

International Performance and Innovation in Services: Preliminary Findings from Logistical and Engineering Consultancy Services

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Abstract

This research aims to explore the relationship between service innovation and international development of service firms. Therefore a theoretical model is tested with the purpose of explaining how firms achieve international performance. Data from a specific survey answered by 51 top managers of business service firms are analyzed using the Partial Least Squares method. The result shows that service innovation does play a significant role in international performance but far less than international experience. Symmetrically, international competence of the firm's personnel enhances innovative behavior. The ability to use ICT appears also to be a powerful driver for both strategies.

Keywords: service innovation, service internationalization, international performance, information and communication technology (ICT)

1. Introduction

This research tries to put some light on the barely studied relationship between innovation and internationalization in the service sector. Many research found innovation, and more specifically product innovation, to be an important factor in explaining entry and success in export markets: successful innovation may push productivity or help to find a greater demand in foreign countries. However this relationship has to be verified for service activities: do innovation and international capacity combine together, allowing a service company to achieve high performance in international markets? Reversely, the international development of a service firm may act as a powerful driver of its innovative process. Information and communication technology (ICT) has also to be taken into account as it plays an important role for services and may simultaneously influence the company's innovation and its internationalization.

The different paths by which innovation process and international development are linked in internationalized business services are described by a theoretical model which is empirically tested on a sample of 51 business service companies. The weight of different determinants, including innovation, on the international performance of service companies can so be compared. The conceptual framework has first to be investigated because the linkages between innovation and internationalization have been rarely studied in services. The second part describes the key variables, the theoretical model and some methodological aspects of our survey. The last section provides the results of the empirical analysis and discusses the main findings as well as the conclusions and the managerial implications that can be drawn.

2. Conceptual Framework

As stated by Prahalad and Bettis (1986), firms rarely conduct two strategies simultaneously because this would come up against the logic of efficiency in resource allocation. This is a very widely spread behavior that can also be observed in manufacturing SMEs (Léo, 1987): firms do choose one main axis for their development. This alone could explain why the researchers remain reluctant to study relationships between these two strategies.

However, this strategic behavior doesn't imply that actions or operations on any other axis should be completely excluded. Moreover, thoroughly developing a specific strategy may open opportunities in other fields that may be seized by the manager if he is convinced they are profitable and compatible with his main strategy. Furthermore, in the manufacturing sector the works of Vernon (1966, 1979) have for long highlighted the existing links between the product life cycle and the internationalization process; numerous research works have since stated that innovation is quite a prerequisite for successfully exporting products. Indeed, the research gap affects service activities. The main reason probably lies in their specific context: innovation in services is perceived as a complex question and it is also the case for service internationalization. Complexity may therefore rise seriously when analyzing their relationships.

2.1 Innovation in Service Activities

Service innovation analysis is developing in complexity and thoroughness since the inversed product life-cycle model (Barras, 1986) and the technological trajectories (Soete & Miozzo, 1990). These approaches focused on technology, in particular ICT, putting forward its strong link with innovation in services. However these early approaches have been seriously criticized by innovation analysts; as expressed by Faïz Gallouj (1994, 2003) or by Camal and Faïz Gallouj (1996) they seem too deterministic and they clearly omit non-technological trajectories of innovation which may be of rather important for services.

Camal Gallouj (2002) tries to elaborate a service innovation theory and proposes a much broader point of view. Any service can be defined as the simultaneous mobilization of technical characteristics (material or immaterial) and internal (the provider) or external (the client) skills, in order to produce a service with clearly defined characteristics. Innovation can therefore be seen as any change that affects one or several terms of one or several vectors of these characteristics (technical, service) or skills. Changes may take many different forms: evolution or variation, extinction, emergence, association, dissociation, formatting. Innovation is not considered as a result, but as a process leading to modalities of innovation: radical, incremental, improvement, *ad hoc*, recombining or formalization.

This representation of services as vectors of skills and characteristics can be applied to any major questions concerning service dynamics. Unfortunately, it doesn't rank the resources able to generate innovation. Other analysts have identified the resources used for successful innovation: R&D, innovative capability of the personnel, its competence, capability of the firm to well organize its development (departments and networks) or its relational capability that make work together all the elements of the company. For service activities, the question remains open: does a specific resource play the leading role for innovation? What is their respective influence on performance?

2.2 Services International Development

In a sense, according to Gallouj's definition, internationalization could be considered as a specific case of innovation. But such a point of view would be far too reducing because internationalization is not only an innovation for the firm: it has direct and relatively rapid consequences in terms of turnover, operations, costs and benefits (Farrell, 2004. Gottfredson *et al.*, 2005). The main difference with innovation lies in the extent of changes, probably more limited in the case of internationalization because of the quest to cut costs and the risk associated with new markets.

Many years ago, Välinkangas and Lethinen (1994) had already identified the three main strategic axes for international development: standardization, specialization or customization. Standardization often compels the firm to redefine its core service concept even on its home market; but a standardized service will significantly facilitate further international development with a better remote control of the homogeneity and quality of the services delivered. It also favors the pursuit of scale economies, aiming the service at the widest ranging market possible. With specialization the firm seeks to take advantage of one single and unique service, totally differentiated from those of competitors. Customization is akin to adaptation which is a natural way to cope with the differences between local foreign context and domestic market; a correctly adapted service will be more easily assimilated and accepted by foreign clients.

Analyzing the dominant strategy, Philippe and Léo (2010) find that internationalized business services firms are associating two different approaches, customization of services and standardization of procedures: on the one hand, they try to be closer to their clients and adapt their services to each specific context, which leads them to widen the range of services they offer. On the other hand, they seek internal efficiency by the improvement of procedures and often by quality certification.

International development makes firms come to terms with strategic choices in many fields concerning mainly the content of services, the way they are delivered to clients and the organization developed abroad. All may have consequences on service innovation, even if it may probably be through different ways. The positive association between exporting and performance has been explained by learning-by-exporting, a selection mechanism favoring the most internationalized firms: exporters gain greater ability to adapt to changing markets, (Salomon & Shaver, 2005), to adopt new production technologies and enhance productivity (Cassiman & Golovko, 2011).

2.3 Innovation and Internationalization in Services, a Rarely Studied Relationship

A systematic survey of scientific publications issued between 2005 and 2011 (databases used: ABI / Inform Global (ProQuest), Emerald, JSTOR, Sage Journals Online, EBSCO, Oxford Journals, SciELO and Redalyc) and dealing simultaneously with service innovation and service internationalization reveals this huge scientific gap. Although numerous research works are conducted and published on the two fields taken separately, the possible relationships between these two strategies have little interested authors, as far as service firms are concerned. Only few articles (about ten or less) can so be identified as paving the way for this research and most are only indirectly related to this research question.

These selected research works are often aimed to examine how the internationalization process contributes (either directly or indirectly) to the development of innovations in service companies. They draw attention to the international networks developed by exporting service firms and the consequences it has on their innovation potential. Most of other papers are of little interest for this research.

Frenz *et al.* (2005) aimed to identify the relationship between internationalized companies and the propensity to innovate. They first observed that it was mainly the case for firms operating within a larger group. As already stated by Zanfei (2000), to belong to a group leads to a greater potential for innovation, since each member firm may learn about the environment in which other members are operating. More interesting for our problematic, Frenz *et al.* (2005) observe that independent companies can also have the opportunity to learn from different environments and cultures, when operating in different countries, thus impacting positively their innovation potential. Nachum and Zaheer (2005) try to understand why service companies settle abroad even when technology allows easily trading at a distance. They note that all firms don't perceive the distance the same way: search for knowledge or quest for efficiency are the two most important factors taken here into account by service firms. Some seek to establish export platforms with low investment of organizational resources when others try to gain knowledge from the variety of environments offered by international settlements. A similar survey was conducted by Lavie and Miller (2008) which focused on the structural and relational aspects of organizational networks, looking at their immediate impact on the performance of the firm. They identify a learning-by-development process as the best explanation for the relationships they observe.

Martinez-Gomez *et al.* (2010) relate the research works focusing on networks with the ones focusing on strategies. They intend to understand the relationship between globalization or internationalization strategies and the dependence of knowledge intensive service firms on innovation networks. Thus, they highlight the characteristics of internationalized companies conducting innovative actions.

Meliá *et al.* (2010) have collected data from small and medium service companies in the perspective of international entrepreneurship. They intend to demonstrate that innovation speeds up production time and accelerate development process. The results presented by these authors suggest that two different models of internationalization can be found within the service sector: a gradual one and a far more rapid one, which is chosen by more innovative firms.

These articles help to bring more evidence to the research field but remain focused on other questions, namely networks, strategy and resources. Generally speaking, these texts consider innovation as the main initial process for internationalization of continuously innovating companies. However they underline also that this relationship can also be analyzed as a feedback process: operating in different countries, may constantly stimulate innovative activity in service companies. New markets generate more diversity in business activities. The personnel have to deal with a new legal and cultural context: new processes, new ways to contact clients, *etc.* have to be set up and this, in turn, feeds future innovations. The knowledge acquired in international markets often entails reconsidering the resources used and the way services are provided.

3. Theoretical Model and Methodological Aspects

In order to assess the effects that service innovation may have on international development it is worth building a theoretical model specifying the variables and the relationships to be tested. Then the sample from which data are drawn will be briefly presented, as will be the method used to test the model.

3.1 Key Variables

International performance is the variable this research tries to explain. It has to be verified if innovative service firms developing abroad better perform than others in international markets. But innovative behavior is not the only way to obtain good performances abroad: Obviously it also depends on the specific resources the company has developed to be efficient in these markets, namely the international competence of its staff and the advantage given by its international experience which is obtained over time by facing the contrasted environments of various countries. These four variables form the main body of the theoretical model.

As cross effects are expected, linking international resources to innovative activity, other resources contributing to innovation have also to be taken into account: The ability of the firm to well organize its innovative process has been identified as one of the basic resources for innovation, the second one being its ability to well communicate. Lastly a specific competence may play a prominent role for service companies: The capability of using ICT in various applications. ICT indeed is probably the main technological change affecting the services in very various domains, most of them being strategic.

3.1.1 International Performance

The results of the combined resources and advantages will be judged through this variable and it is essential to well assess it, well define what international performance means and how it can be measured. Most of the numerous studies that have given specific answers to this problem were developed in the context of exporting small or medium sized firms and have been extensively analyzed by Luong (2009). Performance is generally observed through the dynamics of international turnover, international profits and geographical extension. It can be evaluated either by calculating ratios based on the firm's accounts or by asking to the top management its own assessment. As anyone could expect, the two measures appear to be quite well correlated in Luong's sample but unfortunately not enough to be synthesized into a single latent variable. The first method should give unbiased evaluations but highly sensitive to exceptional events. The second method takes into account the achievement of the objectives set up by the management (Diamantopoulos & Kakkos, 2007) and should give more stable and considered data.

Moreover service activities performance in international markets is rather hard to calculate using the commonly used accountancy rules: some firms are simply exporting when others have set up subsidiaries abroad; different kinds of non (or shared) equity partners are also used; many international networks use a mix of these settlement's modes and intermediate situations should entail very specific calculations (Léo and Philippe, 2011). In the limited time of a phone interview, the manager's assessment is probably the best evaluation that can be obtained on how the firm is performing on international markets. As for any measure constructed from an expressed opinion, that question was asked in different terms in order to let emerge a latent variable. The items translated in English can be found in Table 2 given in appendix, as it will be for the variables presented next.

3.1.2 International Competence and Experience

According to the resources based theory, international performance depends on specific resources that are more or less available to service firms. Two of them have appeared to us particularly sensible for service firms which are narrowly tied to their human resource: the international competence of their staff and the international experience obtained from long lasting involvement in foreign countries (which is probably more a competitive advantage of the firm than a resource). The competence of the staff dealing with very diverse environments encountered at international level was assessed by the managers for five separate competence fields.

As observed by many authors (Laghzaoui, 2009) the international experience acquired by a firm is poorly evaluated by the geographical extent of its markets or by the duration of its international development. We tried to measure it through direct questions asked at the end of the interview: sentences (given in appendix) were proposed to managers who had to express their degree of agreement on a five points Likert's scale.

3.1.3 Innovative Intensity

Service companies choose different ways to conduct their innovative actions and attain different levels in these processes. Therefore, measuring how far a firm is innovative is a real difficulty. Previous studies often retain upstream indicators, such as existence of a R&D department, importance of R&D expenses (Dib, 2008) or patents; downstream indicators are also in use, such as the share of new products in total sales. These indicators have been severely criticized and the problem increases when dealing with service innovation which covers a much broader field according to Gallouj's approach (2002).

The methodological choice made here is to measure *ex post* innovation through the managers' opinion on what has changed since a couple of years in their company. They were asked to assess the intensity of changes

accomplished during the last three years in eight separate domains based on the classification proposed by Tidd *et al.* (2008) and on Eglie's proposal (2004) to distinguish radical innovations (affecting the core service) from incremental ones (concerning the associated peripheral services). It was also asked to rank the firm among its main competitors from the technological point of view: backward, at the same level or far ahead. Lastly, the share of the general turnover obtained by recently (i.e. since three years) developed service activities was also asked, answers being converted from percentages into a 5 levels scale.

3.1.4 R&D Capability

The mainstream of innovation research points out the R&D department as the main driving force of innovation in service firms. However empirical approaches have shown that the R&D department should not be the only clue of an innovative activity which is often much more lightly organized (as methods-, pilot- or strategic committees). Furthermore, when an R&D department exists in service firms (most of the time in technical consultancy) it plays the role of an externalized department for client companies and doesn't work, strictly speaking, on the renewal of the service concept or on the technology used to deliver quality services (Philippe & Léo, 2010). Nevertheless, the capability to well organize the firm's innovative activity has to be measured. The managers were asked to assess the efficiency of their personnel and of their organization dedicated to innovation from the point of view of their innovative capability.

3.1.5 Relational Capability

Research works on innovation also highlight the prominent role played by fluent communication, either within the company or between the firm and its external stakeholders (clients, suppliers, partners, consulting advisers, and even with possible competitors). Managers were asked to judge their company's efficiency to communicate with different kinds of partners.

3.1.6 ICT Competence

As far as services are concerned, the capability of a firm to use ICT for various purposes should play an important role in innovation as well as in international performance. The managers were asked how they were considering the ability of their firm to use ICT in different domains.

3.2 Theoretical Model

The theoretical model, illustrated in figure 1, is proposed in order to clarify and organize the complexity of the relationship studied here. As such it remains relatively simple. Testing it should allow assessing by which different ways service innovation and internationalization are related. The main hypothesis of this research is that service innovation impacts positively international performance. Many analysts (Bartlett & Ghoshal, 1990; Jeong, 2003) have clearly stated how important the relationship between innovation and internationalization may be for the firms' strategies. Dib (2008) reports that the more innovative are the companies, the more they develop at international level. The first hypothesis (H 1) of the model transcripts this common idea: Innovative intensity should exert a positive influence on the international performance of service companies.

The same authors put also forward that the entry into new markets may induce incremental innovation strategies as well as more radical ones. This 'feedback' relationship is taken into account by the second main hypothesis of the model (H 2). It states that international competence exert a positive influence on service innovative intensity.

As observed by Dosi (1988), new products (or services) are more and more knowledge-intensive. New innovations are demanding more specialized knowledge which becomes more complex and fragmented. Firms with employees able to master the newest technology may hold a technological advantage. Nevertheless they have to set up organizational means, as for example a method committee or an R&D department, in order to concretize their innovative potential. The third hypothesis (H 3) states that R&D capability is positively linked with innovative intensity.

For McGee *et al.* (1995) companies participating in organizational networks increase their technological advantage. According to Fleury and Fleury (2003), these organizational networks, are developed by firms which are more and more internationalized. These networks may be strongly organized and ruled or much more fuzzy, according to each situation and what is judged as the most suitable by the promoters. Nevertheless the usefulness of these networks depends on the capacity of the firm to well communicate with a partner. Therefore the relational capability of a company should have a positive influence on its service innovative intensity (H 4).

The ability to use ICT plays a very peculiar role in this model. It obviously affects positively the relational capability (H 5), as it offers new communication resources which can expand the firm's relationships with all its partners. Furthermore this specific competence may also generate new services, new delivery modes and as such

it should be also a powerful driver for service innovation: Hypothesis (H 6) states that ICT competence directly impacts innovative intensity. According to Kon (2006, p. 53), the competitive pressure entailed by a new technology boosts productivity and capital growth. Mastering a new technology should directly impact the firm's performance. In this research, we propose the hypothesis (H 7): ICT competence exerts also a direct positive influence on the international performance of service companies.

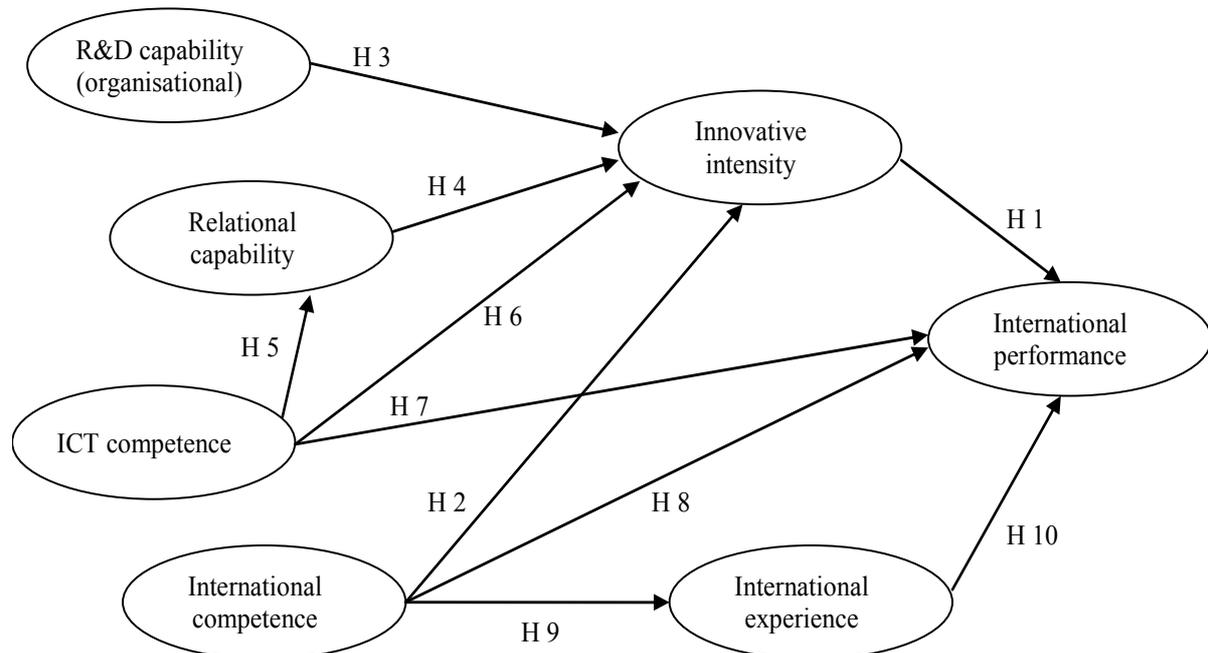


Figure 1. The theoretical model

The lower part of the model as shown in figure 1 is dedicated to better explain international performance. The strategic choice of developing activities abroad and the specific resources devoted to that aim (namely the staff's international know-how) are probably the main cause of international performance and long lasting involvement. The latter is the source of international experience which may be a competitive advantage in foreign markets. Therefore experience should impact positively the international performance of the firm (H 10). The hypothesis (H 8) states that international competence should also directly influence international performance. But that link can also be indirect through international experience: Hypothesis (H 9) states that international competence influences the international experience.

3.3 Questionnaire and Sample

As it is often the case when dealing with enterprises and their strategies, a dedicated survey is necessary to correctly assess their innovations, innovative capabilities, as well as their international performance, resources and assets. A phone questionnaire was set up in order to obtain the wanted information and assessments from firms' head manager after a 10-12 minutes interview. Its first part is aimed at describing and measuring innovation in service activity, and the second part at evaluating international development, performance and assets. Due to the short time of interview, very few questions have free answers. The questionnaire was first submitted to a small sample of people in order to test and verify if every questions were similarly understand and easy to answer. Most of the questions are designed in such a way that the responding person had to give her/his assessment on a five points scale. As much as possible, the wording of items refers to those already used and tested by previous studies on innovation or international development that were found in the literature survey.

A sampling list was set up with the intention of pre-selecting French business service firms which had already developed markets abroad. According to these criteria, the "Altares" data base selected around two thousand firms from which only 807 could be kept for the phoning list as effectively in the suited target. Professional interviewers (Mars-Marketing, Marseille) systematically called them by phone during the months of May and June 2011. 361 contacts were obtained but unfortunately 309 answered negatively arguing they didn't export any

service (271) or claiming they had no international activity at all (38). One answer had also to be deleted as it contained too many missing values.

This left only 51 responses for our study. The 6 per cent overall answering rate is clearly low and can be attributed to the need we had of getting answers from top managers. Nevertheless, these answers can be analyzed, even if any generalization of the observed results should be done very cautiously. The responding firms belong to two main kinds of activities: 28 are transport organizers and 19 are engineering consultants. The very few others are in software engineering, research, management consultancy or operational services but all are selling abroad the same kind of services: logistical or technical studies.

Due to its rather small size, this sample deserves to be a bit more precisely described. 29 firms which answered our questionnaire are independent and small or medium sized. Among the 22 others, 12 are subsidiaries of large corporations. Thus, most interviewed managers have full authority on their enterprise which has a small or medium size.

These companies have been opening to international markets for long and therefore benefit from a serious international experience: only one initiated that strategy less than five years ago and five between five and 10 years. A majority (34) of this sample has developed a delivery network abroad and, among them, 82 per cent with at least one subsidiary. This is not surprising considering the length of their international involvement (Léo *et al.*, 2006). Moreover the choice of the subsidiary form attests the maturity of their international experience: Though the most expensive, it is probably the best suited form for service firms' outlets (Philippe & Léo, 2010). The firms of the sample are also rather deeply involved in international markets: the mean share of international turnover reaches 66 per cent for the 50 firms having given these data. This highly internationalized profile is confirmed by the number of countries where international sales are obtained. With about 16 countries on average, this sample of service firms is widely open to international markets.

3.4 The Partial Least Squares Method

Due to the exploratory context of this research and to the limited size of the sample, the PLS appears to be a well appropriate statistical technique. PLS has been acknowledged to be a robust method (Chin, 1998) which requires very few probabilistic assumptions. PLS path modeling is a multivariate technique to test structural relationships and a general method to estimate models with latent variables measured by many items. Its main objective is the causal predictive analysis when problems are complex with very limited theoretical support (Wold, 1982). In spite of the limited size of the sample, the quality of the model's estimates can be evaluated by using the bootstrap process.

4. Results and Discussion

The first result of the empirical testing of our model was to reject the idea that a unique variable could synthesize service innovation: The ten indicators are not describing a single latent variable but at least two dimensions should be retained. The first dimension is build from four items and describes quite well an innovative process in the back office that determines the commercialization aspects of the service: means for service delivery, scripts, procedures, pricing, quality certifications, brand and labels. The second dimension comes far behind and identifies innovations leading to diversification: search for new clients to be targeted is associated with the share of sales obtained by new services. It is worth to note that none of the remaining questions can be associated with these two first dimensions. This result rejoins the previous observations that innovation in service activities is mainly oriented towards procedures and service delivery organization; the creation of fully new service concepts remains quite rare. Moreover, introducing these two dimensions into our research model, deeply deteriorate its statistical quality. In our sample, only the main dimension of innovation, the procedure oriented one, plays a significant role towards international development.

The second result was to drop 12 items from the calculations as they didn't comply with the convergent validity threshold of 0.55 suggested by Falk and Miller (1992). Consequently the variables are measured by fewer items than anticipated, but the general shape of the theoretical model can be maintained.

Our first model trials lead also to reject one of the initial hypotheses which assumed that international competence had direct consequences on international performance (H 8). Models including this relationship give bad results and deleting it enhances all the quality tests. The collected data privilege two indirect relationships *via* the international experience and *via* the innovative intensity. The model presented next examines the validity of the remaining 9 hypothetical relations.

From a methodological point of view Hair *et al.* (1998) suggest adopting a two stages analysis for structural equations modeling. The measurement model should be evaluated before looking at the theoretical model. The

measurement model examines the quality of each latent variable according to the measured items. The theoretical model estimates the supposed relationships between the different variables. This two steps approach ensures that the structural relationships will be extracted from a set of measuring instruments with desirable psychometric properties.

4.1 The Measurement Model

The measurement model is evaluated by indicators of internal consistency, convergent validity, and discriminating validity, all given by the same software (Smart PLS 2.0). Internal consistency is examined by the Cronbach's alpha (Nunnally, 1978) and by the composite reliability indicator (Jöreskog Rho) which has to reach 0.7 or more. Fornell and Larcker, (1981) suggest to assess convergent validity by the average variance extracted (AVE) which must be higher than 0.5 and discriminating validity by checking whether the AVE for each construct is greater than the squared correlations between constructs.

Table 1. Performance of the measurement model for the studied sample

Variables	AVE (Rho CV)	Composite reliability (Jöreskog Rho)	Chronbach's alpha	Discriminating validity (squared correlations between variables) (AVE is given in the diagonal for comparison)						
				R&D Capa.	Rel. Capa.	ICT Comp.	Inter. Comp.	Inter. Exper.	Innov. Intens.	Inter. Perf
				R&D Capability	0.740	0.849	0.673	0.740		
Relational Capability	0.796	0.886	0.751	0.101	0.796					
ICT Competence	0.593	0.853	0.771	0.074	0.305	0.593				
International Competence	0.715	0.909	0.866	0.116	0.101	0.167	0.715			
International Experience	0.860	0.925	0.838	0.091	0.039	0.046	0.531	0.860		
Innovative Intensity	0.557	0.834	0.734	0.199	0.164	0.061	0.358	0.178	0.557	
International Performance	0.622	0.868	0.798	0.189	0.071	0.202	0.363	0.382	0.247	0.622

All our latent variables, but one, meet these requirements as it can be seen in table 1. The R&D capability, with a 0.67 alpha value is somewhat weak and we may consider this construct as just acceptable: many social science studies accept a 0.6 value as the lower threshold authorized for an exploratory study (Pasquali, 1999). Therefore the measurement model meets all required conditions and can be considered as fairly acceptable.

4.2 Discussion

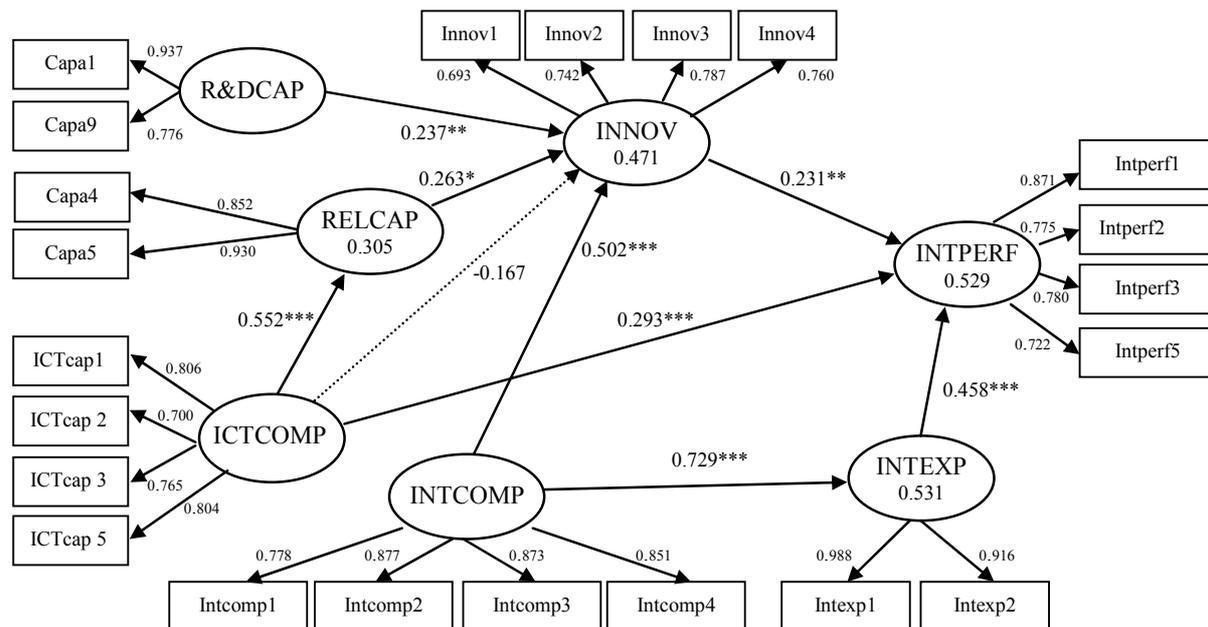
The structural model is assessed using the same software (Smart PLS 2.0). Figure 2 presents overall explanatory power and estimated path coefficients. The oval forms represent the latent variables. Written inside are their names and the R² obtained from the whole model in explaining each totally or partially endogenous variable. Fully exogenous variables don't exhibit any value there.

The items connected to the latent variables are in rectangular forms. The coefficients associated to the relationships are standardized path coefficients. It may be noticed that all but one have positive values giving a first confirmation of the hypothetical relationships. The negative relation is very weak, not significantly differing from zero.

The statistical significance values of these path coefficients are established thanks to the bootstrapping technique. Here 1000 subsamples were created by randomly removing observations from the original dataset. The T-tests obtained accept not normally distributed data. Among the nine relationships structuring our model, eight appear to be significantly differing from zero and seven of these eight relations are beyond the 0.95 confidence interval recommended as lowest limit by Cheung and Lau (2008). They are marked in Figure 2 with two or three stars. Thus the corresponding hypotheses are not infirmed by the data. The only weak hypothesis relates innovative intensity to relational capacity (H 4). It can only be accepted with a relatively low 0.90 confidence interval.

The direct influence that could be exerted by ICT competence on innovative intensity is not confirmed by the data. Its absolute bootstrapping t-value of 1.08 is too low and therefore we cannot say that such a relationship exists. It has to be mentioned that the indirect link, via the relational capability, is confirmed by the model and these two ties seem to have exhausted all the contents of this relationship. Nevertheless, the model gives better results when we keep this vanishing relationship. We can therefore understand it just as a simple correcting effect to the overwhelming weight of the indirect causality.

On the whole, the explanatory power of the research model appears fairly good. It accounts for 53 per cent of the variance in international performances and 47 per cent of the variance in services innovative intensity. It shows that innovation exerts a positive influence on international development in the studied sample and that, in turn, international competence impulse new innovation dynamics. But service activities seemingly don't obey to the same dynamic rules as in manufacturing where new products seem to be the main driver of long term international growth: innovative intensity appears far less important than the experience acquired on these markets. Services are indeed more sensible to cultural specificities which are better taken into account by experienced companies. Another difference with manufacturing, service innovation in the studied companies seems mainly oriented towards the commercial side of the service activity: procedures to be followed, means for service delivery, pricing strategy (business model), brand, quality certifications and labels.



Variable names:

- INNOV = Innovative intensity
- INTEXP = International experience
- INTPERF = International performance
- INTCOMP = International competence
- R&DCAP = R&D capability
- RELCAP = relational capability
- ICTCOMP = capability to use ICT

Coefficients precision:

(according to the bootstrapping method)

- *** = probability for the null hypothesis lower than 0.01
- ** = probability for the null hypothesis between 0.05 and 0.01
- * = probability for the null hypothesis between 0.10 and 0.05

Directly measured items are given in Table 2 in appendix

Figure 2. The structural model

The central role played by the ability to use ICT is partially confirmed in this study: It simultaneously affects innovation and international performance as already observed by other research works. It is also worth to note that ICT plays a more discriminating role when it is used within the network or for a tighter contact with the market. These two fields are also the ones retained by the sample for measuring at best the relational capability. The coupling of innovative and international strategies seems more effective when they their purpose is to satisfy clients' needs, which are best identified by close contact and experience.

5. Conclusion

Reciprocal relationships between innovation and internationalization in services appear to be a huge question and imply rather complex research. These two axes of development have always been considered separately for services. Bringing them together enables us to understand better, from a conceptual and a managerial point of view, the relationships which these two dynamics share. Of course, no definitive answers should be drawn from this preliminary study, covering two business service activities but neglecting *de facto* many others. Nevertheless the theoretical model measuring some determinants of the linkages between innovation and internationalization

produced roughly acceptable results. Service innovation obviously has consequences for the international development of service firms but internationalization is also a powerful driver for service innovations through the international competences acquired. Such a mechanism is probably at work in other business to business services but this has to be verified by further research. The model confirms also that ICT play a pervasive role, facilitating and generating innovation on one hand, and enabling, on the other hand, to better organize smooth relationships within the firm's network and with its foreign clients.

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Appendix

Table 2. Recapitulation of variables and measuring items (standardized loadings in brackets)

INTPERF: Degree of satisfaction with firm's international results since last three years	1 (highly dissatisfied) to 5 (highly satisfied)
Intperf 1: globally international service activities (0.87)	
Intperf 2: growth of international sales (0.77)	
Intperf 3: profitability of international service activities (0.78)	
Intperf 5: geographical expansion (number of foreign market countries) (0.72)	
INTEXP: International experience	1 (totally disagree) to 5 (totally agree)
Intexp 1: Our experience allows us to well control our international development (0.93)	
Intexp 2: We have a first class international experience at our disposal (0.91)	
INTCOMP: International competence of personnel	
Assess your staff's competence on these domains:	1 (no specific competence) to 5 (excellent)
Intcomp 1: Foreign rules, regulation and legislation (0.77)	
Intcomp 2: Commercial ways and customs in common use in foreign countries (0.87)	
Intcomp 3: Culture and civilization of foreign countries (0.87)	
Intcomp 4: Administrative or technical tasks for international trade (0.85)	
INNOV: Innovative intensity: Since last three years:	1 (not changed) to 5 (deeply changed)
Innov 1: The internal procedures set up to perform the service (0.69)	
Innov 2: The way the service is made available for clients (0.74)	
Innov 3: The service business model (0.78)	
Innov 4: The legal environment of the services (brand, labels, certifications) (0.76)	
R&DCAP: R&D organizational capability	1 (poor efficiency) to 5 (excellent efficiency)
Capa 1: R&D department or any other one in charge of driving the changes (0.93)	
Capa 9: Ability to master new technology (soft or hardware) (0.77)	
RELCAP: Relational capability	1 (poor efficiency) to 5 (excellent efficiency)
Capa 4: Ability to communicate with clients (0.85)	
Capa 5: Ability to communicate within your own network (0.93)	
ICTCOMP: Capability of the firm to use ICT in these domains:	1 (poor capability) to 5 (excellent capability)
ICTcap 1: Information for clients or partners (0.80)	
ICTcap 2: Prospecting and watching (0.70)	
ICTcap 3: Service delivery to clients (0.76)	
ICTcap 5: Communication within your own network (0.80)	