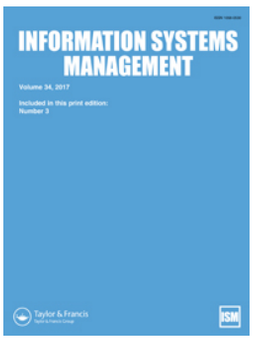

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# Information Systems Strategy and its Relationship With Innovation Differentiation and Organizational Performance

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**ABSTRACT**
This study, from the resource-based view, analyzes the different typologies of information systems (IS) strategy and their effects on firms' innovation differentiation strategy and performance. Distinguishing between innovative and conservative IS strategy, results from the Spanish food industry show that an innovative IS strategy has a stronger direct effect on organizational performance, but that a conservative IS strategy can be a safer way to support the innovation differentiation strategy of firms.

**KEYWORDS**
Information systems strategy; innovation differentiation; organizational performance; resource-based view

## Introduction

The high and steady expenditures in information technologies (IT) in the last 3 decades and the capacity of these technologies to change industry structures and create new ways of making business awakened great interest in professionals and researchers. Key questions are still in vogue, such as how IT must be managed or if these technologies can be a source of sustainable competitive advantage for those organizations that venture their capital and efforts beyond the unavoidable infrastructure and applications common among their competitors. Difficulties persisted in proving a positive relationship between IT and performance (Perez-Lopez & Alegre, 2012). A simple, direct relationship between IT investment and performance does not grasp the complexity of IT and their interactions with business activities (Palacios-Marqués, Merigo, & Soto-Acosta, 2015). The business perspective calls for an analysis of the different IT management approaches and of how these different IT strategies can support business strategies to obtain competitive advantages. Authors from the business perspective usually prefer the term information systems (IS) strategy rather than IT strategy (Chen, Mocker, & Preston, 2010), although both terms, IS and IT strategy, are used to word the same concept.

To analyze the interaction of IT with business activities, the resource-based view (RBV) has been considered a solid theoretical framework since the works of Clemons and Row (1991), and Mata, Fuerst, and Barney (1995). Some of the reasons for the choice of this theoretical approach are that the RBV avoids some drawbacks found in previous studies, such as lack of theoretical models that guide positive research efforts, failure in the introduction of contingent variables and interaction effects, and the use of single proxy predictors like IT investment (Liang, You, & Liu, 2010). From this theoretical framework (RBV), this study analyzes the role of the firm's IS strategy in supporting innovation differentiation activities and how IS strategy affects organizational performance.

The importance of the IT/IS strategy and its relationship with the business strategy has been amply studied. Some researchers argued that the IS strategy can both support and drive the business strategy (Preston & Karahanna, 2009). Beyond this, Galliers (2004) stated that the IS strategy can be considered as a part of comprehensive business strategy that involves the potential impact of IT on organizational performance, as well as changes attendant on management issues arising from IS initiatives. Therefore, Chen and colleagues (2010) claimed that to consider the IS strategy dependent on business strategy may result in a limited view; and that organizations need a guide for decision making in the IT field, not necessarily subject to business strategy.

The first aim of this research is to provide, from the solid ground of the IS literature, a review of the IS strategy concept used in the literature, and how IS strategy is related to business strategy in general, and the innovation function in particular.

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The second objective of this work is to afford empirical evidence, based on data from the Spanish food industry, of the effects of the different IS strategies on organizational performance and the relationship between IS strategy and the firm's innovation strategy. The empirical results can help in making decisions about which IS strategy is better to obtain competitive advantages in general and, in particular, in supporting innovation differentiation.

The article is divided into four parts. The first section sets the theoretical background found in the research, developing the IS strategy concept, the support that IS can afford to the innovation processes, and analyzing if this support can be a source of competitive advantage. Subsequently, the hypotheses are established. Section two introduces the research methodology. The validation of the measurement scales and the empirical testing of the hypotheses are carried out by means of partial least squares structural equation modeling (PLS-SEM) analysis (Hulland, 1999) using data gathered from managers in 166 companies from the Spanish food industry. Section three analyses the results obtained from the proposed hypotheses. Finally, we present conclusions and limitations, and suggest future lines of research.

## Theoretical framework and hypotheses

If IT are not an end in themselves, but are tools to support business activities and strategies of the organization, a positive relationship between IT and performance should be masked if intermediate organizational variables are not taken into account (Popa, Soto-Acosta, & Loukis, 2016). The complex relationship between IT and business activities is reflected in the large number of authors who emphasized organizational factors as essential for successful implementation and use of IS (Wade & Hulland, 2004). Melville, Kraemer, and Gurbaxani (2004) stated there are critical internal factors that modulate the value of IT (e.g., organizational structure and policies, rules, practices, and workplace culture).

The RBV has been considered a solid conceptual framework by many researchers to study the effects of IT and IS on performance (Wade & Hulland, 2004) because this theoretical approach allows organizational variables to be included in the analysis. The RBV explains the differences of results among organizations by means of the heterogeneous strategic assets owned by firms, and focusing the attention inside the organizations and their resources (Grant, 1991). The RBV highlights the importance of distinctive capabilities, particularly those of an intangible nature. According to the RBV, a sustainable competitive advantage must be based in a set of unique resources and capacities that are valuable, rare, difficult to imitate, and non-substitutable by other resources (Barney, 1991).

The first theoretical analysis from the RBV about the attributes of the IT tangible resources like hardware, networks, and software applications made it clear that they can hardly provide a lasting competitive advantage (Powell & Dent-Micallef, 1997). IT products and services are available to all firms so they are not scarce, and most applications can be easily duplicated by competitors by hiring qualified staff. These resources may therefore be considered a commodity taking into account the ease with which they can be copied or acquired on the market. Besides, innovations developed within the firm in the form of IT applications are difficult to patent or keep in secrecy (Mata et al., 1995). Nevertheless, not all authors agree with this "commodity view" of IT, arguing that a perfect mobility of the IT infrastructure implies that its value is only quantified in terms of their individual components (Bharadwaj, 2000; Weill, Subramani, & Broadbent, 2002). For these authors, the supposition of easy duplication of IT systems ignores the synergy of integrated systems.

Besides the physical IT infrastructure, the competence of human resources belonging to the IS department has been considered a key element in a plausible firm competitiveness, and usually occupy a predominant position in the IT capability concept developed by different authors since the first theoretical approaches until today (Bharadwaj, 2000; Byrd, Pitts, Adrian, & Davidson, 2008). Due to the intangible nature of the skills and knowledge of the IT personnel, the IT human resources have been considered more prone to becoming a possible source of competitive advantage than the IT infrastructure. Nevertheless, depending on the kind of knowledge in question, the results of the analysis can be disparate. Regarding the technical skills possessed by the IT personnel, Mata and colleagues (1995) considered these skills as not heterogeneously distributed across firms and that IT knowledge can be externally obtained by hiring technical consultants and contractors. Thus, from the RBV, the technical skills of the IT human resources cannot become a strategic asset. For Huang (2010), only IT management skills are likely to be a source of sustained competitive advantage since they are gained over long periods of time through the accumulation of experience in the firm, permitting to deal with complex relations between the IT function and business functions, customers, and suppliers.

Thus, managers can consider IT as a strategic resource (Soto-Acosta, Popa, & Palacios-Marqués,

2016) or as a "commodity" (Demirhan, Jacob, & Raghunathan, 2005), depending on how they approach IT. The strategic value attributed by managers to IT will depend on the specific business activities of the firm and its business strategy, and this stance results in a strategic position regarding IT in the organization.

## IS Strategy

There is a big variety of conceptualizations of IS strategy in literature. According to the extensive literature review of Chen and colleagues (2010), different terms are used to represent a similar concept, such as IT strategy (Gottschalk, 1999), IS strategy (Chan, Huff, Copeland, & Barclay, 1997), IT/IS strategy (Atkins, 1994), or information strategy (Smits, van der Poel, & Ribbers, 1997). Sabherwal and Chan (2001) suggested a distinction between IT strategy and IS strategy: IS strategy focuses on business systems or applications, and its main objective is the alignment with the business needs and its use for strategic benefits; whereas IT strategies focus on technology policies, including such aspects as architecture, technical standards, safety standards, and technological risk attitudes. In this article, we use the term IS strategy independently of the original term used in the references cited.

Chen and colleagues (2010) distinguished three main conceptualizations of IS strategy. The first one considers the IS strategy as the use of IS to support business strategy. This conception suggests that the core of an IS strategy must be connected to the business strategy previously established. Since IS strategy is derived from the business strategy, this concept can be defined as business-centric (Chen et al., 2010). By this definition, the business and IS strategies are intrinsically linked (strategic alignment of the IT, Chan et al., 1997). Although the IS function is an essential part of the organization, its ultimate objective is to support and to enable other business functions.

The second perspective considers the IS a business within a business (Preston & Karahanna, 2009), because the IS function is to provide services to the workers in the organization who become clients from the point of view of the IS personnel. Additionally, the IS function requires its own functional strategy to create and deliver a service (IS) demanded by other departments. These statements suggest that the functional IS unit may have a different strategy than other business units'. Consequently, the alignment between IS strategy and business strategy is a reaction of the IS department to the necessities of the rest of departments modulated by the business strategy.

Finally, the third conception of IS strategy describes the strategy as a shared vision of the role that IS play in the organization (Chen et al., 2010; Varajão, Martinho, & Soto-Acosta, 2014). This conceptualization of IS strategy is viewed as a consistent general pattern that guides future decisions and business activities related to IS rather than a specific plan. This perspective reflects the attitude of an organization's managers (including IT managers) toward IS, which is based on previous business experience and the IT potentialities to cover business necessities. This IS strategy definition covers aspects from technological components to processes within the organization. This conception of IS strategy, from the RBV, defines the role of IS in the organization with two clear-cut options: the IT as a commodity, or the IT as a source of competitive advantage. The vision of IT managers and the industry where the firm operates are key factors in the choice (Devece, 2013; Johnson & Lederer, 2013). Following Chen and colleagues (2010), we make a distinction between two possible options for managers to adopt IS—an innovative IS strategy and a conservative IS strategy—with a third possibility: the lack of strategy regarding IS.

### Innovative IS strategy

Organizations that continually seek IT innovations are more likely to develop and exploit unique IS systems that generate competitive advantages over competitors in cost or in differentiation (Li, Tan, Teo, & Tan, 2006; Lin, Tsai, & Ha, 2014). However, while an innovative IS strategy is more likely to provide a competitive advantage for a company, this strategy is more expensive and riskier than a conservative strategy (Chen et al., 2010). In other words, the potential risks and benefits for an organization pursuing an innovative strategy is contingent on its ability to carry it out successfully (Galliers, 2004; He & Wong, 2004). In the context of the theory of dynamic capabilities (Teece, Pisano, & Shuen, 1997), the adoption of an innovative IS strategy can generate a capacity for IT innovation that makes IT a valuable, heterogeneous, and complex resource (Dibrell, David, & Craig, 2008; Popa, Soto-Acosta, & Perez-Gonzalez, 2016; Soto-Acosta, Popa, & Palacios-Marqués, 2017). Stratopoulos and Lim (2010) examined the use of an innovative strategy by major U.S. firms and concluded companies that maintained an innovative IS strategy often outperform their competitors. Besides, these authors find that IT innovations are persistent. Companies with an innovative IS strategy have higher levels of performance than non-adopters. However, these authors highlight the moderating effect of the sector or industry, because for some sectors, innovative IT is the basis of competitive strategy, while in others,

the adoption of IT is something less than a strategic necessity. The understanding of the present and future IT strategic value for a specific industry is essential to make decisions on which IS must be adopted, and there are popular tools such as the McFarlan's IT portfolio matrix (McFarlan, 1981) to analyze it. An innovative IS strategy is more suited for those industries with a high impact of IS/IT applications on future—but not yet—industry competitiveness, such as health care (Currie & Seddon, 2014) and education (Romero-Forteza & Carrió-Pastor, 2014).

Doherty and Terry (2009) found empirical evidence in that the effective application of IS capabilities can deliver significant improvements to the organization's competitive positioning through the design, implementation, and operation processes. Following the same rationale that Stratopoulos and Lim (2010) and the proposition stated by Chen and colleagues (2010), we propose the following hypothesis:

H1: An innovative IS strategy has a positive direct effect on organizational performance.

### Conservative IS strategy

Companies pursuing a conservative IS strategy adopt the best practices developed by industry leaders. In some cases, this is an imposed strategy due to the lack of ability to create the knowledge required to meet the demands dictated by the environment. Consequently, this stable and safe approach makes the organization unable to obtain competitive advantage through IS since it is unlikely that it could develop new and unique resources and capabilities. However, a conservative IS strategy is not necessarily much poorer than an innovative IS strategy in terms of impact on business performance (Chen et al., 2010). Through the evaluation of the competitors' IS initiatives, organizations that adopt a conservative IS strategy can calibrate the successes and failures of the IS leaders and adjust their own IS strategy based on these observations. Moreover, focusing on providing low-risk and low-cost IT initiatives, IS conservatives specialize in reducing failures and augmenting the quality and reliability of IS, all of which have an impact on organizational performance (Wade & Hulland, 2004). But this IS strategy can be risky too. In this sense, Cegielsky, Reithel, and Rebman (2005) analyzed the integration of emerging IT in U.S. firms. In the study conducted with top executives, these researchers concluded that, given the rapid technological developments in IT, organizations using this conservative strategy can easily become obsolescent in terms of IT.

Summing up, although the goal is to gain a competitive advantage by innovating with IT, a failure can negatively affect the financial outcomes (Leidner & Mackay, 2007). Thus, organizations that are not well positioned for IT leadership can benefit from adopting a conservative IS strategy. Nevertheless, this benefit does not imply an outstanding performance or a competitive advantage. Hence, our second hypothesis:

H2: A conservative IS strategy does not have a significant direct effect on organizational performance.

Finally, we can conclude that the lack of IS strategy, understood as the absence of a consistent pattern in the IT investment, should be an impediment in the normal functioning of a business compared with more IT congruent competitors, obviously modulated by the importance of IT in the specific industry and the intensity in the use of information. An undefined IS strategy implies to leave the decisions of IT investments to the necessities of the business functions and the criteria of the department managers. The lack of IS strategy does not necessarily mean decentralization of decisions, but even with the presence of an IT planning, this will produce an incongruent pattern in the IT projects and a lack of informational flow between different activities.

IS strategy provides a more comprehensive IS planning even if this IS strategy is set after the business function conception. Furthermore, IS strategy can be applied to guide IT decisions for organizations that do not have a clearly defined business strategy or organizations that do not necessarily conceive IT as a source of competitive advantage (Hagel & Brown, 2001; Ross, Weill, & Robertson, 2006). Then:

H3: An undefined IS strategy has a negative effect on organizational performance.

### Innovative differentiation and IS strategy

Innovation requires some flexibility in the organizational structure (Blumentritt & Danis, 2006). The existence of channels of open communication, decentralized structure, loose job definitions, distributed decision making, and flexibility in processes and procedures are associated with the innovation activity (Martinez-Conesa, Soto-Acosta, & Carayannis, 2017; Popa, Soto-Acosta, & Martinez-Conesa, 2017). According to Tallon (2007), companies with a focus on innovation differentiation obtain greater business value of IT in the Research & Development (R&D) processes.

In order to develop innovation capacity and incorporate innovation as a key component in the business strategy, an organization must generate resources and competences to create new products (Colomo-Palacios, Cabezas-Isla, García-Crespo, & Soto-Acosta, 2010; Colomo-Palacios, Ruano-Mayoral, Soto-Acosta, & García-Crespo, 2012). The organization must develop processes and collaborative structures to deal with innovation activities, and must connect this creativity with the existing business (Bhaskaran, 2006). Thus, IT can be an essential element to build this capacity (King & Burgess, 2006). According to Frishammar and Hörte (2005), the organizational performance will be improved when the innovative activity of an organization is supported with IT initiatives that result in the systematic introduction of new processes and products that fit with existing processes, promoting the loyalty of customer and stimulating demand for other products.

Dibrell and colleagues (2008) found that where an organization emphasizes innovative differentiation, innovation is directly linked to the importance given to IT. Moreover, Song and Song (2010) showed that the use of IT reduced the negative impact of the physical separation, the incongruity of goals, and the cultural differences of marketing teams and R&D, which can be a weapon of improvement for the integration of R&D and marketing. Chen, Preston, and Tarafdar (2015) found out that an innovative IS strategy is associated with an innovative business orientation strategy, which is, in turn, key to creating customer value. Thus, the importance of the IS in the innovation function is granted. But the choice between an innovative and a conservative IS strategy is ambiguous in an innovative differentiation strategy (Martínez-Simarro, Devece, & Llopis-Albert, 2015). The relationship between innovation and IT is complex and must be studied with caution. For instance, in a sector where IT only supports R&D activities and is not at the core of innovation due to the low use of IT in the production processes or in the product itself, an innovative IS strategy increases the risks and uncertainty of the results in R&D without adding great value to the products and services. The fact is that R&D has an inherent risk and an innovative IS strategy to support innovation activities adds still more uncertainty. Besides, when IT are not key competitive elements and are not integrated in the resultant product (as in the food industry), the supporting elements in the innovation activities are more easily replicable by competitors, since they are not integrated with complementary resources and do not raise their causal ambiguity. Then, from the RBV, those systems supporting R&D activities do not qualify as a strategic resource (valuable, rare, imperfectly imitable, and non-substitutable). As Lim and Stratopoulos (2008) claimed, in some sectors, it is possible to consider IT as a necessity, but not an element of differentiation. The food industry is located in this group. All in all, the rapid pace of IT in terms of knowledge management (Darroch, 2005) and the importance of the latter in innovation processes can compensate the risks taken in an innovative IS strategy.

On the contrary, a conservative IS strategy can have a positive effect on innovation. As stated above, if IT are essential parts of the product or service, a conservative IS strategy is completely counterproductive. But for those sectors where IT are not incorporated into products, a conservative IS strategy can support the R&D function with the best practices in the sector without adding more unnecessary risks. Then:

H4: Organizations with an innovative differentiation strategy and in sectors where products have a low IT content find that a conservative IS strategy is more attractive than an innovative one.

This fourth hypothesis is based purely on an RBV rationale and considers the IS and business strategy independently. From the point of view of the first definition of IS strategy (IT alignment), IS strategy must be connected to the business strategy and the same competitive stance must be found in the business activities and in the IS department. But this is not the case in the IS strategy approach of this study.

Finally, as in the general case of organizational performance, an erratic behavior in the IT projects will be inconsistent with innovative differentiation. The drawbacks of an inconsistent IS strategy are clear. For instance, an emphasis on the necessities of specific departments can create difficulties for the IT function and consequently generate potential barriers to the alignment of IT goals with the general business strategy. From the point of view of the second definition of IS strategy (Chen et al., 2010), the vision of the IT function as a business area that can make independent decisions regarding the different necessities of the rest of the departments can undermine optimal decisions about business strategy as a whole (Baldwin & Curley, 2007). Thus, if an organization has a clear strategy on how to compete, managers should put emphasis on a clear pattern to

guide IS decisions in order to support the business strategy:

H5: An undefined IS strategy is incompatible with an innovative differentiation strategy.

## Methodology

### Sample

The lack of information on the variables we considered in the study forces us to create a primary source of information by means of a survey. Data were collected from executives of Spanish food industry firms. This sector was chosen because of its importance and complexity. The food industry is currently facing many challenges that require a transformation of many of its practices in the production and marketing of its products (Federación Española de Industrias de la Alimentación y Bebidas (FIAB), 2011). These changes are related to the cooperation of companies along the food chain, relations with companies at the same stage of the chain, and a call for the strategic use of IT. Moreover, the influence of legislation and government pressure are acting as catalysts for these changes. All this is due to increased pressure from the market, increasing globalization and competition, and the need for differentiating and segmenting the market. Furthermore, some issues have become paramount for the competitiveness of companies, such as some complex requirements of quality assurance, reliability, and flexibility in the delivery of the product, better understanding of consumer behavior and trends, assumption of sustainable practices, etc.

Considering only the industrial component of this sector (food and beverages), which is the empirical part of this study, and taking into account the data of the FIAB report (2011), Spain's global net sales amounts to 81,369 million euros and 445,475 employees, contributing 17% of the industrial employment. It is second in exports in the industrial sector, second after the automotive industry, exporting 79% of total exports to the European Union, 7% to Latin America, 7% to Asia, 6% to the United States and Canada, and 5% to the rest of Europe.

### Variables measurement

The following measures were operationalized in a 7-point Likert scale (from 1 "strongly disagree" to 7 "strongly agree").

#### IS strategies

The scales chosen for measuring the IS strategies are the ones proposed by Chen and colleagues (2010). According to the typology of IS strategy of these authors, the approach of these scales represents a superior concept regarding the two first conceptions presented in the theoretical framework. We follow the same nomenclature of Chen and colleagues (2010), IS innovator (innovative IS strategy), IS conservative (conservative IS strategy), and undefined IS strategy. All three scales have three items each. The wording of the scales (IS innovator, IS conservative, and undefined IS strategy) are shown in Appendix A.

#### Innovation differentiation strategy

Considering the work of Miller (1988), two types of differentiation strategy can be established: those based on innovation and those based on intensive practices in marketing and branding. This differentiation strategy has also been profoundly studied in works such as those of Lee and Miller (1996), Spanos and Lioukas (2001), or Spanos, Zaralis, and Lioukas (2004).

In order to measure innovation differentiation strategy, we use a previously validated scale used in the works of Rivard, Raymond, and Verreault (2006), and Spanos and Lioukas (2001). This scale is derived from an adaptation of the works of Dess and Davis (1984), and Miller (1988). The scale consists of four items related to the economic effort in innovation and the frequency with which innovations in products and processes (see appendix A) are made: (1) R&D expenditures for product development, (2) R&D expenditures for process innovations, (3) emphasis on being ahead of the competition, and (4) rate of product innovations.

#### Organizational performance

According to the RBV, possession of sustainable competitive advantages should result in extraordinary rents. In light of this, most studies from RBV consider several financial aspects when assessing firm performance (Melville et al., 2004). Among the financial indicators that have been extensively adopted in the literature, we can find profit-based measurements as Return On Assets (ROA) (Bharadwaj, 2000; Santhanam & Hartono, 2003; Tanriverdi, 2006), financial profitability, or Return On Investment (ROI) (Ravichandran & Lertwongsatien, 2005; Tippins & Sohi, 2003), and Return On Sales (ROS) (Bharadwaj, 2000; Santhanam & Hartono, 2003; Tanriverdi, 2006). But some authors consider that there has been an overreliance on financial data regarding the effect of IT and its applications in performance (Brynjolfsson & Hitt, 1998). Rai, Patnayakuni, and Patnayakuni (1997) pointed out that improvements produced by IT may not be reflected in the financial performance of the companies because the benefits may be redistributed through companies or pass on to consumers.

The relative position in the market has also been taken into account by several authors when measuring the firm performance (Bruque, Moyano, Vargas, & Hernández, 2003; Tippins & Sohi, 2003), as well as the growth in sales (Powell & Dent-Micallef, 1997; Tippins & Sohi, 2003) or revenue (Bharadwaj, 2000; Rai, Patnayakuni, & Seth, 2006).

It is also often acceptable that IT should affect both the benefits and productivity. However, Thatcher and Oliver (2001) considered that productivity does not fully reflect the benefits provided by IT. When applications that reduce costs are implemented, profits and productivity are improved. However, product quality and pricing decisions need not be affected. Applications that improve design, production, and the very product improve product quality and increase prices. Although this setting can increase profits, it also increases production costs, and therefore, under certain conditions, reduces the productivity of the organization. Improvements in quality would occur when investment in IT leads to the creation of new products or improving existing ones. For this reason, Thatcher and Oliver (2001) advocated a different approach to measure organizational performance related to IT.

Therefore, we consider the following elements to be included in the organizational performance measurement: (1) the quality of the product or service, (2) the success of new products or services, (3) the client retention rate, and (4) the level of sales.

These elements of performance are difficult to measure, and there is difficulty in obtaining objective data. Consequently, the performance was also measured by means of a Likert-scale based on the opinion of the respondent. Performance assessment using auto-evaluation scales based on managers' perceptions has been widely used in similar studies (Tippins & Sohi, 2003).

### Control variables

To avoid misleading results, factors other than those proposed in the hypotheses are included in the model. Following Ravichandran and Lertwongsatien (2005), the control variables used are organization size and organization age.

Size is a classic control variable in organizational analysis. Firms with larger size may have a bigger IS department and access to capital (Mata et al., 1995), directly affecting IT capabilities and performance. This reason justifies that size has been amply used as a control in similar studies (Bruque et al., 2003; Ray, Muhanna, & Barney, 2005; Tanriverdi, 2006). The organization size was assessed as the number of employees. Regarding organization age, older firms may be linked to solid established routines and policies affecting performance, so we also included the age of the firms in years to capture any founding values and maturation effects.

### Data collection

The final questionnaire was adjusted to achieve an extension of a single page (with the aim of improving the response rate). The sample was made up of managers who worked in companies of the food industry in Spain. According to the FIAB, in 2011, the number of companies in the industry was 29,334. The questionnaire was sent by email from January 2011 to June 2011 to a simple random sample of 400 companies. In order to correct the problems attributed to this method of data collection, and pursuing to raise the response rate and quality of the questionnaires, a set of procedures for survey research proposed by Dillman (1978) was followed. In a second stage of the data collection, the companies that had not answered the survey were telephoned, requesting and reminding to complete the questionnaire (it was impossible to make contact with 23 companies). The number of questionnaires received amounted to 184 (responsive rate of 48%). The complete and valid questionnaires were 166.

## Results

Before the assessment of the hypotheses, the reliability of the scales was tested. Due to the use of a self-reported questionnaire with a single respondent, the common method bias must be evaluated. For this purpose, a Harman's single factor test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) for the assessment of the common method variance was carried out. The final exploratory factor analysis (EFA) with varimax rotation including all the items used in the questionnaire (except item M3, see appendix A) is shown in Table 1. Because of the number of scales in the EFA (5 scales), the number of factors had to be 5. The EFA with all the items showed problems due to the low weight of item M3, "emphasis on being ahead of competition," in its scale (innovation differentiation strategy), and a weight higher than 0.5 in the organizational performance factor. Thus, item M3 was discarded and was not used in the rest of the analyses.

Table 2 shows for each variable the mean, the standard deviation, and the correlation between variables. All the variables present in this table were estimated by averaging their items score.

From Table 2, we can conclude that the control variables will not modify the relationships between the variables considered in this study because of their low correlations (excepting that between organizational performance and age).

**Table 1.** EFA of the items forming the variables under study.

| Item | IS innovator | IS conservative | Undefined IS strategy | Innovative differentiation | Organizational performance |
|---|---|---|---|---|---|
| E1 | **0.88** | −0.18 | −0.01 | 0.11 | 0.25 |
| E2 | **0.89** | −0.06 | −0.05 | −0.01 | 0.33 |
| E3 | **0.90** | 0.00 | −0.07 | 0.14 | 0.17 |
| E4 | 0.09 | **0.88** | −0.15 | −0.03 | 0.17 |
| E5 | −0.19 | **0.85** | −0.13 | 0.19 | −0.04 |
| E6 | −0.12 | **0.81** | −0.24 | 0.16 | −0.09 |
| E11 | −0.04 | −0.11 | **0.87** | −0.08 | −0.29 |
| E12 | −0.04 | −0.20 | **0.92** | −0.21 | −0.05 |
| E13 | −0.05 | −0.23 | **0.89** | −0.19 | −0.15 |
| M1 | 0.14 | 0.10 | −0.17 | **0.83** | 0.34 |
| M2 | 0.03 | 0.14 | −0.21 | **0.68** | 0.56 |
| M4 | 0.14 | 0.28 | −0.46 | **0.65** | 0.16 |
| R1 | 0.31 | 0.05 | −0.03 | 0.26 | **0.82** |
| R2 | 0.22 | −0.06 | −0.20 | 0.22 | **0.75** |
| R3 | 0.19 | 0.01 | −0.13 | 0.03 | **0.84** |
| R4 | 0.21 | 0.06 | −0.19 | 0.31 | **0.70** |

*Note*. EFA with Varimax rotation and forcing 5 factors. Bold numbers indicate the items for each factor.

**Table 2.** Means, standard deviations, and correlations.

| | Variable | Mean | *SD* | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Size (number of employees) | 179.14 | 571.77 | | | | | | |
| 2 | Age (years since foundation) | 21.51 | 32.50 | −0.01 | | | | | |
| 3 | IS innovator | 3.46 | 1.57 | 0.11 | 0.10 | | | | |
| 4 | IS conservative | 4.52 | 1.22 | 0.08 | 0.04 | 0.00 | | | |
| 5 | Undefined IS strategy | 3.09 | 1.78 | 0.07 | 0.00 | −0.15 | −0.40** | | |
| 6 | Innovative differentiation | 5.03 | 1.27 | 0.13 | −0.10 | 0.30** | 0.36** | −0.57** | |
| 7 | Organizational performance | 5.11 | 1.12 | 0.21* | 0.02 | 0.51** | 0.10 | −0.31** | 0.64** |

*$p < 0.05$; **$p < 0.01$.

Another interesting result afforded by Table 2 is that the IS innovator and the IS conservative are not mutually exclusive. There is no correlation between them, but exclusiveness should show negative correlations between opposite strategies. In fact, this negative correlation appears for the undefined IS strategy with both the IS innovator and the IS conservative strategy. This suggests that some organizations are ambidextrous (He & Wong, 2004) and they show characteristics of both IS strategies. This is an interesting point, since Chen and colleagues (2010), despite recognizing the possibility of some firms adopting simultaneously, to some degree, explorative and exploitative behaviors regarding IT, considered the innovative and conservative IS strategies incompatible.

Different hypothesized models were explored by means of Smart-PLS 3.2.3 software. PLS is a contrasted statistical method of modeling a "causal" network of latent variables (Hair, Hult, Ringle, & Sarstedt, 2013).

## Measurement model

The first analysis carried out was to assess the reliability, convergent validity, and discriminant validity of the measurement mode. All constructs use a reflective measurement model (Hair et al., 2013). The high correlation between items of the same scale and the results of the EFA (Table 1) forerun the results obtained with the PLS-SEM analysis. The reliability of the constructs is warranted by the individual standardized loadings of the items—all higher than the recommended 0.7 threshold (see Figure 1). The Cronbach's alpha of the scales were 0.82 (innovation differentiation), 0.92 (IS innovator), 0.83 (IS conservative), 0.93 (undefined IS strategy), and 0.88 (organizational performance). The composite reliabilities were also checked. According to Hair and colleagues (2013), values between 0.70 and 0.95 are satisfactory to good, and values above 0.95 can be problematic. The composite reliability of all the scales were higher than 0.70 and only the undefined IS strategy presents a value above 0.95 (0.957; see appendix A).

For the assessment of the convergent validity, the values of the average variance extracted (AVE) was examined. Values higher than 0.5 assure that the latent variable explains more than half of the variance in comparison to their corresponding indicators (Hagel & Brown, 2001). All the AVE values of the scales are higher than 0.7 (see appendix A), thus indicating a sufficient degree of convergent validity.

To test the discriminant validity, the square root of AVE in each construct was compared with the correlation values with all other variables, being in all the cases higher.

These results and the fit of the measurement model within the global models (Figures 1 and 2) allowed us to assume the reliability and validity of scales.

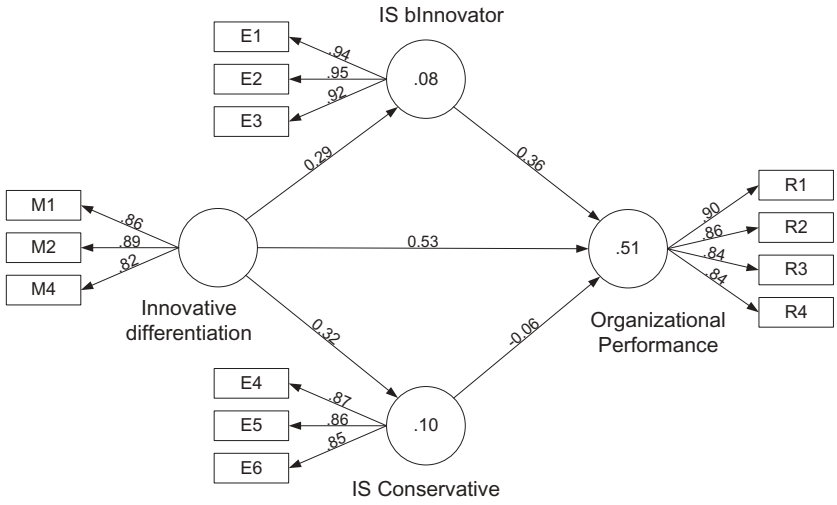


**Figure 1.** Innovator and conservative IS strategy with PLS.

### *Structural models*

The structural models shown in Figures 1 and 2 sum up the hypothesized model. Hypotheses 1, 2, and 4 are included in the model shown in Figure 1. Hypotheses 3 and 5 are in the model in Figure 2. These two models were necessary to minimize collinearity (Temme, Kreis, & Hildebrandt, 2006), since the IS innovator construct and the undefined IS strategy are highly correlated. Additionally, individual models for each IS strategy, alongside with the innovative differentiation and organizational constructs, were carried out (data not shown). The results obtained in these partial models are similar to the values of the relationships in model 1 and 2.

Figure 1 shows that Hypotheses 1 and 2 are satisfied. The model shown in Figure 1 confirms that there is a positive, relevant, and statistically significant impact (path coefficient = 0.36) of an innovative IS strategy (IS innovator) on organizational performance (Hypothesis 1). The relationship between conservative IS strategy (IS conservative) and organizational performance is not significant (path coefficient = 0.06).

Taking into account that the reference $R^2$ values of 0.25, 0.50, and 0.75 can be considered respectively as the thresholds of the low, medium, and significant explanatory power of the latent variables, the combination of IS innovator construct and innovative differentiation are relevant factors that explain organizational performance ($R^2$ = 0.51; see Figure 1). The inclusion in the model of the path between innovative differentiation and organizational performance is obvious. Although this work does not aim to deal with this relationship, the effects of an innovation strategy on performance (performance measured as the quality of the product or service, the success of new products or services, or the client retention rate) are sufficiently proved by researchers (Al-Alak & Tarabieh, 2011; Günday, Ulusoy, Kılıç, & Alpkan, 2011; Jiménez-Jiménez & Sanz-Valle, 2011; Thornhill, 2006).

The isolated effect of innovative differentiation on organizational performance in a model only with these

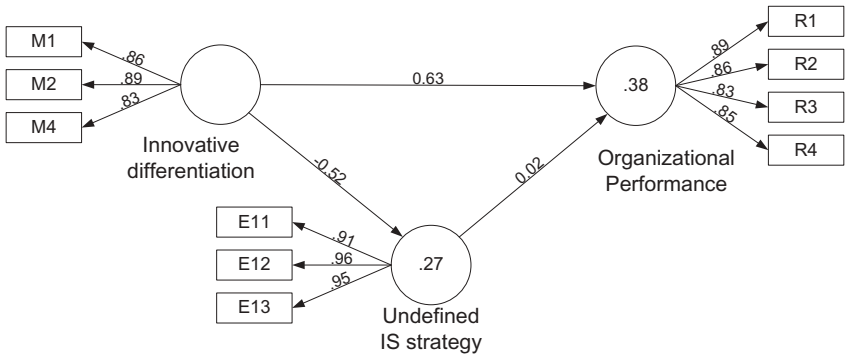


**Figure 2.** Undefined IS strategy model with PLS.

two constructs (model not shown in the figures) reaches a $R^2$ of 0.39. This same result can be observed in the model shown in Figure 2, where the effect on organizational performance of the undefined IS strategy is so low that all the $R^2$ (0.38) can be attributed to the innovative differentiation construct. This implies an increase of 0.12 in the $R^2$ of the organizational performance attributable to the IS innovator construct.

Hypothesis 3 is not confirmed in the model shown in Figure 2. The path coefficient between the undefined IS strategy construct and organizational performance is low (0.023), and the lack of IS strategy is not directly translated into a poor organizational performance.

Regarding Hypothesis 4, the influence of the innovative differentiation strategy on the IS strategy adopted by a company is ambiguous. The path coefficient is similar in both cases (0.29 for the IS innovator, and 0.32 for the IS conservative, respectively; see Figure 1), and the $R^2$ keeps the same proportion, although only the $R^2$ of the IS conservative construct reaches the threshold of 0.1 to be considered as significant. Then, although there is a tendency to adopt conservative IS strategies in companies with an innovative differentiation strategy in the food industry, the difference with companies that adopt an innovative IS strategy is not significant.

Finally, Hypothesis 5 was supported by the negative path coefficient between innovative differentiation and undefined IS strategy (−0.52, Figure 2).

## Discussion

One of the main objectives of this study is to prove the strategic value of IT. The approach from the RBV involves using IT as a "commodity" or as a strategic weapon. The "commodity" approach turns IT into a non-strategic asset: elements that can be easily obtained in the market. This view considers that IT cannot be a source of competitive advantage, but it also prevents to add more risks to those arising from the R&D because the IT systems implemented in the organization are standard and consolidated in the market. As we have shown in this study, there is no significant influence on performance when the conservative IS strategy adopts the "commodity" approach. This result concurs with studies using a technical approach for IT (Bhatt & Grover, 2005; Ray et al., 2005; Tanriverdi, 2006), where IT is strictly defined in technical terms or using spending proxy variables (Dehning & Stratopoulos, 2003). Thus, when the IT resource is considered only as equipment and software (tangible resources), IT show little significant effect on performance. However, when the concept of IT is extended to include complementary assets and capacities, some of the intangible resources, such as IT staff's skills and the IT competences of managers, the results show a positive relationship between IT and business performance. From the RBV, the IT personnel's managerial skills (Mata et al., 1995) are the only strictly IT capability that theoretically fulfils the characteristics necessary to become a source of competitive advantage. Thus, the competitive strength of IT capability hinges on the business and managerial knowledge—the dominant capacities in the IT–business integration. The studies from the RBV recurrently emphasized the value of complementary organizational resources that contribute to the integration of IT in business activities. This integration is the theoretical justification of an innovative IS strategy as a source of competitive advantage. The results obtained regarding the effect of IS innovators on organizational performance confirms that of Bhatt and Grover (2005), whose operationalization of their "relationship infrastructure" (p. 253) shares the same underlying idea of interaction with business functions. This result agrees with the core assumption of the RBV that understands the firm as a set of productive assets, whose value for firm growth does not lie in the assets themselves, but rather in the services they produce, or in the way they are used. Hence, the competitive advantages derived from IT will not emanate so much from the tangible assets in which they are materialized, but rather from the way they are used and from the business activities they support. A significant body of works confirm this link between IT and firm performance (Liang et al., 2010; Melville et al., 2004; Piccoli & Ives, 2005).

Another important conclusion of this work is that the IS strategy and the business strategy are independent in organizations, since an innovative differentiation strategy can be accompanied by an innovative or a conservative IS strategy (see Table 2).

A second objective of this work is the review of the IT/IS strategy concept in the Management Information Systems (MIS) literature. We agreed with the typology commented by Chen and colleagues (2010) that identified three major concepts: IT strategy to support the competitive strategy, IT strategy as a guide of the IS/IT function plan, and IS strategy as a shared vision of the role that IS play in the organization. The present work assumes the latter conception and validates the scale for measuring the IS strategy proposed by Chen and colleagues (2010).

A relevant result of this study is the low correlation between the innovative IS strategy and the conservative one. This implies that some balance is sought out by managers between the risky but more profitable IT exploration approach and the secure but less advantageous exploitation approach (Nerkar, 2003). This reality confronts the clear-cut theory that consider both IS strategies as mutually exclusive (Chen et al., 2010).

### Implications for management

The practical implications of our finding are related with the value of being innovative in IT. It is certain that, from the RBV, IT do not have the necessary characteristics to be a source of competitive advantage by themselves due to their imitability. Nevertheless, complementarity with other assets has been recognized by researches as a corner stone in understanding competitive advantage through IT, since it acts as an isolation mechanism against imitation. Then, the source of competitive advantage lays in the managerial process of IT-Business integration. This managerial process must be necessarily articulated by an IS strategy, and from the results obtained, an IS innovator can reach superior performances, at least in terms of product quality, sales and customer retention. The other strategic option, the conservative IS strategy, although it does not affect performance directly, is viewed by the Spanish food industry managers as an adequate option to support the innovation function.

### Limitations and future research

The first limitation of this study is associated with the methodology used. The use of self-administered questionnaires and the subjective measurement of the dependent variable, in this case organizational performance, is always subjected to different types of biases (Podsakoff et al., 2003). Generalization of the results is limited by the utilization of only one industry in the sample. Future research could test the results of this study in different industries and try different levels of performance, since the effect of IT can be diluted or hidden by other general relevant factors, when only economic performance is considered, and some of the effects proven in this study can be lessened.

Future research is linked with the limitations of the work. Different industries should be studied, not only those with a low IT content in the final product, like in the food industry, but industries where IT is essential in their products or services.

The analysis of other business strategies (cost or marketing differentiation) and their interaction with the IS strategy would shed light on this complex relationship as well. The use of objective measurement for the organizational performance would add soundness to the results.

Another issue for future research is the development of more complex scales to measure different dimensions of IS strategy. A differentiation of the key activities of business competitive strategies would help to discern those who are more susceptible to isolate IT innovations from competitors.

Finally, the intervening and moderating factors that regulate the relationship between business strategy and IS strategy need to be analyzed. In the case of innovation, this study presents some reflections, but no organizational variable has been included in the theoretical model.

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## Appendix A. Measurement scales

| Item | Scale | Composite reliability | AVE |
|---|---|---|---|
| | IS innovator* | 0.95 | 0.87 |
| E1 | Our organization is a leading IS innovator in our industry. | | |
| E2 | Our organization believes in being first in the industry in developing new IS initiatives even if not all of these efforts prove to be highly profitable. | | |
| E3 | Our organization responds rapidly to early signals concerning areas of opportunity for IS. | | |
| | IS conservative* | 0.90 | 0.74 |
| E4 | Our organization follows a safe and stable approach to developing new IS initiatives. | | |
| E5 | Our organization adopts promising IS innovations once these initiatives have been proven in our industry. | | |
| E6 | IS innovations are carefully examined before they are chosen by our organization. | | |
| | Undefined (no IS strategy)* | 0.957 | 0.881 |
| E11 | Our organization does not have definitive long-term IS goals. | | |
| E12 | Our organization does not have an articulated IS strategy. | | |
| E13 | Our organization does not have a consistent pattern of behavior regarding IS | | |
| | Innovative differentiation** | 0.893 | 0.736 |
| M1 | R&D expenditures for product development | | |
| M2 | R&D expenditures for process innovations | | |
| M3 | Emphasis on being ahead of competition*** | | |
| M4 | Rate of product innovations | | |
| | Organizational performance | 0.917 | 0.734 |
| R1 | Service or product quality | | |
| R2 | New service or product success | | |
| R3 | Customer retention rate | | |
| R4 | Level of sales | | |

*Chen and colleagues (2010); **Rivard and colleagues (2006); ***This item has been eliminated in the Partial Least Square (PLS) analysis.