

Research article

## Corporate, operational, and information systems strategies: Alignment and firm performance

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### Abstract

This study investigates the effect of the alignment between corporate, operational, and information systems strategies and firm performance. Data were collected from the application of 138 questionnaires to large utility companies in the Australian electricity sector. In the analysis, modeling using structural equations was used to establish the dependency relationship between the variables. The results suggest that aligning operational and information systems strategies can improve firm performance. Likewise, no direct effect of corporate strategy on the firm performance was found.

**Keywords:** strategic alignment; information systems; technological innovation; operational effectiveness; firm performance.

### Estrategias corporativas, operativas y de sistemas de información: alineación y rendimientos de la firma

#### Resumen

Este estudio investiga el efecto de la alineación entre las estrategias corporativas, operativas y de sistemas de información y los rendimientos de la firma. Se recolectaron datos a partir de la aplicación de 138 cuestionarios a grandes empresas de servicios en el sector eléctrico australiano. En el análisis se utilizó la modelación mediante ecuaciones estructurales, con el fin de establecer la relación de dependencia entre las variables. Los resultados sugieren que alinear las estrategias operativas y de sistemas de información puede mejorar el rendimiento de la firma. Así mismo, no se encontró ningún efecto directo de la estrategia corporativa en el rendimiento de la firma.

**Palabras clave:** alineación estratégica; sistemas de información; innovación tecnológica; efectividad operativa; resultados de la firma.

### Estratégias corporativas, operacionais e de sistemas de informação: alinhamento e desempenho da empresa

#### Resumo

Este estudo investiga o efeito do alinhamento entre as estratégias corporativas, operacionais e de sistemas de informação e os retornos da empresa. Os dados foram coletados a partir da aplicação de 138 questionários a grandes empresas de serviços públicos do setor elétrico australiano. Na análise, foi utilizada uma modelagem por meio de equações estruturais para estabelecer a relação de dependência entre as variáveis. Os resultados sugerem que o alinhamento das estratégias operacionais e de sistemas de informação pode melhorar o desempenho da empresa. Da mesma forma, nenhum efeito direto da estratégia corporativa no desempenho da empresa foi encontrado.

**Keywords:** alinhamento estratégico, sistemas de informação; inovação tecnológica; eficácia operacional; resultados de assinatura.

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## 1. Introduction

Faced with competitive pressures to improve efficiency and productivity through technological innovation, many organizations invest substantial resources in Enterprise Information Systems (EIS) to manage and improve their innovation, products, and processes (Crumpton, 2013; Ifandoudas & Chapman, 2006; Tidd, Bessant, & Pavitt, 2001). There is an expectation that EIS implementation will reduce operational costs and increase flexibility, reliability, quality, productivity, and profitability. In general, there is a widespread assumption that implementing an EIS will contribute to a firm's sustainability and enhance its competitive advantage (Masini, 2003). However, the evidence of the effect of such complex technological systems on firm performance is mixed (Mabert, Soni, & Venkataramanan, 2003). Many of these technological innovations fail to deliver the expected outcomes or even undermine performance (Cotteleer, 2001; Davenport, 2000; Jamieson & Hyland, 2004). Therefore, the extent to which these technological innovations assist organizations to improve operational performance has received little attention and is not well understood (Armbruster, Bikfalvi, Kinkel, & Lay, 2008).

Such failures are often the result of a gap between strategy formulation and strategy implementation (Cicchetti, 2003). Successful strategy implementation involves determining key performance indicators (KPI) and establishing benchmarks that foster continuous improvement processes and ensure added value to products and services. In many cases, benefits from the implementation of EIS are limited because of inappropriate performance measures (White, 1996). For a better understanding of EIS effectiveness, and to assess the gap between expected and actual results, an information systems (IS) perspective should be used to measure performance. Such a perspective allows organizations to adapt their technological strategies to market-driven dynamics and eventually develop IS-driven innovation capabilities (Neiroti, Cantamessa, & Paolucci, 2006). Per this view, successful IS-driven innovation is likely the result of a strategic triad that aligns the firm's corporate, operational, and technology strategies (Pearlson, Saunders, & Galletta, 2019).

Previous studies on strategic management have indeed suggested that strategic alignment greatly determines business performance (Cao & Hoffman, 2011; Cao & Schniederjans, 2004; Dawley, Hoffman, & Lamont, 2002; Joshi, Kathuria, & Porth, 2003; Lingle & Schiemann, 1996; Schniederjans & Cao, 2009). Aligning strategy and operations is assumed to be a key determinant of firm performance and competitive advantage (Balau, 2015; Scur & Heinz, 2016). More specifically, an effectively aligned IS strategy correlates positively to information technology (IT) infrastructure development, which in turn arguably shapes business models and impacts firm performance (Baker, Jones, Cao, & Song, 2011; Bharadwaj, El Sawy, Pavlou, & Venkatraman, 2013; Choe, 2016; Peppard, Galliers, & Thorogood, 2014).

However, we contend that the extant literature has not adequately addressed the effect of such alignment on firm performance. Empirical evidence linking strategic or operational effectiveness measures (e.g., cost, quality, flexibility, speed, or reliability) with IS effectiveness (e.g., system quality, information quality, service quality, or user satisfaction) is scarce. Similarly, we have not found evidence on the role of strategic alignment between *IS effectiveness (ISE)* and *operational effectiveness (OE)* in the extant strategy literature.

Building on previous research on systems effectiveness, operations effectiveness, and strategy formulation, we intend to shed light on the determining effect that an IS-driven strategy alignment has on firm performance.

The rest of the paper is organized as follows. Section 2 provides a conceptual framework used for the formulation of hypotheses and the presentation of the conceptual model of the relationship between the proposed variables, while section 3 presents the methodology. The fourth section presents the most important results and findings. Finally, in the fifth section, the conclusions of the work, limitations, and future lines of research are discussed.

## 2. Theoretical framework

The dynamic nature of the business environment forces organizations to build innovation skills that facilitate their adaptation to a globalized marketplace (Balau, 2015; Ferrer & Santa, 2012; Masson, Jain, Ganesh, & George, 2016; Teece, Pisano, & Shuen, 1997). Such innovation skills require an effective combination of operational effectiveness and strategic flexibility (Boer, Kuhn, & Gertsen, 2002).

### 2.1 Operational effectiveness

Operational effectiveness refers to the ability to establish processes based on core capabilities within organizations that encourage them to exceed customers' expectations (Santa, Hyland, & Ferrer, 2013). Both strategic management and operational effectiveness are essential to the performance of the firm, but they operate differently (Țuțurea & Rotaru, 2012). However, for many managers this difference is unclear, so they often appeal to management methods and techniques aimed at improving operational effectiveness in place of actual strategy formulation and implementation (Adam & Ebert, 2002; Coulter & Coulter, 1998). Not surprisingly, sustained profitability tends to be elusive (Țuțurea & Rotaru, 2012) and often unattainable through sheer operational effectiveness (Crumpton, 2013).

Whereas operational effectiveness can be defined as executing a firm's activities better than the competition, strategic management—and the resulting competitiveness and strategic positioning—refers to performing completely different activities to the competition, or performing the same activities in a radically different manner (Porter, 2008). Operational effectiveness is key

to achieving competitiveness (Namnai, Ussahawanitchakit, & Janjarasjit, 2015). To avoid wasting resources and—possibly—becoming uncompetitive (Tuțurea & Rotaru, 2012), firms must effectively manage such competitive aspects as cost, quality, reliability, flexibility, and speed (Hill, 2005). This, however, is not enough to achieve a competitive advantage. A firm will only hold a strategic position and develop competitive advantage if it manages to be operationally effective better and faster than its competitors (Bigelow, 2002). Therefore, we propose the following hypothesis:

- H1: Operational effectiveness positively relates to firm performance.

When competitors opt for the easy imitation approach and copy each other's quality systems, product cycle, and other operational tactics, this leads to strategic convergence and, in the long term, no firm wins (Balau, 2015). To gain an edge in the market, firms should not only be reasonably competitive in all of the industry's key operational themes, but they should also excel in some specific aspects (Wheelwright & Bowen, 1996). For instance, a car manufacturer aiming at developing a new, differentiating, and potentially competitively advantageous new model will benefit from an expeditious, cost-effective research and development process, increased product reliability, product portfolio variety, lean management, and business strategy flexibility (Muffatto & Roveda, 2000).

To achieve operational effectiveness, organizations generally emphasize five dimensions: cost, quality, reliability, flexibility, and speed (Hill, 2005). A firm achieves a *cost* advantage when it performs activities more effectively than its competitors (Balau, 2015). *Quality* is achieved when products and services meet both customer demands, manufacturing specifications, and delivery conditions (Hill, 2005; Russell & Taylor, 2006). *Reliability* is achieved when products and services keep meeting the agreed conditions consistently over time (Corbett, 1992; Porter, 1996). *Flexibility* is achieved when the firm can adjust what it does, how it does it, and when it does it in response to customer demands (Slack, 1991). And *speed* is achieved when the firm operates on time (Russell & Taylor, 2006; Tidd et al., 2001), through shorter times between the customer's request and product or service delivery (Hill, 2005). Likewise, strategies based on the integration of the supply chain between companies also help the organization to achieve operational effectiveness (Bernile & Lyandres, 2019). In view of the previous arguments, the following hypothesis is proposed:

- H2: Operational strategy positively relates to operational effectiveness.

## 2.2 Information systems effectiveness

By contributing to strategic decision making, planning, and implementation (Manchanda & Mukherjee, 2014;

Mirchandani & Lederer, 2014), an EIS can be instrumental in improving organizational outcomes, achieving strategic objectives (Delone & McLean, 2003; Winkler & Wulf, 2019), attaining competitive advantage (Doll & Torkzadeh, 1998), and generally ensuring long-term sustainability (Gatian, 1994; Gökşen, Damar, & Doğan, 2016; Karim, 2011; Yuthas & Eining, 1995). By supporting innovation adoption, an EIS can be key in maintaining or improving competitive performance (Hernández, Jiménez, & Martín, 2008; Herring & Roy, 2007; Ranjan, Jha, & Pal, 2016). An effective EIS facilitates information identification, classification, validation, evaluation, capture, and storage. Furthermore, an effective EIS allows information search, delivery, retrieval, and distribution to specific targets within the company (Andreu, Ricart, & Valor, 1996; Devece-Carañana, Peris-Ortiz, & Rueda-Armengot, 2015; Guimaraes, 1988; Kettinger & Marchand, 2011). Given the above, we suggest the following hypothesis:

- H3: IS strategy positively relates to firm performance.

In short, an effective EIS should be a key determinant of a firm's competitiveness (Kraemer & King, 1986; Laudon & Turner, 1989; Porter & Millar, 1985; Wiseman, 1988). However, many EIS projects do not yield the expected results (Davenport, 2000; Dos Santos & Peffer, 1995; Jamieson & Hyland, 2004) or may result in negative outcomes (Hayes, Hunton, & Reck, 2001). All things considered, an EIS implementation's return on growth or organizational development does not seem to be proportional to firms' expectations (Kauffman & Weill, 1989; Weill, 1992).

Now, if an EIS implementation does not come paired with profound changes in organizational practices, financial benefits and improvements in productivity are unlikely (Devece-Carañana et al., 2015). Companies characterized as laggards in technology adoption, in particular, tend to assign responsibility for EIS development and implementation to their IT or IS departments. As a result, EIS implementation is often undervalued and perceived only as a focused, technological solution (Dubelaar, Sohal, & Savic, 2005). To yield a positive, measurable effect on business performance, firm managers should rather assume an EIS implementation as a firm-wide transformation intentionally aligned with the firm's strategy (Armbruster et al., 2008; Woolthuis, Lankhuizen, & Gilsing, 2005). Based on the above, the following hypothesis is formulated:

- H4: Operational and IS strategies determine operational effectiveness.

The DeLone and McLean Model of Information Systems Success stands out among other approaches to assess EIS outcomes (Brown & Jayakody, 2008; Manchanda & Mukherjee, 2014; Özkan, 2006). This model has been tested and applied in various studies and sectors (Khayun, Ractham, & Firpo, 2012; Rai, Lang, & Welker, 2002; Ramdan,

Azizan, & Saadan, 2014; Romi, 2013; Seddon, 1997; Seddon & Kiew, 1996). The updated DeLone and McLean model (Delone & McLean, 2003, 2004) measures the effect of IS—the independent variable (IV)—on firm success—the dependent variable (DV)—in six interrelated dimensions: *quality of information*, *system quality*, *quality of service*, *use*, *user satisfaction*, and *impact on the organization*.

*Quality of information* involves measuring an IS output in terms of content, integrity, ease of understanding, personalization, relevance, and safety; *system quality* refers to the desired system characteristics and performance, as measured by adaptability, availability, reliability, response time, and usability; *quality of service* corresponds to the support offered by the IS to its users, as measured by assurance, empathy, and responsiveness; *use* measures the users' opinion on the extent to which their IS experience improves their job performance, controlling for type of IS use, search patterns, number of visits to the IS site, and number of operations performed; *user satisfaction* refers to the psychological state across the entire customer experience cycle, as measured by recurrence, repetition, and customer satisfaction surveys; and *impact on the organization* is the positive or negative effect on individual, group, and organizational behaviors, as indicated by expanded market share, sales growth, reduced search costs, and time savings.

In general, EIS are intended to provide relevant, timely, and precise information to support strategic, value-adding business decision making. However, EIS are often limited to measuring financial outcomes (Kueng, 2000), and many managers do not exploit their full potential (Gunasekaran, Williams, & McGaughey, 2005). Given the significant investment of time, financial capital, and human resources involved in implementing an EIS, as well as the organization-wide adaptation required to incorporate it into the organizational culture and routines, EIS returns should go much further than simply providing financial statements. An effective EIS should result in comprehensive strategic decision-making that enhances individual and group performance and monitoring tools (Yoo, Goo, & Rao, 2020). Consequently, the effectiveness of an EIS needs to be accounted for in terms of the system's contribution to the improvement of operational performance and the organization's strategic outcomes. By virtue of this, the following hypotheses are proposed:

- H5: Operational strategy positively relates to IS effectiveness.
- H6: System effectiveness positively relates to operational effectiveness.
- H7: IS effectiveness positively relates to firm performance.

### 2.3 Strategic alignment

Since the early 1990s, much of the scholarly literature on strategy has debated "what strategy is", resulting in multiple and sometimes conflicting views (Cummings & Daellenbach, 2009). Whereas some authors describe

strategy as a higher-order, broad definition of the firm's long-term horizon, others conceive it as a more detailed specification of the means to progress towards such a horizon (Martin, 2014; Melre da Silva & Souza Neto, 2014; Peppard et al., 2014). Some of the literature on strategy contends that the former, the broader construct, is a real strategy, and the latter operative process is rather strategic planning.

We subscribe to an integrative view of strategy as a management system that does not exclude, per se, either of these approaches. A strategy is indeed a systemic approach to connect managerial decisions to the business context (Carter, Clegg, & Kornberger, 2008; Gunasekaran et al., 2005; Mintzberg, 2007), set long-term objectives, develop organizational capabilities (Chandler, 1962), and generally guide changes aimed at ensuring the firm's growth and continuity (Abib & Hoppen, 2015). As such, a strategy is key to fostering technology development, organizational change, innovation, and performance (Cicchetti, 2003; Cummings & Daellenbach, 2009; Geisler, Krabbendam, & Schuring, 2003).

Within this strategic system, we distinguish between *corporate strategy (CS)*, *operational strategy (OS)*, and *IS strategy (ISS)*. We are particularly interested in the roles these types of strategy play in improving firm performance through the implementation and management of technological innovations. More specifically, we set out to explore how the alignment of corporate, operational, and IS strategies impact *firm performance (FP)*.

A *corporate strategy* sets the direction that the organization will follow (Wheelen & Hunger, 2007; Narayanan, Zane, & Kemmerer, 2011; Saloner, 1991; Thompson, Gamble, Peteraf, & Strickland III, 2015), setting long-term strategic objectives and allocating corporate resources to achieve such objectives (Antosz & Merchán, 2016). Likewise, an *operational strategy* establishes the firm's desired strategic position relative to its market and competitors (Balau, 2015), defines strategic goals to generate competitive advantage through cost leadership or differentiation (Porter, 1980), and implements actions to attain these goals (Mintzberg, Lampel, Quinn, & Ghoshal, 2003). Consequently, the following hypotheses are presented:

- H8: Corporate strategy positively relates to firm performance.
- H9: Operational strategy positively relates to firm performance.

Operational strategy involves a combination of decisions and actions (Barnes, 2002) based on competitive priorities (Scur & Heinz, 2016) and aimed at creating an effective and efficient organizational system capable of implementing corporate strategy (Maia, Cerra, & Alves Filho, 2005; Vörös, 2010). When intentionally aligned with corporate and operational strategies, an IS strategy can be a source of competitive advantage (Delery & Doty, 1996; Tallon & Pinsonneault, 2011). Strategic IS is the ability to identify

and evaluate the implications of IT-based opportunities as an integral part of corporate and operations strategy formulation and define the role of IS/IT in the organization (Peppard & Ward, 2004). In addition, it is necessary for the success of communication, culture, and performance, as they are part of strategic alignment (Smeureanu & Diab, 2019). Consequently, the following hypotheses are formulated:

- H10: Corporate strategy positively relates to operational strategy.
- H11: Corporate, operational, and IS strategies determine firm performance.
- H12: Corporate strategy positively relates to IS strategy.
- H13: IS strategy positively relates to operational effectiveness.
- H14: Operational and IS strategies determine IS effectiveness.
- H15: Corporate, operational, and IS strategies are positively related.

The three-prong alignment between corporate, operations, and IS strategies has been referred to in previous research as the “strategic triangle”. In the absence of an effective strategic triangle, the true value of an EIS implementation may not be secured or even realized (Henderson & Venkatraman, 1993). Lack of alignment between IS investments such as EIS, process automation, and other technology investments adversely affects the adoption and construction of IT infrastructure (Byrd, Lewis, & Bryan, 2006; Newkirk & Lederer, 2006), generates unnecessary expenses (Belalcázar Villamar & Díaz, 2016), and limits the firm’s capacity to focus and emphasize its key strategic priorities (Dubelaar et al., 2005). No single EIS application can deliver a sustained competitive advantage; rather, an advantage is obtained through the capacity of an organization to exploit an EIS functionality continuously.

Strategic alignment is a dynamic process of continuous adaptation and change (Henderson & Venkatraman, 1993; Pearlson, Saunders, & Galletta, 2019). Coherent alignment of two or more organizational dimensions requires that strategies must be synchronized to maintain the stated alignment in an ever-changing environment (Sabherwal, Hirschheim, & Goles, 2001). Organizations that manage such synchronous alignment between their corporate, operations, and IS strategies develop a dynamic, IS-driven innovation capability that can generate competitive advantage (Neiroti et al., 2006; Smeureanu & Diab, 2019). Thus, the following hypotheses are formulated:

- H14: Operational and IS strategies determine IS effectiveness.
- H15: Corporate, operational, and IS strategies are positively related.

The absence or deficiency in IS strategy could explain the pervasive gap between strategy formulation and strategy implementation, a notorious pitfall in many strategic management processes (Cicchetti, 2003). An IS strategy alignment ensures that IS development plans are integrated with organizational and functional strategic plans (Peppard & Ward, 2004). Similarly, IS strategy plans

deploy, use, and manage a firm’s IS capabilities (Chen, Mocker, Preston, & Teubner, 2010). Based on this, the following hypothesis is formulated:

- H16: IS strategy positively relates to IS effectiveness.

Based on the previous discussion, it is hypothesized that the strategic alignment constructs between corporate strategy (CS), operational strategy (OS) and IS strategy (ISS); and between operational effectiveness (OE) and IS effectiveness (ISE), will have a positive impact on the performance of the company (FP) (Figure 1).

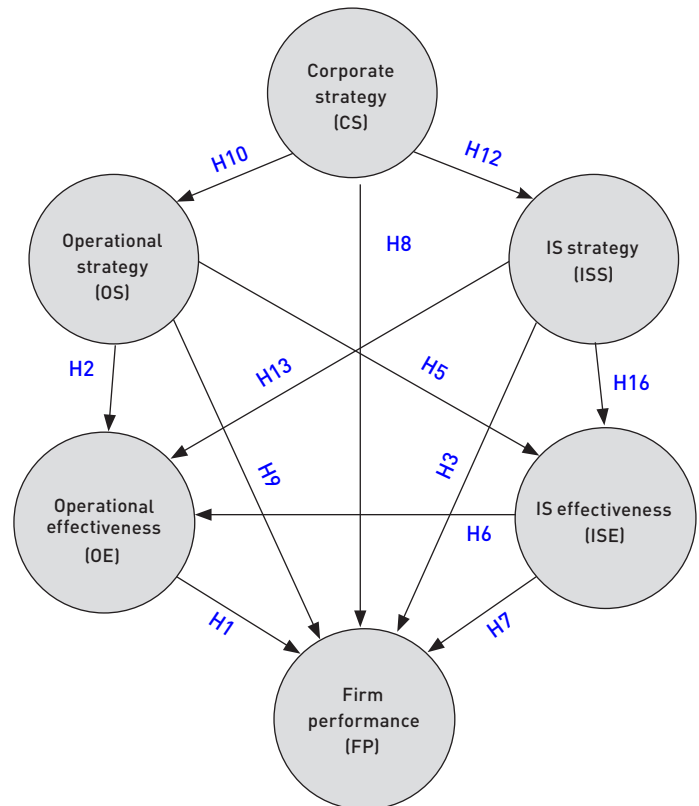


Figure 1. Conceptual model  
Source: own elaboration.

### 3. Methodology

We used a multiphase approach to assess the proposed relationships. First, we conducted unstructured interviews to build an initial basis of inquiry to identify preliminary issues and variables that needed detailed investigation. Second, we conducted a more detailed analysis using semi-structured interviews. Third, we analyzed companies’ reports related to the firms’ IS strategies, implementation, and post-implementation. We then used this interview–documentary triangulation, together with a literature review, to develop a survey instrument to collect quantitative data through a self-administered questionnaire.

The literature on qualitative research has stressed the importance of triangulation to analyze the subject under study from multiple perspectives and thus increase the

validity of the constructs and results (Breitmayer, Ayres, & Knafl, 1993; Denzin & Lincoln, 1994; Hussein, 2015; Jick, 1979; Pettigrew, 1990; Stake, 1995). Triangulation implies looking at the same phenomenon from different angles, through the use of different data collection strategies and data sources (Gibbert, Ruigrok, & Wicki, 2008). For our study, we achieved triangulation through the examination of strategic planning documents at a large electricity distribution firm in Australia. The strategic plan emphasized meeting the increasing demands of the electricity network's customers, regulators, and shareholders. The strategic manager and his team agreed to review and improve our questionnaire, particularly the questions related to strategy. We subsequently conducted four pilot tests to refine our key variables' measures and the survey instrument. These pilot tests thus complemented the interview-documentary triangulation to develop our final instrument.

We divided the final questionnaire into six sections. We used the first section to identify the background, the areas of responsibility, and the respondent's involvement in the use of EIS applications. The second section was related to strategies, based on Cicchetti (2003), Geisler et al. (2003), Henderson and Venkatraman (1993) and Henderson and Venkatraman (1993). We included a third section with organizational behavior questions for a parallel study that one of the authors was conducting, but they were not included in this study's analyses. In the fourth section, we asked 19 questions on technological innovation effectiveness (Delone & McLean, 2003). The questions chosen had been previously used in empirical studies on IS effectiveness in a university accounting system (Seddon & Kiew, 1996), a university student registrar information system (Rai et al., 2002), and service organizations' EIS (Pitt, Watson, & Kavan, 1995). To reduce the risk of mismeasurement (Rai et al., 2002), we included in this section some questions on IS service quality. In the fifth section, we asked 20 questions about operational effectiveness drawn from the literature review and relevant interviews conducted during the qualitative triangulation phase. The sixth and final section addressed issues related to firm performance and firm performance improvement, based on the literature review and qualitative triangulation process.

We administered the questionnaire to a convenience sample of large service organizations in the electricity sector that had recently implemented an EIS. To capture different assumptions, expectations, knowledge, and perceptions of technological innovation (Orlikowski & Gash, 1994), we administered the survey to managers, engineers, technologists, and administrative and operational staff. Of the 450 surveys distributed, 144 were returned (a 32% response rate). After reviewing each returned questionnaire for completeness, we excluded six respondents from our analyses due to large amounts of missing data, lack of involvement of the respondent in the use of the EIS, or the impossibility of identifying the respondent's role in the firm (i.e., manager, engineer, or EIS operator/user).

We tested the hypotheses, the survey instrument, our measurement constructs, and the "best fit" model following the guidelines of Hair, Black, Babin, and Anderson (2010).

#### 4. Results

We used a structural equation modeling (SEM) approach, using both SPSS (IBM Corp, Released 2016) and the SPSS Analysis of Moment Structures (Amos) module (Arbuckle, 2016) to do a multivariate analysis of our data, confirm our conceptual model by estimating the predictive relationship of the model's variables and model fit indexes, and determine our analyses' confidence levels.

SEM is a powerful tool among other multivariate techniques that can examine single relationships at one time (Hair et al., 2010). It is an analytical technique used in several disciplines and has been used often by social science researchers over the last 20 years (Tabachnick & Fidell, 2011). SEM provides a method of testing hypotheses about relationships among latent and observed variables by estimating a set of separate multiple regression equations simultaneously (Hair et al., 2010). SEM is an appropriate data analysis technique for this research on multiple dependent relationships which combines both exploratory and confirmatory strands in the main and competing models (Anderson & Gerbing, 1988).

We assessed our measures' internal consistency by estimating Cronbach's alpha coefficient (Cronbach, 1951) and items-to-total correlations (Table 1). All constructs yielded alpha values greater than 0.7, which is the cut-off level set for basic research (Nunnally & Bernstein, 1978).

**Table 1.** Constructs' internal consistency measures.

Variable	# of Items	Alpha ( $\alpha$ )
Corporate strategy (CS)	4	0.885
Operational strategy (OS)	3	0.890
Information systems strategy (ISS)	3	0.825
Operational effectiveness (OE)	4	0.939
IS effectiveness (ISE)	4	0.916
Firm performance (FP)	3	0.884

Source: own elaboration.

To assess construct validity and determine the model's overall fit (Cooksey, 2007; Hair et al., 2010), we tested the relationships between the observed variables and their continuous latent variables using a confirmatory factor analysis (CFA). We estimated factor loadings and kept items that loaded only on one construct (i.e. no factor cross-loading was allowed), equivalent to oblique rotation in exploratory factor analysis (EFA).

Table 2 summarizes the CFA results. The model's 54 parameters generated an input covariance matrix with 231 sample moments. There are 59 regression weights, 0 covariance, and 27 variances, for a total of 86 estimated parameters. The chi-square ( $\chi^2$ ) and the goodness-of-fit

test shows a chi-square minimum (CMIN) value of 481,810, with 177 degrees of freedom and a probability of less than 0.0001 ( $p < 0.0001$ ), which suggests that the data's fit with the hypothesized model is not entirely adequate. However, previous research has addressed  $\chi^2$  limitations by developing goodness-of-fit indices that take a more pragmatic approach, such as the  $\chi^2$ /degrees of freedom ratio or CMIN/DF, where a ratio between 3 to 1 is indicative of an acceptable fit between the hypothetical model and the sample data (Byrne, 2010; Wheaton, Muthen, Alwin, & Summers, 1977). Our data yielded a CMIN/DF value of 2.722, which falls within the acceptable range. Also, baseline comparisons fit indices—normed fit index (NFI), relative fit index (RFI), incremental fit index (IFI), Tucker-Lewis index (TLI), and comparative fit index (CFI)—are close to or exceed the accepted cut-off value of  $\geq 0.80$  (Bentler & Bonett, 1980), as shown in Table 2. This suggests that the hypothesized model fitted the observed variance-covariance matrix well, relative to the null or independence model.

**Table 2.** Baseline comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	0.862	0.851	0.902	0.884	0.885
Saturated model	1.000		1.000		1.000
Independence model	0.000	0.000	0.000	0.000	0.000

Source: own elaboration.

To test our predictions on the relationship between strategic alignment and firm performance, we estimated regression weights and conducted a path analysis for the entire model. As evidenced by the results summarized in Table 3 and Figure 2, nine parameters were significant and three were non-significant. The results support Hypothesis H10, which proposed that CS has a positive impact on OS ( $\beta = 0.91$ ,  $p < 0.001$ ), and hypothesis H12, which proposed that CS has a positive impact on ISS ( $\beta = 0.87$ ,  $p < 0.001$ ). This result supports the notion that corporate strategy relates to, and likely leads, both operational and IS strategies (Narayanan et al., 2011; Saloner, Shepard, & Podolny, 2005; Thompson et al., 2015).

**Table 3.** Regression weights (labels S1-S4 refer to corresponding path sections in Figure 2)

	Estimate	S.E.	C.R.	P	Label
OS ← CS	1.103	0.103	10.747	***	
ISS ← CS	0.923	0.096	9.650	***	S1
SE ← ISS	0.457	0.106	4.294	***	S2
SE ← OS	-0.041	0.085	-0.479	0.632	
OE ← OS	0.049	0.065	0.765	0.444	
OE ← ISS	0.233	0.092	2.522	0.012	
OE ← SE	0.452	0.090	5.025	***	S3
FP ← OE	0.522	0.126	4.139	***	S4
FP ← SE	0.441	0.112	3.945	***	
FP ← CS	-0.584	0.226	-2.591	0.010	
FP ← OS	0.172	0.125	1.374	0.169	
FP ← ISS	0.410	0.156	2.626	0.009	

Source: own elaboration.

Our results did not support hypothesis H9, which proposed that OS has a direct effect on FP ( $\beta = 0.26$ , n.s.). However, hypotheses H8, which proposed that CS has a

direct effect on FP ( $\beta = -0.72$ ,  $p = 0.010$ ), and H3, which proposed that ISS has predictive power on FP ( $\beta = 0.56$ ,  $p < 0.01$ ), were both supported by the results. The latter did so with a stronger, clearer effect, which supports the contention that, in organizations implementing technological innovations such as an EIS, the IS strategy tends to set the course, particularly in day-to-day operations (Davenport, 2000).

The results did not provide evidence of an effect of OS on OE ( $\beta = 0.09$ , n.s.), so hypothesis H2 was rejected. Hypothesis H5, which proposed that OS has an impact on SE, was also rejected ( $\beta = -0.7$ , n.s.). However, ISS does have an impact on OE ( $\beta = 0.36$ ,  $p = 0.012$ ), which supports hypothesis H13. Likewise, hypothesis H16, which proposed that ISS has a positive impact on SE, was supported by the results ( $\beta = 0.46$ ,  $p < 0.01$ ). Taken together, these findings indicate that IS strategies positively influence the effectiveness of IS implementations. As suggested by previous research, the main obstacle to innovative technology (e.g., an EIS implementation) is the dramatic change they bring to business operations (Davenport, 2000). Information system effectiveness is as much about changing the way a business operates as it is about technological innovation, and therefore depends directly on a clear IS strategy.

Hypothesis H6, which proposed that SE has a positive impact on OE, was supported by these results ( $\beta = 0.46$ ,  $p < 0.01$ ). Likewise, hypothesis H1, which proposed that OE has a positive impact on FP, was also supported ( $\beta = 0.45$ ,  $p < 0.01$ ), as well as hypothesis H7, which proposed that SE has a positive impact on FP ( $\beta = 0.38$ ,  $p < 0.01$ ).

Taken together, our findings suggest that CS does influence FP, albeit indirectly. Moreover, strong alignment between corporate strategy and IS strategy will positively impact IS and operational effectiveness, and, consequently, firm performance. Figure 2 illustrates these findings, highlighting the path dependency between our constructs, respectively S1 to S4.

The lack of support for hypotheses H9, H2, and H5 supports contentions that many firms do not assign a top priority to operational strategies, but rather rely on IS strategies to become more competitive (Tuțurea & Rotaru, 2012).

## 5. Conclusions

The results imply that the impact of strategy on firm performance is indirect and path-dependent, and strongly relates to an effective interaction between the intended outcomes and how strategies are implemented. Notwithstanding the arguably key role of corporate, operational, or IS strategies in determining firm performance (Balau, 2015; Choe, 2016), our research suggests that any strategy per se is not enough, but it is rather an intentionally strategic alignment which will significantly impact performance. Moreover, although the strategic triad proposed by Pearlson, Saunders, & Galletta (2019) is indeed an important determinant of a firm's performance and competitiveness, it seems that it is the alignment of corporate and IS strategies which more clearly

determines IS and operational effectiveness, and, through them, firm performance. More specifically, when IS innovation is an important component of a firm's strategy, firm performance can be enhanced through effective IS implementations which result from intentionally aligning corporate and IS strategies.

These results could be interpreted in at least two, opposing ways. One could argue that operational strategy and operational effectiveness are not as important for firm performance as corporate and IS strategies, and IS effectiveness. An alternative explanation could be that the firms studied have not given OS and OE the attention they deserve, likely because of their focus on technology and innovation. They could be missing an opportunity to enhance firm performance by employing a more complete, intentional strategic alignment, one much more in line with the aforementioned strategic triad.

Future studies could further explore the alignment between operational strategy and corporate and IS strategies, especially in firms with a lesser focus on technological innovation. Deconstructing operational effectiveness into specific performance objectives such as cost, quality, reliability, flexibility, and speed could be the key to a better understanding of how IS and operational strategies can interact effectively. A closer look at such interactions would certainly contribute to IS effectiveness and firm performance measures which, so far, have not included operational effectiveness measures [Delone & Mclean, 2004]. By gaining such understanding, strategic management would benefit from a more comprehensive insight into performance determinants.

An important managerial implication from our research relates to the widespread concern regarding the relative ineffectiveness or suboptimal outcomes of many IS implementations. The increasing complexity of both the business context and the technological innovations implemented to compete in such a context imposes an ever-increasing challenge. Return on IS and technology investment is often unclear, or even negative in many cases. Our results shed some light on these issues. Firms that do not intentionally align their corporate strategy with their information systems and operational strategies are prone to wasting scarce resources on EIS and other technological innovations that yield suboptimal returns or do not make business sense. Managers should therefore not only ensure such alignment but also implement IS performance measures that accurately measure IS outcomes promptly, to potentiate firm performance through information systems and operational effectiveness.

This research confirms that EIS and other technological implementations should not be viewed as an end in themselves but rather as a way of enhancing performance, and therefore competitiveness. Additionally, the fact that corporate strategies do not have a direct impact on firm performance indicates the need for clear performance objectives when implementing technological innovations, as achieving a sustainable competitive advantage is the ultimate end of corporate strategy.

Our study has limitations. First, we used a convenience sample, deliberately selecting respondents based on their role, knowledge, experience, expertise, and tenure. Second, the sample size is relatively small compared to more extensive, quantitative studies conducted in other Western cultures, so generalizability across all sectors is not recommended. Nevertheless, our results provide insights that justify extended, larger, quantitative studies.

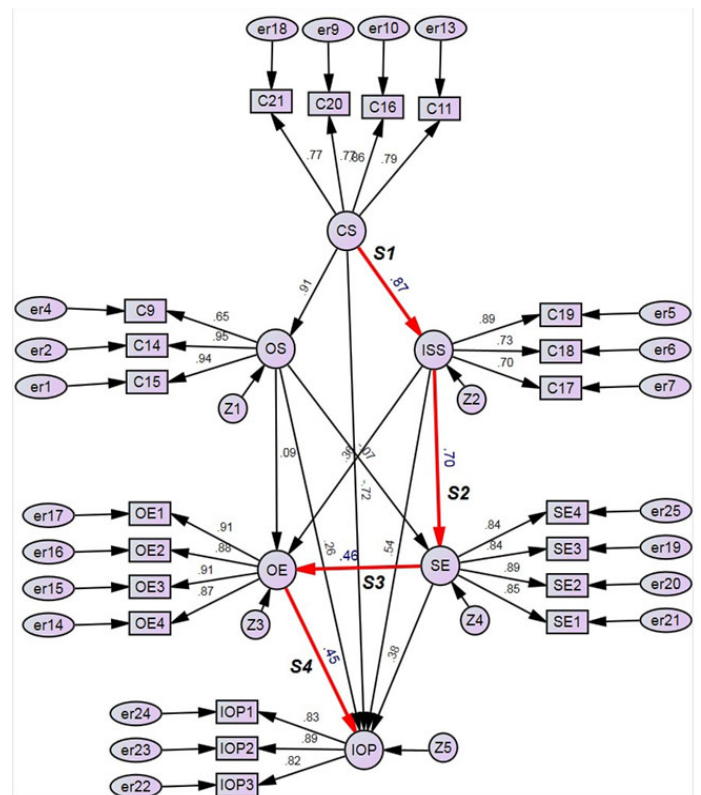


Figure 2. Path model for the prediction of strategic alignment  
Source: own elaboration.

### Conflict of interest

The authors declare no conflict of interest.

### References

Abib, G., & Hoppen, N. (2015). The Consultant's Role in the Strategic Alignment Process. *Revista de Administração Contemporânea*, 19(5), 584-605. <https://doi.org/10.1590/1982-7849rac20151384>

Adam, E. E., & Ebert, R. J. (2002). *Production and Operation Management: Concepts, Models and Behavior*. New Jersey, NJ: Prentice Hall.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411-423. <https://doi.org/10.1037/0033-2909.103.3.411>

Andreu, R.; Ricart, J. E. Y Valor, J. (1996). *Estrategia y sistemas de Información* (3ª ed.). Madrid: McGraww-Hill.

Antosz, M. S., & Merchán, N. H. M. (2016). Análisis de las estrategias empresariales y de las TIC. *3C Empresa. Investigación y pensamiento crítico*, 5(1), 29-46.

Arbuckle, J. L. (2016). Amos (Version 21.0) [Computer program]. Chicago: SPSS.

Armbruster, H., Bikfalvi, A., Kinkel, S., & Lay, G. (2008). Organizational innovation: The challenge of measuring non-technical innovation in large-scale surveys. *Technovation*, 28(10), 644-657. <https://doi.org/10.1016/j.technovation.2008.03.003>



- Baker, J., Jones, D. R., Cao, Q., & Song, J. (2011). Conceptualizing the dynamic strategic alignment competency. *Journal of the Association for Information Systems*, 12(4), 299-322. <https://doi.org/10.17705/1jais.00265>
- Balau, M. (2015). The Influence of Market Context on Business Strategy, Competitor Imitation and Operational Effectiveness. *Acta Universitatis Danubius. Œconomica*, 11(4), 33-44.
- Barnes, D. (2002). The complexities of the manufacturing strategy formation process in practice. *International Journal of Operations & Production Management*, 22(10), 1090-1111. <https://doi.org/10.1108/01443570210446324>
- Belalcázar Villamar, A., & Díaz, F. J. (2016). Towards the Strategic Alignment of Corporate Services with IT, applying Strategic Alignment Model (SAM). *Journal of Computer Science & Technology*, 16(1), 52-58.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88(3), 588-606. <https://doi.org/10.1037/0033-2909.88.3.588>
- Bernile, G., & Lyandres, E. (2019). The effects of horizontal merger operating efficiencies on rivals, customers, and suppliers. *Review of Finance*, 23(1), 117-160. <https://doi.org/10.1093/rof/rfy017>
- Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital business strategy: toward a next generation of insights. *MIS quarterly*, 471-482.
- Bigelow, M. (2002). How to achieve operational excellence. *Quality Progress*, 35(10), 70-75.
- Boer, H., Kuhn, J., & Gertsen, F. (2002). *Continuous innovation*. Paper presented at the Seminar presented at University of Western Sydney, Campbelltown.
- Breitmayer, B. J., Ayres, L., & Knafl, K. A. (1993). Triangulation in qualitative research: Evaluation of completeness and confirmation purposes. *Journal of Nursing Scholarship*, 25(3), 237-243.
- Brown, I., & Jayakody, R. (2008). B2C e-commerce success: A test and validation of a revised conceptual model. *The Electronic Journal Information Systems Evaluation*, 11(3), 167-184.
- Byrd, T. A., Lewis, B. R., & Bryan, R. W. (2006). The leveraging influence of strategic alignment on IT investment: An empirical examination. *Information & Management*, 43(3), 308-321. <https://doi.org/10.1016/j.im.2005.07.002>
- Byrne, B. M. (2010). *Structural equation modeling with AMOS: basic concepts, applications, and programming (multivariate applications series)*. New York: Taylor & Francis Group, 396, 7384.
- Cao, Q., & Hoffman, J. J. (2011). Alignment of virtual enterprise, information technology, and performance: an empirical study. *International Journal of Production Research*, 49(4), 1127-1149. <https://doi.org/10.1080/00207540903555478>
- Cao, Q., & Schniederjans, M. J. (2004). Empirical study of the relationship between operations strategy and information systems strategic orientation in an e-commerce environment. *International Journal of Production Research*, 42(15), 2915-2939. <https://doi.org/10.1080/00207540410001691884>
- Carter, C., Clegg, S. R., & Kornberger, M. (2008). Strategy as practice? *Strategic Organization*, 6(1), 83-99. <https://doi.org/10.1177/1476127007087154>
- Chandler, A. D. (1962). *Strategy and structure: Chapters in the history of the American industrial enterprise*. Cambridge: Massachusetts Institute of Technology Press.
- Chen, D. Q., Mocker, M., Preston, D. S., & Teubner, A. (2010). Information systems strategy: reconceptualization, measurement, and implications. *MIS quarterly*, 34(2), 233-259. <https://doi.org/10.2307/20721426>
- Choe, J. M. (2016). The Relationships among Strategic Performance Measurement Systems, IS Strategic Alignment, and IT Infrastructure for Knowledge Management. *Global Business & Finance Review*, 21(1), 56-72. <https://doi.org/10.17549/gbfr.2016.21.1.56>
- Cicchetti, A. (2003). Strategic planning in healthcare organisations: The role of health technology assessment. In E. Geisler, K. Krabbendam & R. Schuring (Eds.), *Technology, health care, and management in the hospital of the future* (2nd ed.) [pp. 67-80]. San Francisco: Praeger Publishers.
- Cooksey, R. (2007). *Illustrating statistical procedures for business, behavioural & social science research*. Australia: Tilde University Press.
- Corbett, L. M. (1992). Delivery windows-a new view on improving manufacturing flexibility and on-time delivery performance. *Production and Inventory Management Journal*, 33(3), 74-79.
- Cotteleer, M. (2001). Exploring Performance Following ERP Implementation. Harvard Business School working paper.
- Coulter, M. K., & Coulter, M. K. (1998). *Strategic management in action* (6th ed.). New Jersey, NJ: Prentice Hall.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334. <https://doi.org/10.1007/BF02310555>
- Crumpton, M. A. (2013). Building operational efficiencies. *The Bottom Line*, 26(1), 21-24. <https://doi.org/10.1108/08880451311321555>
- Cummings, S., & Daellenbach, U. (2009). A Guide to the Future of Strategy?: The History of Long Range Planning. *Long Range Planning*, 42(2), 234-263. <https://doi.org/10.1016/j.lrp.2008.12.005>
- Davenport, T. H. (2000). *Mission critical: realizing the promise of enterprise systems*. Boston: Harvard Business Press.
- Dawley, D. D., Hoffman, J. J., & Lamont, B. T. (2002). Choice situation, refocusing, and post-bankruptcy performance. *Journal of Management*, 28(5), 695-717. <https://doi.org/10.1177/014920630202800507>
- Delery, J., & Doty, H. (1996). Modes of theorizing in strategic human resource management: Test of universalistic, contingency, and configurational performance predictors. *Academy of Management Journal*, 39(4), 802-835. <https://doi.org/10.5465/256713>
- Delone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: a ten-year update. *Journal of management information systems*, 19(4), 9-30. <https://doi.org/10.1080/07421222.2003.11045748>
- Delone, W. H., & Mclean, E. R. (2004). Measuring e-commerce success: Applying the DeLone & McLean information systems success model. *International Journal of Electronic Commerce*, 9(1), 31-47. <https://doi.org/10.1080/10864415.2004.11044317>
- Denzin, N. K., & Lincoln, Y. S. (1994). *Handbook of qualitative research*. Thousand Oaks: Sage publications.
- Devece-Carañana, C. A., Peris-Ortiz, M., & Rueda-Armengot, C. (2015). A scale for measuring information management in organisations. *Gestión 2000*, 32(2), 49-60. <https://doi.org/10.3917/g2000.322.0049>
- Doll, W. J., & Torkzadeh, G. (1998). Developing a multidimensional measure of system-use in an organizational context. *Information & Management*, 33(4), 171-185. [https://doi.org/10.1016/S0378-7206\(98\)00028-7](https://doi.org/10.1016/S0378-7206(98)00028-7)
- Dos Santos, B. L., & Peffers, K. (1995). Rewards to investors in innovative information technology applications: First movers and early followers in ATMs. *Organization science*, 6(3), 241-259. <https://doi.org/10.1287/orsc.6.3.241>
- Dubelaar, C., Sohal, A., & Savic, V. (2005). Benefits, impediments and critical success factors in B2C E-business adoption. *Technovation*, 25, 1251-1262. <https://doi.org/10.1016/j.technovation.2004.08.004>
- Ferrer, M., & Santa, R. (2012). The interrelatedness of innovation competences, operational effectiveness and organizational processes. *Review of Management Innovation & Creativity*, 5(14)-35-49.
- Gatian, A. W. (1994). Is user satisfaction a valid measure of system effectiveness? *Information & Management*, 26(3), 119-131. [https://doi.org/10.1016/0378-7206\(94\)90036-1](https://doi.org/10.1016/0378-7206(94)90036-1)
- Geisler, E., Krabbendam, K., & Schuring, R. (2003). *Technology, health care, and management in the hospital of the future* (2nd ed.). San Francisco: Praeger Publishers.
- Gibbert, M., Ruigrok, W., & Wicki, B. (2008). What passes as a rigorous case study? *Strategic Management Journal*, 29(13), 1465-1474. <https://doi.org/10.1002/smj.722>
- Gökşen, Y., Damar, M., & Doğan, O. (2016). Building management information systems to coordinate the university business processes: A proposed model for Dokuz Eylül University. *Ataturk University Journal of Economics & Administrative Sciences*, 30(2), 361-374.
- Guimaraes, T. (1988). Information resources management: improving the focus. *Information Resources Management Journal (IRMJ)*, 1(1), 10-21. <https://doi.org/10.4018/irmj.1988100102>
- Gunasekaran, A., Williams, H. J., & McGaughey, R. E. (2005). Performance measurement and costing system in new enterprise. *Technovation*, 25(5), 523-533. <https://doi.org/10.1016/j.technovation.2003.09.010>
- Hair, J., Black, W. C., Babin, B., & Anderson, R. E. (2010). *Multivariate data analysis: A global perspective* (Seventh ed.). New Jersey: Pearson.

- Hayes, D. C., Hunton, J. E., & Reck, J. L. (2001). Market reaction to ERP implementation announcements. *Journal of Information Systems*, 15(1), 3-18. <https://doi.org/10.2308/jis.2001.15.1.3>
- Henderson, J. C., & Venkatraman, H. (1993). Strategic alignment: Leveraging information technology for transforming organizations. *IBM systems journal*, 32(1), 472-484. <https://doi.org/10.1147/S999.5387096>
- Hernández, B., Jiménez, J., & Martín, M. J. (2008). Extending the technology acceptance model to include the IT decision-maker: A study of business management software. *Technovation*, 28(3), 112-121. <https://doi.org/10.1016/j.technovation.2007.11.002>
- Herring, H., & Roy, R. (2007). Technological innovation, energy efficient design and the rebound effect. *Technovation*, 27(4), 194-203. <https://doi.org/10.1016/j.technovation.2006.11.004>
- Hill, T. (2005). *Operations Management* (2a ed.). Basingstoke: Palgrave Macmillan.
- Hussein, A. (2015). The use of Triangulation in Social Sciences Research: Can qualitative and quantitative methods be combined? *Journal of comparative social work*, 4(1), 1-12.
- IBM Corp. (Released 2016). IBM SPSS Statistics for Windows (Version 21) [Computer program]. Chicago, IL: IBM Corp.
- Ifandoudas, P., & Chapman, R. (2006, 8-12 September). *Strategic ICT implementation within SMEs for business Improvement: The COSTWORTH project*. Paper presented at the 6th International CINet Conference, Brighton, United Kingdom.
- Jamieson, K., & Hyland, P. (2004, 18-21 July). *IS failure: Just too much information?* Paper presented at the 8th World Multi-Conference on Systemics, Cybernetics and Informatics, Orlando, U.S.A.
- Jick, T. D. (1979). Mixing qualitative and quantitative methods: Triangulation in action. *Administrative Science Quarterly*, 24(4), 602-611. <https://doi.org/10.2307/2392366>
- Joshi, M. P., Kathuria, R., & Porth, S. J. (2003). Alignment of strategic priorities and performance: an integration of operations and strategic management perspectives. *Journal of Operations Management*, 21(3), 353-369. [https://doi.org/10.1016/S0272-6963\(03\)00003-2](https://doi.org/10.1016/S0272-6963(03)00003-2)
- Karim, A. J. (2011). The significance of management information systems for enhancing strategic and tactical planning. *JISTEM-Journal of Information Systems and Technology Management*, 8(2), 459-470. <https://doi.org/10.1590/S1807-17752011000200011>
- Kauffman, R. J., & Weill, P. (1989). An Evaluative Framework for Research on the Performance Effects of Information Technology Investments. In J.I. DeGross, J.C. Henderson, and B.R. Konsynski, eds., *Proceedings of the International Conference on Information Systems* (pp. 377-88). Boston: Association for Information Systems.
- Kettinger, W. J., & Marchand, D. A. (2011). Information management practices (IMP) for the senior manager's perspective: an investigation of the IMP construct and its measurement. *Information Systems Journal*, 21(5), 385-406. <https://doi.org/10.1111/j.1365-2575.2011.00376.x>
- Khayun, V., Ractham, P., & Firpo, D. (2012). Assessing e-excise success with Delone and Mclean's model. *Journal of Computer Information Systems*, 52(3), 31-40.
- Kraemer, K. L., & King, J. L. (1986). OR Practice—Computer-Based Models for Policy Making: Uses and Impacts in the US Federal Government. *Operations Research*, 34(4), 501-512. <https://doi.org/10.1287/opre.34.4.501>
- Kueng, P. (2000). Process performance measurement system: a tool to support process-based organizations. *Total quality management*, 11(1), 67-85. <https://doi.org/10.1080/0954412007035>
- Laudon, K. C., & Turner, J. (1989). *Information Technology and Management Strategy*. Englewood Cliffs, NJ: Prentice-Hall.
- Lingle, J. H., & Schiemann, W. A. (1996). From balanced scorecard to strategic gauges: is measurement worth it? *Management Review*, 85(3), 56-61.
- Mabert, V. A., Soni, A., & Venkataramanan, M. A. (2003). Enterprise resource planning. Managing the implementation process. *European Journal of Operation Research*, 146(2), 302-314. [https://doi.org/10.1016/S0377-2217\(02\)00551-9](https://doi.org/10.1016/S0377-2217(02)00551-9)
- Maia, J. L., Cerra, A. L., & Alves Filho, A. G. (2005). Inter-relações entre estratégia de operações e gestão da cadeia de suprimentos: estudos de caso no segmento de motores para automóveis. *Gestão & Produção*, 12(3), 377-391. <http://dx.doi.org/10.1590/S0104-530X2005000300008>
- Manchanda, A., & Mukherjee, S. (2014). An empirical application of DeLone and McLean model in evaluating decision support system in the banking sector of Oman. *Journal of International Technology and Information Management*, 23(2), 47-58.
- Martin, R. L. (2014). The big lie of strategic planning. *Harvard Business Review*, 92(1/2), 3-8.
- Masini, A. (2003). The ERP paradox: an empirical investigation of the impact of enterprise systems on operational effectiveness. Ph.D. dissertation. INSEAD, Fontainebleau
- Masson, S., Jain, R., Ganesh, N. M., & George, S. A. (2016). Operational efficiency and service delivery performance: A comparative analysis of Indian telecom service providers. *Benchmarking: An International Journal*, 23(4), 893-915. <https://doi.org/10.1108/BIJ-02-2014-0014>
- Melre da Silva, L., & Souza Neto, J. (2014). Method for measuring the alignment between information technology strategic planning and actions of information technology governance. *JISTEM: Journal of Information Systems and Technology Management*, 11(1), 131-152. <https://doi.org/10.4301/S1807-17752014000100008>
- Mintzberg, H., Lampel, J., Quinn, J.B., & Ghoshal, S. (2003). *The Strategic Process: Concepts, Contexts, Cases* (4a ed.). London: Pearson Education Limited.
- Mintzberg, H. (2007). *Tracking strategies: Toward a general theory*. Oxford: Oxford University Press.
- Mirchandani, D. A., & Lederer, A. L. (2014). The impact of core and infrastructure business activities on information systems planning and effectiveness. *International Journal of Information Management*, 34(5), 622-633. <https://doi.org/10.1016/j.ijinfomgt.2014.06.001>
- Muffatto, M., & Roveda, M. (2000). Developing product platforms: analysis of the development process. *Technovation*, 20, 617-630. [https://doi.org/10.1016/S0166-4972\(99\)00178-9](https://doi.org/10.1016/S0166-4972(99)00178-9)
- Namnai, K., Ussahawanitchakit, P., & Janjarasjit, S. (2015). *Modern cost management innovation and performance: A conceptual model*. Paper presented at the Allied Academies International Conference. Academy of Accounting and Financial Studies. Proceedings.
- Narayanan, V. K., Zane, L. J., & Kemmerer, B. (2011). The cognitive perspective in strategy: An integrative review. *Journal of Management*, 37(1), 305-351. <https://doi.org/10.1177/0149206310383986>
- Neiroti, P., Cantamessa, M., & Paolucci, E. (2006, 8-12 September). *The role of firm-specific capabilities in IT driven innovation: An analysis on large Italian enterprises*. Paper presented at the 7th International CINet Conference Lucca, Italy.
- Newkirk, H. E., & Lederer, A. L. (2006). The effectiveness of strategic information systems planning under environmental uncertainty. *Information & Management*, 43(4), 481-501. <https://doi.org/10.1016/j.im.2005.12.001>
- Nunnally, J. C., & Bernstein, I. H. (1978). *Psychometric theory*. New York: McGraw-Hill.
- Orlikowski, W., & Gash, D. (1994). Technological frames: making sense of information technology in organizations. *ACM Transactions on Information Systems (TOIS)*, 12(2), 174-207. <https://doi.org/10.1145/196734.196745>
- Özkan, S. (2006). A Process Capability Approach to Information Systems Effectiveness Evaluation. *Electronic Journal of Information Systems Evaluation*, 9(1), 7-14.
- Pearlson, K. E., Saunders, C. S., & Galletta, D. F. (2019). *Managing and Using Information Systems: A Strategic Approach* (6a ed.). Hoboken: John Wiley & Sons.
- Peppard, J., & Ward, J. (2004). Beyond strategic information systems: towards an IS capability. *Journal of Strategic Information Systems*, 13(1), 167-194. <https://doi.org/10.1016/j.jsis.2004.02.002>
- Peppard, J., Galliers, R. D., & Thorogood, A. (2014). Information systems strategy as practice: Micro strategy and strategizing for IS. *The Journal of Strategic Information Systems*, 23(1), 1-10. <https://doi.org/10.1016/j.jsis.2014.01.002>
- Pettigrew, A. M. (1990). Longitudinal field research on change: Theory and practice. *Organization science*, 1(3), 267-292. <https://doi.org/10.1287/orsc.1.3.267>
- Pitt, L. F., Watson, R. T., & Kavan, C. V. (1995). Service quality: A measure of information systems effectiveness. *MIS Quarterly*, 19(2), 173-188. <https://doi.org/10.2307/249687>
- Porter, M. E. (1980). *Competitive strategy: Techniques for analyzing industries and competitors* (Vol. 980). New York: Free Press.
- Porter, M. E. (1996). What is strategy? *Harvard Business Review*, 74(6), 61-81.

- Porter, M. E. (2008). *On competition*. Boston: Harvard Business School Press.
- Porter, M. E., & Millar, V. E. (1985). How information gives you competitive advantage. *Harvard Business Review*, 63(4), 149-160.
- Rai, A., Lang, S. S., & Welker, R. B. (2002). Assessing the validity of IS success models: An empirical test and theoretical analysis. *Information Systems Research*, 13(1), 50-69. <https://doi.org/10.1287/isre.13.1.50.96>
- Ramdan, S., Azizan, Y. N. B., & Saadan, K. B. (2014). E-government systems success evaluating under principle islam: A validation of the delone and mclean model of islamic information systems success. *Academic Research International*, 5(2), 72-85.
- Ranjan, S., Jha, V. K., & Pal, P. (2016). Literature review on ERP implementation challenges. *International Journal of Business Information Systems*, 21(3), 388-402. <https://doi.org/10.1504/IJBIS.2016.074766>
- Romi, I. M. (2013). Testing delone and mclean's model in financial institutions. *American Academic & Scholarly Research Journal*, 5(3 special issue), 121-129.
- Russell, R. S., & Taylor, B. W. (2006). *Operations management: Quality and competitiveness in a global environment* (5th ed.). Hoboken: John Wiley & Sons.
- Sabherwal, R., Hirschheim, R., & Goles, T. (2001). The dynamics of alignment: Insights from a punctuated equilibrium model. *Organization Science*, 12(2), 179-197. <https://doi.org/10.1287/orsc.12.2.179.10113>
- Saloner, G. (1991). Modeling, game theory, and strategic management. *Strategic Management Journal*, 12(S2), 119-136. <https://doi.org/10.1002/smj.4250121009>
- Saloner, G., Shepard, A., & Podolny, J. (2005). *Administración estratégica*. México, DF: Limusa Wiley
- Santa, R., Hyland, P., & Ferrer, M. (2013). Technological innovation and operational effectiveness: their role in achieving performance improvements. *Production Planning & Control: The Management of Operations Management*, 25(12), 969-979. <https://doi.org/10.1080/09537287.2013.785613>
- Schniederjans, M. J., & Cao, Q. (2009). Alignment of operations strategy, information strategic orientation, and performance: an empirical study. *International Journal of Production Research*, 47(10), 2535-2563. <https://doi.org/10.1080/00207540701673465>
- Scur, G., & Heinz, G. (2016). The environmental dimension in the context of the operations strategy of the São Paulo's ABC region automotive manufacturers. *Revista brasileira de gestão de negócios*, 18(60), 290-304. <https://doi.org/10.7819/rbgn.v18i60.2195>
- Seddon, P. B. (1997). A respecification and extension of the DeLone and McLean model of IS success. *Information Systems Research*, 8(3), 240-253. <https://doi.org/10.1287/isre.8.3.240>
- Seddon, P. B., & Kiew, M.-Y. (1996). A partial test and development of DeLone and McLean's model of IS success. *Australasian Journal of Information Systems*, 4(1), 90-109. <https://doi.org/10.3127/ajis.v4i1.379>
- Slack, N. (1991). *The manufacturing advantage: achieving competitive manufacturing operations*. London: Mercury Books.
- Smeureanu, I., & Diab, B. (2019). Modeling the Impact of Information System on Organizational Culture and Business-IT Strategic Alignment. *Informatica Economica*, 23(3), 16-25. <https://doi.org/10.12948/issn14531305/23.3.2019.02>
- Stake, R. E. (1995). *The art of case study research*. Thousand Oaks, CA: Sage.
- Tabachnick, B. G., & Fidell, L. S. (2011). Multivariate Analysis of Variance (MANOVA). *International encyclopedia of statistical science*, 13, 902-904.
- Tallon, P. P., & Pinsonneault, A. (2011). Competing perspectives on the link between strategic information technology alignment and organizational agility: insights from a mediation model. *MIS quarterly*, 35(2), 463-486. <https://doi.org/10.2307/23044052>
- Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533. [https://doi.org/10.1002/\(SICI\)1097-0266\(199708\)18:7<509::AID-SMJ882>3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z)
- Thompson, A. A., Gamble, J. E., Peteraf, M. A., & Strickland III, A. J. (2015). *Administración Estratégica: Teoría y Casos* (19 ed.). México, D.F.: McGraw-Hill.
- Tidd, J., Bessant, J. R., & Pavitt, K. (2001). *Managing innovation: integrating technological, market and organizational change* (4a ed.). Hoboken: John Wiley & Sons.
- Țuțurea, M., & Rotaru, M. (2012). Eficacitatea Operațională Și Strategia. *Review of Management & Economic Engineering*, 11(3), 11-22.
- Vörös, J. (2010). *Termelés-és szolgáltatásmenedzment*. Budapest: Akadémia Publisher.
- Weill, P. (1992). The relationship between investment in information technology and firm performance: A study of the valve manufacturing sector. *Information Systems Research*, 3(4), 307-333. <https://doi.org/10.1287/isre.3.4.307>
- Wheaton, B., Muthen, B., Alwin, D. F., & Summers, G. F. (1977). Assessing reliability and stability in panel models. *Sociological Methodology*, 8, 84-136. <https://doi.org/10.2307/270754>
- Wheelwright, S. C., & Bowen, H. (1996). The Challenge of manufacturing advantage. *Production and Operations Management*, 5(1), 59-77. <https://doi.org/10.1111/j.1937-5956.1996.tb00385.x>
- Wheelen, T.L. & Hunger, J.D. (2007). *Administración estratégica y política de negocios: conceptos y casos*. (10a ed.). México, DF.: Pearson Education.
- White, G. (1996). A survey and taxonomy of strategy-related performance measures for manufacturing. *International Journal of Operations and Production Management*, 16(3), 42-61. <https://doi.org/10.1108/01443579610110486>
- Winkler, T. J., & Wulf, J. (2019). Effectiveness of IT Service Management Capability: Value Co-Creation and Value Facilitation Mechanisms. *Journal of Management Information Systems*, 36(2), 639-675. <https://doi.org/10.1080/07421222.2019.1599513>
- Wiseman, C. (1988). *Strategic information systems*. Water Street: McGraw-Hill Professional.
- Woolthuis, R. K., Lankhuizen, M., & Gilsing, V. (2005). A system failure framework for innovation policy design. *Technovation*, 25(6), 609-619. <https://doi.org/10.1016/j.technovation.2003.11.002>
- Yoo, C. W., Goo, J., & Rao, H. R. (2020). Is Cybersecurity a Team Sport? A Multilevel Examination of Workgroup Information Security Effectiveness. *Management Information Systems Quarterly*, 44(2), 907-931. doi: 10.25300/MISQ/2020/15477
- Yuthas, K., & Eining, M. M. (1995). An experimental evaluation of measurements of information system effectiveness. *Journal of Information Systems*, 9(2), 69-84.