E-business implementation and performance: analysis of mediating factors

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Abstract

Purpose – The purpose of this paper is to examine the impact of e-business implementation (in terms of internal integration and external diffusion) on organizational performance through the mediating effects of differentiation, enterprise agility, customer relationship development and partner attraction.
Design/methodology/approach – A survey of franchisors was conducted across the USA and Spain. Before running the model, the paper tests for measurement invariance across the two country samples. The paper uses structural equation modeling to test the conceptual model.
Findings – The results of the measurement invariance suggest that all the constructs supported this characteristic, except for internal integration. External diffusion leads to differentiation, enterprise agility, relationship development and partner attraction for American and Spanish firms. However, internal integration has no impact on any outcome in the USA while, for Spanish firms, it has a positive and direct effect on economic performance. The full mediating role of non-financial performance between external diffusion and organizational performance depends on the country analyzed. While differentiation and relationship development fully mediate this relationship in the US sample, in the Spanish sample, the advantages of external diffusion are transferred through differentiation, enterprise agility and partner attraction.
Practical implications –The paper suggests that franchise firms should not focus on the direct effect of e-business implementation on performance. Instead, franchisors should consider that its effect on performance is achieved through greater differentiation, relationship development, enterprise agility and partner attraction. So, the paper suggests that franchisors should think about the long-term effects of the advantages obtained from implementing e-business.
Originality/value – This study contributes to IS research by identifying the link between internal integration and external diffusion and organizational performance through the examination of the mediating role of non-financial performance measures in two countries. Compared with previous research, the paper first analyzes measurement invariance across countries to provide unbiased results.

Keywords Measurement invariance, Partial least squares, E-business implementation, Mediating effect, Multi-country analysis
Paper type Research paper

1. Introduction

In today's highly volatile economic environment, it is crucial for firms to focus on strategies that create value and increase their performance. In the last decade, there has been a growing interest in understanding the antecedents of the implementation of internet-based technologies and in e-business and its consequences in terms of

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performance or value creation (Zhu and Kraemer, 2005; Koellinger, 2008; Bordonaba-Juste *et al.*, 2012). Previous research has focussed on e-business, which is a new way to manage business and relationships between partners and customers and involves the use of internet-based technologies such as intranet, extranet, CRM, web page, among others, to share information, improve customer service, facilitate transactions and improve back-office activities (Zhu, 2004; Lin and Lin, 2008). Therefore, e-business is an innovation that involves the integration of different technologies to manage intra- and inter-organizational business processes (Wu *et al.*, 2003; Abu-Musa, 2004; Lin, 2008). The perceived benefits or the relative advantages are one of the main reasons for adopting an innovation (Gunasekaran and Ngai, 2005; Lin, 2008; Ifinedo, 2011; Bordonaba-Juste *et al.*, 2012). Among the perceived benefits are income generation, opportunities in new markets, new distribution channels, higher visibility and improvement in customer services, among others (Barua *et al.*, 2004).

However, mixed results have been obtained about the consequences of e-business on performance. While some authors conclude that there is a positive and direct link between e-business and performance (Wu *et al.*, 2003; Zhu and Kraemer, 2005; Zhu *et al.*, 2004), others suggest that there is no significant direct effect (Bharadwaj, 2000; Tippins and Sohi, 2003; Ravichandran and Lertwongsatien, 2005). Possible explanations are that performance is a wide term that includes different aspects (see Davis *et al.*, 2003; Denning and Richardson, 2002 for a review), that there are important variables that mediate this relationship (Kmieciak *et al.*, 2012) and that direct and indirect effects should be analyzed simultaneously (Sanders, 2007). Although these studies analyze e-business implementation as a whole, little is known about its effect on performance in terms of intra- and inter-organizational business processes (Wu *et al.*, 2003; Zhu and Kraemer, 2005).

E-business implementation may impact performance indirectly in different ways, for example, in the development of collaborative relationships, knowledge management processes or the innovation of processes, products or services (Chen and Tsou, 2007; Koo *et al.*, 2007; Koellinger, 2008; Pérez-López and Alegre, 2012). It has been found that e-business leads to changes in different business aspects such as corporate strategy, management and marketing (Bordonaba-Juste *et al.*, 2012). However, what is its final impact on performance? In this paper we want to analyze the impact of e-business implementation (in terms of its two dimensions: internal integration and external diffusion) on performance. Our model differs from past studies in two aspects. First, most previous research, has analyzed e-business as a single construct so little attention has been paid to the consequences of each dimension of e-business on performance (Wu *et al.*, 2003). Second, we include measures of non-financial performance (differentiation, enterprise agility, relationship development and partner attraction) as mediating variables in the relationship between e-business implementation and organizational performance. Accordingly, this paper tries to answer the following questions: What are the competitive advantages that can be achieved by implementing e-business? What are the underlying mechanisms by which e-business relates to organizational performance? The analysis of the two separate dimensions of e-business implementation allows us to provide a deeper understanding of the effect of each of them on selected aspects of competitive advantages.

This paper contributes not only to IS research by analyzing these questions but also by providing a cross-country analysis. The model we propose is tested in two countries: the USA, the paradigmatic setting in previous studies, and Spain, a country with a lower intensity of IS adoption, allowing us to compare the two countries and see where the differences and similarities lie. The effect of national culture on IT adoption

is a recent topic to what paid attention. There is some research that studies countries other than the USA but it is less common to find cross-country studies that analyze e-business diffusion across countries with different national cultures (Erumban and de Jong, 2006; San Martín *et al.*, 2011; Zhao, 2011). Because of the cross-cultural nature of the study, measurement invariance is necessary for valid inference and discussion.

Furthermore, the benefits of e-business implementation are emphasized in sectors, such as retailing, in which firm success depends on expansion based on outlets in different locations. This research provides empirical evidence of the value of e-business implementation in the franchise sector, a sector that could especially benefit from the use of internet-based technologies (Dixon and Quinn, 2004).

The paper is organized as follows. The next section presents the literature review and the hypotheses that make up the conceptual model. Then, the database and methodology used in the research will be outlined and the results will be presented. The paper ends with a discussion of the findings, limitations and recommendations for future research.

2. Literature review

Prior studies that investigate the relationship between IS adoption or implementation and firm performance report mixed results (e.g. Devaraj and Kohli, 2003; Bharadwaj, 2000; Tippins and Sohi, 2003). One explanation of this is how firm performance is measured. Bondra and Davis (1996) conclude that the measure of IT performance should be closely related to the benefits that firms can obtain through IT use. Therefore, the same should be true of the measure of performance with respect to e-business. E-business implementation is more that the mere adoption of IS as it involves greater internal and external process integration, a closer link with business partners and customers, and managerial and strategic advantages (Ash and Burn, 2003; Wu *et al.*, 2003; Teo and Pian, 2003; Bordonaba-Juste *et al.*, 2012).

An additional explanation for the differences found in previous results is the failure to consider the underlying mechanisms by which the use and integration of internet-based technologies relate to firm performance (Patrakosol and Lee, 2009; Pérez-López and Alegre, 2012). Researchers have suggested that performance variables can be refined by including intermediate consequences that finally impact on financial or organizational performance (Ravichandran and Lertwongsatien, 2005). Table I shows a summary of some papers that analyze the impact of IS or IT use on performance. As can be seen, there is no consensus about how to measure performance, although most of the papers opt for financial performance. Some authors analyze the IS-performance relationship at an aggregate level without analyzing the marginal or intermediate effects (Wu *et al.*, 2003; Teo and Pian, 2003), while others analyze only the effect of IT use on intermediary business processes (customer relationship management, procurement, flexibility or service quality, among others) without including the final effect on firm performance or firm value (Jayachandran *et al.*, 2005; Perez-Arostegui *et al.*, 2012).

Information technology systems have an impact on value chain management and on the relationships within the value chain. According to Porter (2001), the implementation of internet-based technologies (intranet, extranet and internet, among others) influences the cost and quality of all the activities of the value chain: logistics, operations, marketing and sales, after-sales services, human resources management, technology development and procurement. Every activity involves the creation, processing and communication of information and the internet has the ability to link

Authors	Performance measurement	Findings
Bharadwaj (2000)	Financial performance: Average growth, sales, cost, ratios, ROA, ROS	Profit ratios higher for IT leaders Cost ratios lower for IT leaders
Avlonitis and Karayanni (2000)	Sales performance Sales efficiency	The use of IT tools has no direct effect on sales performance or on sales efficiency
Wu *et al.* (2003)	Sales performance Customer satisfaction Relationship development Efficiency	Positive and direct effect of intensity of adoption and each performance measure
Tippins and Sohi (2003)	Firm performance over 3 years: Profitability, ROI, customer retention, sales growth	IT competency (IT knowledge, IT operations, IT objects) directly impacts performance
Devaraj and Kohli (2003)	Hospital performance: Revenue, mortality rates	Support of direct link between IT usage and performance
Teo and Pian (2003)	Second order construct of competitive advantage: Cost reduction, growth, innovation, differentiation Alliance	Positive and direct effect of IT adoption and competitive advantages
Lee and Grewal (2004)	Tobin's *q*	Sales channel does not influence performance Communication channel impacts on performance
Ravichandran and Lertwongsatien (2005)	Operating performance Market-based performance	Indirect impact of IS resources and capabilities on performance through IT support for core competencies
Koellinger (2008)	Turnover Profit Employment	Positive relationship between e-business technologies and turnover. Non-significant for the profit or employment
Pérez-López and Alegre (2012)	Financial performance (ROA, ROI and profitability) Market performance (sales growth, customer retention, success in new products, product quality)	No direct effect between IT competency and performance Knowledge management mediates the relationship Market performance influences financial performance

Table I.
Literature review

Source: Own elaboration

these activities and make data widely available both within the company and to suppliers, channel partners and customers. Our study attempts to examine how e-business implementation affects firm performance (organizational performance), but we are going to pay special attention to the mediating role of non-financial consequences, namely, differentiation, enterprise agility, relationship management and partner attraction.

2.1 E-business implementation and performance

According to the innovation and diffusion literature (Bass, 1969; Rogers, 1995), the diffusion of technological innovations refers to the extent of the use of new methods, processes or production systems. Researchers consider e-business as one of the most important technological innovations (Jackson and Harris, 2003).

E-business has been defined in several ways. Sawhney and Zabin (2001) define e-business as: "the use of electronic networks and associated technologies to enable, improve, enhance, transform or invent a business process or business system to create superior value for current or potential customers" (p. 15). Later, Wu *et al.* (2003) suggest that e-business is "the use of Internet technologies to link customers, suppliers, business partners, and employees using at least one of the following: (a) e-commerce, websites that offer sales transactions, (b) customer-service websites, (c) intranets and enterprise information portals, (d) extranets and supply chains, and (e) IP electronic data interchange" (pp. 1-2); and Lin (2008) defines it as "Internet-based IS used by a firm to integrate internal business activities, processes and IS and conducting business transactions with trading partners" (p. 63). All these definitions recognize that, e-business can potentially transform a firm into a networked entity with seamless supply chains and value creation processes (Sawhney and Zabin, 2001) by helping to build and manage relationships with customers, suppliers, employees and partners.

According to prior research, e-business implementation should be analyzed from both internal and external perspectives (Wu *et al.*, 2003; Lin and Lin, 2008; Rogers, 1995; Zhu and Kraemer, 2005). Hence, this study defines internal integration as "the extent to which ITs are integrated with internal organizational activities such as inventory control, order processing, sales force management and accountancy and with administrative and financial activities". IT applications such as EDI, ERP, MRP or supply chain management (SCM) can be implemented in internal activities. For example, SCM serves as a back-end application that link suppliers, manufacturers, distributors and resellers in a cohesive production and distribution network in order to attain the level of synchronization and collaboration that would make it more responsive to customer needs (Daghfous and Barkhi, 2009). EDI applications use these networks to control costs, reduce paperwork, lower inventory and shorten product cycles (Chou *et al.*, 2004). The supplier integration required to implement EDI, ERP or SCM allows a reduction of the costs of logistics and inventories, improving supply chain performance (Wu *et al.*, 2003; Zhu and Kraemer, 2005; Soto-Acosta and Meroño-Cerdan, 2008). Additionally, other internal aspects such as procurement, financial administration and inventory control increase efficiency, reduce costs (Wu *et al.*, 2003) and improve firm profitability.

External diffusion, on the other hand, "refers to the extent to which the firm integrates its trading partners and transactions with them through ITs" (Lin and Lin, 2008). IT applications such as intranet, extranet, CRM or the web page of the firm are linked to external activities of the firm, also known as front-end activities. Electronic integration with clients or customers also improves the firm's benefits (Frohlich, 2002). The implementation and use of some internet technologies, such as e-commerce and the use of extranets and intranets to provide an active customer service support, allows customers all over the world to have direct access to information about products and promotions and contact the company at any time. So, firms have access to a greater market (Avlonitis and Karayanni, 2000; Teo and Pian, 2003).

Therefore, e-business implementation has an impact on performance across the entire span of the organization's structure (from the procurement department to the field sales force) and across a range of its business processes (from internal administration to supply-chain coordination). Therefore, we propose that:

H1a. Internal integration positively influences organizational performance.

H1b. External diffusion positively influences organizational performance.

2.2 Mediating factors

Internal and external diffusion involve different type of activities, so their impact on firm performance can be mediated through different and specific competitive advantages.

2.2.1 The mediating role of differentiation. Using new technologies, firms can obtain and accumulate information about their customers' preferences and tastes, which facilitates market segmentation (Koo *et al.*, 2007). Personalization is a general strategy followed by companies to increase customer satisfaction. Gao *et al.* (2010) describe user profiling, content modeling and information filtering as the three activities necessary for a successful personalization. New technologies are instruments or interface systems that allow firms to get information from customers, to offer personalized products and to implement one-to-one marketing as the information from customers accumulates in firm's web server (Chopra and Van Mieghem, 2000). Firms can use this information to customize products or services, which will help them to differentiate themselves from their competitors. For example, according to Bloch *et al.* (1996), e-commerce helps a firm to differentiate itself not only through price, by offering a more competitive price, but also through product innovation, and through a more effective customer service. Firms can benefit from the interactivity of internet applications such as e-mail, customer communities, forums to collect customer data (demographic data, product comments, opinions and preferences and potential demands for certain products) (Teo and Pian, 2003).

At the same time, the firm can also be proactive and provide information about products, troubleshooting and provide online customer service. Additionally, other administrative and internal processes such as order placement, order monitoring and payment submission by customers may lead to greater customer support and customer satisfaction (Wu *et al.*, 2003), which may help to achieve a better image of the company and brand differentiation. These authors suggest that some applications implemented in internal processes have the potential to influence brand image by providing employees with a supportive and efficient working environment to better deal with customer inquiries and requirements. For example, firm employees can track and inquire about customers' orders electronically, improving customer service and leading to a better brand image and a greater differentiation of the firm. Thus, the implementation of different technologies in internal and external processes may provide differentiation.

Differentiation that is related to brand image and brand positioning is one of the most important outcomes of the adoption and use of internet technologies and has a positive impact on firm performance (Koo *et al.*, 2007). Differentiation achieved through the implementation of e-business may eventually increase economic performance. For example, these technologies promote the brand and reinforce corporate identity by creating an interaction between the firm and its customers which, in turn, may strengthen a brand's equity (Holland and Baker, 2001). In e-retailing, the firm that sells most is not necessarily the firm that offers the lowest prices, but the firm that transmits greater trust to its customers. Therefore, it is proposed here that:

H2a. The relationship between internal integration and organizational performance is mediated by differentiation.

H2b. The relationship between external diffusion and organizational performance is mediated by differentiation.

2.2.2 The mediating role of enterprise agility. An important consequence of e-business implementation is the increase in flexibility in managerial or strategic initiatives (Overby *et al.*, 2006). Previous research has found that differences in the level of implementation of IT influence the ability to introduce innovations (Duncan, 1995), the level of strategic agility (Weill *et al.*, 2002; Fink and Neumann, 2007), and the development of competitive actions (Sambamurthy *et al.*, 2003). Internal and external processes are involved in the level of firm agility or flexibility as they improve operational efficiency and allow the firm to respond quickly to environmental changes. Communication processes allow firms to obtain information about new market trends and changes in customers' needs, while the implementation of e-business in administration and internal processes allows flexibility to adapt production, product development or the supply chain (Daghfous and Barkhi, 2009) and to reduce the levels of organizational complexity and bureaucracy (Rubio and Aragon, 2009).

The implementation of e-business allows firms to sense changes in customer preferences, trends or market threats, as well as to respond faster to these changes by adapting their processes to the new environment (Overby *et al.*, 2006). This adaptability enables firms to incorporate new technologies into product development, manufacturing, marketing and other functional areas of the firm. Additionally, firms are going to positively value firms that respond fast to market changes and adapt their strategies to the environment. In the end, this increases the level of cash flow and firm performance (Chen and Lien, 2013; Sarkees, 2011; Voola *et al.*, 2012). So, it is proposed here that:

H3a. The relationship between internal integration and organizational performance is mediated by enterprise agility.

H3b. The relationship between external diffusion and organizational performance is mediated by enterprise agility.

2.2.3 The mediating role of relationship development. Previous research has suggested that IT adoption might help firms to increase, improve and manage successful relationships and alliances with their customers, suppliers, employees and partners (Teo and Pian, 2003; Wu *et al.*, 2003; Zhu and Kraemer, 2005). This is attributed to the fact that internet-based technologies allow firms to improve the quality of communications with their partners by integrating their systems with those of their partners (Holm *et al.*, 1996). For example, e-procurement and the implementation of IT in other internal administrative tasks imply that both parties invest in the system and that both are looking for lasting relationships. These applications increase the effectiveness of operational processes and improve partner relationships and supply chain integration (Chang *et al.*, 2013). Additionally, being more efficient and transparent in accounting or financial management practices through the sharing of information among business partners can help to build stronger relationships (Wu *et al.*, 2003).

The implementation of different technologies in external communications also allows the firm to develop long-term customer relationships. For example, relationships with customers are changing and firms could take advantages of e-commerce attributes and of some ITs to build long-term relationships based on loyalty (Lee, 2001). Improving customer relationships entails organizing the business in order to treat customers individually and the personalization of the solutions offered through the customer service support. Marketers can benefit from creating and using network effects to build a customer base.

E-technologies allow firms to have access to relevant information. Both internal and external information helps the firm to know its clients more deeply. Firms can customize the shopping experience, provide special offers, better predict buying patterns, evaluate customer value and build long-term relationships (Chen and Popovich, 2003). Therefore, the more efficient relationship management obtained as a consequence of using e-technologies may help firms to increase sales and to decrease service costs and customer loss (Ragins and Greco, 2003) so firms can satisfy their customers better than their competitors and improve their long-term performance (Lai *et al.*, 2006). Hence, it is proposed here that:

H4a. The relationship between internal integration and organizational performance is mediated by relationship development.

H4b. The relationship between external diffusion and organizational performance is mediated by relationship development.

2.2.4 The mediating role of partner attraction . Most research has focussed on the effect of ITs to attract new customers, but there is little research that analyzes the use of internet-based technologies to attract business partners, employees or investors. For example, potential visitors to web sites could be customers, managers, shareholders, private investors or the press (Constantinides, 2002). Chatterjee and Sambamurthy (1999) propose the use of web sites and other technologies to inform potential investors about the company, its product and its business model. Additionally, the internet may be used as a source of forming e-alliances (Lee and Grewal, 2004).

Although most companies are interested in attracting business partners, retailers are especially interested in this objective. Retailers' growth strategy has focussed on opening outlets in different locations because their objectives are in terms of territorial coverage, particular market share or penetration. Increasing the number of locations is an important strategy to raise sales volume and market share (Michael, 2003). Therefore, it is proposed here that:

H5. The relationship between external diffusion and organizational performance is mediated by partner attraction.

Figure 1 shows the conceptual model that is tested in the next section.

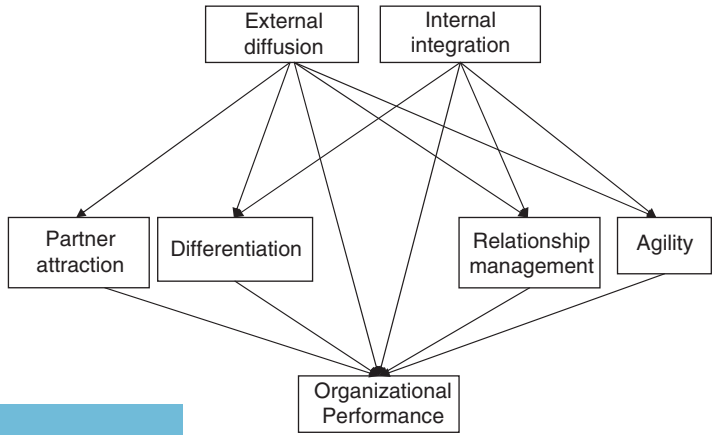

Figure 1.
Conceptual model

2.3 Cross-country analysis and context of the study

Culture plays a significant role in the type of technologies used to support decision making (Zhao, 2011). Most previous research about the cultural framework has used Hofstede's framework. Hofstede's dimensions have been used in different contexts, including in IS context (Lim and Palacio-Marqués, 2011).

Due to the different levels of IT diffusion across countries, multi-country analyses have motivated recent research (Hanafizadeh *et al.*, 2009; Zhao, 2011; San Martín *et al.*, 2011; Sabiote *et al.*, 2012). Culture influences how innovations are integrated into business activities and, therefore, the impact of these innovations on performance could be different. Recently, Lim and Palacio-Marqués (2011) found that Web 2.0 is used for different purposes by Korean, American and Spanish firms. Korean firms used Web 2.0 services for social networking, the US firms used them for conducting their internal tasks, and Spanish firms used them for both purposes. Our study was conducted in two different countries (the USA and Spain) to investigate the contrast between a high- and a low-usage rate country (Fundación Orange, 2011).

The context of our study is the franchise sector. This sector was selected because there is little research that discusses the use of internet-based technologies by franchising firms in detail. Most prior articles take the form of preliminary studies with descriptive results about the use of internet applications (Dixon and Quinn, 2004; Rao and Frazer, 2005; Grünhagen *et al.*, 2008). Their results suggest that internet applications could be implemented to improve communications with suppliers and franchisees, improve financial performance and improve operational efficiency and coordination in SCM. As well as the benefits from using internet-based technologies that any other retailer can obtain, franchise firms can use web pages and the e-mail to inform prospective franchisees about the business and about how to contact the franchisor (Dixon and Quinn, 2004; Cedrola and Memmo, 2009).

3. Methodology

3.1 Sample and procedures

To test the hypotheses, a survey of franchisors was conducted across the USA and Spain. The Spanish sample was selected from the *Franchise Yearbook* of Tormo Asociados (2009) and the information provided by the National Franchisor Register. The US sample was obtained from the listings of *The Franchise Handbook* (Enterprise Magazines Inc, 2010). Prior to the formal survey, several pretests were conducted. The pretests involved franchise firms and franchise experts both in the USA and in Spain. Based on their feedback, items in the questionnaire were reworded and minor layout changes were made in order to improve clarity and readability.

The data were collected during September-December 2010 by means of a survey that was distributed by e-mail. The questionnaires were sent to IT managers or top executives, namely, managing directors and CEOs (for firms that did not have IT managers) in 600 Spanish and 1,218 US franchise firms. We think that these are suitable respondents for the questionnaire because franchise chains, like most SMEs, are not big enough firms to have a person responsible for IT or to have an IT department. The CEO is usually the person that takes the decision to adopt and innovation or not. Similar informants have been used in previous research that analyses the use or adoption of IT in SMEs (Teo and Pian, 2003; Sanders, 2007; Bordonaba-Juste *et al.*, 2012). These executives were asked to complete the questionnaire or to forward it to the appropriate person, thus reaching the most knowledgeable "key informants" (Phillips, 1981) for the purposes of this study (see Table II). Follow-up phone

	%
Knowledge about IT (5-point Likert scale)	
1	0
2	3.7
3	11.9
4	57.8
5	26.6
Position	
Director franchise development/strategic business units	22
CEO/owner/president	62
Marketing/sales director	15
Director of IT	6
Others (financial, training, recruitment)	1
Years in business	
<4	14.4
4-10	51
$+10$	36.6
Industry	
Retail	36.5
Restaurants and fast food industry	9
Services	54.5

Table II.
Informant characteristics

calls were made to solicit participation in the survey in accordance with Dillman (2000). Following the refining process, a final sample of 109 valid cases in the USA and 100 in Spain was obtained, yielding a response rate of 16.7 percent in Spain and 9 percent in the USA. The key informant characteristics are presented in Table II. In the table, we also provide information about the sectors involved, distinguishing among retail, services and restaurants and fast-food.

A common method bias could pose a serious problem for findings when both independent and outcome variables are collected from the same source, as in this study. Hence, Harman's one-factor test was conducted to assess whether a single latent factor accounted for all the observed variables in our study. The single factor explained 27 percent of the variance in the Spanish sample and 30 percent of the variance in the US sample, while the variance explained increased to 91 percent and 88 percent, respectively, when considering seven factors. Since one factor did not explain much of the variance, we can be reasonably sure that the data have no severe common method bias.

3.2 Definition of the variables

We measure e-business implementation using a scale of the use of the internet and any web-based applications for conducting intra- and inter-firm business processes. We measure e-business implementation in terms of internal integration and external diffusion. We followed the scale provided by Lin and Lin (2008) and Lin (2008) for both measures. In the construct of external diffusion, we included some items related to the use of IT with franchisees. All the items were measured using a five-point Likert scale.

Organizational performance includes the increase in sales, market share and profitability compared to competitors. This measure consists of cost-based performance and revenue-based performance measures (Kirca *et al.*, 2005). Differentiation contains four items about the brand value, reputation and customer service support (Lederer *et al.*, 1997; Teo and Pian, 2003). Enterprise agility is a reflective construct made up of two

items referring to the effects of IT use on the firm's way of doing business and on its response to market changes (Teo and Pian, 2003, Teo, 2007). These items have been adapted from previous studies. To measure relationship management, two items were included that measure the quality of the relationship between the firm and its franchisees and between the firm and its customers. As the context of the study was franchising, an item related to the attraction of new franchisees was included (Table III). This construct has not been previously used in IS research, so no previous items were available. Additionally, size was included as a control variable, measured as the total number of outlets of the chain.

4. Results

4.1 Validation of the measurement scales

The measurement model for constructs with reflective measures is assessed by looking at the individual item reliability, internal consistency and discriminant validity. The individual item reliability is evaluated by examining the loadings of the measures with the construct they are intended to measure. An exploratory factor analysis using

E-business implementation	
Extent of integration of IT in… (internal integration)	
Accounting and financial management	INT1
Material and inventory control	INT2
Order processing and fulfillment	INT3
Sales force automation	INT4
Extent of use of IT in …(external diffusion)	
… exchanging operational data with suppliers	EXT1
… exchanging operational data with franchisees	EXT2
… exchanging operational data with business customers	EXT3
… facilitating shipment and logistics management with suppliers	EXT4
… facilitating shipment and logistics management with franchisees	EXT5
… customer service support	EXT6
Compared to our main competitor. We have…	
Organizational Performance (Perform)	
… increased our market share	PERFORM1
… increased our profitability	PERFORM2
… increased our sales volume	PERFORM3
Differentiation (Differentiation)	
… increased our brand value	DIFFER1
… increased our reputation and credibility	DIFFER2
… provided our customers and partners with information about us	DIFFER3
… provided new customer support services	DIFFER4
Enterprise agility (Agility)	
… responded more quickly to changes in the environment	AGIL1
… changed our way of doing business	AGIL2
Relationship (Relation)	
… improved the quality of the relationship with our customers	RELAT1
… improved the quality of the relationship with our franchisees	RELAT2
Attracting partners (Attraction)	
… attracted new franchisees	ATTRACT1

Note: All the items were on the five-point Likert-type scale where 1 indicates strong disagreement and 5 strong agreement

Table III.
Measurement scale

principal component analysis (PCA) and varimax rotation were carried out. Indicators with factor loadings of <0.5 on each factor were eliminated (Carmines and Zeller, 1979). A confirmatory factor analysis (CFA) was conducted to test our measurement model. The PCA indicated that the performance, relationship development, agility, market differentiation and attraction constructs each loaded onto separate factors. The internal consistency was examined using the composite reliability index of Fornell and Larcker (1981). In our model, the composite reliability index for all constructs exceeds the minimum acceptable value of 0.7 (Hair *et al.*, 1998) and Cronbach's α exceeds the minimum limit of 0.7 (Nunnally, 1978). Table IV shows that the measurement model is adequate.

The next step was to evaluate discriminant validity. Table V shows the correlations among the reflective constructs. It also shows that the square root of the average variance explained (AVE) is greater than the correlations among the reflective constructs, suggesting evidence of discriminant validity.

4.2 Measurement invariance analysis

Measurement invariance is required in cross-country studies in order to provide unbiased group comparisons. There are three types of measurement invariance: configural, factorial and scalar (Steenkamp and Baumgartner, 1998; Diamantopoulos and Papadopoulos, 2010). The results of the three invariance tests are presented in Table VI.

The first step is to provide evidence of configural invariance. This test is required to determine whether US and Spanish firms use the same pattern in the measurement of the items. Configural invariance requires the same pattern of fixed and free factor

		USA					Spain				
		Loading	R^2	Composite reliability	AVE	Cronbach's α	Loading	R^2	Composite reliability	AVE	Cronbach's α
Differ	Differ_1	0.89	0.81	0.89	0.72	0.850	0.87	0.92	0.92	0.75	0.886
	Differ_2	0.85	0.74				0.87	0.91			
	Differ_3	0.82	0.52				0.85	0.51			
	Differ_4	0.79	0.47				0.88	0.48			
Agility	Agility1	0.89	0.61	0.91	0.82	0.783	0.95	0.79	0.89	0.89	0.883
	Agility2	0.92	0.82				0.97	0.81			
Relat	Relat1	0.93	0.84	0.89	0.81	0.758	0.96	0.85	0.91	0.91	0.897
	Relat2	0.89	0.49				0.95	0.74			
Perform	Perform1	0.91	0.73	0.91	0.80	0.862	0.93	0.81	0.87	0.85	0.912
	Perform2	0.86	0.64				0.90	0.75			
	Perform3	0.88	0.65				0.92	0.75			
Internal	Internal1	0.75	0.50	0.85	0.66	0.824	0.86	0.52	0.91	0.79	0.811
	Internal2	0.92	0.62				0.85	0.89			
	Internal3	0.75	0.52				0.83	0.66			
External	External1	0.85	0.72	0.90	0.65	0.742	0.74	0.79	0.88	0.63	0.829
	External2	0.72	0.52				0.73	0.80			
	External3	0.84	0.61				0.80	0.48			
	External4	0.80	0.48				0.71	0.45			
	External6	0.79	0.56				0.78	0.57			
Attract	Attract1[a]	na	na	na	na	na	na	na	na	na	na

Table IV.
Measurement model

Notes: $R^2 > 0.3$; composite reliability > 0.7; AVE > 0.5; loadings > 0.7. [a]The construct has just one indicator

	External	Internal	Relation	Attract	Differentiation	Performance	Agility
USA							
External	*0.8062*	0	0	0	0	0	0
Internal	0.4142	*0.8124*	0	0	0	0	0
Relation	0.4894	0.1542	*0.9*	0	0	0	0
Attract	0.3103	0.1161	0.61	*1*	0	0	0
Differentiation	0.4961	0.2354	0.7267	0.6835	*0.8485*	0	0
Performance	0.4222	0.2719	0.6851	0.6315	0.763	*0.894*	0
Agility	0.4522	0.1896	0.6498	0.5487	0.7535	0.6494	*0.9055*
Spain							
External	*0.793*	0	0	0	0	0	0
Internal	0.6084	*0.888*	0	0	0	0	0
Relation	0.3957	0.2081	*0.953*	0	0	0	0
Attract	0.3272	0.1021	0.4594	*1*	0	0	0
Differentiation	0.3925	0.1128	0.7172	0.4658	*0.8660*	0	0
Performance	0.4125	0.3041	0.5907	0.4766	0.7047	*0.921*	0
Agility	0.3764	0.2391	0.5572	0.5442	0.7472	0.6651	*0.9433*

Table V.
Discriminant validity

	χ^2	df	$\Delta\chi^2$	Δdf	CFI	RMSEA	CD
Configural invariance							
Fully free (M1)	646.62	252			0.901	0.08	0.974
USA	236.38	126			0.903	0.07	0.981
Spain	345.15	126			0.899	0.08	0.976
Factor loadings constrained (M2)	658.82	228	12.2 ns	13	0.901	0.08	0.974
Scalar constrained (M3)	687.20	205	28.38 ns	19	0.900	0.082	0.972

Table VI.
Results of measurement invariance

loadings to be specified for each country. This implies running the model for each subsample to see if the model fits each group. The results of our configural invariance are shown in Table VI, supporting the existence of configural invariance for each country. The second step is to test for factorial invariance. This test consists of constraining the baseline modeling in terms of factor loadings. This means that the loadings of each item are the same in both countries. We present the initial model and the fully constrained model and the level of significance of the χ^2-test carried out.

A more detailed analysis suggests that all the factors, except internal integration, supported factorial invariance. We carried out a χ^2-test between the constrained and unconstrained items of each factor and found that two of the three items of the internal integration scale cause this non-invariance. Although we cannot compare the two countries in terms of internal integration, we have continued with the other constructs to test the strong measurement invariance. This is also known as scalar invariance. To assess scalar invariance, we compare the model with and without constraining the intercepts. We test whether the intercepts are equal across countries. A detailed analysis of all the intercepts of each construct show that the scalars are invariant, but the intercepts related to internal integration are significantly non-invariant. Only if all three types of invariance are supported can we confidently carry out a latent variable mean comparison.

The results allow us to compare the latent means of the constructs that are invariant between the two countries. Table VII shows the mean differences of external diffusion

	USA	Spain	*t*-test
Internal	3.84	3.55	2.249**[a]
External	3.61	3.52	0.711
Performance	4.02	3.87	1.167
Differentiation	4.14	4.16	0.168
Agility	4.05	4.29	2.16*
Relation	4.12	3.90	1.65*
Attraction	4.11	3.88	1.171

Table VII.
T-test differences between countries

Notes: [a]Not applicable as measurement invariance is not supported in this construct. *,**Significant at 0.1 and 0.05 levels, respectively

and all the outcomes included in the model: differentiation, relationship development, enterprise agility, partner attraction and organizational performance. Small differences between the two countries are found in the latent means of enterprise agility and relationship development with a higher value for the Spanish sample in the first case and for the American sample in the second one.

4.3 Testing of the research hypotheses

Tables VIII and IX show the results of the conceptual model with the significant path coefficients using Smartpls 2.0 (Ringle *et al.*, 2005). After computing the path estimates, a bootstrap analysis was performed to assess the statistical significance of the path coefficients. To test predictive relevance, the Q^2 proposed by Stone-Geisser was calculated. This test can be obtained from the cross-validated redundancy that measures the quality of the structural model (Tenenhaus *et al.*, 2005). All of the endogenous constructs show positive values for the Q^2 test, suggesting good predictive relevance. In the Spanish sample, Q^2 value of the firm performance, differentiation, enterprise agility, customer development and partner attraction is 0.48; 0.11; 0.14; 0.15 and 0.11; while in the USA these values are 0.50; 0.17; 0.17; 0.19; 0.10, respectively. Results were also tested by implementing SUR models in the software STATA. The SUR models allow correlation among residuals of the different regressions. The results obtained were similar.

We found that the internal integration and the external diffusion of e-business have different consequences. As internal integration has not supported measurement

Total effect on performance	Effect on performance	Effect of internal on	Effect of external on		Mediation effect between external diffusion and performance	BC 95% Confidence interval	
Coeff	Coeff				Point estimate	Low	Upper
Internal 0.302***	0.325***			Total	0.324		
External 0.218*	−0.127 ns			Mediators			
DIFFER	0.41***	−0.02	0.39***	DIFFER	0.165	0.03	0.33
AGILITY	0.26***	0.10	0.32***	AGILITY	0.083	0.01	0.18
RELAT	0.07	0.11	0.31***	RELAT	0.022	−0.05	0.11
ATTRAC	0.15*		0.35***	ATTRAC	0.053	0.01	0.13
$R^2 = 0.23$	$R^2 = 0.62$						

Table VIII.
Analysis of mediating effects for Spain

Note: *,***Significant at 0.1 and 0.01 levels, respectively

Total effect on performance		Effect on performance	Effect of internal on	Effect of external on	Mediation effect between external diffusion and performance		BC 95% confidence interval	
	Coeff	Coeff				Point estimate	Low	Upper
Internal	0.111ns	0.117ns			Total	0.407		
External	0.381***	−0.03 ns			Mediators			
DIFFER		0.39***	0.03	0.48***	DIFFER	0.192	0.06	0.37
AGILITY		0.11	−0.02	0.45***	AGILITY	0.049	−0.03	0.17
RELAT		0.23***	−0.06	0.51***	RELAT	0.118	0.02	0.26
ATTRAC		0.16*		0.31***	ATTRAC	0.0494	−0.008	0.12
	$R^2 = 0.192$	$R^2 = 0.647$						

Note: *,***Significant at 0.1 and 0.01 levels, respectively

Table IX.
Analysis of mediating effects for USA

invariance, we cannot compare the results obtained between the two countries in terms of that construct. In terms of external diffusion, we can compare the results obtained between the USA and Spain.

Results suggest that internal integration and external diffusion influence the outcomes analyzed differently. While in both countries, external diffusion has no significant direct impact on organizational performance, rejecting *H1b*, its indirect path differs between the two countries. In Spain, results suggest that internal integration has a positive and significant effect, supporting *H1a*, while, in the USA, this construct has no significant influence on performance. In the USA, *H1a* is rejected.

We proposed that the impact of internal integration and external diffusion on organizational performance is mediated by non-financial performance measures obtained through the implementation of different technologies. We follow Tippins and Sohi's (2003) methodology, and Preacher and Hayes' (2008) method to test multiple mediation. We have first run the model without the mediating variables (initial model) and then with the mediators included in the model. As can be seen in Tables VIII and IX, the variance of organizational performance increased when the mediating variables were included in the model (from 0.129 to 0.647 in the US sample and from 0.226 to 0.619 in the Spanish sample). In the case of Spain, external diffusion is also fully mediated by differentiation, enterprise agility and partner attraction because the direct effect of these variables on organizational performance in the initial model becomes non-significant when mediators are introduced into the model (see Table VIII). Although internal integration showed a significant effect when there are no mediators, results show that it has no impact on any mediator (differentiation, agility, relationship development) included in the model, thus rejecting *H2a*, *H3a* and *H4a*.

In the US sample, we can only test the mediating effect of non-economic outcomes between external diffusion and organizational performance because, in the model without mediators, there is no direct effect between internal integration and organizational performance (see Table IX), which is a condition for testing for a possible mediation effect. Therefore, all the hypotheses related to the mediation effect of internal integration, *H2a*, *H3a* and *H4a*, were rejected. It can be seen in Table IX that external diffusion has a positive influence on differentiation, agility, relationship management and partner attraction, and that external diffusion is fully mediated by differentiation and relationship development.

To sum up, the results provide support for *H2b* and *H4b*, in the US sample, and for *H2b*, *H3b* and *H5* in the Spanish sample.

5. Discussion and implications

5.1 Discussion of findings

Following previous research (Sanders, 2007; Koo *et al.*, 2007) which suggested that the effect of IT implementation should be studied by simultaneously including direct and indirect effects, this paper provides new evidence about the impact of e-business implementation on organizational performance by examining its two dimensions, internal integration and external diffusion, separately. In our paper, we include the mediating effects of non-financial performance measures. The analysis was carried out in two different countries, the USA and Spain.

Our measurement invariance analysis provides a better understanding of the consequences of e-business implementation among franchise firms. From a series of invariance analyses, we conclude that, while external diffusion was invariant in terms of the configuration of the constructs, factorial loadings and scalars, factorial invariance was not supported for internal integration across the countries. This conclusion suggests that US and Spanish franchise firms conceptualize external diffusion and the outcomes analyzed in the model (differentiation, enterprise agility, relationship development and organizational performance) in the same way and with the same factor loadings.

The results of the path coefficients also indicate that the findings about the impact of internal integration and external diffusion on economic performance are mixed. Although we have found a positive effect of internal integration on economic performance in the Spanish sample, we cannot compare this result with the one obtained for the US sample as invariance was rejected. Therefore, the discussion of the results will be based on the different effects of external diffusion on economic performance. Although external diffusion initially has a positive impact on economic performance, it is eroded when mediator variables are included in the model. In both countries, external diffusion has no significant direct effect as it is fully mediated by non-economic benefits. Additionally, we find that the implementation of technologies in external business processes has a strong and positive impact on differentiation, enterprise agility, relationship development and partner attraction, which confirms previous findings (Wu *et al.*, 2003; Dixon and Quinn, 2004; Constantinides, 2002; Koo *et al.*, 2007; Teo, 2007; Kmieciak *et al.*, 2012). This result is robust across countries. However, our results suggest that internal integration has no significant effect in any non-economic outcome. Our findings partially confirm Wu *et al.*'s (2003) research which found that only administration tasks and not e-procurement had a positive effect on customer satisfaction and relationship development. Our internal integration construct includes more aspects, such as order taking and inventory control, that may be more related to efficiency or cost reduction, aspects not included in the current study.

Regarding our research question about how the benefits of e-business implementation (in terms of internal integration and external diffusion) are transferred to organizational performance, we find some similarities and differences between the two countries. While, for US franchise firms, the advantages of external diffusion are transferred to performance through differentiation and relationship development, for Spanish firms they are transferred through differentiation, enterprise agility and partner attraction.

Differentiation exerts a mediating role on the relationship between external diffusion and economic performance in both samples. This result confirms the idea

that using new technologies gives firms access to more information about the market, which allows them to provide customizable services and products (Koo *et al.*, 2007; Chen and Tsou, 2007). Relationship development has a mediating effect between external diffusion and organizational performance only for American firms, which confirms previous research (Wu *et al.*, 2003). The economic success of the franchise system is created, to a great extent, by the successful management of the relationship with franchisees and, as is found in our research, this can be achieved by the use of ITs. However, this has not been confirmed in the Spanish context.

Enterprise agility, on the contrary, has not a mediating role on the relationship between external diffusion and organizational performance in the USA. Although a positive and significant relationship between external diffusion and enterprise agility is found, confirming previous research (Overby *et al.*, 2006), no effect is obtained on performance, contrary to what we expected (Sarkees, 2011). A possible reason for this might be that enterprise agility is a complex construct that could be divided into the ability to sense and to respond to market changes. Each of these abilities may have different effects on firm performance, as Garrison (2009) found. Another possible reason is that enterprise agility may not have a direct effect on performance; its effect may be indirect, as suggested by other authors (Rai *et al.*, 2006, Pavlou and El Sawy, 2006). Future research should pay more attention to this variable and its consequences to provide more findings about this relationship in the US context. On the other hand, in Spain, enterprise agility seems to be an instrument for transmitting the benefits of implementing technologies in external communications and logistics to organizational performance, confirming previous studies (Overby *et al.*, 2006; Sarkees, 2011; Rubio and Aragon, 2009).

Finally, we find that partner attraction mediates the relationship between external diffusion and organizational performance in Spain, which confirms previous research (Dixon and Quinn, 2004; Cedrola and Memmo, 2009). However, this mediation effect was not found in the US sample. One possible explanation for this result could be the fact that e-mail and web pages are only used to ask for information. Contacting the firm does not imply that the enquirer will become a franchisee.

5.2 Implications of findings

Our study contributes to IS research by analyzing the value of investing in e-technologies in a new context, namely, the franchise sector. Little IS research has focussed on analyzing the use of these new technologies in the franchising context. A second contribution of this paper is that we analyze the same model in two countries in the same sector. This paper provides evidence that there are other reasons than how performance is measured that explain the mixed results found in previous research. These mixed results can be explained by the rejection of the measurement invariance of the constructs. As measurement invariance analyses were performed prior to running our research model, we can be sure that our research findings are free from country biases. Little IS research has validated its constructs with invariance analysis. Finally, we contribute with the analysis of the mediating role of non-financial performance in the e-business implementation-performance relationship. Although some researchers have analyzed different measures of performance, they have not included the mediating effects between them. This paper provides evidence of the intermediate effects of external diffusion that, finally, increase performance. Our results also show that not all the non-financial benefits of implementing e-business have an impact on organizational performance.

This study's findings provide important managerial implications for franchisors. Franchisors should adopt technologies and implement them in external processes, such as communication, business processes to avoid losing the opportunity of improving their competitive position. Furthermore, the value of investing in the integration of different technologies to manage intra- and inter-organizational business processes for franchisors lies in the anticipated increase in economic performance that they may be able to achieve indirectly. This research was carried out during a period of financial crisis. The management of the relationship with customers and other agents is a key question for firms in this situation. Spanish consumers continue to look for additional value, which may be offered through differentiation. Additionally, through an active use of technologies in communication or brand management, Spanish franchisors can attract new franchisees to their chain and increase their performance during this period of economic crisis. American customers and franchisees not only value differentiation, but also they reward franchise firms that take care of the relationships between the firm and themselves. Other factors, such as marketing strategy, may be more advantageous than increasing market coverage through additional franchisees.

5.3 Limitations and future research

This research has limitations that provide areas for future research. First, the database is quite heterogeneous with franchisors operating in different sectors. So, a single-sector analysis is needed to generalize our findings. Additionally, further studies comparing different countries and using different contexts are necessary before internal integration and external diffusion can be established as an adequate cross-national measure of e-business implementation. The second limitation is the omission of potential mediating variables such as organizational capabilities, technical support or knowledge that may influence performance. Furthermore, we have used a single informant to answer the questionnaire. Adding the opinion of IT personnel could be interesting for future research. Finally, performance was measured using subjective items. Future research is encouraged to use more objective indicators.

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Further reading

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