication goals (Dameron, Lê, & Lebaron, 2015; Jääskeläinen & Luukkanen, 2017; Muriithi, Horner, & Pemberton, 2016; Philip, 2007; Segars et al., 1998).

Environmental analysis involves scanning all external factors that affect (but are not directly controlled by) the organization to identify opportunities for improving operations (Hill et al., 2014; Mintzberg et al., 2009; Porter, 1986). Through environmental analysis, firms can secure information that describes advancements, opportunities, and threats in the external environment (Dameron et al., 2015; De Lorenzi Cancellier, Blageski Junior, & Rossetto, 2014; Newkirk & Lederer, 2006; Singh et al., 2002; Xu, Ong, Duan, & Mathews, 2011). Hence, SIS must incorporate strong planning capabilities

to be flexible enough to adapt IS effectively to changing external factors (Davenport, Harris, & Morison, 2010; George, Haas, & Pentland, 2014; Leidner, Lo, & Preston, 2011; Marabelli & Galliers, 2017) and to enable organizational competencies to conceive strategies.

Strategy conception relates to the development, evaluation, and selection of organizational strategies (Bernado et al., 2017; Hill et al., 2014; Mintzberg et al., 2009; Porter, 1986). Specifically, it involves identification of potentially problematic issues, generation of alternative courses of action, and analysis of proposed strategic approaches (Kaplan & Norton, 2008; Porter, 1986; Rouhani, Ashrafi, Ravasan, & Afshari, 2016; Segars et al., 1998; Shollo & Galliers, 2016; Singh et al., 2002). Thus, IS can strengthen a firm's capacity to coordinate and integrate, and can increase its ability to alter current strategies (Jääskeläinen & Luukkanen, 2017; Kim, Shin, Kim, & Lee, 2011; Newkirk & Lederer, 2006; Pavlou & El Sawy, 2006, 2010).

Managers must develop and implement strategic actions that are consistent with the company's business strategy, thereby facilitating the achievement of long-term organizational goals (Hill et al., 2014; Jääskeläinen & Luukkanen, 2017; Mintzberg et al., 2009; Porter, 1986). During strategy implementation, SIS provides information about how project plans are realized, facilitates communication and coordination of work activities among work personnel, supports budgetary processes, and matches job requirements with personnel qualifications (Jääskeläinen and Luukkanen, 2017; Kim *et al*., 2011; León-Soriano *et al*., 2010; Muriithi *et al*., 2016; Newkirk and Lederer, 2006; Teo and King, 1997).

Finally, strategic control relates to monitoring the implementation of a strategy and assessing its outcomes (Hill et al., 2014; Kaplan & Norton, 1992, 2008; Wolf & Floyd, 2017). Strategic control ensures effective and efficient use of resources to accomplish organizational objectives (Jääskeläinen and Luukkanen, 2017; León-Soriano *et al*., 2010; Singh *et al*., 2002). Specifically, strategic use of IS generates and integrates data for careful evaluation by organizational personnel (Kaplan & Norton,

2008). Moreover, it allows for comparison of corporate performance with budgets, goals, standards, and targets (León-Soriano *et al*., 2010; Muriithi *et al*., 2016; Newkirk and Lederer, 2006).

Thus, SIS is a set of IT/IS applications that collect, process, analyze, and provide data/information for decision making. These applications enable a holistic, interactive, decentralized, and dynamic view of the organization; generate organizational knowledge; and facilitate learning in the strategic planning process. Hence, SIS-embedded strategic planning enables strategy content to gain competitive advantage and improve firm performance.

2.2 Strategic orientation

Strategic orientation relates to the way in which a firm adapts to environmental changes to achieve corporate performance (Chan, 1997; Moore, 2005). Among the strategic typologies in strategic management, Miles and Snow's typology (Miles et al., 1978) is one of the most enduring, scrutinized, and applied frameworks (Anwar & Hasnu, 2016; Avci, Madanoglu, & Okumus, 2011; Chatzoglou, Chatzoudes, Sarigiannidis, & Theriou, 2017; Conant, Mokwa, & Varadarajan, 1990; Frambach, Fiss, & Ingenbleek, 2016).

This typology considers that managers' divergent strategic orientations can induce similar businesses to operate differently when facing environmental changes (Efrat & Shoham, 2013). They argued that these business strategies may exist simultaneously within industries, and viable strategies (prospectors, defenders, and analyzers), if properly implemented, would yield similar results and outperform non-viable strategies (reactors) (Anwar & Hasnu, 2016; Parnell, Long, & Lester, 2015). Ultimately, Miles and Snow (Miles et al., 1978) defined four strategic orientation archetypes as part of their typology: prospector, defender, analyzer, and reactor firms.

Prospector firms monitor market trends in order to be the first entrant in a new market or the first developer of a new product (Avci et al., 2011; Parnell, Koseoglu, Long, & Spillan, 2012; Parnell et

al., 2015). These firms are externally oriented and constantly redefine markets. In addition, they adopt new production systems and technologies with little hesitation (Efrat & Shoham, 2013; Frambach et al., 2016; Moore, 2005).

However, defender firms protect their status in the current markets and seek market stability (Conant et al., 1990; Efrat & Shoham, 2013; Parnell et al., 2015). They are risk averse and adhere to systems that improve the efficiency of existing operations (Moore, 2005; Parnell, 2010; Sabherwal & Chan, 2001). They seek only proven opportunities and thus, tend to lag behind industry competitors in terms of innovation (Anwar & Hasnu, 2016; Avci et al., 2011; Chatzoglou et al., 2017).

Analyzer firms are hybrids of defenders and prospectors (Conant et al., 1990; Frambach et al., 2016; Parnell et al., 2015). These firms primarily seek to minimize risk and maximize opportunities for profit, developing a balance between the two (Avci et al., 2011; Parnell, 2010; Sabherwal & Chan, 2001). Analyzers tend to focus on efficiency and productivity when the market is stable, but they engage in cautious scanning and innovation during market turbulence (Anwar & Hasnu, 2016; Chan, 1997; Parnell et al., 2012).

Finally, reactor firms tend to be inconsistent in their adaptive patterns. They respond to changes in competitive circumstances only when forced (Avci et al., 2011; Chan, 1997). According to Miles and Snow (Miles et al., 1978), the reactors have a dysfunctional orientation because of their inconsistent strategic approach (Miles et al., 1978). They often suffer poor performance relative to firms with different strategic orientations (Anwar & Hasnu, 2016; Moore, 2005).

In summary, defenders play it safe by operating in a narrow, stable domain, whereas prospectors frequently take risks with untried products. Analyzers are highly risk averse; they look for opportunities to grow but only add new products/services that have already been shown to work successfully by another organization (a prospector). Reactors do not follow a conscious strategy,

which is not considered viable in the long run (Anwar & Hasnu, 2016; Chan, 1997; Sabherwal & Chan, 2001).

2.3 Corporate performance

To analyze critical features of the competitive environment, it is necessary to extend extant measurements of corporate performance so they can assess multiple dimensions of organizational success (Chan, 1997; Jääskeläinen & Luukkanen, 2017; Mithas, Ramasubbu, & Sambamurthy, 2011; Mostaghel, Oghazi, Beheshi, & Hultman, 2015; Norreklit, 2000; Reefke & Trocchi, 2013; Sen, Bingol, & Vayway, 2017; Sohn, You, Lee, & Lee, 2003; Yoshikuni, Machado-da-silva, Albertin, & Meirelles, 2014). Many researchers consider the balanced scorecard (Kaplan & Norton, 1992) an effective and comprehensive tool for measuring corporate performance based on financial success, customer performance (CUPE), internal process efficiency, and organizational learning (Bento, Bento, & White, 2013; Callado & Jack, 2015; Kaplan & Norton, 2008; Park, Lee, & Chae, 2017; Perkins, Grey, & Remmers, 2014; Yoshikuni & Albertin, 2017).

Financial performance (FIPE)—a function of productivity and growth-based corporate performance—is related to the degree to which a firm converts tangible and intangible assets into shareholder value (Atkinson, Kaplan, Matsumura, & Young, 2011; Mithas et al., 2011; Norreklit, 2000; Perkins et al., 2014). Productivity strategy concerns the efficient management of costs, expenses, and investment performance; growth strategy is primarily associated with revenue generation (Callado & Jack, 2015; Kaplan & Norton, 2008; Lipe & Salterio, 2000; Park et al., 2017; Sohn et al., 2003; Stewart, 2001; Yoshikuni et al., 2014).

CUPE specifies how a firm can create value for the market (León-Soriano *et al.*, 2010; Mostaghel *et al.*, 2015; Sohn *et al.*, 2003; Stewart, 2001). Specifically, a firm can promote customer satisfaction by delivering desired product attributes to the market, thereby demonstrating added value and

improving customer retention (Bento et al., 2013; Kaplan & Norton, 2008; Lipe & Salterio, 2000; Mithas et al., 2011; Norreklit, 2000; Park et al., 2017; Reefke & Trocchi, 2013; Stewart, 2001; Yoshikuni et al., 2014).

Internal process performance (IPPE) identifies activities in the value chain that transform assets into benefits for clients and shareholders (Mithas et al., 2011; Norreklit, 2000; Park et al., 2017; Perkins et al., 2014; Sohn et al., 2003). Generally, researchers consider that "internal business processes" encompass all activities in the internal value chain. This perspective dictates that three processes are common to all firms: innovation, operations, and post-sales (Callado & Jack, 2015; Kaplan & Norton, 2008; Lipe & Salterio, 2000; Park et al., 2017; Reefke & Trocchi, 2013).

Finally, the organizational growth and learning perspective (GLPE) indicates how intangible assets are aligned and integrated to create organizational value (Bento et al., 2013; Lipe & Salterio, 2000; Mithas et al., 2011; Park et al., 2017; Perkins et al., 2014; Reefke & Trocchi, 2013). This component is measured based on human capital (i.e., employee training), information capital (i.e., IT/IS support and alignment with strategy), and organizational capital (i.e., corporate cultural attitudes) (Kaplan & Norton, 2008; Park et al., 2017; Sohn et al., 2003; Stewart, 2001; Yoshikuni & Albertin, 2017; Yoshikuni et al., 2014).

3. Research model, hypothesis development, and control variables

Based on the literature review, it was postulated that SIS-embedded strategic planning (Whittington, 2014) enables the competitive strategy described by Miles *et al*. (1978) and influences corporate performance (Kaplan & Norton, 1992). The model is presented in Figure 1 with the hypotheses.

[Insert Figure 1 here]

3.1 Strategic information systems and strategic orientation

Strategic planning helps companies develop capabilities to achieve organizational objectives (Mintzberg et al., 2009; Wolf & Floyd, 2017). A company's strategic orientation defines the stance it adopts to achieve these objectives (Miles et al., 1978). Strategic orientations are characterized as analyzer, prospector, defender, and reactor. Thus, the SIS-embedded strategic planning process enables the business strategy's content (Chan et al., 2006; Whittington, 2014).

Porter (1985), a seminal study of competitive strategy, defines strategic positioning (content strategy of cost leadership and differentiation) as dependent on an effective strategic planning process. Mintzberg *et al.*(2009) define content strategies as deliberate planning (goal formation, alternative generation, and choice), and (or) emergent forces (decisions and actions arising within an organization) in that they are developed by strategic activities disseminated across all organizational levels. Both of these studies demonstrate that strategic content comprises outcomes influenced by a strategic business process—either more or less formal. According to recent strategy theory research of Wolf and Floyd (2017) on the landscape of strategic planning, practice strategy is defined as a dimension that promotes strategic planning effectiveness, thereby enabling content strategy and impacting organizational performance. Then, strategic practices refer to the routines and norms of strategic work, which are included in the strategic planning process by dimensions of practitioners, praxis, and technologies (Whittington, 2014). Therefore, the proposal model of strategic planning defined by Wolf and Floyd (2017) describes strategic practices as antecedents to support content strategy and influence performance by IT/IS resources (SIS).

Hence, as mentioned earlier (section 2.1), the SIS is a set of IS applications and IT resources that is embedded in strategic planning and enables organization to execute their business strategies in practice (Marabelli & Galliers, 2017; Whittington, 2014) to impact firm performance (Melville *et al.*, 2004). SIS provides a wide range of information on strategic planning routines, enabling an

organization's participatory capacity to think, analyze, formulate, coordinate, and monitor business strategy (Singh et al., 2002; Yoshikuni & Jeronimo, 2013).

According to Chen *et al.* (2010) and Merali *et al.* (2012), effective use of SIS helps organizations successfully execute the strategic planning process. These authors argue that successful strategic planning implies the company's ability to effectively promote its employees' cooperative work in thinking, analyzing, and developing strategies supported by IS.

SIS facilitates the strategic awareness phase by promoting communication, integration, and cooperation from top to bottom, and from bottom to top (Chen et al., 2010; Jääskeläinen & Luukkanen, 2017; Segars & Grover, 1999); and without boundaries—local or global—so that all employees understand the strategic priorities (Newkirk et al., 2003; Newkirk & Lederer, 2006; O'Brien & Marakas, 2007). SIS promotes organizational commitment through teamwork (Chan & Reich, 2007; Segars & Grover, 1999). In light of Wolf and Floyd (2017), any business strategy's success depends on employees' understanding of the strategy's development and execution. Therefore, SIS has relevant dissemination awareness strategies for strategic orientations, such as defender, analyzer, and prospector (Bernado et al., 2017; Jääskeläinen & Luukkanen, 2017; King, 1978).

SIS enables the strategic planning process to map external factors from the general environment (Newkirk & Lederer, 2006) and to develop strategies to capture opportunities and mitigate threats (Kaplan & Norton, 2008; Porter, 1986). According to Sabherwal and Chan (2001), SIS promotes flexibility for prospectors to monitor their product/market trends more closely and to spend more on marketing than defenders do; it also promotes flexibility for analyzers to accomplish imitation successfully through extensive marketing surveillance. According to Chen *et al.* (2010) and Leidner *et al.* (2011), SIS has a similar influence on innovation and conservative strategies as it does on prospector and defender strategies.

Pavlou and El Sawy (2010) find that effective use of SIS allows organizations to respond in real time to external environmental challenges by reconfiguring existing resources. SIS supports strategic planning conception by developing dynamic capabilities for reconfiguring existing operational skills to respond to environmental changes better (Yoshikuni & Albertin, 2017). Moreover, it enables capabilities to reconfigure existing resources spontaneously in order to build new operational capabilities and address urgent, unpredictable, and new environmental situations (Pavlou & El Sawy, 2006, 2010). Therefore, among defenders, SIS contributes to long-term planning, or futurity, which is a key characteristic of that configuration. Among prospectors, SIS contributes to proactiveness by helping the organization to develop strategic decisions quickly and effectively. Finally, among analyzers, SIS contributes to high levels of internal and external analyses conducted by organizations (Chan et al., 2006; Sabherwal & Chan, 2001).

SIS enables flexibility and agility during strategic planning formulation (Jääskeläinen & Luukkanen, 2017; Kearns & Sabherwal, 2006) and implementation of business strategies, with an emphasis on operational efficiency and flexibility for innovation (Chen et al., 2010; Marabelli & Galliers, 2017). According to Chan and Huff (1992), SIS can support business strategies, such as aggressiveness, analysis, proactiveness, risk-taking defensiveness, and futurity/innovativeness. According to Gupta *et al.* (1997) and Sabherwal and Chan (2001), strategies described by Chan and Huff (1992) reflect three types of SIS that correspond to the defenders, analyzers, and prospectors. SIS supports efficiency, flexibility, and comprehensiveness, which align with the defender, prospector, and analyzer business strategies, respectively. Thus, SIS supports defenders' emphasis on cost containment, prospectors' desire for flexibility and innovation, and analyzers' endeavors to achieve efficiency and innovation simultaneously.

Firms need to know how a strategy is working and why it might not be working, and thus, the monitoring phase is necessary for all strategies (Mintzberg et al., 2009). Hence, as mentioned before

(section 2.1), SIS is a set of IT/IS applications that collect, process, analyze, and provide data/information for decision making. This enables a holistic, interactive, decentralized, and dynamic view of the organization and generates organizational knowledge and learning in the strategic planning process (Yoshikuni & Jeronimo, 2013). This way, the prospector orientation supported by SIS enables firm creativity by generating new products and services as well as new business approaches (Chan & Reich, 2007; Gupta et al., 1997; Sabherwal & Chan, 2001). Moreover, the defender orientation is promoted by SIS for control, that is, for organizational efficiency and productivity (Chan et al., 2006; Martinez-Simarro, Devece, & Llopis-Albert, 2015; Philip, 2007), and for creation of a stable condition for maintaining current products and customer relationships (Chan & Reich, 2007; Gupta et al., 1997). Finally, SIS contributes to high levels of internal (production) and external (marketing) analyses, enabling comprehensive decision making to develop analyzer strategies (Chan, 1997; Croteau and Bergeron, 2001; Sabherwal and Chan, 2001). Therefore, planning capabilities provided by SIS result in creation of value and benefits for the strategic planning process by disseminating strategic awareness; analyzing external factors; promoting cooperation for conception; and developing, implementing, and monitoring competitive strategies (Mentzas, 1997; Newkirk et al., 2003; Newkirk & Lederer, 2006) for defenders, analyzers, and prospectors (Miles et al., 1978). Thus, the following hypotheses were postulated.

H1a: SIS is positively associated with the adoption of the analyzer strategic orientation.

H1b: SIS is positively associated with the adoption of the defender strategic orientation.

H1c: SIS is positively associated with the adoption of the prospector strategic orientation.

It is understood that reactor firms do not have a clear, consistent strategy (Chan, 1997; Sabherwal & Chan, 2001); do not use IS strategically (Gupta et al., 1997); and are characterized by extreme organizational inertia and respond to environmental pressures only when forced (Anwar & Hasnu, 2016). Thus, the following was hypothesized.

H1d: SIS is not positively associated with the adoption of the reactor strategic orientation.

Hence, an SIS-embedded strategic planning process (Newkirk & Lederer, 2006; Singh et al., 2002) enables competitive strategy content for defenders, analyzers, and prospectors (Miles *et al.*, 1978; Sabherwal and Chan, 2001) in all its stages (strategic awareness, environmental analysis, development, and business strategy execution and monitoring).

3.2 Strategic orientation and corporate performance

A business strategy is the outcome of decision making that guides an organization with respect to the environment, structures, and processes to improve corporate performance (Bernado et al., 2017; Croteau & Bergeron, 2001; Hill et al., 2014; Mintzberg et al., 2009). A business strategy defines a company's long-term plan to achieve its goals.

The relationship between strategy and performance has been examined in numerous works, both theoretically and empirically (Anwar & Hasnu, 2016; Chatzoglou et al., 2017). Many studies show that Miles and Snow's assumption of its effect of improving firm performance in the long run is overwhelming (Anwar & Hasnu, 2016; Parnell, 2010). Drawing from extant research and empirical findings showing that a firm's strategic orientation affects its corporate performance, this study tested the following hypotheses.

H2a: The analyzer orientation positively affects corporate performance.

H2b: The defender orientation positively affects corporate performance.

H2c: The prospector orientation positively affects corporate performance

However, the effect on reactors is uncertain or inappropriate and is generally linked with poor performance (Avci et al., 2011; Conant et al., 1990; Moore, 2005). Moreover, several studies demonstrate that the defender, analyzer, and prospector strategies outperform the reactor strategy (Anwar & Hasnu, 2016; Parnell, 2010; Parnell et al., 2015).

Nevertheless, recent studies on orientation strategy in developing countries, such as China and Turkey, show that reactor strategies have a negative effect on firm performance (e.g., Parnell *et al.,* 2012). Drawing from extant research and empirical findings, the following hypotheses were tested.

H2d: The reactor orientation negatively affects corporate performance.

3.3 Strategic information systems and corporate performance

Over the past 30 years, studies have continued to build on empirical evidence that reveals positive effects of IS strategy on corporate performance (Gerow, Grover, Thatcher, & Roth, 2015; Sabherwal & Chan, 2001; Yayla & Hu, 2012). These studies show that organizations perform well when key IT/IS resources are aligned to support effective management of business strategy (Coltman, Tallon, Sharma, & Queiroz, 2015).

According to Gerow *et al*. (2015), the SIS literature frequently emphasizes the positive aspects of alignment in theoretical frameworks and empirical research on firm performance (e.g., increased sales revenue, improved operational efficiency, cost reductions, and enhanced customer value). Recent studies demonstrate that IT/IS resources enable firm capabilities with tacit, socially complex firm-specific resources that are shown to enhance the customer value proposition and explain variations in FIPE (Merali et al., 2012).

Wade and Hulland (2004) suggest in their study of strategy and IS based on the resource-based view theory that IT/IS resources directly and indirectly influence competitive position and performance. Hence, once IT/IS resources are embedded in the organizational structure, firms can use them to create dynamic capabilities to renew and re-invent their organizations' resource base in order to adapt to the changing competitive context and, to re-position themselves to maintain or improve their competitive positioning (Merali et al., 2012; Pavlou & El Sawy, 2010). Yoshikuni and Albertin (2017), in a recent study, investigate the strong effects of IT/IS resource-enabled dynamic capabilities on business process improvement in order to understand customer needs and impacts on FIPE. Based

on these arguments, the following hypotheses were developed:

H3: SIS is positively associated with corporate performance.

3.4 Control variables

According to Chan *et al.* (2006) and Melville *et al.* (2004), organizational size (i.e., number of employees [SIZE]) and sector are industry characteristics that influence the relationship between SIS and corporate performance. Anwar and Hasnu (2016) and Parnell *et al.* (2012) demonstrate that there are different effects on the relationship between orientation strategy and performance based on different sectors and firm sizes. Two hypotheses were proposed to examine the moderation effects on exogenous and endogenous variables.

H3a: The effect of SIS on the orientation strategy is moderated by control variables.

H3b: The effect of the orientation strategy on firm performance is moderated by control variables.

4. Methodology

This section describes the sample, data, and analytic methods.

4.1 Sample

After a thorough literature review, a survey instrument was developed (see Appendix for details) and a pre-test survey was conducted to check the clarity of the items' contents, response time, and related observations (Kim et al., 2011; Yayla & Hu, 2012). The respondents were three IT/IS researchers and two researchers from the business field. Table 1 summarizes the measures and sources of the variables used in the analyses. Then, content validity of the instrument was tested through a pilot test with 42 organizational informants, who were Executive Master of Business Administration

(EMBA) professionals enrolled in a large university in Brazil (D'Arcy & Devaraj, 2012; Yayla & Hu, 2012).

[Insert Table 1 here]

The sample was selected from Brazilian companies using directories provided by the Center for Applied Information Technology [GVCia] of Fundação Getulio Vargas (FGV)[1]. Key informant methodology was used to obtain the sample, and respondents were chosen based on their position, experience, and professional knowledge (Kim et al., 2011). The target respondents included senior business administrators with adequate knowledge of IS and business strategizing processes.

The survey was administered via email, and questionnaires were distributed to 1,577 organizations. Respondents had two weeks to respond, during which time they could review the questionnaire with other company executives. Respondents could resolve possible doubts with the authors by email or telephone. A total of 394 (23%) questionnaires were returned. Among them, 47 had missing data; these responses were removed from the analyses, yielding a final sample size of 389.

To identify potential bias in the subsamples, the organization groups of "EMBA" and "GVCia" were compared with those of the final sample (N = 389). All t-tests comparing the responses provided by these two samples showed no significant differences. A dummy variable was included in the model to represent the sample (i.e., 42 organizations vs. the main study) of which a participant was a part. The path from the dummy variable to corporate performance was not significant ($\beta = 0.01$, $p > 0.05$). The Statistical Package for the Social Sciences (SPSS, Version 20.0) was used for all analyses, and any incomplete response sets from the final dataset were eliminated.

4.2 Data treatment

Past studies have shown that research using partial-least-squares path modeling (PLS-PM) methods

must use a sample of no less than 10 times the number of structural paths arriving at a given reflexive construct (J. Henseler, Ringle, & Sinkovics, 2009; Urbach & Ahlemann, 2010). Given this rule and the conceptual model, the minimum sample size in this study was 40 respondents. The sample of 389 far exceeds this threshold.

Corporate performance (CP) is a latent, second-order variable composed of multiple reflective constructs, including FIPE, CUPE, IPPE, and GLPE, according to Yoshikuni *et al.* (2014). Moreover, corporate performance was modeled as a latent, second-order variable according to the guidelines of Bento *et al.* (2013), Wetzels *et al.* (2009), and Wold (1982). This allowed the execution of the PLS-PM algorithm.

Finally, statistical techniques were applied to detect and (where possible) control for common method bias. Consistent with Chin *et al.* (2013), the measured latent marker variable (MLMV) technique was used for the model at the corporate performance level.

4.3 Analysis

PLS-PM was used to analyze all variables and evaluate the relationships among them. PLS-PM is a well-established method for simultaneous analysis of multiple variables (e.g., asymmetric variable distributions and limited data) (see Ringle *et al.*, 2012, 2014). The SmartPLS 2.0 M3 program was used to perform all PLS-PM analyses (Ringle, Wende, & Will, 2005).

In evaluating the normality of each measure, none was found to be sufficiently non-normal to warrant correction. All skewness values were less than 3, and all kurtosis levels were less than 10 (see Marôco, 2010). Table 2 summarizes these statistics.

Of the respondents who returned questionnaires, 30% were C-level executives (e.g., chief executive officers), 37% were management and coordination personnel, and 33% were supervisors with decision-making powers. Of the firms represented in the sample, 13 firms (3%) were engaged in

agribusiness (generic value chain of these businesses related to agriculture and livestock). Moreover, 100 firms (26%) were involved in manufacturing of durable goods (non-perishable goods, such as cars, household appliances, and furniture) and non-durable goods (commodities for basic needs, such as food, drink, clothes, shoes, and cosmetics). The remaining 276 firms (71%) were services providers (corresponding to trade activities in goods and provision of services, such as merchandise trade to public administration, transportation, financial and real estate activities, business or personal services, education, and health and social promotion). Of the represented firms, 3% had fewer than 9 employees at the time of data collection; 8% had 10–49 employees; 9% had 50–99 employees; 11% had 100–249 employees; 11% had 250–499 employees; and 58% had more than 500 employees. The sample was heavily populated by firms in the services and manufacturing sectors (97%).

5. Results

This section describes the analysis results for the measurement and structural models as well as the reflective constructs. This section also presents the results of the hypothesis tests.

5.1 Measurement model

The reflective constructs in the measurement model were evaluated by checking their internal consistency, indicator reliability, convergent validity, and discriminant validity (Hair, Hult, Ringle, & Sarstedt, 2013; Jörg Henseler, Hubona, & Ash, 2016).

The Fornell–Larcker (1981) criterion was used to evaluate the convergent validity and average variance extracted (AVE; values greater than 0.50 are preferable) of the reflective constructs (J. Henseler et al., 2009; Ringle et al., 2014). Composite reliability (CR) is the most reasonable measure of reliability for PLS-PM, because it prioritizes variables according to their respective reliabilities (Ringle et al., 2014). CR values greater than 0.70 are considered internally consistent (D'Arcy &

Devaraj, 2012; Jörg Henseler et al., 2016). To analyze the validity of the model's constructs, the Fornell–Larcker criterion was compared with the square root of the constructs' AVE values with highest latent variable correlation with any other construct (J. Henseler et al., 2009); see Table 2. Furthermore, a bootstrapping method with 1,000 replications was used to determine the statistical significance of the tests.

[Insert Table 2 here]

The convergent validity and square root of the strategy indicator's AVE (the value of which is on the diagonal) was also evaluated. Table 2 shows that all AVE and internal consistency values (which should exceed 0.70) were acceptable. Moreover, indicators with outer loadings between 0.50 and 0.70 were considered because of the increases in AVE and CR beyond the threshold values suggested by (Hair et al., 2013). Table 3 shows that the indicators have higher factor loadings on their assigned constructs and lower factor loadings on other constructs, thereby indicating discriminant validity (Chin, 1998; Ringle et al., 2014; Urbach & Ahlemann, 2010).

[Insert Table 3 here]

The second-order corporate performance variable yielded an AVE value of 0.63 and CR estimate of 0.89. A comparison of the Fornell–Larcker criterion with the square root of corporate performance (0.944) AVE values shows the criterion to be satisfied.

5.2 Structural model

To test for multicollinearity among the model's constructs, their variance inflation factor (VIF) values were evaluated. All VIF values were well below Marôco's (2010) recommended limit of five, suggesting that there was no multicollinearity among the variables in the data.

Tables 4–6 (Cases 1–3) show the moderating effects of all latent and control variables on the relationships between the exogenous and endogenous variables. First, the relationships between all

latent variables are statistically significant ($p < 0.05$; see Table 4, Case 1). Although SIS and adoption of the reactor strategic orientation are negatively related ($\beta = -0.264$; $p < 0.001$), the relationships between SIS and adoption of other strategic orientations are positive ($\beta_{analyzer} = 0.408$, $\beta_{defender} = 0.335$, $\beta_{prospector} = 0.482$; all $p < 0.001$). This pattern of effects is also evident for corporate performance. The results show the adoption of the reactor strategic orientation to be negatively associated with corporate performance ($\beta = -0.103$; $p < 0.05$), but that of the analyzer ($\beta = 0.221$), defender ($\beta = 0.207$), and prospector (0.275) strategic orientations to be positively related to corporate performance ($p < 0.001$).

By including a direct path between SIS and CP, the strong positive relationship between the two variables is verified ($\beta = 0.376$, $p < 0.001$). Moreover, the variance explained by this new model (R^2) increased from 37.4% to 47.3% (see Table 5, Case 2).

The control variables (sector and size) had no moderating effects on the significant relationships described above (see Table 6, Case 3). However, firm size seems to have moderated the (originally non-significant) relationship between the reactor strategic orientation and corporate performance ($\beta = -0.125$; $p < 0.05$).

[Insert Table 4 here]

[Insert Table 5 here]

[Insert Table 6 here]

5.3 Controlling for common method bias

Chin *et al.*'s (2013) MLMV technique is applied to control for common method bias (Table 7, Case 4), because this study used one instrument to obtain data from single respondents at a single point in time. Specifically, four items designed to have the lowest possible correlation with the other constructs under investigation were used (see Table 8). These items were intended to capture common method variance, if any existed within the data.

[Insert Table 7 here]

[Insert Table 8 here]

To verify the MLMV analysis results, the differences between path coefficients across two groups (Cases 3 and 4) were explored. A parametric approach to the PLS-multi-group analysis (PLS-MGA, Hair et al., 2013) was used with the specification of group-specific path coefficients, standard errors (obtained from a 5,000-case bootstrapping procedure), and sample size. The normality of the data was verified, and, consistent with (Hair et al., 2013), the differences between β3 and β4 were observed to be non-significant. Taken together, these results indicate that common method bias is not a concern in the data used (see Table 9).

[Insert Table 9 here]

The coefficient of determination (R^2), which measures variance in strategic orientation and corporate performance, provides an indication of the structural model's predictive power. Cohen (1988) suggests that in social and behavioral sciences, R^2 values of 2%, 13%, and 26% indicate small, medium, and large effects, respectively. As evidenced by the R^2 values in Case 4, the coefficients of determination indicate that the relationships of the analyzer, defender, and prospector strategic orientations are characterized by a large effect. Only the reactor strategic orientation induced a small effect ($R^2 = 9.90\%$).

5.4 Direct and indirect effects of exogenous and endogenous variables

All possibilities for mediation were evaluated to identify the direct and indirect effects of SIS on CP. First, the direct effect of SIS on CP was estimated. This analysis revealed a strong positive relationship between SIS and CP ($\beta = 0.585$; $p < 0.001$) and featured a large coefficient of determination ($R^2 = 34.2\%$). Following Zhao *et al.* (2010), it was concluded that there are likely indirect effects intrinsic to the model as well. Accordingly, the mediator variables from the PLS-PM

analysis were included, and the variance accounted for (VAF) associated with each calculation was evaluated (see Table 10).

[Insert Table 10 here]

Owing to significant indirect effects (p value < 0.001), the VAF value was analyzed, as it determines the size of the ratio of the indirect effect to the total effect (Preacher & Hayes, 2008). According to Hair *et al.* (2013), when the VAF is less than 20%, there is almost no mediation present. A VAF exceeding 80% indicates full mediation. However, a VAF of 20–80% suggests partial mediation. The results indicate that none of the strategic orientation types mediate the relationship between SIS and CP.

5.5 Comparing differences between path coefficients in the structural model

According to Hair *et al.* (2013), the parametric approach is useful for exploring the differences between path coefficients in the structural model. In this vein, the differences between path coefficients associated with the relationship between SIS and strategic orientation variables were evaluated. Table 11 summarizes the results of these analyses.

[Insert Table 11 here]

Tables 12 and 13 summarize the results of the analyses of differences between path coefficients associated with the relationship between SIS and strategic orientation variables on corporate performance.

[Insert Table 12 here]

[Insert Table 13 here]

6. Discussion and conclusion

This study investigated the relationship between SIS and strategic orientation, between SIS and corporate performance, and between strategic orientation and corporate performance. Furthermore, this study explored how the effective use of SIS to support business strategy affects these outcomes. Specifically, this study explored the effects of SIS on four distinct strategic orientations—analyzer, defender, prospector, and reactor—and the direct effects of strategic orientation types on corporate performance.

The coefficient of determination associated with the inclusion of corporate performance and all strategic orientation types (except reactor) indicated that the model had good explanatory power. Given these findings, this study expands the extant theory and can assist practitioners to use SIS effectively in developing countries during periods of economic turbulence to gain superior corporate performance. The research method used the statistical technique of PLS-PM with SmartPLS software, which was proven an appropriate tool for the analysis.

Table 14 below demonstrates the hypotheses and original evidence.

[Insert Table 14 here]

The tests for Hypothesis 1 reveal significant path coefficients, indicating that incorporation of IS into the strategic planning process positively influences the likelihood of a firm adopting an analyzer, defender, or prospector strategic orientation. The study demonstrates that SIS provides firm capabilities for disseminating strategic awareness; analyzing external factors; and promoting cooperation for designing, developing, implementing, and monitoring competitive strategies (defender, analyzer, and prospector). Moreover, the results show that SIS is negatively related to the adoption of the reactor strategic orientation. This finding is consistent with expectations, as reactor firms tend to respond to the competitive environment inconsistently and without the steady use of SIS.

Furthermore, SIS was more strongly related to the prospector strategic orientation than the defender one. These results suggest that SIS produces business value through the promotion of

environmental adaptation by pioneering new products or responding to emergent opportunities. Specifically, SIS allows firms to communicate objectives more effectively, scan the environment, promote organizational flexibility, and innovate in a volatile environment. The study also found that an IS-incorporated business strategy promotes organizational flexibility, allowing firms to be creative and remain competitive in unpredictable business environments. Hence, effective use of SIS is believed to contribute to the building of capacity to reconfigure existing operational skills in order to respond to environmental changes better. Moreover, SIS can enable improvisation capabilities to reconfigure existing resources spontaneously in building new operational capabilities and to face urgent, unpredictable, and new environmental situations during economic turbulence.

In addition, the results show no significant difference in how SIS affects adoption of the analyzer or defender strategic orientation. These results provide evidence for the notion that SIS pushes firms to protect their market share by improving the efficiency and productivity of current operations, while simultaneously monitoring the turbulent environment for new growth opportunities.

The tests for Hypothesis 2 indicate that a firm's adoption of the analyzer, defender, or prospector strategic orientation positively influences its corporate performance. By contrast, the results show that the adoption of the reactor strategic orientation is negatively associated with corporate performance. The results confirm those of other studies conducted in the United States (Moore, 2005; Parnell et al., 2015), which indicate no differences between the effects of the environment of a stable economy versus that of an economy facing a crisis.

The tests for Hypothesis 3 reveal significant path coefficients, indicating that SIS positively influences corporate performance. The research result is consistent with those of other studies carried out in countries with stable economies (Leidner et al., 2011) and in developing economies (Yayla & Hu, 2012). This finding demonstrates that IT/IS resources should be used to support and enable capabilities of business strategy (i.e., alignment) in order to drive firm performance. The study shows

that SIS incorporated in the strategic planning process makes a greater contribution to corporate performance than does the strategic orientation adopted by the prospector, defender, analyzer, or reactor company. Thus, it can be concluded that the enabling of strategy-as-practice is supported by SIS, which becomes more effective than the strategic firm posture, that is, practices involving the strategic planning process are more effective than strategy content is. Hence, this study shows that SIS enables firm capabilities to blend rational and top-down decision making, and promotes an integrative, communicative device and a key coordinating mechanism for strategic decisions.

The tests for Hypothesis 4 were supported by the moderation of firm size in the relationship between SIS and the prospector strategic orientation as well as that between the reactor strategic orientation and corporate performance. The research confirms the results of past studies (Anwar & Hasnu, 2016; Chan & Reich, 2007; Chan et al., 2006; Parnell et al., 2015) that size influences competitive strategy and corporate performance. Organization size—small, medium, or large—is believed to influence dependent variables based on the availability of financial resources and maturity in the use of SIS. However, the moderation by sector did not support the relationship between SIS and strategic orientation and between strategic orientation and corporate performance. These results suggested that a high concentration of services and manufacturing sectors (97%) did not allow verification of the moderation of control variables.

The post-hoc analysis verified positive cause-and-effect relationships among the perspectives of an organization's strategy. The analysis confirms Park *et al.*'s (2017) finding that companies should try to improve their performance in their learning and growth perspective in order to influence internal processes and impact customer satisfaction to improve FIPE. The results show that path coefficients of the reflective models were strong and significant: GLPE ->IPPE ($\beta = 0.607$; $p < 0.001$; $R^2 = 0.369$), IPPE -> CUPE ($\beta = 0.655$; $p < 0.001$; $R^2 = 0.429$), and CUPE -> FIPE ($\beta = 0.507$; $p < 0.001$; $R^2 = 0.257$). Thus, a balanced scorecard is an appropriate model to measure corporate performance.

Taken together, the results show that effective use of SIS enables strategic orientation and creation of several benefits to influence firm performance. Furthermore, IS can contribute to the creation of business value to support all strategic planning processes. As such, the results indicate that the adoption of SIS solutions during economic crises can help firms perform well, even in volatile operating environments.

7. Implications and future research

This study contributes to Whittington's (2014) theory and research questions, which focus on the necessity of SIS and strategy researchers to have a joint agenda. This is because the IS field has longstanding interest in the strategic role of SIS, while strategy researchers are increasingly recognizing the significance of material technology in strategy work.

This study's results provide additional empirical support for the argument that IS use supports business strategy. The results suggest that both the effects of effective use of SIS on different types of competitive strategies and the strategic orientation influence corporate performance.

The effects of SIS on corporate performance vary depending on competitive strategy. Specifically, effective use of IS strategy enhances the prospector, defender, and analyzer strategies, suggesting that these types of organizations should pay close attention to how they use IS in order to support their business strategies. The results also imply that SIS empowers the strategic planning process and enables strategy content.

Hence, the study confirms that, in practice, it is not sufficient simply to monitor an organization's IT investment level. It is also necessary to understand and monitor how firms use technology to create business strategy value.

An important consideration for planning by practitioners is that not all firms use SIS in the same way to improve business strategy. It would appear that prospectors and analyzers have more to gain

from the use of SIS, suggesting that they utilize SIS with greater effort to scan the environment and create new products and services through IT applications, such as customer relationship management, big data, and customer analytics, rather than through operational support systems.

However, among defenders, the effects of SIS use are different to those among prospectors. These organizations use SIS with available data and information to make better decisions and improve operational efficiency (productivity and scale economies). Meanwhile, this kind of firm focuses on operational efficiency by reneging on innovation initiatives; in the long run, it may have difficulty staying in the market.

Hence, these results suggest that it is important for planners to be aware that components of the strategic planning process are supported by SIS, because mechanisms used to attain effective SIS depend on the organization's business strategy orientation. Assuming that each strategic orientation requires specific organizational capabilities to achieve superior performance, each company must align IT/IS resources that enable key processes to be effective in achieving strategic initiatives.

Another important observation is that effective use of SIS is more strongly related to exploration activities (prospector and analyzer) than to exploitation strategy (defender) in turbulent economies. In other words, the effective use of SIS in this scenario contributes to mitigating the risk of launching new products and services in a recessionary market by innovation strategy. Hence, this research confirms past studies (Chen et al., 2010; Leidner et al., 2011) that when SIS is effectively employed, it may create distinguish between firms' performance and strategic business improvements attributable by use of SIS.

In agreement with past studies (Conant et al., 1990; Moore, 2005), the direct effects of Miles and Snow's strategic types are equal to corporate performance by firms with defender, analyzer, and prospector strategic orientations. Reactors showed inconsistent behavior, but other studies in developing countries (Parnell et al., 2012) demonstrate a significant negative effect on corporate

performance. It is believed that reactor firms find it extremely difficult to survive in turbulent economies without a strategic planning process. In the context of this turbulent environment, SIS was demonstrated as a better alternative to support the strategic planning process and competitive strategy content.

Finally, this study's results suggest that effective use of SIS ensures a stronger impact of the competitive prospector strategy and corporate performance in turbulent economic environments. The results show that it is important for firms to understand how SIS supports the strategic planning process and enables competitive strategy in periods of economic crises.

Future studies, for example, could investigate how SIS contributes to strategy-as-practice in the areas of praxis, practices, and practitioners. According to Whittington (2014), firms do not have substantial empirical experience in applying various intimate methodologies, particularly ethnography, to business strategy from within.

Another potential focus of SIS researchers is to understand how digital technology impacts business strategy transformation. This would aid understanding of the importance of these technologies for the strategic planning process and content strategy.

Another topic to be investigated is the mediation of digital technology in the participation of strategy practitioners, that is, the level of collaboration of stakeholders in the strategic planning process.

Further study on how SIS could contribute to the strategic planning process should be conducted to understand the messy unfolding of practices involving strategic initiatives. Based on the research questions by Marabelli and Galliers (2017), strategists should be aware that strategizing is an emergent and emerging process and that it needs to be treated as such.

A final question to be resolved is how SIS can create dynamic and improvisation capabilities for firms to engage in exploration and exploitation innovation. Greater insight into these variables would

provide further information on how SIS creates strategy business value that can affect firms' capabilities for achieving superior performance in turbulent business environments.

Thus, this study contributes to the field of IS and strategy theory and presents many implications for practitioners and researchers in the field.

8. Study limitations

Although this study provides substantial insights into how SIS promotes business value through competitive strategy and corporate performance, it has limitations. First, as mentioned earlier (section 4) , cross-sectional design does not allow a researcher to fully establish the causality between independent variables and dependent variables, and a carefully designed longitudinal study could address this question more successfully.

Second, the sample for the study was not perfectly random, because the difficulty of collecting data from Brazilian organizations precluded full randomization. Furthermore, data were collected for only two major sectors which hindered the ability to generalize across other sectors. However, this limitation is also an acceptable, as it enabled the observation of variations within the two sectors, thereby ruling out the effects of the agribusiness industry on SIS.

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APPENDIX: Abbreviated questionnaire

All items were presented in the form of 7-point Likert-type scales ranging from 1 (strongly agree) to 7 (strongly disagree).

Strategic IS enables a firm to…

- (SIS_1) disseminate its objectives to all levels.
- (SIS_2) scan all external factors that affect it.
- (SIS_3) formulate business strategies.
- (SIS_4) implement strategies consistently with the firms' business strategy in order to achieve goals.
- (SIS_5) monitor the strategy and compare outcomes with other firms.

Strategic orientation

Analyzer orientation

The firm develops a strategy to…

- (ANAL_1) adopt industry innovations only after lengthy consideration.
- (ANAL_2) focus first on serving current customers and second on capturing new customers.
- (ANAL_3) realize that present developments are indeed opportunities allowing for the assumption of necessary risks.

Defender orientation

The firm develops a strategy to…

- (DEFE_1) maintain a safe niche using a traditional store format.
- (DEFE_2) stick with use of the current store format.
- (DEFE_3) concentrate on improving current retailing methods rather than developing new methods.

Prospector orientation

The firm develops a strategy to…

- (PROS_1) be an innovation leader in the market.
- (PROS_2) move into new markets frequently.
- (PROS_3) be the first in the industry to develop new ways to market goods.

Reactor orientation

The firm develops a strategy to…

- (REAC_1) make unavoidable changes due to excessive pressure from the environment.
- (REAC_2) respond to environmental pressure by cutting costs.
- (REAC_3) enact fundamental changes when it faces negative events, such as a crisis.

Corporate performance by BSC

Financial performance

- (FIPE_1) The company reaches its goals of profitability to satisfy shareholders.
- (FIPE_2) The business is efficient in terms of spending (i.e., cost management, expenses, and investments) to meet productivity goals.
- (FIPE_3) The company reaches its goals with respect to revenues.

Customer performance

- (CUPE_1) Customers remain loyal to the company.
- (CUPE_2) The market associates the company's image (brand) with the quality of the services and/or products it represents.
- (CUPE_3) Customers are satisfied with value provided by the company.

Internal process performance

The firm is efficient and effective in promoting…

- (IPPE_1) business process innovation.
- (IPPE_2) business process operations.
- (IPPE_3) business process post-sale activities.

Growth and learning performance

- (GLPE_1) Employees are satisfied with the firm's human capital policies (attraction, retention, and development)
- (GLPE_2) The firm is recognized by the market as a good place to work.
- (GLPE_3) Employees have the essential skills to manage their routines and strategic activities.

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[1] FGV is active in the areas of information and research, both applied and academic, with more than 90 study centers. FGV was recognized as the top think tank in Latin America for seven consecutive years (FGV, 2015). The GVCia is a leading IT/IS applied research center in Brazil and has been publishing studies on IT/IS theory for more than 25 years (Meirelles, 2016).

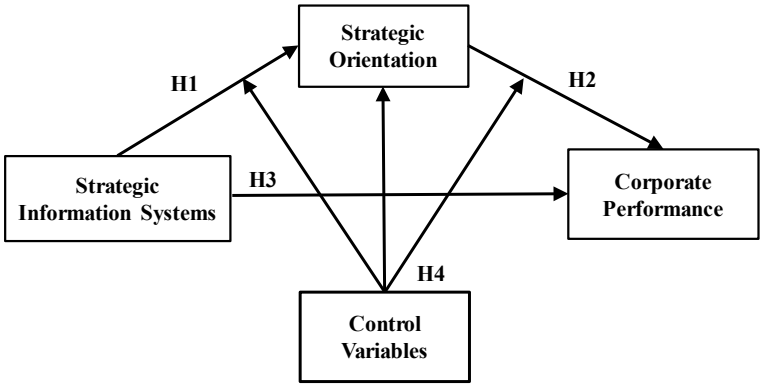

Figure 1: Model

Table 1: Measures and sources of variables used in the analyses

Variable	Measure	Source
Strategic Information Systems	IS support strategic planning	Singh *et al*. (2002); Newkirk and Lederer (2006)
Strategic Orientation	Analyzer Defender Prospector Reactor	Miles *et al*. (1978); Moore (2005)
Corporate Performance	Financial Customer Internal process Organizational learning and growth	Kaplan and Norton (1992); Yoshikuni *et al*. (2014)
Control Variables	Organizational size (i.e., number of employees [SIZE]) and sector	Anwar and Hasnu (2016); Chan *et al*. (2006); Melville *et al*. (2004)

Table 2: Pearson correlations and descriptive statistics for latent variables

Latent variable	1	2	3	4	5	6	7	8	9
1 – SIS	**0.78**								
2 – Analyzer Orient.	0.41	**0.71**							
3 – Defender Orient.	0.33	0.62	**0.71**						
4 – Prospector Orient.	0.48	0.50	0.47	**0.84**					
5 – Reactor Orient.	-0.26	-0.08	-0.07	-0.33	**0.72**				
6 – GLPE	0.49	0.38	0.35	0.36	-0.19	**0.75**			
7 – CUPE	0.38	0.38	0.42	0.37	-0.12	0.47	**0.76**		
8 –IPPE	0.58	0.48	0.41	0.56	-0.28	0.60	0.65	**0.74**	
9 –FIPE	0.45	0.36	0.37	0.36	-0.14	0.43	0.50	0.57	**0.91**
AVE	0.61	0.51	0.50	0.70	0.51	0.56	0.58	0.54	0.83
Composite Reliability	0.88	0.75	0.75	0.88	0.76	0.79	0.80	0.78	0.94
Mean	4.44	4.93	5.04	5.11	3.49	4.94	5.22	4.90	4.51
Std. Deviation	1.35	1.16	1.41	1.13	1.21	1.59	1.01	1.10	1.16
Variance Coefficient	0.30	0.24	0.28	0.22	0.35	0.32	0.19	0.22	0.26
Skewness |Sk|	0.31	0.37	0.84	0.46	0.09	0.35	0.96	0.46	0.60
Kurtosis |Ku|	0.57	0.06	0.30	0.33	0.25	0.60	1.55	0.09	0.17

Table 3: Cross-loadings to determine discriminant validity of the first model

First latent variable	Item	1	2	3	4	5	6	7	8	9
1 –SIS	SIS_1	**0.706**	0.355	0.314	0.461	-0.243	0.401	0.355	0.444	0.517
	SIS_2	**0.733**	0.209	0.171	0.276	-0.157	0.273	0.255	0.417	0.355
	SIS_3	**0.864**	0.335	0.251	0.386	-0.201	0.361	0.279	0.510	0.352
	SIS_4	**0.815**	0.328	0.283	0.309	-0.199	0.356	0.275	0.466	0.391
	SIS_5	**0.764**	0.319	0.248	0.389	-0.204	0.311	0.286	0.396	0.269
2 - Analyzer SO	ANAL_1	0.187	**0.613**	0.406	0.201	0.039	0.186	0.223	0.232	0.186
	ANAL_2	0.268	**0.659**	0.363	0.468	-0.108	0.207	0.177	0.374	0.223
	ANAL_3	0.375	**0.843**	0.537	0.387	-0.076	0.339	0.381	0.403	0.370
3 - Defender SO	DEFE_1	0.254	0.474	**0.752**	0.243	-0.035	0.270	0.312	0.257	0.261
	DEFE_2	0.124	0.257	**0.550**	0.049	0.110	0.171	0.168	0.139	0.142
	DEFE_3	0.291	0.524	**0.800**	0.559	-0.133	0.311	0.368	0.415	0.307
4 - Prospector SO	PROS_1	0.367	0.345	0.384	**0.810**	-0.244	0.285	0.212	0.429	0.225
	PROS_2	0.450	0.450	0.423	**0.848**	-0.307	0.333	0.377	0.507	0.371
	PROS_3	0.382	0.460	0.374	**0.860**	-0.271	0.292	0.318	0.478	0.305
5 - Reactor SO	REAC_1	-0.213	-0.045	-0.051	-0.209	**0.759**	-0.104	-0.103	-0.230	-0.181
	REAC_2	-0.196	-0.090	-0.091	-0.228	**0.764**	-0.144	-0.130	-0.192	-0.163
	REAC_3	-0.148	-0.028	0.024	-0.317	**0.616**	-0.036	0.007	-0.164	-0.035
6 - Financial Performance	FIPE_1	0.367	0.295	0.320	0.311	-0.140	**0.923**	0.449	0.494	0.370
	FIPE_2	0.416	0.329	0.320	0.314	-0.086	**0.887**	0.434	0.518	0.380
	FIPE_3	0.433	0.351	0.359	0.366	-0.161	**0.921**	0.492	0.553	0.427
7 - Customer Performance	CUPE_1	0.271	0.305	0.356	0.254	-0.111	0.350	**0.773**	0.469	0.318
	CUPE_2	0.222	0.272	0.321	0.248	-0.059	0.473	**0.806**	0.547	0.340
	CUPE_3	0.382	0.299	0.282	0.343	-0.114	0.312	**0.692**	0.461	0.426
8 - Internal Process Performance	IPPE_1	0.467	0.252	0.216	0.241	-0.207	0.440	0.450	**0.720**	0.496
	IPPE_2	0.410	0.389	0.353	0.336	-0.137	0.468	0.609	**0.816**	0.446
	IPPE_3	0.408	0.441	0.355	0.735	-0.289	0.352	0.358	**0.670**	0.390
9 - Growth and Learning Performance	GLPE_1	0.223	0.219	0.223	0.125	-0.094	0.265	0.290	0.318	**0.682**
	GLPE_2	0.411	0.291	0.252	0.228	-0.107	0.344	0.341	0.496	**0.757**
	GLPE_3	0.444	0.337	0.307	0.428	-0.220	0.350	0.420	0.511	**0.798**

Table 4: Case 1: relationships between all latent variables

Relationship	β	S.E.	*t*	*p*	R^2
SIS → Analyzer SO	0.408	0.042	9.714	0.000	16.7%
SIS → Defender SO	0.335	0.045	7.480	0.000	11.2%
SIS → Prospector SO	0.482	0.039	12.471	0.000	23.2%
SIS → Reactor SO	-0.264	0.052	5.065	0.000	7.0%
Analyzer SO → CP	0.221	0.058	3.835	0.000	37.4%
Defender SO → CP	0.207	0.055	3.759	0.000	
Prospector SO → CP	0.275	0.060	4.555	0.000	
Reactor SO → CP	-0.103	0.045	2.268	0.023	

Table 5: Case 2: relationships between all latent variables and the direct effect of SIS on CP

Relationship	β	S.E.	*t*	*p*	R^2
SIS → Analyzer SO	0.406	0.044	9.177	0.000	16.5%
SIS → Defender SO	0.334	0.047	7.152	0.000	11.2%
SIS → Prospector SO	0.479	0.041	11.830	0.000	23.0%
SIS → Reactor SO	-0.263	0.052	5.053	0.000	6.9%
Analyzer SO → CP	0.142	0.054	2.629	0.009	47.3%
Defender SO → CP	0.188	0.050	3.733	0.000	
Prospector SO → CP	0.159	0.058	2.772	0.006	
Reactor SO → CP	-0.049	0.040	1.226	0.220	
SIS → CP	0.376	0.045	8.377	0.000	

Table 6: Case 3: interaction effects of the control variables on the relationships among SIS, SO, and CP

Relationship	β	S.E.	*t*	*p*	R^2
SIS → Analyzer SO	0.372	0.049	7.597	0.000	
Sector → Analyzer SO	0.019	0.049	0.378	0.706	
Size → Analyzer SO	0.066	0.046	1.435	0.151	19.20%
SIS * Sector → Analyzer SO	0.107	0.063	1.693	0.090	
SIS * Size → Analyzer SO	-0.106	0.124	0.855	0.392	
SIS → Defender SO	0.313	0.051	6.087	0.000	
Sector → Defender SO	-0.014	0.049	0.289	0.773	
Size → Defender SO	0.032	0.052	0.616	0.538	12.30%
SIS * Sector → Defender SO	0.089	0.049	1.814	0.070	
SIS * Size → Defender SO	-0.045	0.068	0.665	0.506	
SIS → Prospector SO	0.438	0.045	9.727	0.000	
Sector → Prospector SO	-0.054	0.067	0.816	0.415	
Size → Prospector SO	0.123	0.049	2.495	0.013	25.20%
SIS * Sector → Prospector SO	0.044	0.081	0.544	0.587	
SIS * Size → Prospector SO	-0.018	0.097	0.185	0.854	
SIS → Reactor SO	-0.267	0.054	4.949	0.000	
Sector → Reactor SO	0.017	0.049	0.337	0.736	
Size → Reactor SO	0.001	0.054	0.011	0.991	8.8%
SIS * Sector → Reactor SO	0.047	0.098	0.479	0.632	
SIS * Size → Reactor SO	-0.129	0.113	1.143	0.253	
Analyzer SO → CP	0.137	0.053	2.574	0.010	
Defender SO → CP	0.168	0.048	3.503	0.000	
Prospector SO → CP	0.189	0.055	3.434	0.001	
Reactor SO → CP	-0.048	0.040	1.194	0.232	
Analyzer SO * Sector → CP	-0.034	0.062	0.552	0.581	
Analyzer SO * Size → CP	-0.030	0.059	0.515	0.607	
Defender SO * Sector → CP	0.064	0.046	1.399	0.162	
Defender SO * Size → CP	0.007	0.050	0.145	0.885	49.90%
Prospector SO * Sector → CP	-0.016	0.051	0.319	0.750	
Prospector SO * Size → CP	-0.070	0.084	0.827	0.408	
Reactor SO * Sector → CP	0.058	0.073	0.800	0.424	
Reactor SO * Size → CP	-0.125	0.047	2.663	0.008	
Sector → CP	0.004	0.037	0.105	0.916	
Size → CP	0.053	0.041	1.276	0.202	
SIS * Sector → CP	0.024	0.063	0.379	0.705	

SIS * size → CP	-0.001	0.069	0.008	0.994
SIS → CP	0.338	0.044	7.650	0.000

Table 7: Case 4: structural model with MLMV variables to control for common method bias

Relationship	β	S.E.	*t*	*p*	R^2
SIS → Analyzer SO	0.300	0.051	5.919	0.000	
Sector → Analyzer SO	0.013	0.045	0.290	0.772	
Size →Analyzer SO	0.068	0.045	1.487	0.137	24.10%
SIS * Sector → Analyzer SO	0.108	0.063	1.716	0.086	
SIS * Size → Analyzer SO	-0.060	0.093	0.640	0.522	
MLMV → Analyzer SO	0.242	0.050	4.848	0.000	
SIS → Defender SO	0.233	0.053	4.324	0.000	
Sector → Defender SO	-0.022	0.049	0.451	0.652	
Size → Defender SO	0.030	0.053	0.578	0.563	18.90%
SIS * Sector → Defender SO	0.092	0.052	1.755	0.079	
SIS * Size → Defender SO	-0.052	0.064	0.812	0.417	
MLMV → Defender SO	0.267	0.052	5.121	0.000	
SIS → Prospector SO	0.368	0.045	8.114	0.000	
Sector → Prospector SO	-0.061	0.071	0.866	0.387	
Size → Prospector SO	0.126	0.051	2.485	0.013	30.10%
SIS * Sector → Prospector SO	0.041	0.076	0.540	0.589	
SIS * Size → Prospector SO	-0.010	0.081	0.127	0.899	
MLMV → Prospector SO	0.233	0.048	4.908	0.000	
SIS → Reactor SO	-0.233	0.056	4.199	0.000	
Sector → Reactor SO	0.023	0.053	0.436	0.663	
Size → Reactor SO	0.007	0.056	0.133	0.894	9.90%
SIS * Sector → Reactor SO	0.043	0.094	0.458	0.647	
SIS * Size -> Reactor SO	-0.115	0.108	1.063	0.288	
MLMV → Reactor SO	-0.113	0.058	1.942	0.052	
Analyzer SO → CP	0.117	0.054	2.186	0.029	
Defender SO → CP	0.155	0.049	3.153	0.002	
Prospector SO → CP	0.175	0.059	2.958	0.003	
Reactor SO → CP	-0.036	0.040	0.890	0.374	
Analyzer SO * Sector → CP	-0.037	0.063	0.591	0.554	
Analyzer SO * Size → CP	-0.038	0.058	0.649	0.516	50.80%
Defender SO * Sector → CP	0.063	0.046	1.361	0.173	
Defender SO * Size → CP	0.012	0.050	0.244	0.807	
Prospector SO * Sector → CP	-0.027	0.052	0.520	0.603	
Prospector SO * Size → CP	-0.066	0.083	0.795	0.427	
Reactor SO * Sector → CP	0.063	0.073	0.864	0.387	
Reactor SO * Size → CP	-0.122	0.048	2.558	0.011	

Sector → CP	0.002	0.039	0.038	0.969
Size → CP	0.058	0.043	1.343	0.179
SIS * Sector → CP	0.025	0.066	0.377	0.706
SIS * Size → CP	0.010	0.065	0.152	0.879
SIS → CP	0.327	0.048	6.816	0.000
MLMV → CP	0.108	0.044	2.431	0.015

Table 8: Formative indicators used for MLMV analysis

MLMV_1: It is easy for me to reach my goals.
MLMV_2: I would never abandon the desire to have my own business.
MLMV_3: I have a positive attitude toward others.
MLMV_4: I always imagine my house in the future.

Table 9: PLS-MGA results

Relationship	Case 3		Case 4		Case 3 vs. Case 4		
	β3	S.E.	β4	S.E.	|β3 -β4|	t	p
SIS → Analyzer SO	0.372	0.049	0.300	0.051	0.072	1.025	0.306
SIS → Defender SO	0.313	0.051	0.233	0.053	0.079	1.063	0.284
SIS → Prospector SO	0.438	0.045	0.368	0.045	0.070	1.095	0.275
SIS → Reactor SO	-0.267	0.054	-0.233	0.056	0.034	0.439	0.661
Analyzer SO → CP	0.137	0.053	0.117	0.054	0.019	0.256	0.798
Defender SO → CP	0.168	0.048	0.155	0.049	0.013	0.195	0.846
Prospector SO → CP	0.189	0.055	0.175	0.059	0.015	0.183	0.855
Reactor SO → CP	-0.048	0.040	-0.036	0.040	0.012	0.211	0.833
SIS → CP	0.338	0.044	0.327	0.048	0.011	0.171	0.864

Table 10: Results of VAF analysis

Relationship	Indirect effect	S.E	t	p	Direct effect	Total effect	VAF
SIS → Analyzer SO → CP	0.035	0.074	4.392	0.000	0.326	0.361	10%
SIS → Defender SO → CP	0.036	0.041	7.875	0.000	0.326	0.362	10%
SIS → Prospector SO → CP	0.064	0.022	14.63	0.000	0.326	0.390	16%
SIS → Reactor SO → CP	-0.008	0.060	5.459	0.000	0.326	0.318	-3%

Table 11: Differences between path coefficients: SIS and strategic orientation

						SIS vs. Endogenous Variable		
Endogenous Variable (1)	**β1**	**S.E.**	**Endogenous Variable (2)**	**β2**	**S.E.**	**|β1 -β2|**	**t**	**p**
Analyzer SO	0.300	0.051	Defender SO	0.233	0.053	0.066	0.898	0.370
Analyzer SO	0.300	0.051	Prospector SO	0.368	0.045	0.068	1.006	0.316
Analyzer SO	0.300	0.051	Reactor SO	-0.233	0.056	0.533	6.671	0.000
Defender SO	0.233	0.053	Prospector SO	0.368	0.045	0.135	1.934	0.053
Defender SO	0.233	0.053	Reactor SO	-0.233	0.056	0.466	5.800	0.000
Prospector SO	0.368	0.045	Reactor SO	-0.233	0.056	0.601	7.482	0.000

Table 12: Differences between path coefficients in the relationship between SIS and CP and the relationship between SO and CP

SIS -> CP (1)			SO - > CP (2)			SIS vs. SO		
	β1	S.E.		β2	S.E.	|β1 -β2|	t	p
SIS	0,376	0,045	Analyzer	0,137	0,053	0,239	3,442	0,001
SIS	0,376	0,045	Defender	0,168	0,048	0,208	3,165	0,002
SIS	0,376	0,045	Prospector	0,189	0,055	0,187	2,635	0,009
SIS	0,376	0,045	Reactor	-0,048	0,04	0,424	7,051	0,000

Table 13: Differences between path coefficients: SO and CP

						Exogenous Variable (1,2) vs. CP		
Exogenous Variable (1)	**β1**	**S.E.**	**Exogenous Variable (2)**	**β2**	**S.E.**	**|β1 -β2|**	**t**	**p**
Analyzer SO	0.117	0.054	Defender SO	0.155	0.049	0.038	0.517	0.606
Analyzer SO	0.117	0.054	Prospector SO	0.175	0.059	0.057	0.720	0.472
Analyzer SO	0.117	0.054	Reactor SO	-0.036	0.040	0.153	2.285	0.023
Defender SO	0.155	0.049	Prospector SO	0.175	0.059	0.020	0.258	0.797
Defender SO	0.155	0.049	Reactor SO	-0.036	0.040	0.191	3.003	0.003
Prospector SO	0.175	0.059	Reactor SO	-0.036	0.040	0.211	2.948	0.004

Table 14: Hypotheses and original evidence

	Hypothesis	Results
H1a	SIS is positively associated with the adoption of an analyzer strategic orientation.	Supported
H1b	SIS is positively associated with the adoption of a defender strategic orientation.	Supported
H1c	SIS is positively associated with the adoption of a prospector strategic orientation	Supported
H1d	SIS is not positively associated with the adoption of a reactor strategic orientation.	Supported
H2a	The analyzer orientation positively affects corporate performance.	Supported
H2b	The defender orientation positively affects corporate performance.	Supported
H2c	The prospector orientation positively affects corporate performance	Supported
H2d	The reactor orientation negatively affects corporate performance.	Supported
H3	The effect of SIS is positively associated with corporate performance.	Supported
H4a	The effect of SIS on the orientation strategy are moderated by control variables.	Partially supported
H4b	The effect of the orientation strategy on firm performance is moderated by control variables.	Not supported
H4c	The effect of SIS on corporate performance are moderated by control variables	Not supported