The adequacy of an inter-organizational information system model for domotics service innovation in the building sector

Adecuación de un modelo de sistema de información interorganizacional para la innovación de servicios domóticos en el sector de la edificación

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Abstract: The flexibility of SMEs that largely constitute the building sector is one of the key elements to enable the building industry to address the financial crisis that began in 2007. Therefore, in order to achieve a recovery in the sector, this study based on empirical research analyzes the factors that allow adaptation of interorganizational information systems (IOIS) for domotics service innovation in the building sector. The main findings from this study allow us to conclude four ways in which the IOIS might contribute to service innovation in the building sector. The final purpose is to improve management in the interrelations between different agents to undertake more complex building projects, contributing in particular to improve the quality of housing.

Keywords: building, IOIS, ICT, service innovation, domotics services.

Resumen: La flexibilidad de las PYMEs que mayoritariamente componen el sector de la edificación es uno de los elementos claves que le está permitiendo al sector soportar la crisis financiera iniciada en 2007. Por ello, con el fin de lograr una recuperación en el sector, este estudio basado en un trabajo de investigación empírico analiza los factores que permiten la adecuación de los sistemas de información interorganizacionales (SIIO) para la innovación de servicios domóticos en el sector de la edificación. El objetivo último es mejorar la gestión de las interrelaciones entre empresas para llevar a cabo proyectos de construcción más complejos.

Palabras clave: sector de la edificación, SIIO, TIC, innovación de servicios, domótica.

Introduction

The building sector is one of the main sectors of activity and potential employment generation in the EU. The Europe 2020 strategy considers this sector, comprised of SMEs in a 99,9%, as a target sector for economic growth. The sector has experienced a significant decline in recent years as a result of the financial crisis that began in 2007, a drop that is accompanied by a low penetration of ICT into business processes oriented to interrelationship with other companies, even though access to broadband networks has increased from 40% in 2004 to nearly 80% in 2009 (Ecorys, 2008).

This shrinkage of the market has slowed down the pace of the building sector, which has been kept, in part, by the flexibility of many SMEs that have managed to specialize in building small houses, restorations or comprehensive reforms (BIC-GALICIA, 2010). This specialization is an example of innovation in services through the implementation of processes

adapted to the new market demands (Gann and Salter, 2000; Miles, 1993); and this innovation is linked to both the internal restructuring and the use of new technologies at home, and it appears to be a significant commitment to implement home automation in homes and to improve facilities, as well as to use renewable energy and geothermal materials, which are identified as key issues for the sustained recovery of the sector (Cinza-Cabarcos, 2008).

To enhance this recovery through service innovation we need, now more than ever, more efficient management systems and comprehensive management models of supply chains to overcome, through ICT, outdated supply chains for co-operation environments where information between organizations may be easily exchanged (Kubicki et al., 2009; Carbonell-Ureña, 2011). Therefore, there is a clear trend in the building sector to improve information management as a tool to optimize resources. In this sense, there are proposals for e-commerce systems oriented to collaboration and exchange of information associa-

ted with the project (Yeung et al., 2009), proposals for supply chain management systems through B2B Marketplaces (Carbonell-Ureña, 2011; Castro-Lacouture et al., 2007; White et al. 2007; Chung et al., 2009), and proposed systems for information management information and support at home, such as BIM technology (*Building Information Modeling*), IFC format (*Industry Foundation Classes*) and its association with CAD systems (Jeong et al. 2009; Shin et al., 2008; Vanlande et al., 2008).

This paper analyzes the adequacy of an inter-organizational information system (IOIS) model for domotics service innovation in the building sector. The concept of IOIS responds to the general idea of a collaborative system of supply chain management that allows information management and flow between agents (Hu et al., 2011). The IOIS fosters collaboration and specialization of agents, and provides a more interactive project monitoring tool, offering, thus, a suitable framework for service innovation in the sector (Kyung et al., 2011).

I. Theoretical framework, hypothesis formulation and proposed model

Inter-organizational relations are increasingly becoming more and more important, involving a larger number of organizations of different nature. Cooperation is one of the most dynamic ways to achieve the critical mass necessary for SMEs, despite its relatively small size, so that they can be more competitive and, integrated with technological networks, ac-

cess foreign markets at a reasonable cost. (Kvinauskaitė et al., 2006).

Current information systems have reached a high degree of adoption for internal processes in companies, as well as for information exchanges with other companies, which has led to the emergence of inter-organizational information systems (IOIS) (Orero-Giménez and Criado-Fernández, 1999). This approach leads us to formulate the following research question: *which characteristics must one IOIS meet in order to be adequate for enabling domotics service innovation in the building sector?*

The IOIS adequacy proposal from this research is grounded on two different but complementary approaches, which will be discussed in the following sections: first, the IOIS can be analyzed according to four dimensions -strategic, collaborative, organizational and technological (Orero-Giménez and Criado-Fernández, 1999)-; but it also may be considered under den Hertog's (2000) model for service innovation, which also identifies four dimensions or areas -service concept, client interface, service delivery system and technological options-.

I.1. The IOIS characterization model

Orero-Giménez and Criado-Fernández (1999) developed a model to characterize how an IOIS allows participant enterprises to develop competitive advantages.

Figure 1
The IOIS characterization model

As shown in Figure 1, the IOIS is characterized by how the enterprise performs on a set of features grouped into four dimensions:

- *Strategic dimension (STG)*: it considers the IOIS as a source of competitive advantage, and is related to new value proposition for services.
- *Collaborative dimension (COL)*: it fosters the creation of communication channels between companies –suppliers and customers– and the extension of the business value chain to larger geographic areas.
- *Organizational dimension (ORG)*: it considers the degree to which the IOIS can be represented as a “global organization”, including interdependencies among participants.
- *Technological dimension (TEC)*: it is related to the features of the information and communication technologies (ICT) enabling to achieve greater efficiency of information processing.

1.2. The dimensional model of service innovation

A service organization needs to constantly revisit how it will create and deliver value to its customers to remain competitive. Therefore, in today's world it is absolutely critical for most organizations to innovate, as that is how they may create sustainable competitive advantages. Den Hertog (2000) identifies four dimensions of service innovation to sustain

competitive advantages in an enterprise, as shown in Figure 2:

- *Service concept*: it refers to a service concept that is new to its particular market, i.e., the content and characteristics of the new or renewed service. The characteristics of existing and competing services cause firms to make adjustments in the service concept *strategy*.
- *Client interface*: it considers innovation in the interface between the service provider and its customers. Often, the characteristics and desires of existing and potential clients and *collaborators* tempt a service company to make adjustments in the client interface.
- *Service delivery system*: it is related to the link between the service provider and its client, since delivery does involve an interaction between participant organizations across this interface. It refers to the internal *organizational* arrangements that have to be managed to allow service workers to perform their job properly, and to develop and offer innovative services.
- *Technological options*: it fosters the use of ICT to allow for greater efficiency and effectiveness in the service-related information-processing elements.

Therefore, *enterprise service innovation (ESI)* can be defined as a perceived improvement, which involves

Figure 2
The dimensional model of service innovation

the combination of these four dimensions, in order to sustain competitive advantages in an organization.

1.3. Research model design

In this research, we propose an IOIS adequacy model for domotics service innovation in the building sector. This model is constructed by the identification between the dimensions of the IOIS characterization model and the dimensions of the den Hertog's model, as shown in Figure 3:

- The *strategic dimension* of the IOIS is related to the ability of the IOIS to provide production factors to the participating enterprises (i.e., material, human and intangible resources), and the approach to improve the value proposition for a service in the market (i.e., more or less specialized, and oriented to quality improvement and savings cost).
- The *collaborative dimension* fosters communication channels between enterprises -suppliers and customers- allowing a greater involvement for improving provision of services. ICT use in cooperation has succeeded in reducing distances and increasing interdependencies between geographically remote areas, extending the business value chain to larger geographic areas. Therefore, the collaborative dimension attends to the fact that the relationship is geographically dispersed at national or, even, global level; it allows, then, accessing to markets and environments which otherwise would be unreachable.
- The *organizational dimension* considers the IOIS from the perspective of a global organization and characterizes interdependencies between partici-

pants. This dimension refers to the link between suppliers and customers within the IOIS being, precisely, the internal organization of IOIS which allows more complex service delivery to its customers. Therefore, the organizational dimension refers to the aspects related to teamwork capabilities and interorganizational learning ability or knowledge transfer, which give participating organizations advantages of flexibility and organizational efficiency.

- The *technological dimension* characterizes the features of the technologies required for the implementation of the IOIS, refers to the level and quality of information available and includes aspects related to information accessibility, reliability and ease of acquisition, degree of use of electronic systems, ease of use and speed of access to remote locations, systematization of information channels, etc.

The research model will thus analyze which IOIS features and dimensions are considered most important to *enterprise service innovation (ESI)*. These features could foster SME's domotics service innovation in the building sector through the implementation of processes adapted to new market demands and supported by the IOIS. The relations between the IOIS dimensions and the *ESI* involve the formulation of four research hypotheses:

- *H1: Strategic factors (STG) in an IOIS enhance the adequacy for service innovation (STG→ESI)*
- *H2: Collaborative factors (COL) in an IOIS improve the adequacy for service innovation (COL→ESI)*
- *H3: Organizational factors (ORG) in an IOIS favor the adequacy for service innovation (ORG→ESI)*

Figure 3
Research model

- *H4: Technological factors (TEC) in an IOIS increase the adequacy for service innovation (TEC→ESI)*

2. Research methodology and results

The four hypotheses formulated in the previous sections involve structural relationships of the research model for the analysis of the factors that contribute to the suitability of an IOIS for domotics service innovation in the building sector.

Specifically, we design a model that allows us to analyze the adequacy of IOIS for domotics service innovation in the building sector; and that would consist of one endogenous construct (*ESI*) and four exogenous constructs (*STG*, *COL*, *ORG* and *TEC*). After depuration of indicators, we obtain a PLS research model with four exogenous constructs, one endogenous construct and 14 indicators (Figure 4).

Figure 4
PLS research model

The research model was empirically tested using PLS (Partial Least Squares) technique (Cepeda-Carrión and Roldán-Salgueiro, 2005). The software tool used for this analysis was SmartPLS 2.0M3 (Ringle et al., 2005).

2.1. Research work and longitudinal study

For hypotheses testing and research model analysis, we designed a longitudinal study during four consecutive years. In this type of longitudinal study, the evaluation of indicators is applied to the same population for several years, in order to measure changes in response between the segments (cohorts) of the population. The segments studied are the different

types of agents that constitute the domotics building sector: developers, designers, contractors, builders and domotics integrators.

Samples were randomly selected from companies in the province of A Coruña (Spain). The number of samples representing each type of agent was proportional to their number in the overall population –sample sizes are shown in Table I below–, and representativeness of the sample during the different years was assured with a confidence level of 95 percent, and a maximum error level of 10 percent. A questionnaire was distributed to each company by means of a personal interview to CEOs and IT managers. The questionnaire adapted items from the virtuality analysis model (Criado-Fernández, 2000) to the building sector and consists of 14 Likert-5 questions.

Table I
Research work sizing

Year	Interview range	Sample
2006	August – September	124
2007	August – October	133
2008	September – October	140
2009	March – April	142

Sampling characteristics: confidence level = 95%, maximum error level = 10%, $p=q=0.5$

Sampling size has been determined to satisfy the minimum number of samples required to apply the technique PLS, which is determined –as a rule of thumb– by multiplying by 10 the maximum number of latent variables and training indicators towards a construct or the maximum number of structural paths toward a endogenous construct (i.e., the more complex regression) (Chin, 1998).

2.2. Measurement model assessment

The evaluation of the measurement model using PLS technique allows us to obtain information on the reliability of the items through the factor loadings of the indicators of the latent variables, the reliability of the constructs and the convergent and discriminant validity of the model.

Item reliability was assessed through observation of the standardized loadings of the latent variable indi-

cators, all of which were considered of a reflective nature. As shown in Table 2, all items have a factor loading (λ) higher than the 0.70 threshold value, as determined by Nunnally (1978). Convergent validity assessment consisted on the analysis of the constructs' composite reliability (ρ_c) and average variance extracted (AVE). Values obtained were superior to 0.85 and 0.50, respectively, higher than the limit values of 0.7 and 0.5 (Hair et al., 1998; Fornell and Larcker, 1981).

Discriminant validity was tested comparing the square root of AVE with the bivariate correlations between constructs, as recommended by Gefen and Straub (2005). As shown in Table 3, we checked that the square root of the AVE was higher than all the bivariate correlations between each construct and the rest of constructs, which assures that the indicators are correctly measuring their correspondent construct and not the others.

2.3. Temporal stability

To examine temporal stability for this longitudinal study, test-retest score reliability coefficients were calculated for each of the subsequent years (Campbell and Stanley, 1966). The test-retest score is an index of

temporal stability that can be calculated using Pearson's correlation coefficient over the model items.

Table 3
Discriminant validity

	ESI	COL	STG	ORG	TEC
ESI	(0.890)				
COL	-0.586	(0.878)			
STG	0.616	-0.340	(0.822)		
ORG	0.627	-0.590	0.378	(0.909)	
TEC	0.427	-0.255	0.382	0.598	(0.845)

Table 4
Temporal stability of the model

Year	2006	2007	2008	2009
$r_{\text{test, retest}}$	test	0.88	0.75	0.74

As shown in Table 4, test-retest scores ($r_{\text{test, retest}}$) range between 0.88 and 0.74. This is a very good temporal reliability for a four-year longitudinal study, so we can affirm the temporal stability of the model.

Table 2
Reliability of individual items and constructs and convergent validity

Construct	Indicator	Loads (λ)	Reliability (ρ_c)	AVE
ESI – Enterprise Service Innovation			0.9381	0.7928
	ESI1 – Improve delivery	0.7426		
	ESI2 – Improve products time to market	0.9127		
	ESI3 – Improve organizational flexibility	0.9497		
	ESI4 – Improve cost savings	0.9405		
STG – IOIS' strategic dimension			0.8620	0.6759
	STG1 – New technology assessment	0.8103		
	STG2 – Decentralized decision	0.8624		
	STG3 – Collective learning	0.7920		
COL – IOIS' collaborative dimension			0.8692	0.7701
	COL1 – National market relationship	0.7938		
	COL2 – Global market relationship	0.9540		
ORG – IOIS' organizational dimension			0.9048	0.8262
	ORG1 – Continuous improvement	0.9104		
	ORG2 – Business objectives search	0.9075		
TEC – IOIS' technological dimension			0.8820	0.7137
	TEC1 – Information standardization	0.8126		
	TEC2 – Information proximity	0.8447		
	TEC3 – Handling scattered information	0.8760		

2.4. Structural model assessment

The assessment of the structural model provides information about the amount of construct variance explained by the predictor variables. It also shows the structural path coefficients and their statistical significance. Signification of interaction effects and main effects was analyzed through a bootstrap re-sampling procedure with 500 subsamples. Table 5 shows these results along the longitudinal study.

The analysis of the structural model showed significant paths (β) –most at the $p < 0.001$ level sustained over the whole longitudinal study– for the relations: $STG \rightarrow ESI$, $COL \rightarrow ESI$ and $ORG \rightarrow ESI$. It must be noted that $TEC \rightarrow ESI$ was non-significant. From the observation of path coefficients (β), all significant paths had positive values over 0.2, except for the $COL \rightarrow ESI$ relation, which was significant but with negative sign.

With regards to explained variance (R^2) values, the model offers a good explanation of ESI , with values from 60 to 82 percent of variance explained by the factors considered over the four-year longitudinal study.

Predictive relevance of the model was also tested through a Stone-Geisser's (Q^2) test using a blindfolding procedure with a distance omission of 7. All cross-validated redundancy measures were positive for all years -ranging between 0.44 and 0.61- and, therefore, we can state that the model has predictive relevance.

The main results from the analysis of the research model relations are:

- *Enterprise service innovation: $STG \rightarrow ESI$ and $ORG \rightarrow ESI$* are sustained over the longitudinal study, so hypotheses H1 and H3 are accepted. Therefore, the IOIS

features contributing to service innovation are, mostly, strategic and organizational.

- *Collaborative IOIS features: $COL \rightarrow ESI$* is significant but negative, rejecting hypothesis H2, and therefore the collaborative IOIS features contribute negatively to service innovation.
- *Technological IOIS features: $TEC \rightarrow ESI$* is non-significant, rejecting hypothesis H4; thus, ICT are not perceived as source of service innovation to the SMEs in the building sector.

The structural model validation has led to verify two research hypotheses and to reject another two, with this verification being sustained over time. In the following section we discuss these results.

3. Discussion of obtained results

In the introduction to this study, we highlighted the importance of the building sector in the European economy, with the recovery of this sector being one of the objectives of the eEurope 2020 strategy. Also, we mentioned that this was a very traditional industry in which, although connectivity through broadband networks had been improved, ICTs are not generally used for coordination and collaboration purposes. Despite this fact, papers published in the recent years have focused on proposing technological improvements, generally linked to information systems. However, one of the biggest advantages that have allowed some "survival" of companies in the sector in recent times comes from the existence of many SMEs, which have a very important characteristic in times where markets are adverse: flexibility.

In view of the results, the proposed research model allows us to analyze what are the factors that con-

Table 5
Hypotheses' testing and model's predictive relevance

Relationship			2006	2007	2008	2009
ESI		R^2	0.6027	0.8191	0.7862	0.7334
		Q^2	0.4375	0.6090	0.5055	0.4953
H1 :	$STG \rightarrow ESI$	β	0.402 ***	0.583 ***	0.574 ***	0.598 ***
H2 :	$COL \rightarrow ESI$	β	-0.263 ***	-0.265 ***	-0.280 ***	-0.222 ***
H3 :	$ORG \rightarrow ESI$	β	0.305 **	0.272 ***	0.241 ***	0.265 ***
H4 :	$TEC \rightarrow ESI$	β	0.024 (n.s.)	-0.001 (n.s.)	-0.017 (n.s.)	0.030 (n.s.)

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ significance level based on a one-tailed $t_{(499)}$ -Student

tribute most to service innovation by SMEs in the building sector. Therefore, in this work, instead of proposing technological improvements, we have focused on assessing the adequacy of an IOIS as an enabler of service innovation.

3.1. Enterprise service innovation

This research has revealed evidence for considering that an IOIS is suitable for achieving competitive advantage by providing participating organizations new production factors to define a new value proposition to its services. This aspect is consistent with results obtained by other studies (Carbonell-Ureña, 2011; Orero-Giménez and Criado-Fernández, 1999).

Therefore, it is important that domotics services innovation is driven by factors of a strategic nature, with potential benefits for participating organizations in the construction sector, as shown in Table 6.

Table 6
Potential benefits of service innovation in building sector

Agent	Potential benefits
Promoters	Improving project efficiency Reducing costs and error chances Comprehension of the development process
Designers	Improving communication, time savings Increase speed and accuracy of specifications
Contractors	Low costs of administration and communication Offer and achievement efficiency Time savings More project control and security Reaffirms project communication
Builders	Low inventory and real estate costs Low customer service costs
Domotics integrators	Reduce channel costs Improved access to information Profitability purchase access to active and customer specifications

Furthermore, findings from this research have also shown that an IOIS empower inter-organizational working groups, through a link between suppliers and customers within the IOIS, which enhances inter-organizational learning and organizational flexibility. This confirms prior research by different authors who analyzed virtual consortia systems (Kerridge et al., 2000) or organizational improvement through value

chain (Castro-Lacouture et al., 2007; Chung et al., 2009), which are particular cases of an IOIS in building sector. Similarly, organizational flexibility provided by the IOIS promotes domotics service innovation and allows cooperation from different vendors with complementary capabilities to offer more sophisticated services tailored to their customers' needs. This idea is related to the concept of "netchain" exposed by Capó-Vicedo et al. (2009), integrating the analysis of supply chain networks by allowing the simultaneous study of all types of interdependencies, sources of value, and coordination mechanisms. This model fits perfectly with SMEs characteristics.

3.2. The collaborative IOIS features

The collaborative IOIS features were found to contribute negatively to service innovation by SMEs in the building sector. Therefore, IOIS is not a factor which enhances domotics service innovation with regard to cooperation between companies of the building sector which are located in dispersed geographic locations; in fact, it has the opposite effect. The collaborative aspects, which are key issues when proposing supply chain management systems, collide with previous research in this field in which collaboration was taken for granted as a driver for improvement (Yeung, et al., 2009).

One possible interpretation is that these relationships have traditionally been based on trust and interpersonal –and physical– collaboration; thus, the introduction of an IOIS as a mediation agent, may be perceived as an external agent which weakens the past existing link between agents. Then, since traditionally these relationships in the building sector have been based on trust and collaboration interpersonal mediated through an IOIS, the IOIS could be perceived as a threat that could eventually wipe the key link that has existed between the agents in the past, in addition to encourage market entry of competitors outside the circle of trust.

There are some studies that introduce the idea that unfavorable relationships that often exist among trading partners, from a practical viewpoint, make IOIS adoption difficult (Ham and Johnston, 2007). However, this finding does not only refer to punctual unfavorable relationships. In particular, SMEs in building sector only collaborate with well-known partners, often in long-term business relations. According to Fernández-Cardador et al. (2012), the most influential factor in collaborative behavior is the existence of common goals, which highlights the importance of

identifying an initial set of participants to keep common objectives or goals.

The main practical consequence is that SMEs in the building sector are very reluctant to introduce innovations which alter the relations between the service provider and potential customers. According to den Hertog (2000), service delivery system is a dimension that SMEs in the building sector will try to keep unaltered in order to maintain the traditional links with providers and customers. Therefore, SMEs perceive the IOIS to enhance service delivery system only in already consolidated customer-supplier relationships. And so, we can affirm that SMEs do not perceive the IOIS as an enabler to build new customer-supplier relationships.

3.3. The technological IOIS features

Technological IOIS features -i.e. ICT- are not perceived as source of service innovation to the SMEs in the building sector. Therefore, there is no clear evidence that the IOIS allows improving the quality of the information available in the building sector.

This finding may be an important cause of the low penetration of ICTs in inter-organizational-oriented business processes in this sector, as mentioned in the introduction of this paper (Ecorys, 2008). According to this report, SMEs do not perceive ICT's potential for innovation in services, mainly due to two reasons: low-development of e-skills and limitations in high-speed broadband Internet access. The major problem of these shortcomings lies not only on the low degree of development, but in the disparity of its development caused by territorial, cultural and social differences. To address this, the EU has taken a number of initiatives aimed at updating ICT-related skills, including training on how to embrace emerging technologies.

Information technologies can help reduce costs, enable more efficient development processes and bring products to market more quickly than in the past (Chung, et al., 2009). According to Den Hertog (2000), the technological options are involved in the majority of service innovations.

The principal practical consequence of this finding is that SMEs in the building sector have an important lack in technological innovation. Therefore, ICT skills are a very important as a source of possible competitive advantages for SMEs in building sector. New information technology is especially important to services, since it allows for greater efficiency and effectiveness in the information-processing elements.

Conclusions

The current environment of competition leads firms to seek new ways to compete. The IOIS is also an option in this regard, as it allows to increase the traditional boundaries of the organization surpassing natural barriers between different companies and allowing the creation of a link to move from a state of competitive advantage to collaborative advantage.

This study assesses the factors influencing adequacy of an IOIS for domotics service innovation in the SMEs in the building sector in order to sustain competitive advantages. In this sense, the study allows us to conclude four ways in which the IOIS might contribute to service innovation:

- a) *Defining a specific market where SMEs can develop new service concepts.* Productive resources (material, human and intangible) that the IOIS provides, and the way they work, are considered by companies as an important source of competitive advantages which allow participating organizations develop a new value proposition to services offered to other participating companies in a specific new market.
- b) *Enhancing service delivery system in long-time consolidated customer-supplier relationships.* Firms in the building sector do not consider IOIS potential to foster collaboration in conditions of geographical dispersion, which causes some opposition to their participation in the IOIS instead. That is, companies see geographical proximity as a necessary aspect of organizational efficiency; the IOIS does not overcome this issue because, traditionally, these relationships are based on trust and inter-personal collaboration, so then the collaboration through an IOIS should preserve this relation.
- c) *Improving client interfaces, and therefore the linkage between the service provider and the final client.* The IOIS can empower teamwork and knowledge transfer among participating companies. This stands for organizational flexibility and efficiency mediated by the existence of inter-organizational working groups, through a link between suppliers and customers within the IOIS.
- d) *Introducing technological options to allow for greater efficiency and effectiveness in the information-processing elements.* Companies in building sector are very reluctant to the use of ICT and do not consider the information as a strategic asset to

improve organizational efficiency. Therefore, ICT skills could be further developed in the sector:

This exploratory work also opens interesting lines of action and future work. One of them is the study of how interactions between different cultures and customs for a particular type of agent may influence the incorporation of this agent to the IOIS. Especially, we emphasize that it would be necessary to find solutions and cooperation mechanisms for companies in the building sector, considering the entry of competitors located in dispersed geographic locations as a positive aspect for innovation in services and not as threat that could destroy a traditional relation. The current situation motivates the sector, more than ever, to seek and find areas for improvement, even at the cost of extending the traditional circles of interpersonal trust (Kyung et al., 2011; Madlberger, 2008).

On the downside, the main limitation of the study is that it is confined to the province of A Coruña, and therefore cultural and social biases may be present. Its extension to a larger territory is not immediate, although segments share are similar in other parts of Spain. The extension of this research to a supranational level is even more complex and would require a similar study with a well-defined purpose.

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