



How information systems strategy moderates the relationship between business strategy and performance [☆]



David Martinez-Simarro ^{a,*}, Carlos Devece ^{b,**}, Carlos Llopis-Albert ^{b,***}

^a Ainia Centro Tecnológico, Spain

^b Universitat Politècnica de València, Spain

ARTICLE INFO

Article history:

Received 7 February 2014

Received in revised form 4 November 2014

Accepted 27 January 2015

Available online 7 February 2015

Keywords:

Information systems strategy

Business strategy

Competitive advantage

Organizational performance

ABSTRACT

This study analyzes the moderating effect of information systems (IS) strategy on the relationship between a firm's business strategy and organizational performance. From the resource-based view, the study analyzes the support that an innovative IS strategy and a conservative IS strategy can provide to low-cost and differentiation business strategies. Results of analysis for a sample of 166 firms from the Spanish food industry demonstrate the effectiveness of innovative IS strategies in firms with low-cost business strategies. In contrast, innovative IS strategies fail to compensate the risk of innovation in marketing activities and consequently in business strategies that rely on image differentiation. The relationship between IS strategy and business strategies that rely on innovative differentiation is ambiguous, but for the food industry, the innovative IS strategy is counterproductive. Conclusions provide guidance on strategic decision-making for developing information systems in firms according to business goals.

© 2015 Elsevier Inc. All rights reserved.

1. Introduction

The strategic use of information technology (IT) is a matter of concern for researchers and managers (Luftman et al., 2013). Firms need to make decisions regarding IT use in response to technological evolution and changes in business activity. Previous studies indicate that, without a solid information systems (IS) strategy, IT contribution to organizational performance may fall short of expectations (Chen, 2012).

Most research dealing with the strategic use of IT focuses on business and IT alignment (Chan & Reich, 2007). This approach omits an IT/IS strategy perspective and consequently ignores the alignment's dynamic nature. Existing research fails to respond to basic questions such as what are the advantages and problems for IT innovators and how does the IT/IS strategy interact with core activities and the business strategy.

This research examines how implementing a particular IS strategy (conservative or innovative) affects the relationship between business

strategy and competitive advantage regarding performance. This study empirically tests how IS strategy affects the relationship between business strategy and performance using data from 166 firms in the Spanish food industry, which is a leading industrial sector in terms of turnover and number of employees.

2. Definition of IS strategy

Despite the importance of IS for organizations, the literature lacks a consistent definition and measurement method for the concept of the IS strategy. A narrow concept of the IS strategy focuses on technology and the IS department (Chan & Reich, 2007) to obtain the IT alignment with the business strategy. Other authors (Chen, Mocker, & Preston, 2010) conceptualize the IS strategy construct as the organizational perspective of the investment, deployment, use, and management of information systems. This definition integrates aspects such as technology, human resources, and business processes, adopting a broad perspective. This definition also suggests that, conceptually, the IS strategy is not a part of the business strategy and that the IS strategy affects the entire organization. This research adopts this broad IS strategy conception, according to which the IS strategy is independent from the firm's business strategy.

This study acknowledges two distinct organizational approaches to the IS strategy: the innovative IS approach and the conservative IS approach. Organizations that continually pursue innovation in IS are more likely to create and profit from unique IS that will potentially provide competitive advantages. An innovative IS approach is riskier and more costly than a conservative approach (Leidner, Lo, & Preston, 2011).

[☆] The authors are grateful to contributions from Rafael Lapiedra, Universitat Jaume I and Joaquin Alegre, Universitat de València, for their careful reading and suggestions.

* Correspondence to: D. Martinez-Simarro, Ainia Centro Tecnológico, c/Benjamin Franklin, 5-11, 46980 Paterna, Spain.

** Correspondence to: C. Devece, Department of Business Organization, Universitat Politècnica de València, Camino de vera s/n, 46022 Valencia, Spain.

*** Correspondence to: C. Llopis-Albert, ETSID, Universitat Politècnica de València, Camino de vera s/n, 46022 Valencia, Spain.

E-mail addresses: dmsimarro@ainia.es (D. Martinez-Simarro), cdevece@upvnet.upv (C. Devece), cllopis@upvnet.upv.es (C. Llopis-Albert).

Firms that adopt a conservative IS approach (i.e., firms that follow their industry leaders' best practices) limit their ability to respond quickly and flexibly to the environment (Doherty & Terry, 2009). This safe approach does not entail obtaining a competitive advantage via information systems (Chen et al., 2010). By evaluating the movements of competitors that adopt an innovative IS approach, firms can gauge the success and failure of IS leaders. Therefore, according to the resource-based view (RBV), the decision to opt for an innovative or a conservative IS approach depends upon the IT characteristics of the firm's core activities and the IS imitability (Doherty & Terry, 2009).

3. How IS strategy moderates business strategy success

This study examines the IS strategy's moderating effect on business strategy by analyzing the IS strategy's effect on firms' activities (Tallon, 2007). This analysis establishes the business strategy to identify activities essential to the organization and then identifies how IT can improve the business strategy.

Specialization by activity lets firms departmentalize organizational functions. This departmentalization provides the most logical classification of IS, the classification researchers dealing with IS typologies commonly use. Chen (2012) uses this classification to analyze, from the RBV, how resources in IT and IS enable high-order business capabilities in operations, R&D, and marketing activities. Grouping and analyzing IT potential by functions is the basis for the current study of the IS strategy's effects on three generic business strategies: (1) innovative differentiation, (2) marketing differentiation, and (3) low-cost (Spanos & Lioukas, 2001).

3.1. Innovative differentiation and IS strategy

For an innovative differentiation strategy, R&D is the key function. For sectors that do not integrate IT into the resulting product or service, the IS act merely as a support for R&D and knowledge management activities. IS for the R&D function integrate different applications to foster knowledge generation. This kind of system covers generic applications such as groupware and very specific applications such as expert systems. If no integration exists with other specific organizational resources and processes, however, competitors can immediately copy or buy and then adopt any IT innovation in the R&D function. Thus, the ever risky innovative IS strategy might be unproductive for R&D activities in sectors such as the food industry. Conversely, in sectors where IT is part of the product or service (e.g., telecommunications or finance), IT forms the basis of companies' R&D. Therefore, an innovative IS strategy is mandatory to achieve innovative differentiation. Lim and Stratopoulos (2008) report that in such sectors, R&D success depends on an innovative IS.

3.2. Marketing differentiation and IS strategy

Business strategy based on differentiation through marketing establishes a closer, richer, and more complex link with the customer. Marketing IS includes customer relation management, sales management, customer support and care, and market planning and research. IS initiatives in the marketing context are visible to competitors, who can quickly copy successful initiatives. Additionally, the first firm that develops an IS initiative undertakes risks. The marketing initiative failure negatively affects the firm because assets such as branding, image, and so forth are hard to rebuild (Bharadwaj, Keil, & Mähring, 2009).

A stable, safe approach, however, allows firms to learn from competitors' failures. A conservative IS approach allows firms to better gauge which moves to make and to rapidly upgrade capabilities in existing systems, thereby improving the IS nearly as quickly as the best competitor could yet without exposure to risk.

3.3. Low-cost strategy and IS strategy

A cost leadership strategy aims at maximum efficacy in operations. The largest contribution of IT to operations appears in processes involving suppliers, production, and data handling (Seggie, Kim, & Cavusgil, 2006). Competitors may encounter difficulties in imitating such information systems. Generally, IT integration in production activities requires co-specialized resources and capabilities, which considerably reduces the imitability of the IS unless imitators adopt the whole production system including technology, procedures, routines, and culture (Piccoli & Yves, 2005). Thus, an innovative IS strategy can pay off in a low-cost business strategy because competitors cannot easily copy such IS (Tallon, 2007). A conservative attitude regarding IS in operations can erode a low-cost strategy because of IT's importance in reducing operating costs (Mithas, Tafti, Bardhan, & Goh, 2012).

4. Method and results

4.1. Measurement of variables

A 7-point Likert scale perceptually measured all strategy scales. Researchers such as Rivard, Raymond, and Verreault (2006) have used and validated the present study's innovation (4 items), marketing (4 items), and low-cost (3 items) business strategy scales. This study follows Chen et al.'s (2010) typology to build the innovative (3 items) and conservative (4 items) IS strategy scales. The organizational performance variable is the mean of three objective indicators (return on total assets, profit margin, and profit per employee) from the SABI 2011 database (Iberian Balance sheet Analysis System).

4.2. Data collection

This study considers only one sector because the scope and importance of the value that IT provides to a firm depend on the firm's activities and sector. In addition, objectively measuring the firm's competitive position requires a study by sectors. The study focuses on the food industry because of its importance in the economy and because of the enormous challenges this sector is currently facing regarding production and distribution (Azoury & Miyaoka, 2013). Marketing and R&D activities are essential in the food sector. In 2011, the Spanish food industry comprised 29,334 firms. The general managers of 1000 firms received questionnaires with the strategy scales via email between January and June 2011. The valid responses amount to 166.

4.3. Results

To analyze how the IS strategy affects the relationship between business strategy and performance, this work assesses two pairs of subsamples: high innovation vs. low innovation in IS; and high conservatism vs. low conservatism in IS. Table 1 shows the correlations between business strategy and organizational performance for each subsample and the Fisher Z test that evaluates the significance of the IS strategy's

Table 1
Correlation between business strategies and organizational performance in the two subsamples of innovative IS strategy.

Business strategy	Firms with high innovative IS strategy (n = 86)	Firms with low innovative IS strategy (n = 80)	Fisher Z
	r	r	
Innovation	−0.10	0.30	−2.39*
Marketing	−0.12	0.27	−2.33*
Low cost	0.20	0.05	0.95

n = sample size.

* p < .01 (two-tailed).

Table 2
Correlation between business strategies and organizational performance in the two subsamples of conservative IS strategy.

Business strategy	Firms with high conservative IS strategy (n = 85)	Firms with low conservative IS strategy (n = 81)	Fisher Z
	r	r	
Innovation	0.05	0.05	0.03
Marketing	0.14	−0.06	1.15
Low cost	−0.17	0.19	−2.15*

n = sample size.

* $p < .5$.

moderating effect on the relationship between business strategy and organizational performance.

As Table 1 indicates, the difference between the innovative IS strategy subsamples is significant for innovation and marketing business strategies: a highly innovative IS strategy is detrimental to R&D and marketing activities. The relation is the inverse, although less significant ($p = .16$), for a low-cost business strategy, where results are less positive for the sample with a low level of innovation in IS.

Regarding the two subsamples of the conservative IS strategy (Table 2), an IS strategy of low conservatism in a low-cost business strategy is significantly counterproductive ($p = .02$).

5. Conclusions

Results show that business strategies respond differently to different IS strategies. An innovative IS strategy produces better results in a low-cost business strategy; whereas a conservative IS strategy works better in marketing and innovation business strategies. Nevertheless, in all these cases, the significance of the results is low and these strategic combinations do not guarantee success. Conversely, some strategies are clearly incompatible. First, opting for a conservative IS strategy with a low-cost business strategy has significant adverse repercussions on performance. This result is important for companies who base their competitive strategy on a low-cost approach. For such companies, investment in IT to develop their own innovative IS should be on a par with their low-cost business strategy. Second, an innovative IS strategy can be extremely risky for marketing and innovation business strategies. The ease with which competitors can copy IT-based practices in marketing and R&D functions justifies these results.

This conclusion has important implications for managers when allocating and deploying IT resources. IT-based projects for functions that are usually firm specific (e.g., supplier relations and manufacturing) can better profit from firms' IT capabilities and a strong and innovative IS department. Conversely, innovative IT initiatives for marketing and R&D activities are less attractive because the innovator takes on the cost and the risk but enjoys only a short period profiting from the innovation before competitors copy the innovative IT initiative. This study concerns a specific sector, and conclusions are therefore not completely

generalizable. For instance, IT does not form part of the final product in the food industry, so results for the innovation business strategy are not generalizable. For other strategies, however, results provide general indications regarding IS strategy outcomes.

References

- Azoury, S., & Miyaoka, J. (2013). Managing production and distribution for supply chains in the processed food industry. *Production and Operations Management*, 22(5), 1250–1268.
- Bharadwaj, A., Keil, M., & Mähring, M. (2009). Effects of information technology failures on the market value of firms. *Journal of Strategic Information Systems*, 18(2), 66–79.
- Chan, Y. E., & Reich, B. H. (2007). IT alignment: What have we learned? *Journal of Information Technology*, 22(4), 297–315.
- Chen, J. L. (2012). The synergistic effects of IT-enabled resources on organizational capabilities and firm performance. *Information Management*, 49(3/4), 142–150.
- Chen, D. Q., Mocker, M., & Preston, D. S. (2010). Information systems strategy: Reconceptualization, measurement, and implications. *MIS Quarterly*, 34(2), 233–259.
- Doherty, N. F., & Terry, M. (2009). The role of IS capabilities in delivering sustainable improvements to competitive positioning. *Journal of Strategic Information Systems*, 18(2), 100–116.
- Leidner, D. E., Lo, J., & Preston, D. S. (2011). An empirical investigation of the relationship of IS strategy with firm performance. *Journal of Strategic Information Systems*, 20(4), 419–437.
- Lim, J. H., & Stratopoulos, T. C. (2008). IT innovation capability and returns on IT innovation persistence. *The 14th Americas Conference on Information Systems, Toronto, Canada, August 14, 15, 16 & 17, 2008*.
- Luftman, J., Zadeh, H. S., Derksen, B., Santana, M., Rigoni, E. H., & Huang, Z. (2013). Key information technology and management issues 2012–2013: An international study. *Journal of Information Technology*, 28(4), 354–366.
- Mithas, S., Tafti, A., Bardhan, I., & Goh, J. M. (2012). Information technology and firm profitability: Mechanism and empirical evidence. *MIS Quarterly*, 36(1), 205–224.
- Piccoli, G., & Yves, B. (2005). IT-dependent strategic initiatives and sustained competitive advantage: A review and synthesis of the literature. *MIS Quarterly*, 29(4), 747–776.
- Rivard, S., Raymond, L., & Verreault, D. (2006). Resource-based view and competitive strategy: An intended model of the contribution of the information technology to firm performance. *Journal of Strategic Information Systems*, 15(1), 29–50.
- Seggie, S. H., Kim, D., & Cavusgil, S. T. (2006). Do supply chain IT alignment and supply chain interfirm system integration impact upon brand equity and firm performance? *Journal of Business Research*, 59(8), 887–895.
- Spanos, Y. E., & Lioukas, S. (2001). An examination into the causal logic of rent generation: Contrasting Porter's competitive strategy framework and the resource-based perspective. *Strategic Management Journal*, 22(10), 907–934.
- Tallon, P. P. (2007). Does IT pay to focus? An analysis of IT business value under single and multi-focused business strategies. *Journal of Strategic Information Systems*, 16(3), 278–300.