International Journal of Business Innovation and Research

ISSN online: 1751-0260 - ISSN print: 1751-0252
https://www.inderscience.com/ijbir

The innovation ambidexterity enabled through business process performance and information systems strategy: an empirical study by strategy-as-practice perspective

Adilson Carlos Yoshikuni

DOI: 10.1504/IJBIR.2021.10054859

Article History:

Received:	16 January 2021
Last revised:	19 January 2021
Accepted:	22 May 2021
Published online:	10 January 2024

The innovation ambidexterity enabled through business process performance and information systems strategy: an empirical study by strategy-as-practice perspective

Adilson Carlos Yoshikuni

Mackenzie Presbyterian University,
Rua da Consolação, 930, Consolação,
São Paulo, 01302-907, Brazil
Email: adilson.yoshikuni@mackenzie.br
Email: ayoshikuni@terra.com.br

Abstract: A central question for researchers and practitioners is if and how business process performance (BPP) has an impact on ambidextrous innovation (AMI) enabled through information systems strategy (ISS). To address this question, this study draws on the strategy-as-practice perspective by using the partial least squares path modelling (PLS-PM) to analyse 856 Brazilian companies. The findings of the study suggest that ISS influences BPP sequentially to enhance AMI. The survey showed that this is more prevalent within the financial sector compared to agribusiness, service and manufacturing industries. Additionally, the results demonstrated that BPP mediates the relationship between ISS and AMI. The study assists, other researchers, and practitioners, to look beyond the direct effects of information technology investments and shift their attention to how ISS by strategy-as-practice perspective can enable BPP to enhance AMI.

Keywords: business process performance; BPP; information systems strategy; ISS; organisational innovativeness; exploitative innovation; EPI; explorative innovation; innovation ambidexterity; strategic planning; strategy-as-practice; SAS; strategy-making; strategy process.

Reference to this paper should be made as follows: Yoshikuni, A.C. (2024) 'The innovation ambidexterity enabled through business process performance and information systems strategy: an empirical study by strategy-as-practice perspective', *Int. J. Business Innovation and Research*, Vol. 33, No. 1, pp.118–136.

Biographical notes: Adilson Carlos Yoshikuni is a Professor in the Center of Applied Social Science, Program of Postgraduate in Controllership and Corporate Finance, Mackenzie Presbyterian University (UPM). He earned his PhD in Business Administration from the School of Business Administration of Sao Paulo at FGV-EAESP. He served in various private companies as a Business Consultant and Project Director. He is the research coordinator of the Group for Technology and Analysis in Management, Accounting, and Finance (TAMAF) at UPM. His research interests include supply chain capabilities, IS strategies, IT-business value, knowledge strategy planning, strategic controllership, accounting information systems, strategy-as-practice, innovation, and ambidexterity.

1 Introduction

The contemporary economic context is characterised by high competition and rapid technological changes. Innovation should be considered to be one of the crucial components needed by firms to survive and gain a competitive advantage over rivals (Wang et al., 2020; Yoshikuni et al., 2021). According to Jansen et al. (2006), innovation can be classified as either exploration and exploitation. Exploratory innovations (ERIs) are designed for emerging customers or markets and are regarded as radical innovations while exploitative innovations (EPIs) are related to meeting the needs of existing customers or markets and are regarded as incremental innovations (Benner and Tushman, 2015; Zang and Li, 2017). Ambidextrous innovations (AMIs) related firms to offer both exploratory and EPI concurrently (March, 1991; Jansen et al., 2009; Xie and Gao, 2018).

Past studies argued that it is not possible to merge strategies that combine exploratory and EPI because firms needed to emphasise providing better products or services or cut expenses to provide customers with lower prices and enhancing delivery times proposal value to the customers (Porter, 1990; Kim and Mauborgne, 2004). Additionally, firms that adopted strategic planning practices can impede innovation initiatives and may decrease firm performance (Song et al., 2011; Arend et al., 2017). For example, when the top managers adopted more conservative strategy practices they can be very dismissive of new ideas (Jarzabkowski and Spee, 2009).

On the other hand, Raisch et al. (2009) investigated whether finding the balance between exploratory and exploitative activities can enhance firm performance. Studies of the strategy-as-practice (SAS) approach indicated that there is a possibility that strategic planning can have a positive effect on innovation initiatives (Wolf and Floyd, 2017; Burgelman et al., 2018). This is because business strategy as a social practice acts (by practitioners) and interacts in the strategising process through strategic thinking, strategy elaboration and strategy implementation (Bolisani and Bratianu, 2017; Yoshikuni et al., 2021). Hence, SAS enables ambidexterity when combined with deliberate strategies that emphasise central directionality and hierarchy, and emergent initiatives that open the way for collective action and convergent behaviour innovation (Jarzabkowski and Spee, 2009) that can have an impact on exploitative, explorative and AMIs (Bodwell and Chermack, 2010).

Thus, this study examines if and how information systems strategy (ISS), as strategy practices domain [strategy praxis, strategy practitioners and strategy practices (Peppard et al., 2014; Whittington, 2014)], embedded in the strategising process can be considered the main key resources that enable the firm's activities to enhance innovation ambidexterity (Marabelli and Galliers, 2017). Therefore, this study focuses on the concept of ISS that is promoted as a part of a larger dynamic and iterative strategising process (Yoshikuni and Albertin, 2018) that leverages exploratory and EPIs through knowledge strategy provided by both the formal and informal systems via the information systems (IS) application (Galliers, 2007, 2011; Galliers et al., 2012).

This study contributes to ISS and SAS literature, examining how IS promotes the strategising process to enable business process performance (BPP). In view of the fact that the process of IS strategy is commonly treated as a black box and these studies have not clarified the real work of practitioners to engage in rational and emergent strategy, as mentioned by Peppard et al. (2014). Additionally, there is less attention dedicated to studying the role that ISS plays in strategy practices (Marabelli and Galliers, 2017), and this research helps researchers and practitioners to understand how ISS enables

strategising power, where both technologies-in-use and strategy practitioners can make use of in organisational strategy, as recommended by Whittington (2014).

Furthermore, strategising through ISS has received little empirical attention (Peppard et al., 2014; Moeini et al., 2019), even more, there are no studies that have investigated the relationship between BPP enabled by ISS (as SAS approach) to impact AMI, in the context of developing economy. Additionally, AMI has attracted growing investigation (Chandrasekaran et al., 2012; Xie and Gao, 2018; Alamayreh et al., 2019) and it is necessary to investigate innovation ambidexterity in more detail focusing on the antecedents and consequences constructs (Zang and Li, 2017). Therefore, this study extends the literature of innovation and strategy management, identifying how IS embedded in strategic planning can enhance the AMI mediated by BPP, as mentioned by Marabelli and Galliers (2017).

2 Theoretical background and hypotheses

2.1 ISS as SAS

According to Whittington (2014), there is a natural link between ISS and the SAS framework of praxis, practices and practitioners. The ISS can leverage strategising practices through practitioners' use of information technologies (ITs) promoting actual praxis and then making use of it in organisational strategy (Huang et al., 2014; Peppard et al., 2014).

Past studies defined that there is strategic alignment between IS and business strategy, when IS resources support the strategic planning to share the mission, objectives, plans contained in the business strategy (Chan and Huff, 1992; Chan and Reich, 2007). Recent studies demonstrated that ISS is embedded into the strategy processes (Gerow et al., 2014; Coltman et al., 2015; Yeow et al., 2018), and it is not possible to make strategic routines, such as analyse, formulate, execute and control strategy without IS applications (Marabelli and Galliers, 2017). Other studies investigated how IS can create new business models, when technology is embedded in customer processes, promoting new experiences, transforming business operations, creating new proposal value of products and services, i.e., IS is essential to formulate strategy content (Bharadwaj et al., 2013; Peppard et al., 2014).

Therefore, IS strategy research can be classified in three domains:

1 strategic alignment between IS and business strategy

2 strategic IS planning by IS application that supports the strategy content

3 the combinations of 1 and 2 (process and content strategy) to gain competitive advantage (Chen et al., 2010; Arvidsson et al., 2014).

This study examines if and how ISS shapes a firm's competitive strategy; its plans, formulation, execution to promote, gain and maintain competitive advantage through a SAS approach (Yoshikuni and Albertin, 2018; Yoshikuni et al., 2018). Thus, this study assumes that ISS enables SAS, allowing firms to analyse scenarios and increase the speed of strategy development (Arvidsson et al., 2014), exploring emergent strategy founded on the multiple organisational sub-communities that influence or redirect the strategy content (Peppard et al., 2014; Whittington, 2014; Marabelli and Galliers, 2017) to attend

the business needs to promote the ability or capability to innovate (Chan and Reich, 2007; Shollo and Galliers, 2016).

2.2 Business process performance

Firms can achieve significant innovation gains if ISS can effect change in business strategy, configuring business processes that will give rise to new initiatives (Chan and Reich, 2007; Tallon et al., 2016). The BPP refers to the firm's ability to change organisational processes to achieve better integration, cost reduction and make innovation (Kaplan and Norton, 2008; Kim et al., 2011; Yoshikuni and Albertin, 2017; Aydiner et al., 2019a). Enhanced BPP, thus, should increase the effectiveness of a firm's processes of innovation, operational, post-sale and support activities (Kaplan and Norton, 2008; Tallon, 2011; Yoshikuni and Albertin, 2020) by allowing the acquisition and assimilation of internal and external knowledge, the resource base should be (re)configured, (re)deployed to be aligned with the firm's strategy (Tallon, 2011; Tallon et al., 2019). ISS leverages firm capabilities to maintain supply-chain relationships and alliances, promoting the advantage of experience and knowledge in a static market to enable EPI (Marabelli and Galliers, 2017).

2.2.1 ISS support market requirements

ISS enables firms' ability to have greater responsiveness to market change and promotes information to a firm to concentrate their resources in business processes that could be critical to the success of the business strategy (Tallon et al., 2016). Hence, ISS may leverage firms to respond quickly to unpredictable changes and support disruptive innovations that can suddenly change an industry's equilibrium (Marabelli and Galliers, 2017; Teubner and Stockhinger, 2020). For example, the ISS by business intelligence or big data analytics (Shollo and Galliers, 2016; Aydiner et al., 2019b; Mikalef et al., 2019) and knowledge strategy (Anwar and Hasnu, 2016; Bolisani and Bratianu, 2017), in line with existing strategic cognitive beliefs, related to managerial experience, market data, and forecasts arising can enhance BPP by sharing seamless data and information among business processes to enhance innovation (Aydiner et al., 2019a; Mikalef et al., 2019; Yoshikuni and Albertin, 2020). Therefore, emerging practices are the outcome of the everyday doings of strategy through ISS (Marabelli and Galliers, 2017), and the firm can change the initial plans in a planned strategy that may be refined and adapted to new contexts, circumstances and market needs (Jarzabkowski and Spee, 2009; Whittington, 2014).

2.2.2 ISS support operational adjustment

ISS enables firms to support operational efficiency, operational flexibility, planning, internal analysis, and external analysis through defenders, prospectors and analysers of strategy content (Chan and Reich, 2007; McLaren et al., 2011; Yoshikuni and Albertin, 2018). ISS enhances operational agility through availing data/information to all supply chain network actors to implement and have organisational control to leverage BPP (Gao et al., 2020; Wamba et al., 2020). For example, ISS enables a firm's capacity to make available better information sharing/communication to make more cost-effective operational processes, drawing on business intelligence and analytical expertise to

respond to external challenges (Kim et al., 2011). Thus, ISS can leverage operational adjustment agility of internal business processes (Lu and Ramamurthy, 2011), when their rapid adaptation is triggered by market requirements and other stimuli (Mikalef and Pateli, 2017; Yoshikuni and Albertin, 2017).

2.2.3 ISS on BPP

Even though many studies are stating that ISS enables business processes and provides better business value to enhance organisational performance (Melville et al., 2004; Kohli and Grover, 2008; Chen et al., 2010; Peppard et al., 2014), other studies focus directly on the impact of IS resources or capabilities to enable BPP (Ayabakan et al., 2017; Queiroz et al., 2018; Ravichandran, 2018) without considering if and how IS strategy (IS embedded in SAS) may influence BPP to achieve innovation ambidexterity. Additionally, there is little research that is focusing on the content of IS strategy to understand how IS can contribute to promoting strategising and consequently enhancing outcomes performance (Peppard et al., 2014; Marabelli and Galliers, 2017; Burgelman et al., 2018). Thus, this study proposes that ISS has influence on BPP enabling the value chain activities changes in a firm to pursue to attend external and internal requirements. Following the hypothesis:

H1 ISS is associated positively with BPP.

2.3 Innovation ambidexterity

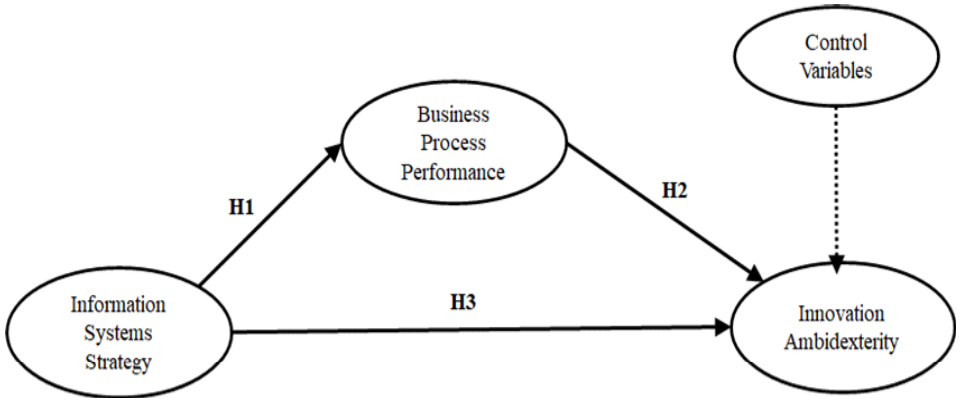
According to March (1991), exploration is related to the discovery of new possibilities and exploitation of old certainties. Exploration includes risk-taking and innovation activities, and exploitation focuses on activities to promote incremental change to create innovation through existing competencies (Raisch et al., 2009; Benner and Tushman, 2015; Ceptureanu and Ceptureanu, 2019). Exploration requires more resource investment with uncertain payoffs, and firms have to focus to seize, i.e., firms' ability to sense opportunities to create ERIs (Bodwell and Chermack, 2010; Xie and Gao, 2018; Alamayreh et al., 2019). Hence, to attend to emerging customers and markets, a firm focus on ERI is required to pursue new knowledge to support the creation of new products and services (Jansen et al., 2006; Zang and Li, 2017). Exploitation emphasises activities that promote the gaining efficiency of existing resources to gain firm performance, i.e., characterised by refinement, implementation, production and selection (Bodwell and Chermack, 2010; Xie et al., 2020). Hence, EPI focuses on the ability to build on existing knowledge (Xie and Gao, 2018; Xie et al., 2020) and incremental innovation on existing products and services for the existing customer (Benner and Tushman, 2003, 2015).

Ambidexterity combines both exploitation activities and exploration activities (Raisch et al., 2009; Bodwell and Chermack, 2010; Ceptureanu and Ceptureanu, 2019). AMI occurs when firms are capable of simultaneously exploiting existing competencies and exploring new opportunities to create innovation (Jansen et al., 2006; Chandrasekaran et al., 2012; Zang and Li, 2017; Ardito et al., 2018; Alamayreh et al., 2019).

2.3.1 BPP mediation and effects on innovation ambidexterity

Firm requires a coherent alignment of competencies, structures, and cultures to engage in intent strategy, in contrast, congruent alignment focuses on emergent initiatives, i.e., the senior leadership team needs to develop cognitive and behavioural flexibility to establish and nurture both to have a meaningful impact on innovation (Bodwell and Chermack, 2010; Lavie et al., 2010; Ardito et al., 2018).

Figure 1 Proposed model



To enhance the AMI a firm requires to develop the ability to sense opportunities and threats through scan, search and exploration (Chandrasekaran et al., 2012; Benner and Tushman, 2015; Zang and Li, 2017; Xie and Gao, 2018). Thus, the capacity to sense new opportunities are based on a balance between centralised and decentralised decision strategy, where ISS can give fast and constant information about what is happening in the external environment to support intent strategy and emergent initiatives to contribute with strategic goals (Galliers, 2011; Marabelli and Galliers, 2017; Gable, 2020). Secondly, firms need to develop and seize opportunities, i.e., the firms' ability to execute strategic insight that leads to strategic action through the operational process. The senior management team examines and confronts intent strategy with emergent initiatives in a variety of contexts before implementation strategy to leverage innovation (Bodwell and Chermack, 2010). Lastly, firms need to develop the ability to reconfigure organisational resources, assets, and structures through ISS, human resources, and complementary resources and capabilities (Ghasemaghaei et al., 2018; Li and Chan, 2019; Tallon et al., 2019). Therefore, this study proposes that BPP influences innovation ambidexterity through ISS, enabling firms to deal with the conflicting demands of a planned strategy, the pursuit of efficiency vis-à-vis by emergence, flexibility and agility (Marabelli and Galliers, 2017). In line with other IS studies (Melville et al., 2004; Kohli and Grover, 2008; Tallon et al., 2016, 2019; Li and Chan, 2019), which have identified that BPP mediates the relationship between ISS and innovation.

Thus, following the two hypotheses:

H2 BPP is associated positively with innovation ambidexterity.

H3 BPP mediates the relationship between ISS and innovation ambidexterity.

Based on the literature review, the proposed model is presented in Figure 1 with the hypotheses.

3 Methodology

3.1 Sample

All constructs adopted in this research had been previously validated through the use of current literature, demonstrating suitable reliability and validity, as recommended by Morgado et al. (2018). The measures of ambidexterity vary greatly across studies, and it can be measured as balanced or combined [(mathematical variations such as subtraction and continuous measures within the balanced ambidexterity perspective, addition, and multiplication within the combined ambidexterity perspective (Aslam et al., 2018)]. This study adopted multiplying two dimensions [exploitative and explorative innovation (Jansen et al., 2006)] because it has been the most used method of forming the ambidexterity construct (see Junni et al., 2013, for a detailed review), ISS adopted through measures from Yoshikuni and Albertin (2018), BPP adopted by measures from Kaplan and Norton (2008). Respondents were asked to evaluate on a seven-point Likert scale (1 – totally disagree, 7 – totally agree) for all constructs.

A pretest was conducted with a sample of 20 companies to validate the instrument with minor changes to the wording of instructions, items, and adjusts of instrument labels. The questionnaire is available in Appendix.

3.2 Population

Firm size was measured by the number of employees as an ordinal variable: micro (until nine employees), small (between 10 to 49 employees), medium (between 50 to 249 employees), medium to large (between 250 to 499 employees), large (above 500 employees), classified by SEBRAE (2017). The sectors, as an ordinal variable, were classified as agribusiness, commerce, financial, manufacturing, services and government industries by IBGE (2017).

3.3 Data treatment

A wide firm selection was contemplated, and it was defined using the convenience sampling data collection from various business sectors, as recommended by Sekaran (2016) and Etikan et al. (2016). The first author personally contacted the firms. The respondents included C-levels [chief executive officer (CEO), chief information officer (CIO) and other], directors, managers, supervisors, coordinators, and senior executives, and the research composed 66% of senior and executive manager, and 35% of middle/first-line manager.

The outliers were examined using the Mahalanobis square distance (DM^2) (Cousineau and Chartier, 2017), and eight cases presented high DM^2 values (26,553, p-value > 0.001) that indicated multivariate outliers and the final sample was 856 cases.

3.4 Statistical technique

This study opted to use partial least squares structural path modelling (PLS-PM), because it is a full-fledged structural equation modelling approach, and is a flexible technique capable of estimating complex models [small sample size, many constructs, many variables, many causal relationships between constructs – arrows – and formative models (Hair et al., 2017; Bido and Silva, 2019)].

Table 1 shows the sample composition by the sector and the number of workers.

Table 1 Composition of the sample

Control variables		*Firm size (number of employees)*						*Sum*	*% percent*
Sector		*Until 9*	*10 until 49*	*50 until 99*	*100 until 249*	*250 until 499*	*Above 500*		
1	Agribusiness	1	5	1	4	0	27	38	4%
2	Commerce	3	12	2	1	5	29	52	6%
3	Financial	1	1	0	0	3	28	33	4%
4	Manufacturing	6	14	13	25	19	135	212	25%
5	Services	43	78	38	45	40	243	487	57%
6	Government	0	2	1	6	8	17	34	4%
Sum		54	112	55	81	75	479	856	
Percent %		6%	13%	6%	9%	9%	56%		

3.5 Common method bias

During the research design phase was controlled the existence of common method bias (CMB) by prior approaches recommended by Schwarz et al. (2017), such as clear and concise language was utilised in the assertive items, respondents knew about all constructs, the respondents were anonymised. Additionally, the measured latent marker variable (MLMV) was applied to verify if possible to control CMB, four formative items were incorporated endogenous variables to have the lowest possible correlation with all constructs under investigation, as recommended by Chin et al. (2013). The four formative indicators used for MLMV analysis were adopted by Yoshikuni and Albertin (2018).

The model with MLMV variables demonstrated a difference of less than 1% in all variance explanations (R^2) than the original one. Additionally, there were non-significant MLMV variables' effects on endogenous variables, indicating that CMB is not a severe concern.

3.6 Measurement model

The study conducted reliability, convergent validity and discriminant validity tests. Reliability was examined using composite reliability (CR) and Cronbach alpha (CA) values, and their values were above the threshold of 0.70, see Table 3 (Bido and Silva, 2019). Indicator reliability was examined, and all construct-to-item loadings were above the threshold of 0.65, see Table 2 (Hair et al., 2017). It was then assessed for convergent validity and AVE values showed the lowest observed value being 0.62 exceeding the

0.50 threshold, and each construct's AVE square root was greater than its highest correlation with any other construct (Fornell-Larcker criterion). Additionally, the HTMT confidence interval values were lower than 0.75 indicating sufficient discriminant validity. Thus, the obtained results confirmed discriminant validity (Henseler et al., 2015).

Table 2 Cross-loadings to determine discriminant validity

First latent variable	*Items*	*ISS*	*BPP*	*ABI*
Information systems strategy (ISS)	ISS_1	*0.790*	0.461	0.447
	ISS_2	*0.855*	0.503	0.466
	ISS_3	*0.856*	0.518	0.445
	ISS_4	*0.862*	0.507	0.46
	ISS_5	*0.814*	0.477	0.398
Business process performance (BPP)	BPP_1	0.480	*0.778*	0.385
	BPP_2	0.473	*0.826*	0.450
	BPP_3	0.474	*0.808*	0.658
Ambidextrous innovation (AMI)	AMI_1	0.244	0.370	*0.677*
	AMI_2	0.500	0.557	*0.808*
	AMI_3	0.478	0.586	*0.883*
	AMI_4	0.451	0.530	*0.853*
	AMI_5	0.48	0.552	*0.863*
	AMI_6	0.295	0.380	*0.644*

Table 3 Assessment of convergent and discriminant validity

Constructs	*1*	*2*	*3*
1 IS strategy	*0.836*		
2 Business process performance	0.590	*0.804*	
3 Ambidextrous innovation	0.531	0.636	*0.793*
Cronbach's alpha	0.892	0.731	0.880
Rho_A	0.894	0.740	0.901
Composite reliability	0.921	0.846	0.910
Average variance extracted (AVE)	0.699	0.647	0.629

3.7 Structural model

The structural model from the PLS analysis is verified through the explained variance of endogenous variables (R^2), path coefficients (β), the effect size of path coefficients (f^2) by performing a bootstrap analysis with 5,000 resamples, see Table 4.

There are significant effects between ISS, BPP, and AMI constructs, and consequently Hypotheses H1 and H2 were both supported. ISS demonstrated large and strong effect on BPP ($f^2 = 0.535$, $\beta = 0.590$, $t = 24.538$, $p < 0.001$), and BPP on AMI ($f^2 = 0.278$, $\beta = 0.488$, $t = 17.183$, $p < 0.001$).

Table 4 Relationships between all latent variables

Variables relationship	*f^2 effect size*	*Path coefficient*	*Standard error*	*t value*	*p value*	*R^2*	*R^2 with MLMV*
ISS -> BPP	0.535	0.590	0.024	24.538	0.000	0.349	0.353
ISS -> AMI	0.058	0.230	0.032	7.227	0.000		
BPP -> AMI	0.278	0.488	0.028	17.183	0.000	0.488	0.488
Size -> AMI	0.000	–0.015	0.034	0.455	0.649		
Sector -> AMI	0.010	0.076	0.032	2.388	0.017		

Hypothesis 3 was supported. It assessed the variance account for (VAF), in the relationship between ISS on AMI was partially mediated by BPP (VAF = 54%, t = 13,753, p-value < 0.001), as mentioned by Hair et al. (2017).

Table 5 Relationships between all latent variables by sectors

Sector cases	*Variables relationship*	*f^2 effect size*	*Path coefficient*	*Standard error*	*t value*	*p value*	*R^2*
Agribusiness	*ISS -> BPP*	*0.449*	*0.557*	*0.106*	*5.250*	*0.000*	*0.310*
38 cases	ISS -> AMI	0.064	0.206	0.137	1.499	0.134	0.542
	BPP -> AMI	0.545	0.602	0.124	4.835	0.000	
Commerce	ISS -> BPP	0.731	0.650	0.085	7.616	0.000	0.422
52 cases	ISS -> AMI	0.006	0.083	0.149	0.555	0.579	0.386
	BPP -> AMI	0.299	0.564	0.119	4.738	0.000	
Financial	ISS -> BPP	1.974	0.815	0.075	10.846	0.000	0.664
33 cases	ISS -> AMI	0.004	0.082	0.275	0.297	0.766	0.451
	BPP -> AMI	0.223	0.604	0.259	2.335	0.020	
Manufacturing	ISS -> BPP	0.425	0.546	0.052	10.571	0.000	0.298
212 cases	ISS -> AMI	0.067	0.231	0.065	3.568	0.000	0.439
	BPP -> AMI	0.323	0.508	0.054	9.470	0.000	
Service	ISS -> BPP	0.506	0.579	0.034	17.256	0.000	0.336
487 cases	ISS -> AMI	0.074	0.252	0.041	6.111	0.000	0.430
	BPP -> AMI	0.264	0.476	0.038	12.490	0.000	
Government	ISS -> BPP	0.976	0.703	0.078	9.031	0.000	0.494
34 cases	ISS -> AMI	0.144	0.280	0.160	1.749	0.080	0.724
	BPP -> AMI	0.727	0.630	0.143	4.408	0.000	

It also verified the control variables, firm size and sector. The firm size was found insignificant (p-value > 0.05), and the sector was found to have a significant effect on AMI (p < 0.01), see Table 4. All sectors demonstrated that ISS has a large and strong positive effect on BPP, and BPP on AMI (p-value < 0.001). The partial mediation was present by BPP in the relationship among ISS and AMI to service and manufacturing sectors, and it was demonstrated full mediation to all other sectors (agribusiness, commerce, financial and government), see Table 5.

To examine the sector influence, the database was separated, and the parametric approach was assessed by a multi-group analysis (PLS-MGA) to explore the differences

between sector path coefficients. The requirements of minimum sample size were attended with ten times the largest number of structural path direct (two arrows) at AMI, 20 cases for a minimum sample, as recommended by Hair et al. (2017).

Table 6 summarises the results of the differences between path coefficients associated with the relationship between SIS on BPP and BPP on AMI. The difference path coefficient was found significantly statistic (p-value < 0.05) in the relationship between ISS on BPP in the multi-group analysis of agribusiness and financial ($|p_1 - p_2| = 0.258$), commerce and service ($|p_1 - p_2| = 0.253$), and commerce and manufacturing ($|p_1 - p_2| = 0.269$).

Table 6 Difference of multi-group analysis between sectors relationships

Sectors		*Relationship between variables*	*Difference of path coefficients* $\|p_1 - p_2\|$				
			6	*5*	*4*	*3*	*2*
1	Agribusiness	ISS > BPP	0.146	0.023	0.011	0.258*	0.093
		ISS > AMI	0.074	0.046	0.025	0.124	0.123
		BPP > AMI	0.029	0.125	0.094	0.002	0.037
2	Commerce	ISS > BPP	0.053	0.070	0.104	0.165	
		ISS > AMI	0.197	0.169	0.148	0.001	
		BPP > AMI	0.066	0.088	0.056	0.039	
3	Finance	ISS > BPP	0.112	0.235*	0.269*		
		ISS > AMI	0.198	0.170	0.149		
		BPP > AMI	0.027	0.127	0.096		
4	Manufacturing	ISS > BPP	0.157	0.034			
		ISS > AMI	0.049	0.021			
		BPP > AMI	0.122	0.031			
5	Service	ISS > BPP	0.123				
		ISS > AMI	0.028				
		BPP > AMI	0.154				
6	Government						

Note: *p-value < 0.05, **p-value < 0.01, ***p-value < 0.001, without symbol no significant (p-value > 0.05).

4 Discussion and conclusions

This study drawing on a SAS perspective examined if and how ISS influences BPP and AMI, and the findings showed that the proposed model had high explanatory power and it explains 34.9% of the variance in BPP and 49.4% of that in AMI.

The tests for Hypothesis 1 revealed large and strong significant path coefficients ($f^2 = 0.535$, $\beta = 0.590$, p-value < 0.001), indicating that IS embedded into the strategising process positively influences the business processes of innovation, operation, post-sale and support activities. Hence, this study demonstrated that ISS, in the SAS perspective, ability the rational and emergent approach to disseminating strategic awareness; analysing external factors, and promoting cooperation for designing, developing,

implementing, and monitoring competitive strategies, in line with previous studies (Yoshikuni and Albertin, 2018). Additionally, this result is an important contribution to ISS literature, as recommended by Whittington (2014), to investigate how IS strategy use can enable strategy practitioners to make firm strategy through a rational and emergent approaches of SAS.

The tests for Hypothesis 2 indicated that BPP was a large and strong significant influence on AMI ($f^2 = 0.278$, $\beta = 0.488$, p-value < 0.001). The findings are in line with ambidexterity conceptual studies (Raisch et al., 2009; Bodwell and Chermack, 2010) and recent empirical study (Zang and Li, 2017), which indicates that BPP impact on innovation ambidexterity and this empirical result provides a detailed and better understanding how BPP enhances ambidexterity through the combination of exploratory and EPI.

Hypothesis 3 also clearly supported that BPP mediates the relationship between ISS and AMI. This finding contributes to previous studies of IS strategy and extends the IS literature that IT resources alone cannot guarantee success (Melville et al., 2004; Kohli and Grover, 2008; Peppard et al., 2014; Marabelli and Galliers, 2017). They should be associated with other organisational resources and business processes to leverage and fulfil their business objectives, and in this study, IS can contribute to enhancing AMI, and extends the literature knowledge of IS strategy.

The analysis of sector control variables demonstrated that ISS has a superior effect on BPP in financial than agribusiness, service and manufacturing sector and the difference, respectively, it showed 46%, 40% and 49% in this relationship. According to previous studies, the findings demonstrated industry characteristics moderate the firm's ability to apply IS resources and extend the knowledge of IT business value literature (Melville et al., 2004; Kohli and Grover, 2008). According to Brasscom (2020) in 2019, Brazilian firms invested in information technology and communication (ICT) $125.4 million dollars that represent 6.8% of Brazil GPD. Additionally, the financial firms have expended 11.4% of their revenue in IT more than commerce 3.8%, manufacturing 4.3% and the average of all sectors 8.0% in 2019 (FGVcia, 2020). Thus, this study contributes to extend the literature of ISS, when identified that ISS can provide different influence on BPP to enhance AMI.

4.1 Research practical implications and future research

The findings showed that ISS is an option available to managers to emphasise the need for IT investment and development of knowledge strategy, to balance the main tension between planned and emergent strategy (exploitation and exploration), associating the setting-up of long-term strategies (hierarchical power) by existing knowledge/resources, and allowing the emergent practice by IS strategising to enhance AMI.

The results demonstrated that IT investment cannot guarantee AMI, mainly in the digital era, even though the sounds appear quite natural in the direct relationship between ISS and AMI. The study showed, in line with previous IS studies, that the link between ISS and AMI, in reality, is acceptable to achieve in the level of BPP. Hence, the SAS approach is enabled when firms know how the effective use of ISS can involve strategy-practitioners to leverage real strategy praxis, and consequently improve business processes to create AMI requirements by market/customers.

4.2 Limitations and future research

The research demonstrated limitations and it is necessary for further research in this area. The structural test by sector demonstrated financial firms have more contribution to BPP than other sectors. Future qualitative research can examine what, why, and how factors can contribute to this organisational behaviour. Once AMI is a temporal process, future research could conduct a longitudinal study to extend knowledge understanding about these issues. This study did not examine the influence of environmental factors, and future research could investigate if and how turbulence factors, such as dynamism, complexity, hostility may moderate these relationships. Further research could investigate different contexts and cultures and compare the results in developed and developing economies.

References

Alamayreh, E.M., Sweis, R.J. and Obeidat, B.Y. (2019) 'The relationship among innovation, organisational ambidexterity and organisational performance', *International Journal of Business Innovation and Research*, Vol. 19, No. 4, pp.554–579, DOI: 10.1504/IJBIR.2019.101656.

Anwar, J. and Hasnu, S. (2016) 'Business strategy and firm performance: a multi-industry analysis', *Journal of Strategy and Management*, Vol. 9, No. 3, pp.361–382, DOI: 10.1108/JSMA-09-2015-0071.

Ardito, L. et al. (2018) 'The influence of production, IT, and logistics process innovations on ambidexterity performance', *Business Process Management Journal*, Vol. 24, No. 5, pp.1271–1284, DOI: 10.1108/BPMJ-11-2017-0306.

Arend, R.J. et al. (2017) 'Strategic planning as a complex and enabling managerial tool', *Strategic Management Journal*, Vol. 38, pp.1741–1752, DOI: 10.1002/smj.2420.

Arvidsson, V., Holmström, J. and Lyytinen, K. (2014) 'Information systems use as strategy practice: a multi-dimensional view of strategic information system implementation and use', *Journal of Strategic Information Systems*, Vol. 23, No. 1, pp.45–61, Elsevier B.V., DOI: 10.1016/j.jsis.2014.01.004.

Aslam, H. et al. (2018) 'Dynamic supply chain capabilities: how market sensing, supply chain agility and adaptability affect supply chain ambidexterity', *International Journal of Operations and Production Management*, Vol. 38, No. 12, pp.2266–2285, DOI: 10.1108/IJOPM-09-2017-0555.

Ayabakan, S., Bardhan, I.R. and Zheng, Z. (2017) 'A data envelopment analysis approach to estimate IT-enabled production capability', *MIS Quarterly*, Vol. 41, No. 1, pp.189–205 [online] http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=121204227&lang=zh-cn&site=ehost-live.

Aydiner, A.S., Tatoglu, E., Bayraktar, E. and Zaim, S. (2019a) 'Information system capabilities and firm performance: opening the black box through decision-making performance and business-process performance', *International Journal of Information Management*, July, Vol. 47, pp.168–182, Elsevier, DOI: 10.1016/j.ijinfomgt.2018.12.015.

Aydiner, A.S., Tatoglu, E., Bayraktar, E., Zaim, S. et al. (2019b) 'Business analytics and firm performance: the mediating role of business process performance', *Journal of Business Research*, November, Vol. 96, pp.228–237, Elsevier, DOI: 10.1016/j.jbusres.2018.11.028.

Benner, M.J. and Tushman, M.L. (2003) 'Exploitation, exploration, and process management: the productivity dilemma revisited', *Academy of Management Review*, Vol. 28, No. 2, pp.238–256, Academy of Management, DOI: 10.5465/AMR.2003.9416096.

Benner, M.J. and Tushman, M.L. (2015) 'Reflections on the 2013 Decade Award – "exploitation, exploration, and process management: the productivity dilemma revisited" ten years later', *Academy of Management Review*, Vol. 40, No. 4, pp.497–514, DOI: 10.5465/amr.2015.0042.

Bharadwaj, A. et al. (2013) 'Visions and voices on emerging challenges in digital business strategy', *MIS Quarterly*, Vol. 37, No. 2, pp.633–661.

Bido, D.S. and Silva, D. (2019) 'SmartPLS 3: specification, estimation, evaluation and reporting', *RAEP*, Vol. 20, No. 2, pp.1–31, DOI: 10.13058/raep.2019.v20n2.1545.

Bodwell, W. and Chermack, T.J. (2010) 'Organizational ambidexterity: integrating deliberate and emergent strategy with scenario planning', *Technological Forecasting and Social Change*, Vol. 77, No. 2, pp.193–202, Elsevier Inc., DOI: 10.1016/j.techfore.2009.07.004.

Bolisani, E. and Bratianu, C. (2017) 'Knowledge strategy planning: an integrated approach to manage uncertainty, turbulence, and dynamics', *Journal of Knowledge Management*, Vol. 21, No. 2, pp.233–253, DOI: 10.1108/JKM-02-2016-0071.

Brasscom (2020) *2019 Sectorial Report, Intelligence and Information*, BRI2-2020-006-01, v34, São Paulo, SP [online] https://brasscom.org.br/relatorio-setorial-de-tic-2019/ (accessed 12 January 2020).

Burgelman, R.A. et al. (2018) 'Strategy processes and practices: dialogues and intersections', *Strategic Management Journal*, Vol. 39, No. 3, pp.531–558, DOI: 10.1002/smj.2741.

Ceptureanu, E.G. and Ceptureanu, S.I. (2019) 'The impact of adoptive management innovations on medium-sized enterprises from a dynamic capability perspective', *Technology Analysis & Strategic Management*, Vol. 31, No. 10, pp.1137–1151, DOI: 10.1080/09537325.2019.1587160.

Chan, Y.E. and Huff, S.L. (1992) 'Strategy: an information systems research perspective', *The Journal of Strategic Information Systems*, Vol. 1, No. 4, pp.191–204, DOI: 10.1016/0963-8687(92)90035-U.

Chan, Y.E. and Reich, B.H. (2007) 'IT alignment: what have we learned?', *Journal of Information Technology*, Vol. 22, No. 4, pp.297–315, DOI: 10.1057/palgrave.jit.2000109.

Chandrasekaran, A., Linderman, K. and Schroeder, R. (2012) 'Antecedents to ambidexterity competency in high technology organizations', *Journal of Operations Management*, Vol. 30, Nos. 1–2, pp.134–151, DOI: 10.1016/j.jom.2011.10.002.

Chen, D.Q. et al. (2010) 'Information systems strategy: reconceptualization, measurement, and implications', *MIS Quarterly*, Vol. 34, No. 2, pp.233–259.

Chin, W.W. et al. (2013) 'Controlling for common method variance in PLS analysis: the measured latent marker variable approach', in Abdi, H., Chin, W.W., Vinzi, V.E., Russolillo, G. and Trinchera, L. (Eds.): *New Perspectives in Partial Least Squares and Related Methods*, pp.231–239, Springer, New York.

Coltman, T. et al. (2015) 'Strategic IT alignment: twenty-five years on', *Journal of Information Technology*, Vol. 30, No. 2, pp.91–100, DOI: 10.1057/jit.2014.35.

Cousineau, D. and Chartier, S. (2017) 'Outliers detection and treatment: a review', *International Journal of Psychological Research*, Vol. 3, No. 1, p.58, DOI: 10.21500/20112084.844.

Etikan, I., Musa, S.A. and Alkassim, R.S. (2016) 'Comparison of convenience sampling and purposive sampling', *American Journal of Theoretical and Applied Statistics*, Vol. 5, No. 1, pp.1–4, DOI: 10.11648/j.ajtas.20160501.11.

FGVcia (2020) *31st Annual Survey of IT Use*, Center of Applied Technology at FGV-EAESP, São Paulo, SP [online] https://eaesp.fgv.br/ensinoeconhecimento/centros/cia/pesquisa (accessed 12 January 2020).

Gable, G.G. (2020) 'The past and future of the *Journal of Strategic Information Systems*: a conversation with Bob Galliers', *Journal of Strategic Information Systems*, Vol. 29, No. 3, p.101612, Elsevier, DOI: 10.1016/j.jsis.2020.101612.

Galliers, R.D. (2007) 'Strategizing for agility: confronting information systems inflexibility in dynamic environments', in De Souza, K. (Ed.): *Agile Information Systems*, pp.1–15, Butterworth-Heinemann, Elsevier Inc., Burlington, MA.

Galliers, R.D. (2011) 'Further developments in information systems strategizing: unpacking the concept', in Galliers, R.D. and Currie, W.L. (Eds.): *The Oxford Handbook of Management Information Systems: Critical Perspectives and New Directions*, pp.329–345, Oxford University Press, Oxford.

Galliers, R.D. et al. (2012) 'Strategic information systems: reflections and prospectives', *Journal of Strategic Information Systems*, DOI: 10.1016/j.jsis.2012.07.001.

Gao, P. et al. (2020) 'Effects of technical IT capabilities on organizational agility: the moderating role of IT business spanning capability', *Industrial Management and Data Systems*, DOI: 10.1108/IMDS-08-2019-0433.

Gerow, J.E. et al. (2014) 'Looking toward the future of IT-business strategic alignment through the pas: a meta-analysis', *MIS Quarterly*, Vol. 38, No. 4, pp.1159–1185.

Ghasemaghaei, M., Ebrahimi, S. and Hassanein, K. (2018) 'Data analytics competency for improving firm decision making performance', *Journal of Strategic Information Systems*, Vol. 27, No. 1, pp.101–113, DOI: 10.1016/j.jsis.2017.10.001.

Hair, J.F. et al. (2017) *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, 2nd ed., Sage Publications, Inc., Thousand Oaks.

Henseler, J., Ringle, C.M. and Sarstedt, M. (2015) 'A new criterion for assessing discriminant validity in variance-based structural equation modeling', *Journal of the Academy of Marketing Science*, Vol. 43, No. 1, pp.115–135, DOI: 10.1007/s11747-014-0403-8.

Huang, J. et al. (2014) 'Site-shifting as the source of ambidexterity: empirical insights from the field of ticketing', *Journal of Strategic Information Systems*, Vol. 23, No. 1, pp.29–44, Elsevier B.V., DOI: 10.1016/j.jsis.2014.01.001.

IBGE (2017) *Contas Nacionais Trimestrais, Study of Brazilian Gross Domestic Product* [online] http://ftp.ibge.gov.br/Contas_Nacionais/Contas_Nacionais_Trimestrais/Comentarios (accessed 12 January 2020).

Jansen, J.J.P. et al. (2006) 'Exploratory innovation, exploitative innovation, and performance: effects of organizational antecedents and environmental moderators', *Management Science*, Vol. 52, No. 11, pp.1661–1674, DOI: 10.1287/mnsc.1060.0576.

Jansen, J.J.P., Vera, D. and Crossan, M. (2009) 'Strategic leadership for exploration and exploitation: the moderating role of environmental dynamism', *The Leadership Quarterly*, Vol. 20, pp.5–18, DOI: 10.1016/j.leaqua.2008.11.008.

Jarzabkowski, P. and Spee, A.P. (2009) 'Strategy-as-practice – a review and future directions for the field', *International Journal of Management Reviews*, Vol. 11, No. 1, pp.69–95.

Junni, P. et al. (2013) 'Organizational ambidexterity and performance: a meta-analysis', *The Academy of Management Perspectives*, Vol. 27, No. 4, pp.299–312.

Kaplan, R.S. and Norton, D.P. (2008) *The Execution Premium: Linking Strategy to Operations for Competitive Advantage*, Harvard Business School Press, Boston.

Kim, G. et al. (2011) 'IT capabilities, process-oriented dynamic capabilities, and firm financial performance', *Journal of Association for Information Systems*, Vol. 12, No. 7, pp.487–517.

Kim, W.C. and Mauborgne, R. (2004) 'Value innovation the strategic logic of high growth', *Harvard Business Review*, Vol. 82, Nos. 7–8, pp.103–112.

Kohli, R. and Grover, V. (2008) 'Business value of IT: an essay on expanding research directions to keep up with the times', *Journal of Association for Information Systems*, Vol. 9, No. 1, pp.23–29.

Lavie, D., Stettner, U. and Tushman, M.L. (2010) 'Exploration and exploitation within and across organizations', *The Academy of Management Annals*, Vol. 4, No. 1, pp.109–155, DOI: 10.1080/19416521003691287.

Li, T. and Chan, Y.E. (2019) 'Dynamic information technology capability: concept definition and framework development', *Journal of Strategic Information Systems*, Vol. 28, No. 4, p.101575, Elsevier, DOI: 10.1016/j.jsis.2019.101575.

Lu, Y. and Ramamurthy, K. (2011) 'Understanding the link between information technology capability and organizational agility: an empirical examination', *MIS Quarterly*, Vol. 35, No. 4, pp.931–954.

Marabelli, M. and Galliers, R.D. (2017) 'A reflection on information systems strategizing: the role of power and everyday practices', *Information Systems Journal*, Vol. 27, No. 3, pp.347–366, DOI: 10.1111/isj.12110.

March, J.G. (1991) 'Exploration and exploitation in organizational learning', *Organization Science*, Vol. 2, No. 1, pp.71–87, DOI: 10.1287/orsc.2.1.71.

McLaren, T.S. et al. (2011) 'A multilevel model for measuring fit between a firm's competitive strategies and information systems capabilities', *MIS Quarterly*, Vol. 35, No. 4, pp.909–929, DOI: 10.1017/CBO9781107415324.004.

Melville, N., Kraemer, K. and Gurbaxani, V. (2004) 'Review: information technology and organizational performance: an integrative model of IT business value', *MIS Quarterly*, Vol. 28, No. 2, pp.283–322.

Mikalef, P. and Pateli, A. (2017) 'Information technology-enabled dynamic capabilities and their indirect effect on competitive performance: findings from PLS-SEM and fsQCA', *Journal of Business Research*, Vol. 70, pp.1–16, Elsevier B.V., DOI: 10.1016/j.jbusres.2016.09.004.

Mikalef, P. et al. (2019) 'Exploring the relationship between big data analytics capability and competitive performance: the mediating roles of dynamic and operational capabilities', *Information and Management*, Vol. 57, No. 2, p.103169, Elsevier, DOI: 10.1016/j.im.2019.05.004.

Moeini, M., Rahrovani, Y. and Chan, Y.E. (2019) 'A review of the practical relevance of IS strategy scholarly research', *Journal of Strategic Information Systems*, Vol. 28, No. 2, pp.196–217, Elsevier, DOI: 10.1016/j.jsis.2018.12.003.

Morgado, F.F.R. et al. (2018) 'Scale development: ten main limitations and recommendations to improve future research practices', *Psychology: Research and Review (Psicologia: Reflexão e Crítica)*, Vol. 30, No. 1, pp.1–20, DOI: 10.1186/s41155-016-0057-1.

Peppard, J., Galliers, R.D. and Thorogood, A. (2014) 'Information systems strategy as practice: micro strategy and strategizing for IS', *Journal of Strategic Information Systems*, Vol. 23, No. 1, pp.1–10, DOI: 10.1016/j.jsis.2014.01.002.

Porter, M.E. (1990) 'Competitive advantage: creating and sustaining superior performance', *Harvard Business Review*, March–April, Vol. 1, No. 2, pp.73–93.

Queiroz, M. et al. (2018) 'The role of IT application orchestration capability in improving agility and performance', *Journal of Strategic Information Systems*, Vol. 27, No. 1, pp.4–21, Elsevier, DOI: 10.1016/j.jsis.2017.10.002.

Raisch, S. et al. (2009) 'Organizational ambidexterity: balancing exploitation and exploration for sustained performance', *Organization Science*, Vol. 20, No. 4, pp.685–695, INFORMS, DOI: 10.1287/orsc.1090.0428.

Ravichandran, T. (2018) 'Exploring the relationships between IT competence, innovation capacity and organizational agility', *Journal of Strategic Information Systems*, Vol. 27, No. 1, pp.22–42, Elsevier B.V., doi: 10.1016/j.jsis.2017.07.002.

Schwarz, A. et al. (2017) 'Examining the impact and detection of the "urban legend" of common method bias', *ACM SIGMIS Database: The DATABASE for Advances in Information Systems*, Vol. 48, No. 1.

SEBRAE (2017) *Study and Research*, DataSebrae [online] https://m.sebrae.com.br/sites/PortalSebrae/estudos_pesquisas/outros-estudosdestaque18,c61af925817b3410VgnVCM2000003c74010aRCRD (accessed 12 January 2020).

Sekaran, U. (2016) *Research Methods for Business: A Skill-building Approach*, 7th ed., John Wiley & Sons, Inc., New York.

Shollo, A. and Galliers, R.D. (2016) 'Towards an understanding of the role of business intelligence systems in organisational knowing', *Information Systems Journal*, Vol. 26, No. 4, pp.339–367, DOI: 10.1111/isj.12071.

Song, M. et al. (2011) 'Does strategic planning enhance or impede innovation and firm performance?', *Journal of Product Innovation Management*, Vol. 28, No. 4, pp.503–520, DOI: 10.1111/j.1540-5885.2011.00822.x.

Tallon, P.P. (2011) 'Value chain linkages and the spillover effects of strategic information technology alignment: a process-level view', *Journal of Management Information Systems*, Vol. 28, No. 3, pp.9–44, DOI: 10.2753/MIS0742-1222280301.

Tallon, P.P. et al. (2016) 'Business process and information technology alignment: construct conceptualization, empirical illustration, and directions for future research', *Journal of the Association for Information Systems*, Vol. 17, No. 9, pp.563–589, DOI: 10.17705/1jais.00438.

Tallon, P.P. et al. (2019) 'Information technology and the search for organizational agility: a systematic review with future research possibilities', *Journal of Strategic Information Systems*, Vol. 28, No. 2, pp.218–237, Elsevier, DOI: 10.1016/j.jsis.2018.12.002.

Teubner, R.A. and Stockhinger, J. (2020) 'Literature review: understanding information systems strategy in the digital age', *Journal of Strategic Information Systems*, Vol. 29, No. 4, p.101642, Elsevier B.V., DOI: 10.1016/j.jsis.2020.101642.

Wamba, S.F. et al. (2020) 'The performance effects of big data analytics and supply chain ambidexterity: the moderating effect of environmental dynamism', *International Journal of Production Economics*, September 2019, Vol. 222, DOI: 10.1016/j.ijpe.2019.09.019.

Wang, C., Chin, T. and Lin, J.H. (2020) 'Openness and firm innovation performance: the moderating effect of ambidextrous knowledge search strategy', *Journal of Knowledge Management*, Vol. 24, No. 2, pp.301–323, DOI: 10.1108/JKM-04-2019-0198.

Whittington, R. (2014) 'Information systems strategy and strategy-as-practice: a joint agenda', *Journal of Strategic Information Systems*, Vol. 23, No. 1, pp.87–91, Elsevier B.V., DOI: 10.1016/j.jsis.2014.01.003.

Wolf, C. and Floyd, S.W. (2017) 'Strategic planning research: toward a theory-driven agenda', *Journal of Management*, Vol. 43, No. 6, pp.1754–1788, DOI: 10.1177/0149206313478185.

Xie, X. and Gao, Y. (2018) 'Strategic networks and new product performance: the mediating role of ambidextrous innovation', *Technology Analysis & Strategic Management*, Vol. 30, No. 7, pp.811–824, DOI: 10.1080/09537325.2017.1380790.

Xie, X. et al. (2020) 'Collaborative ties and ambidextrous innovation: insights from internal and external knowledge acquisition', *Industry and Innovation*, Vol. 27, No. 3, pp.285–310, DOI: 10.1080/13662716.2019.1633909.

Yeow, A., Soh, C. and Hansen, R. (2018) 'Aligning with new digital strategy: a dynamic capabilities approach', *Journal of Strategic Information Systems*, Vol. 27, No. 1, pp.43–58, Elsevier, DOI: 10.1016/j.jsis.2017.09.001.

Yoshikuni, A.C. and Albertin, A.L. (2018) 'Effects of strategic information systems on competitive strategy and performance', *International Journal of Productivity and Performance Management*, Vol. 67, No. 9, pp.2018–2045, DOI: 10.1108/IJPPM-07-2017-0166.

Yoshikuni, A.C. and Albertin, A.L. (2020) 'Leveraging firm performance through information technology strategic alignment and knowledge management strategy: an empirical study of IT-business value', *International Journal of Research – GRANTHAALAYAH*, Vol. 8, No. 10, pp.304–318, DOI [online] https://doi.org/10.29121/granthaalayah.v8.i10.2020.2088.

Yoshikuni, A.C. and Albertin, L.A. (2017) 'IT-enabled dynamic capability on performance: an empirical study of BSC model', *Journal of Business Management*, May–June, Vol. 57, pp.215–231, DOI: 10.1590/S0034-759020170303.

Yoshikuni, A.C. et al. (2018) 'The influences of strategic information systems on the relationship between innovation and organizational', *Brazilian Business Review*, DOI: dx.doi.org/10.15728/bbr.2018.15.5.3.

Yoshikuni, A.C., Galvão, F.R. and Albertin, A.L. (2021) 'Knowledge strategy planning and information system strategies enable dynamic capabilities innovation capabilities impacting firm performance', *VINE Journal of Information and Knowledge Management Systems*, ahead of print, DOI: 10.1108/VJIKMS-07-2020-0128.

Zang, J. and Li, Y. (2017) 'Technology capabilities, marketing capabilities and innovation ambidexterity', *Technology Analysis & Strategic Management*, Vol. 29, No. 1, pp.23–37, DOI: 10.1080/09537325.2016.1194972.

Appendix

Abbreviated questionnaire

Information systems strategy

IS enables a firm to…

ISS_1 Disseminate its objectives to all levels.

ISS_2 Scan all external factors that affect it.

ISS_3 Formulate business strategies.

ISS_4 Implement strategies consistent with the firms' business strategy in order to achieve goals.

ISS_5 Monitor the strategy and compare outcomes with other firms.

Business process performance

The firm is…

BPP_1 Efficient and effective in carrying out the primary activities of the company's value chain (core activities, the core of the business, such as innovation, operational and post-sale).

BPP_2 Efficient and effective in carrying out secondary activities in the company's value chain (support activities).

BPP_3 Efficient to develop new products and services in order to meet the new trends and demands of the market.

Exploratory innovation

The firm…

ERI_01 Accepts demands that go beyond existing products and services we invent new products and services.

ERI_02 Experiment with new products and services in our local market.

ERI_03 Commercialise products and services that is completely new to our organisation.

ERI_04 Frequently utilise new opportunities in new markets.

ERI_05 Regularly uses new distribution channels.

ERI_06 Regularly search for and approach new clients in new markets.

Exploitative innovation

The firm…

EPI_01 Frequently refine the provision of existing products and services we regularly implement small adaptations to existing products and services.

EPI_02 Introduces improved, but existing products and services for our local market.

EPI_03 Improves its provision's efficiency of products and services.

EPI_04 Increases economies of scales in existing markets.

EPI_05 Expands services for existing clients.

EPI_06 Lowers costs of internal processes are an important objective.

Measured latent marker variable

MLMV_01 It is easy for me to reach my goals.

MLMV_02 I would never abandon the desire to have my own business.

MLMV_03 I have a positive attitude towards others.

MLMV_04 I always imagine my house in the future.