Information Systems Outsourcing, the Umbrella Term for e-Business Strategic Management Sourcing: Service Comparison

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Abstract In the business research literature, e-business is considered to be a type of sourcing option of information systems outsourcing (ISO) if it is external to the firm and the renting supplier-owned resource delivers the solution over the internet. As the term "e-business" is conceptually included in ISO, this chapter seeks to investigate the factors that affect the adoption of ISO in general by comparing the effect across five business areas: human resources, finance, logistics, sales, and marketing. Based on the combination of a technology-organization-environment (TOE) framework and the diffusion of innovation (DOI) theory, the authors develop a conceptual model to study the determinants of ISO adoption by business area. This handbook chapter is one of the first to examine ISO adoption in these five business areas and to use a research model that combines the TOE framework and the DOI theory. Data collected from 261 firms in Portugal were used to test the proposed model. Based on a logistic regression, top management was found to be supportive and perceived benefits to be determinants of ISO adoption in all business areas defined. Moreover, other significant factors used to determine ISO included: complexity in human resources, finances and logistics; relative advantages for finance, logistics, and sales; firm size (logistics only); and competitive pressure for business areas (except marketing). Furthermore, attitudes toward change were found to have opposite effects—it is positive for sales and negative for human resources, finance, and logistics.

Keywords Information systems outsourcing (ISO) · Technology-organization-environment · Diffusion of innovations · Human resources ISO adoption · Finance ISO adoption · Logistics ISO adoption · Sales ISO adoption · Marketing ISO adoption

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1 Introduction

Information systems outsourcing (ISO) is the umbrella term that includes a range of options that are external to the firm (Sanders et al. 2007), such as business process outsourcing (BPO) (Lacity et al. 2009); the application service provision (ASP), which is defined as the renting supplier-owned resource delivering the solution over the internet; enterprise resource planning (ERP); customer relationship management (CRM); and all types of e-commerce and e-business, amongst others (Kern et al. 2002). Although in many articles it is common for e-business to be considered the same as e-commerce, the fact is that e-commerce is concerned only with the exchange of goods of financial value, while e-business denotes more general dealings or commercial activities, including operational activities and logistics (Jones et al. 2000). ISO is considered a strategic initiative that enables firm innovativeness through the creation of value networks (Lacity et al. 2010; McFarlan and Nolan 1995; Quinn and Hilmer 1994). Because the decision to outsource an e-business project has significant influence on a firm's ability to balance competing needs, to deploy its best talent, and to prevent leakage of knowledge embedded in assets (Agrawal et al. 2006), this chapter offers guidance on decision making and recommendations for outsourcing any information systems. Also because of rapid changes in technology and ISO activities, both practitioners and researchers must include ever more—and ever more specific—factors in order to understand ISO (Grover et al. 1996). Furthermore, according to IDC the value of ISO in Portugal is 0.66 % of the GDP, and according to the same source this value is much lower compared to the European average (1.47 %) (IDC 2006). Therefore, it is imperative to understand the factors that can most affect its adoption. This chapter seeks to advance researchers' understanding of the determinants of ISO adoption in the different firms' areas, such as human resources, finance, logistics, sales, and marketing. As a result, managers' and academics' future studies can focus on different features of the knowledge used to make ISO decisions. We developed a conceptual model based on the technology-organization-environment (TOE) framework (Tornatzky and Fleischer 1990) and the diffusion of innovation (DOI) theory (Rogers 1995). And to the best of the authors' knowledge, this is one of the first studies to examine ISO adoption in the five business areas, using the conjunction of models proposed. We tested the developed model using survey data from 261 firms that operate in Portugal.

The chapter is organized as follows: First, we present the theories and literature review, and then we describe the research model and hypotheses. Secondly, we describe the research model and hypotheses. Thirdly, we discuss the results of the estimate and tests for the developed model. Finally, we present the main conclusions, including practical limitations and specific suggestions for applications in business firms and future research studies.

2 Literature Review

As the literature reports, creativity and innovation are stimulated by multidisciplinary teams operating outside conventional organization structures (Agerfalk and Fitzgerald 2008; Garvin 1993; Goldman and Gabriel 2005; Inkpen 1996; Leonard-Barton 1995; Nonaka 1991). Since ISO falls into a similar category, we propose that the TOE framework provides a good model to understand the determinants that affect its adoption, because, beyond the features already mentioned, it has many consistent empirical supports (Wang et al. 2010), and is widely regarded as extremely useful in explaining the adoption of technological innovations (Chau and Tam 1997; Gibbs and Kraemer 2004; Oliveira and Martins 2010b; Xu et al. 2004; Zhu et al. 2006). The TOE framework comprises three distinct contexts: technological, organizational, and environmental. The technological context covers the internal and external technologies relevant to the firm, which include current practices and the internal equipment of the company (Starbuck 1976), as well as the technologies that are available externally (Hage 1980; Khandwalla 1970). The organizational context refers to the descriptive measures of the organization, such as its scope and size (Oliveira and Martins 2011; Tornatzky and Fleischer 1990). Finally, the environmental context corresponds to the constraints and opportunities for technological innovation, which include the various actors that may impact the decision process, such as regulators, customers, and suppliers (Tornatzky and Fleischer 1990).

The process of innovation in an organization is quite complex. The number of individuals involved and their attitude to innovation could mean that not all opinions converge in the same direction during the decision process (Oliveira and Martins 2011). As the decision on innovation is seen as a mental process through which an individual first approaches the idea of innovation and then develops an attitude toward it, diffusion plays an important role since is a special type of communication, and the spread of new ideas essentially consists of the creation and sharing of information between participants in achieving a common understanding (Rogers 1995). The DOI theory, developed by Rogers (1995), is related to the organizational innovativeness, which is composed of the individual leaders' characteristics, the internal characteristics of the organizational structure, and the external characteristics of the organization. Individual (leader) characteristics describe the attitude toward change; internal organizational structure characteristics describe their degree of centralization, complexity, formalization, interconnectedness, organization slack, and size. There is a similarity between some of the factors that comprise the DOI theory (Rogers 1995) and the TOE framework (Tornatzky and Fleischer 1990), such as complexity and firm size, which are described further in this chapter. Finally, external environment describes the external characteristics of the organization with regard to the system openness (Oliveira and Martins 2011).

3 Research Model and Hypotheses

We considered four contexts based on both models presented above: technology, organization, and environment from the TOE framework (Tornatzky and Fleischer 1990), and individual (leader) characteristics from the DOI theory (Rogers 1995). The two models are considered to be consistent (Zhu et al. 2006a, b), and are the most widely used firm-level adoption models (Wang et al. 2010). All hypotheses are presented below.

3.1 Hypotheses

The research literature indicates that firms may be less likely to adopt an innovation or technology if it requires a high level of new skills for their employees (Beatty et al. 2001). Since complexity is the degree to which a given innovation is perceived as being difficult to understand or use (Beatty et al. 2001; Corrocher 2003; Rogers 1995), and leads to resistance resulting from the lack of skills and knowledge (Rogers 1983), it could jeopardize the adoption of ISO. Thus, we propose the following hypothesis (Fig. 1).

H1. Complexity will have a negative effect on the adoption of ISO.

Relative advantage refers to the degree to which a particular innovation is perceived as being able to provide greater organizational benefit (Rogers 1983).

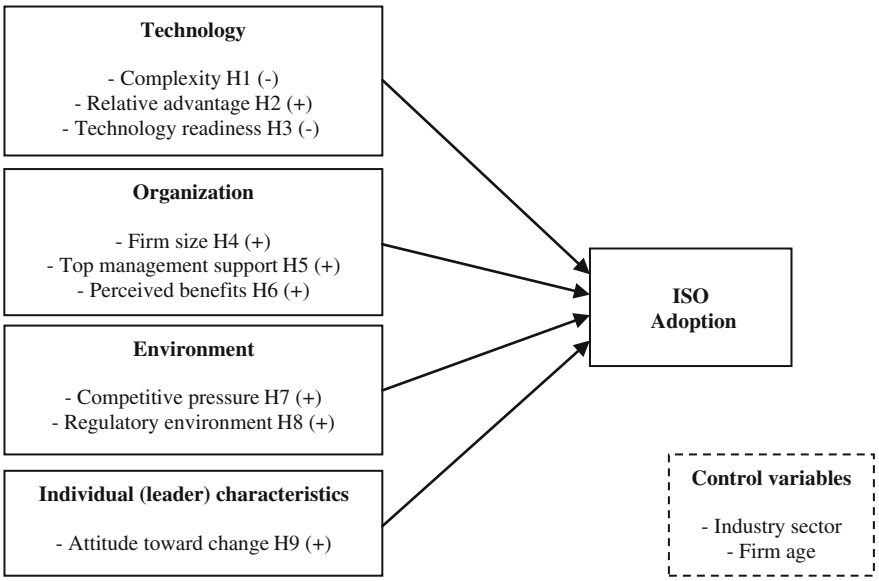

Fig. 1 The conceptual model for deciding on ISO adoption

This variable has been identified as a significant driver for IT innovations usage (Iacovou et al. 1995; Premkumar et al. 1994). Furthermore, the literature reports a positive relationship between relative advantage and IT/IS adoption (Tornatzky and Klein 1982). Thus, the following hypothesis is also proposed:

H2. Relative advantage will have a positive effect on the adoption of ISO.

Technology readiness reflects the physical assets, the human resources (Mata et al. 1995), the IT professionals within the organization who have expertise to implement the innovation, and the IT infrastructure, such as installed technologies, systems, and applications (Ngai et al. 2007). Since ISO is the externalization of these assets (Loh and Venkatraman 1992a), this factor may have a positive influence in innovation adoption (Zhu and Kraemer 2005). In this study, we will assume that the higher the level of technology readiness of an organization, the less likely it will be to adopt ISO. Thus, we propose the following hypothesis on technology readiness:

H3. Technology readiness will have a negative effect on the adoption of ISO.

Firm size is an indicator of the firm's resources and an important factor that influences innovation adoption (Tornatzky and Fleischer 1990). It is defined as an organizational attribute to the diffusion of innovation (Rogers 1995), and is measured by the number of employees and the number of establishments (Cho 2006). The existence of a positive relationship between firm size and adoption of technological innovation has been detected. As larger firms are more likely to make this kind of investment (Majumdar 1995; Quadros et al. 2001; Zhu et al. 2003), the following hypothesis is proposed:

H4. Firm size will have a positive effect on the adoption of ISO.

Top management support has been identified in the literature as a factor that positively affects the adoption of technological innovation (Grover et al. 1996), providing the vision, support, and commitment needed to foster the desired environment for the adoption of innovation (Lee and Kim 2007). In fact, in almost all innovative endeavours, top management support is extremely important (Beatty et al. 2001), and it will help focus efforts toward the realization of organizational benefits and lend credibility to functional managers responsible for its implementation and use (Bradford and Florin 2003). Since ISO is seen as a strategic decision (DiRomualdo and Gurbaxani 1998), this factor can positively affect the adoption of innovation, creating an environment of greater convergence of ideas (McGowan and Madey 1998). Therefore, we propose the following hypothesis:

H5. Top management support will have a positive effect on the adoption of ISO.

Perceived benefits refers to the degree to which new technologies provide more benefits than do old ones (Lin and Lin 2008). This variable has been shown to impact technology adoption (Banerjee and Golhar 1994; Oliveira and Martins

2010a, b). The firm must perceive that the adoption will either resolve existing problems or provide new business opportunities (Beatty et al. 2001), and capture the extent of agreement with claimed benefits relative to its local condition (Chau and Tam 1997). The following hypothesis on perceived benefits is proposed:

H6. Perceived benefits will have a positive effect on the adoption of ISO.

Competitive pressure is defined in the literature as the pressure resulting from a threat of losing competitive advantage (Lin and Lin 2008). It refers to the pressure of competition in the adoption of innovation (Gatignon and Robertson 1989). It is the industry in which the company operates that increases the likelihood of adoption of innovation (Kimberly and Evanisko 1981; Thong 1999; Utterbac 1974). The greater the competitive intensity, the greater is the technology adoption (Gatignon and Robertson 1989; Globerman 1975; Levin et al. 1987; Ngai et al. 2007; Oliveira and Martins 2010b; Teo et al. 2003; Thong 1999). Competitive pressure has been identified as an important determinant in the adoption of innovation (Gibbs and Kraemer 2004; Grover 1993). Firms can simply follow their competitors in order to respond to pressure, regardless of the expected benefits, based solely on their success (Teo et al. 2003). Increased competition makes firms feel the need to seek advantage compared to their peers, through innovation (Wang et al. 2010). Thus, we propose the following hypothesis on competitive pressure:

H7. Competitive pressure will have a positive effect on the adoption of ISO.

The regulatory environment is recognized as a critical factor affecting innovation. The more restrictive the regulatory environment is, the more it is that firms will be willing to delegate management to an entity outside of their organization. The constant difficulty of adaptation for legal requirements can have a positive effect on ISO adoption, so we propose the following hypothesis:

H8. Regulatory environment will have a positive effect on the adoption of ISO.

Attitude toward change describes the attitude of the leader (Rogers 1995). The role played by the leader determines the capacity for innovation (Cannon 1985), and may substantially influence the perception of innovation (Wejnert 2002). Thus, we propose the following and final hypothesis on attitude:

H9. Attitude toward change will have a positive effect on the adoption of ISO.

3.2 Control Variables

It is common to see the use of control variables in information systems studies (Zhu et al. 2006, 2003), since they are used to control the variation of data that were not captured by the explanatory variables. In this study, we need to control for industry sector and firm age.

4 Research Methodology

4.1 Construct Measures and Data Collection

Our construction of items of measurement for the study of ISO adoption takes into account the existing instruments. However, some of the items used were adapted to the context of ISO. Tables 1 and 2 summarizes all of the information about the items measuring the respective independent variables. Most items were measured using a five-point Likert scale ranging from "(1) strongly disagree" to "(5) strongly agree".

The technology readiness and firm size items were not measured by a Likert scale. Table 2 presents the items of these two variables.

The dependent variable, adoption, is dichotomous (0: non-adopter, 1: adopter). It was determined by asking respondents if their firms adopted ISO specifically for the following products: human resources, finance, logistics, sales, and marketing.

A group of experts was formed to analyse each question and suggest improvements for the writing and questionnaire structure. Based on the follow-ups, we reviewed some of the texts of our original research questions. After that, a pilot test was conducted. The pilot test provided the acceptable level of reliability required for all the items comprising the questionnaire.

The sample was obtained from a source list from Dun and Bradstreet, which is one of the world's leading sources of commercial information and insight on businesses. The sample was a random selection of firms from Portugal. In order to meet minimum standards for strata size class of firm, strata were to include a 20 % share of large firms (>250 employees), 40 % of medium-sized firms (50–250), and 40 % of smallest-sized firms (<50 employees). The survey was executed online, with an invitation for participation sent to several managers of the sample firms. The sample was of 600 firms. A total of 261 usable responses were completed, yielding a total response rate of 43.5 %. Table 3 shows the sample characteristics. About 80 % of the data were collected from owners, managing directors, heads of IT, and other senior members of IT, which suggests the high quality of the data source.

4.2 Instrument Validation

A factor analysis was applied in order to assess the construct validation of the measures. Based on factor analysis with varimax rotation (with other rotations the results are similar), eight factors were obtained with eigenvalues greater than 1. These eight factors explain 83.6 % of the total variance in the data. The Kaiser–Meyer–Olkin (KMO) test measures the adequacy of the sample. It returned a value of 0.87, revealing that the matrix of correlation is adequate for factor analysis (Sharma 1996). Table 4 presents only the loadings above 0.5. The results of the

Table 1 Measurement items on five-point Likert scale

Variables	Measurements items	Adapted from
Complexity	C1. Used complexity in integrating system	Grover (1993), Chang et al. (2007), Premkumar and Roberts (1999)
	C2. Complexity in developing the system process	
	C3. Degree of complexity in terms of work practices in operating the system	
	C4. Our firm interaction with the system is clear and understandable	Bradford and Florin (2003)
Relative advantage	RA1. ISO adoption will lead to cost reduction	Li (2008)
	RA2. ISO adoption will lead to transaction acceleration	
	RA3. ISO adoption will provide timely information for decision making	To and Ngai (2006)
	RA4. ISO adoption will increase the business opportunities	
	RA5. ISO adoption improves competitiveness	
Top management support	TMS1. Top management supports ISO adoption	Li (2008)
	TMS2. Top management support is aware of the benefits of ISO	
	TMS3. Top management considers ISO important for the organization	Beatty et al. (2001)
	TMS4. Top management encourages employees to use ISO	
Perceived benefits	PB1. ISO may help improve the performance of my firm	Yiu et al. (2007)
	PB2. ISO can save my firm time in managing their processes	
	PB3. ISO may offer a wider range of products to my firm	
	PB4. ISO may offer a greater number of services to my firm	
	PB5. ISO may offer good investment to my firm	
Competitive pressure	CP1. In our industry, ISO adoption is useful to allow competition	Chwelos et al. (2001) To and Ngai (2006)
	CP2. The leading firms in our industry are committed to the adoption of ISO	Li (2008)
	CP3. Percentage of firms in our industry using ISO	
	CP4. ISO is a strategic necessity to compete	
Regulatory environment	RE1. There is adequate legal protection for ISO	(Zhu et al. 2006)
Attitude toward change	ATC1. For me, the adoption of ISO is desirable	Lee (2009)
	ATC2. When I am confronted with information, both positive and negative, on a new technology, I favour the positive information	Gatignon and Robertson (1989)
	ATC3. Firms outside my industry are usually a better source of information about technologies than firms in my industry. ATC4. I think that using ISO is a good idea	

Table 2 Other measurement items

Variables	Measurements items	Adapted from
Technology readiness	TR1. Number of personal computers that are currently in use in my firm divided by the number of employees	(Zhu et al. 2006)
	TR2. Number of IT professionals located in my firm divided by the number of employees	
Firm size	FS1. Number of employees	Cho (2006), Gibbs and Kraemer (2004), Pei-Fang et al. (2006)
	FS2. Annual business volume	
	FS3. Number of factories	Premkumar and Roberts (1999)

Table 3 Sample characteristics $n = 261$

	Observation	(%)		Observation	(%)
Firm age			*ISO adoption*		
< 10 years	48	18.4	Human resources	86	33.0
11–20 years	74	28.4	Finance	99	37.9
21–50 years	93	35.6	Logistics	68	26.1
> 51 years	46	17.6	Sales	54	20.7
			Marketing	52	19.9
			Industry sector		
Respondent title			Manufacturing	73	28.0
Owner/proprietor	6	2.3	Commerce	35	13.4
Managing director/board member	112	42.9	Services	121	46.4
Head of IT	8	3.0	Construction	20	7.7
Other senior member of IT	7	2.7	Health	12	4.5
Strategy development/organization	74	28.4	*Employee number*		
			<50	99	37.9
Other	54	20.7	50–250	108	41.4
			> 250	54	20.7

items that load higher than 0.50 on their associated factors corroborate the convergent validity of the factors (Chau and Tam 1997). The eight factors found were easily interpreted, they are: perceived benefits (PB), relative advantage (RA), top management support (TMS), complexity (C), technology readiness (TR), firm size (FS), attitude toward change (ATC), and competitive pressure (CP). These results are in accordance with the literature review.

In short, the measurement instrument is valid and reliable, and it can be used to test the proposed research model.

Table 4 Factor and validity analysis

Variable	Perceived benefits (PB)	Relative advantage (RA)	Top management support (TMS)	Complexity (C)	Technology readiness (TR)	Firm size (FS)	Attitude toward change (ATC)	Competitive pressure (CP)
PB1	0.755							
PB2	0.843							
PB3	0.848							
PB4	0.836							
PB5	0.836							
RA1		0.764						
RA2		0.776						
RA3		0.791						
RA4		0.859						
RA5		0.820						
TMS1			0.862					
TMS2			0.864					
TMS3			0.872					
TMS4			0.837					
C1				0.921				
C2				0.925				
C3				0.915				
TR1					0.994			
TR2					0.995			
FS1						0.896		
FS3						0.907		
ATC1							0.789	
ATC2							0.854	
CP1								0.909
CP2								0.687
% of variance explained	16.7 %	16.0 %	14.3 %	10.5 %	8.1 %	6.6 %	5.8 %	5.7 %
Cronbach's α	0.947	0.929	0.943	0.917	0.997	0.784	0.628	0.704

Note *C4, FS2, CP3, CP4, ATC3, and ATC4 question-items were excluded after factor analysis estimation due to low loadings (lower then 0.5). We presented only loadings with an absolute value greater than 0.5

5 Data Analysis and Results

Overall results point to practical ways to apply the model and make decisions based on specific areas. After the measurement instrument was validated and the dichotomous characteristics of the dependent variables defined, a logistic regression was applied to test the research hypotheses in the five ISO products, i.e., human resources, finance, logistics, sales, and marketing. Specifically, we began analysis by checking the multicollinearity, for which we calculated the variance inflation factor (VIF). The VIF ranged from a low of 1.05 to a high of 2.04. The values are below the threshold of 10, indicating that there is no problem of multicollinearity amongst the variables (Hair et al. 1998).

The goodness-of-fit of the five regressions were assessed in three ways. Firstly, to analyse the joint statistical significance of the independent variables, we computed the likelihood ratio (LR) test, which is statistically significant (p value < 0.01) for five regressions. This implies a strong relationship between the dependent and independent variables for all regressions. Secondly, we used the Hosmer–Lemeshow test (Hosmer and Lemeshow 1980; Lemeshow and Hosmer 1982), which reveals that there are no differences between fitted values of the model and the actual values for all regressions (p-value is 0.69, 0.22, 0.70, 0.51, and 0.54, respectively for human resources, finance, logistics, sales, and marketing). Finally, the discrimination power of the model was evaluated in two ways. We used the area under the curve (AUC), which varied from 0.74 to 0.84 (see Table 5), revealing an excellent discrimination (Hosmer and Lemeshow 2000). Also, the corrected classifications of logistic regression varies from 75.3 to 83.4 % (Table 5). The adoption by random choices ([adopters/(adopters + non-

Table 5 Logistic regression

Independent variables	Human resources (β)	Finance (β)	Logistics (β)	Sales (β)	Marketing (β)
Complexity	−0.489***	−0.307*	−0.396**	−0.244	−0.182
Relative advantage	0.042	0.476***	0.572***	0.424**	0.188
Technology readiness	−0.580	1.243	1.107	−2.602	3.043
Firm size	0.413	0.079	0.553*	−0.323	−0.149
Top management support	0.591***	0.781***	0.784***	0.643***	0.616***
Perceived benefits	0.841***	0.731***	1.031***	0.668***	0.741***
Competitive pressure	0.770***	0.786***	0.800***	0.879***	0.258
Regulatory environment	0.339	−0.151	−0.314	−0.349	−0.242
Attitude toward change	−0.318*	−0.351**	−0.364*	0.699***	−0.224
Goodness of fit					
Random choice (%)	55.8	52.9	61.5	67.2	68.1
Correctly classified (%)	77.8	75.7	78.8	83.8	78.4
Area under curve	0.83	0.82	0.83	0.84	0.74

Note β: standardized coefficients. *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

Table 6 Summary of confirmed hypotheses

Hypotheses	Confirmed hypotheses				
	Human resources	Finance	Logistics	Sales	Marketing
Complexity H1 (−)	Yes	Yes	Yes	No	No
Relative Advantage H2 (+)	No	Yes	Yes	Yes	No
Technology readiness H3 (−)	No	No	No	No	No
Firm size H4 (+)	No	No	Yes	No	No
Top management support H5 (+)	Yes	Yes	Yes	Yes	Yes
Perceived benefits H6 (+)	Yes	Yes	Yes	Yes	Yes
Competitive pressure H7 (+)	Yes	Yes	Yes	Yes	No
Regulatory environment H8 (+)	No	No	No	No	No
Attitude toward change H9 (+)	No	No	No	Yes	No

adopters)]2 + [non-adopters/(adopters + non-adopters)]2) varies between 52.9 and 68.1 % for five ISO adoption, which is much less than in the case of our regressions. We, therefore, conclude that the five logistic regressions have much higher discriminating power than the random choice. The three statistical procedures reveal a substantial model fit and a satisfactory discriminating power, and there is evidence for accepting an overall significance of the five models.

The logistic regressions results are presented in Table 5. To test the significance of regression coefficients of the independent variables, the Wald test was used. As shown in Table 5, complexity was statistically significant for human resources ($p < 0.01$), finance ($p < 0.10$), and logistics ($p < 0.05$) business areas, and by the coefficients we see that it is negatively related. Relative advantage is positively and statistically significant for finance ($p < 0.001$), logistics ($p < 0.001$), and sales ($p < 0.001$) business areas. Firm size is only statistically significant ($p < 0.10$) for the logistics business area. Top management support and perceived benefits are positively related to all business areas ($p < 0.001$). Competitive pressure is positively related to all business areas ($p < 0.001$), except for marketing. Attitude toward change is negatively and statistically significant in the following regressions: human resources ($p < 0.001$), finance ($p < 0.001$), logistics ($p < 0.001$); contrarily, this variable is statistically significant for sales regression ($p < 0.001$). Finally, technology readiness and regulatory environment are not statistically significant for any business area.

Table 6 summarizes the hypotheses tested. Several hypotheses are supported: H1 for human resources, finance, and logistics; H2 for finance, logistics, and sales; H4 only for logistics; H5 and H6 for all business areas; and H7 for all business areas, except marketing. H9 is only supported for the sales business area. On the other hand, only two hypotheses are not supported for any business area (H3 and H8).

In the next section, discussion is based on the results of Table 6.

6 Discussion

The study identified the determinants of ISO adoption in different business areas, such as human resources, finance, logistics, sales, and marketing. Because ISO is an umbrella term that includes a range of sourcing options, we offer e-business recommendations and suggest how to use them, along with ideas for further research.

Based on the results of the study and the organizational context, we can recommend that implementation of decision making on ISO include top management support and emphasize perceived benefits (H5 and H6). These two are statistically significant facilitators for ISO adoption in all business areas. In addition, these findings are supported in literature (Cho 2006; Lee 2009; Pan and Jang 2008). These two factors are, therefore, the basis for the adoption of ISO, and all types of sourcing that are associated with it. Firms must perceive the clear and tangible benefits to adopt (Cho 2006), as the adoption of new technologies requires top management support (Lee 2009; Pan and Jang 2008). Secondly, and similarly noteworthy as determining factors, are the finance and sales business area. Using these factors could better position the providers of such solutions when submitting their offer(s), and we recommend that a similar methodology be applied for both areas. However, despite the similarities observed, substantial differences exist between the determinants when comparing the different business areas. We, therefore, recommend that managers, decision-makers, and future researchers apply the following determinants for each business area.

For the human resources business area, we suggest that top management support, perceived benefits, and competitive pressure be used in evaluating ISO. Perceived benefits are positively related with innovation adoption (Beatty et al. 2001), as well as top management support (Lee and Kim 2007) and competitive pressure (Wang et al. 2010). Complexity and attitude toward change were found to be statistically significant inhibitors because they affect ISO adoption negatively. This is an area that is very sensitive to business, as it has direct implications on employees, where a simple mistake could destabilize the normal function of company activity. Hence, the management of all processes between the supplier and the firm must be clear and simple in order to mitigate the risk of error. The attitude toward change will have a negative impact on the human resources business area, contrarily to what we had said initially. Also, firms see in the outsourcing of this business area a way to improve themselves, and focus on their core business. Complexity is negatively corroborated by earlier studies (Chau and Tam 1997; Low et al. 2011), as well as an attitude toward change (Illegems et al. 2001).

In finance and logistics business areas, we suggest that complexity, relative advantage, top management support, perceived benefits, competitive pressure, and attitude toward change be used in evaluating ISO. These variables have opposite effects, i.e., complexity and attitude toward change are inhibitors and top management support, perceived benefits, competitive pressure, and relative advantage are facilitators. Relative advantage significance was reported in earlier studies

(Li 2008), as well as the remaining factors, which were presented above. Despite the similarity, there is a difference with respect to the influence of firm size that is only statistically significant in the logistics business area. Earlier studies found that firm size facilitates innovation (Cho 2006). These findings indicate that managers for both business areas must apply practically the same methodology, taking into account the differences indicated above.

In the sales business area, we suggest that relative advantage, top management support, perceived benefits, competitive pressure, and attitude toward change be used in evaluating ISO. All these findings have literature support, as presented earlier. The fact that attitude toward change is positively significant in only the sales area could be related to the fact that this business area is more dedicated to outside actors (customers), and thus the individual characteristics assume a major role in the sales business area. This finding is very useful for suppliers, as they may focus their efforts on the individual (leader) characteristics and increase their chances of success.

The marketing business area was found to have the smallest set of determinants of all. We suggest that top management support and perceived benefits be used in evaluating ISO. The literature support for these findings was presented earlier. One possible explanation for this finding could be more restricted offers and knowledge about ISO in this particular area. Thus, it is important for suppliers to provide more solutions of this kind for this business area.

7 Theoretical Implications

In other studies about the adoption of ISO, the comparisons between business areas are missing. Thus, this chapter offers recommendations for areas of business when applying analysis of the value of ISO. As the rates of ISO adoption were lower than expected in the past, it is very important to understand the factors that affect it. As a result, business managers and decision makers may apply balanced perceptions of ISO in different areas and decrease, increase, maintain, or invert the situation. Based on the conjunction of the TOE framework (Tornatzky and Fleischer 1990), and the DOI theory (Rogers 1995), we offer our newly developed model for research to study the determinants of ISO adoption across the different business areas of firms. To the best of our knowledge, this study is one of the first to examine the adoption of ISO comparing the different business areas and using the combination of the two models. Despite the importance of all contexts not taking place in each business area alone, in general we found importance for all contexts. Although we found differences in the importance of drivers for ISO adoption in the different business areas, managers, decision makers, and researchers can apply appropriate forms of analysis of ISO using all H1–H9 areas respectively, except H3.

8 Conclusions

In recent years technology has continued to enable new sourcing models of ISO—such as application service provision (ASP), business process outsourcing (BPO), and cloud computing (Lacity et al. 2009; Lacity et al. 2010). However, the value rates of ISO in Portugal are still lower compared to the European average (IDC 2006), and in order to promote ISO adoption, it is essential to clarify the factors that explain this adoption, and make a deep analysis to see if different business areas have the same drivers.

In this handbook chapter, we propose a conceptual model with nine determinants for the adoption of ISO. We empirically tested our model in five business areas (human resources, finance, logistics, sales, and marketing). In general, our hypotheses are confirmed. Thus, our research model seems appropriate. Through the comparison of different business areas, we can see the statistically significant differences between them, as well as their similarities. Notably, top management support and perceived benefits are important factors in all business areas. Also, there is a clear similarity between the factors that affect the adoption of financial and logistics business area. Moreover, technology readiness and regulatory environment have no significance for the adoption of each business area. This means that it does not matter how well a firm is provided with information systems infrastructure and individual experts when making a decision on ISO adoption in the different business areas. Also, the rules imposed by business regulators are not sufficiently difficult to perform for a company to negate the adoption of ISO in the several business areas.

9 Limitations and Future Studies

The research supporting the use of the merged model is limited in some ways. Firstly, it is based on data from a single country, and the findings, therefore, may not seem sufficient to the entire international business community. To solve this limitation, future research might extend the study to other countries. Secondly, the study analysed only the adoption decisions, so for a better comprehension of ISO, it is suggested that future research focus on the stages of post-adoption, in particular the use and impact. Thirdly, for the study of the proposed model, the variables included in our team's view best pertained to the subject under study. However, for future research and implementation by managers, we recommend adding other variables in order to improve the understanding of the topic. Fourthly, since the studied term covered a variety of sourcing options, we encourage future, confirmatory studies of the model that can be applied in a more focused way to every type of IT adoption covered. Finally, in future research new sampling and analysis might be used to validate our model, such as analysing comparative samples between two specific types of industry.

In summary, the procedures to follow to implement the model are:

Step 1. *Provide top management with the need to outsource.* Give all the information that will help them realize the need for outsourcing of information systems. Naturally, when one intends to carry out this change, it is always for a better and a more innovative solution, justifying the change. But what often happens is that the top management is not sensitive to the current difficulties in the management of processes by their employees with current systems. And so they ask themselves: why change when the work appears done? Hence, there is a need to explain the current difficulties and that there may be benefits in terms of efficiency if the existing information systems are switched to outsourcing.

Step 2. *Formulate a comparative list of all the benefits offered by potential suppliers.* There are many solutions, and they differ. It is, therefore, important to choose the solution that meets the real needs of your company. This will be important in terms of process management efficiency and costs savings for the outsourcing solution.

Step 3. *See what your competitors do.* The best way to implement a successful outsourcing solution is to analyse what your competitors do. Given the difficulty inherent in this analysis, the best approach is to examine potential suppliers with outsourcing solutions already in place with your competitors and from there extract the best practices.

Step 4. *Analyse the degree of innovation* that outsourcing could lead to compared with existing systems, as well as the degree of complexity in its implementation.

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