

The Antecedents and Effects of Manufacturer Service Innovation: A Relationship-Learning Perspective

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Abstract--Although the importance of supplier/buyer relationships in product innovation has been acknowledged by many researchers, empirical evidence remains scarce regarding the effects of relationships between original equipment manufacturing (OEM) suppliers and buyers on service innovation. Surveys were completed by representatives of 142 Taiwanese OEM suppliers in the electronics industry. This paper aims to broaden the understanding of service innovation as it relates to relationship learning through the development of three aspects of organizational competence that influence the competitive advantage of an OEM supplier. This study concludes that information-sharing competence, joint-innovation competence, and coordination competence have positive effects on exploitative service innovation and explorative service innovation. Additionally, there appears not to be a significant relationship between information-sharing competence and explorative service innovation. Furthermore, these two aspects of service innovation contribute to a supplier's internal competitive advantages, but only explorative service innovation contributes to a supplier's external competitive advantages. In other words, this study provides deep and clear explanations for the antecedents and effects of service innovation of OEM suppliers.

equipment manufacturing (OEM¹) supplier is to supply a buyer company a product that the buyer company formerly manufactured itself. However, in recent years, increasing numbers of OEM suppliers have become established, providing buyers more choices when choosing a partnership [1]. Furthermore, many OEM suppliers have continually improved their services and/or have developed new services, giving them a market advantage over competitors and making them highly attractive to buyer companies. In this paper, the services provided by an OEM supplier are referred to as *product-linked services*; these are designed to ensure proper functioning of the product and/or to facilitate the buyer's access to the product in an outsourcing relationship [2]. Such a service includes management of business strategy, human resources, information systems, finances, and operations, with an aim to produce and distribute better products for buyers. For example, the Taiwanese company Hon Hai, the biggest OEM supplier in the world, provides both traditional OEM (strictly product development and manufacturing) as well as less traditional services such as electronic manufacturing services (EMS) and component module moving services (CMMS) (see Figure 1). The service model of EMS is to satisfy buyers' needs by providing different combinations of services in the production value chain including original OEM and new substitution services (i.e., global assemble and delivery).

I. INTRODUCTION

In a competitive environment, the view that firms should use innovations in service to add value and outperform their competitors applies not only to service firms but also to manufacturing firms. Essentially, the role of an original

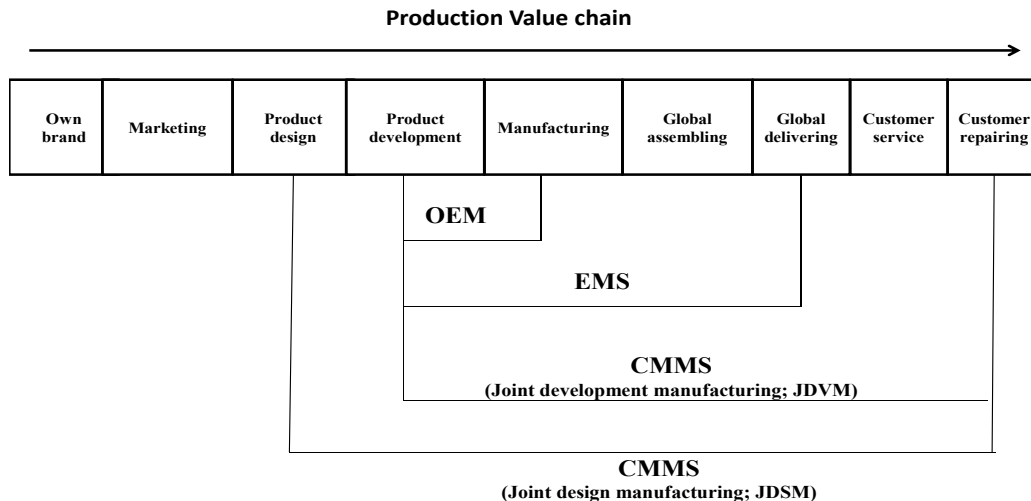


Figure 1. Value-chain and service products among OEM suppliers¹

Source: Yuan, B. J. Cand Chu, K. M. ; Strategic Management of Technology and Innovation, Cengage Learning, Taiwan, 2011.

¹.Original equipment manufacturing: When a manufacturer follows a buyer's sample specifications and design details to assemble all parts into a product and then performs the transaction with the assigned shipping mode[unclear, please clarify; better, delete if not essential] (Lee & Chen, 2000).

Several studies have indicated that novel ideas, new product concepts, service process, and product innovations do not originate from within one firm alone [3]. These works also imply that co-creation and coproduction occur not only between the firm and the customer but also involve other parties, such as value-network partners [4]. According to service-dominant logic, the very nature of services, having a number of features distinguishing them from goods [5], leads to a greater need to co-create with customers and in turn to establish credibility with customers [6]. Accordingly, in outsourcing relationships, buyer-supplier learning relationships play a crucial role in suppliers' proactive and deliberate goal of aligning internal or external resources with new opportunities for new service development in outsourcing relationships [7]. Chen, Lin, and Chang [8] also suggested that joint learning with external partners has positive effects on the innovation performance of firms. In this regard, a relationship learning view [9] is employed to posit that a OEM supplier's strategic orientation should focus on which organizational competences (information-sharing competence for improving information quality, joint-innovation competence for developing relationship-specific memory, and coordination competence for aligning cognition) will be needed to be developed to improve service innovation by improving the level of relational learning with buyers. In other words, by addressing the link between relationship learning and these three competence, this study presents new insights into the development of relationship learning when previous literature on the subject of relationship leaning concentrated on its effects on innovation activities [27, 22].

Many manufacturing companies have become more customer-centric and innovative, beginning to extend services accompanying their offerings as part of a strategy to differentiate themselves from their competitors [10–12]. Baines, Lightfoot, Benedettini and Kay [13] showed that manufacturing firms benefit from introducing new services. Interestingly, many researchers have stated the importance of service innovation, but no studies have discussed the role of service innovation in internal competitive

advantage in a manufacturing context. Hence, this study attempts to explore whether leaning from buyers is a driver for service innovation and whether it further develops an internal environment that cultivates a collaborative culture, formulating joint learning activities for servitization within an organization [14]. Accordingly, we categorize competitive advantage as *external* or *internal* in order to examine the effect of service innovation on competitive advantage, externally and internally. Incorporating this factor into the research framework, therefore, contributes to existing research on service innovation.

The next section provides a literature review and hypothesis development based on the research framework. Then the research methodology and the analyzed findings are presented. Finally, the paper ends with a discussion, conclusions, and an outline of its limitations and suggestions for future research (Fig. 2).

II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Although some researchers have proposed several types of service innovation [15], this study investigates two types of service innovation: *exploitative service innovation* and *explorative service innovation*. Importantly, in contrast to past research on innovation with regard to the definition of exploitative and explorative innovation [16–19], the exploitative and explorative service innovation of OEM suppliers, in this paper, does not refer to the development of new services for gauging the buying behavior of prospective buyers in outsourcing market: the role of the service innovation of an OEM supplier is to renew extant business relationships.

Exploitative service innovation pertains to innovation activities aimed at improving existing relationships to meet the expressed needs of buyers. It is characterized by improvements in the efficiency and quality of existing services. For example, the adoption of advanced information

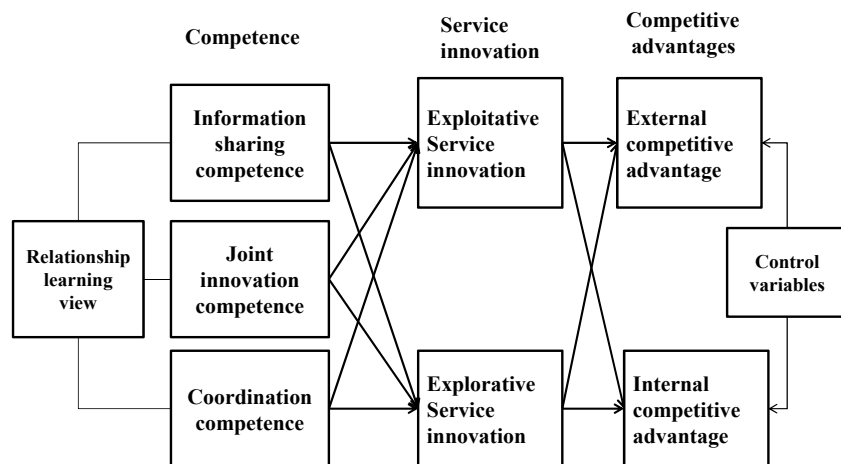


Figure 2. Antecedents and consequences of OEM supplier's service innovation: an integrative framework

technology may increasingly eliminate person-to-person interaction in the provision of a service. New information systems allow buyers to monitor and control inventories and supplier relations more efficiently than their competitors. In contrast, *explorative service innovation* refers to innovation activities that develop new competences, resources, and knowledge designed to supply aspects of buyers' core operations that have not yet been outsourced. Many OEM suppliers are continuously learning lessons from their prior experiences and the best practices of their buyers for the development of new competence-based services; these suppliers try to act as strategic partners rather than merely addressing their buyers' short-term interests [19]. At this time, potential intent to take over more tasks in a supplier-buyer relationship appear. Hence, explorative service innovation, in this study, is not meant to be existing services refinement but the introduction and creation of new services that can further substitute for more of buyers' core operations in an extant outsourcing relationship [20].

In the past decade, the issue of "exploitation versus exploration" has been thoroughly discussed in the field of organization management [16,19,21,22]. There are two reasons that service innovation is categorized into two types. First, many scholars have researched exploitative and explorative innovation as important constructs and have discussed their antecedents or effects [22, 23]. However, relatively few studies have further discussed exploitative and explorative service innovation. Second, March [24] reported that firms can avoid falling into a failure trap or a competence trap when they adopt these two constructs to align resources in pursuit of long-term competitive advantages. Hence, service innovation-oriented OEM suppliers should include both types of service innovation instead of focusing on only one at the expense of the other.

A. Relationship learning view

Manufacturing firms should remember that obtaining and maintaining a competitive advantage is dependent on proactive innovations that show comparative strength with regard to the practices of their competitors [25]. To compete, OEM suppliers need to establish effective and innovative external relationships with competitors, suppliers, customers, universities, research institutions, and the like [26]. According to resource dependence theory (RDT), as a single organization is rarely self-sufficient, as it must enter into relationships with other organizations to obtain critical resources. In other words, activities that efficiently integrate networking partners' knowledge into the innovation process, including development and implementation, may serve as a serious and superior basis for providing services to buyers that are more innovating than those of the competition.

In highly unstable markets, companies need to cooperate with one another and explore or exploit one another's ideas, so that they can react to changing environments as quickly as possible. [9] developed a theory of how management can develop and promote the learning capabilities of targeted customer-supplier relationships. Several studies have

developed an understanding of the effect of relationship learning on innovation but not on service innovation [8, 27, 22]. As learning and integrating buyers' knowledge is the main stimuli for OEM supplier service innovation, competence that can entice buyer and supplier into a close learning community is important [9].

A service is different from a product, which may include consumables, service processes, people, or physical equipment; services require a system, interface, protocol, procedure, function, method, and/or activity. Hence, a supplier of services typically must understand many distinct aspects in order to create new customized services and persuade buyers to incorporate new services into their business process. For example, the cognitive distance of both suppliers and buyers with regard to competence and needs is a concern when both collaborative parties are jointly involved in service activities [28, 29]. Relationship learning allows OEM suppliers to further identify and define their buyers' demands, skills, resources, and functional competences, creating relationship-specific memories that accumulate knowledge and information [9]. In theoretical terms, this study casts light on the literature of the relationship-learning view, analyzing which competences (information-sharing competence for improving information quality, joint-innovation competence for developing relationship-specific memory, and coordination competence for aligning cognition) will have positive effects on service innovation within the context of improving specific relationship learning.

B. Information-sharing competence and service innovation

Information-sharing competence refers to the extent to which a firm can exchange important, accurate, and useful information with buyers, as opposed to competitors [30, 31]. Through efficient and qualified information sharing, firms can gain deeper understanding of each other, including information on resources and functions as well as avenues of collaboration and coordination in continuous interaction [22]. Hence, information sharing is an important starting point for both parties to coordinate and plan operational and strategic issues between buyers and suppliers in an exchange relationship [9].

OEM suppliers who jointly interpret information through frequent meetings or joint teams are better able to quickly become aware of buyers' needs and in turn to push suppliers to refine current routines and techniques to provide high-quality and satisfactory services [22, 32]. Information sharing serves as the basis for employees of service-oriented firms to innovate knowledgeably and to work smoothly together with buyers. Furthermore, ongoing information sharing with buyers who are market leaders can deepen supplier ability to anticipate new preferences and in turn to make more effective and proactive resource allocations to develop their ability to meet and respond to buyer needs [33]. Chen, Li, and Arnold [34] also find that information sharing through collaborative communication has a positive effect on market-related capability building. Therefore, we suggest that information-sharing competence leads to service innovation.

H1: Information-sharing competence has a positive effect on exploitative-service innovation.

H2: Information-sharing competence has a positive effect on explorative-service innovation.

C. Joint-innovation competence and service innovation

Joint-innovation competence refers to the ability of a supplier to engage in developing innovations in products and processes together with a customer. According to knowledge-based theory, the ability to exploit the knowledge of both parties in innovation depends on the ability of buyers and suppliers to share tacit knowledge [35]. OEM suppliers can improve the value of their customized offerings to their buyer based on relation-specific knowledge, the integration of knowledge possessed by both parties [1, 27]. As OEM suppliers continuously enhance and focus more on co-creation with their buyers [4], they are able to develop appropriate strategies to learn, adapt, and integrate buyer's knowledge in innovation. Through a joint innovation process, specific relationship memories of collective insights, beliefs, routines, procedures, and policies accumulated from mutual interactions will be created, stored, and shared between partner organizations.

External sources can provide knowledge in areas where internal sources are inadequate [36]. Due to the transfer of knowledge from international buyers, which are the main learning source for OEM suppliers, continuous interactive action with individual buyers can take advantage of multiple sources of knowledge [37]. Joint innovation can enhance inter-organizational processes of knowledge creation, storage/retrieval, transfer, and application [38]. That is, joint-innovation competence facilitates OEM suppliers developing knowledge-intensive interfaces with buyers [39]. According to service-domain logic [40], the ability to encourage customers as participants involved in service co-creation leads to a superior competitive advantage. Having the ability to develop product, service, and process innovations together with a buyer allows suppliers internalize valuable insight from buyer-centric knowledge and demand that incorporates buyer feedback [41, 42] but also encourages OEM suppliers to develop new resources and assets within their own firm [43], and thus to offer new services to foster or expand a collaborative relationship.

H3: Joint-innovation competence has a positive effect on exploitative service innovation.

H4: Joint-innovation competence has a positive effect on explorative service innovation.

D. Coordination competence and service innovation

Coordination competence is ability to create a boundary-spanning activity that incorporates firm-to-firm connections into a network of mutually supportive interactions [44, 45]. It is expected that coordination would result in better fits between suppliers and buyers, as well as a reduced cognitive distance [9]. OEM suppliers and buyers can adapt to specific organizational needs by dynamically modifying competencies to suit each other's requirements [46].

Service innovation means buyers may be confused by new service, and conflict may even appear if suppliers do not show a superior ability to coordinate to increase their degree of familiarity and reduce the chances of bad interaction [47, 48]. In order to reduce cognitive distance in new service development and efficiently and effectively respond to variations in buyer needs, well coordinated activities that can create a relationship-specific element of interpretation of goals and strategies is expected to enable consensus development and thus reduce redundant communication in the process of innovativeness [49]. For example, the supplier can appoint coordinators who are responsible for relationships with partners to continue to adjust the understanding of buyer's goals, potentials, and the strategies that can help suppliers develop suitable services, such as how we can support each other and how to match resource use (e.g., personnel, finances) to innovation. OEM suppliers and buyers can easily work together to generate innovative ideas and to solve problems of new service development [44] when the buyer's perceived risk and uncertainty is reduced [50].

H5: Coordination competence has a positive effect on exploitative service innovation.

H6: Coordination competence has a positive effect on explorative service innovation

E. Service innovation and external competitive advantage

Innovation is a fundamental instrument of growth strategy that firms entering new markets can use to increase existing market share and gain a competitive advantage [51]. This implies that buyers are attracted to a supplier who can leverage resources actively or quickly to introduce new methods in services, while its competitors are only keeping on in an older way. It is paramount for an OEM supplier to have a competitive position in comparison to other competitors. Competition in the outsourcing market puts pressure on OEM suppliers to upgrade their competence and to be more innovative in the service domain, providing their buyers with integrated product-linked service packages, i.e., solutions, opportunities, or effective ways to meet buyers' demands for cost reduction and higher quality, react quickly to technology trends, and respond to competitors' potential strategies and "total solutions" [52].

Service innovation provides technological and process innovations, shortened lead times for product development, joint marketing programs, and shortened response times, all of which are key in determining how to exceed a buyer's expectations for an original product and service. This implies that suppliers' service innovations will encourage more relation-specific investment from buyers and in turn increase switching costs of buyers when buyers perceive more value and higher satisfaction [53]. Hence, we postulate that service innovation has positive and significant effects on external competitive advantage.

H7: The higher the level of exploitative service innovation, the greater the level of external competitive advantage.

H8: The higher the level of explorative service innovation, the greater the level of external competitive advantage.

F. Service innovation and internal advantage

According to the RBV, human resources and capabilities are an important source of a firm's competitive advantage. Internal employees are expected to know more about their areas of specialization than anybody else; they therefore play an important role in the content of a given service. Moreover, the capability of an internal employee also signals the supplier's ability to create valuable products or perform valuable services for a buyer. The perception of the benefits derived from the competences of OEM suppliers, as represented by employees who can share new ideas, resolve problems, and provide innovative responses to buyers, will increase buyers' confidence in future collaboration. Hence, it is important to create and encourage a service-oriented environment in which employees are motivated and have the freedom to plan, develop, and launch new innovative services [54].

To satisfy buyers with a new service will push a firm to assimilate up-to-date buyer information, as well as integrating resources and knowledge from all involved departments and building effective communication to coordinate mechanisms among different units in order to avoid redundant processes and miscommunication, leading to cross-department synergies. Chen and Tsou [55] suggested that firms that continuously provide innovative services are often characterized by a service-oriented working environment, better cross-functional coordination, and well-defined training and learning mechanisms. In such an environment, employees will have greater job satisfaction, improved domain knowledge, and greater levels of creativity [56]. It is argued that service-oriented OEM suppliers that provide a culture of learning and build cross-functional assimilating mechanisms can make internal employees more responsive, open, and innovative. [55, 57, 58] stated that in the evaluation of employee job satisfaction, domain knowledge and level of creativity after new services are launched can reflect the level of internal competitive advantage. Hence, we postulate that service innovation may have positive and significant effects on internal competitive advantage.

H9: The higher the level of exploitative service innovation, the greater the level of internal competitive advantage.

H10: The higher the level of explorative service innovation, the greater the level of internal competitive advantage.

III. DATA ANALYSIS

We evaluated both the quality of the measurement model and the relationships between the constructs in this SEM model using a partial least squares (PLS) technique (using Smart PLS 2.0 software) [59]. In agreement with O'Cass and Sok [60] and their rationale for adopting PLS, there were two reasons why we adopted PLS to analyze the results. First, PLS is appropriate because the main objective of the study was to maximize the predictive ability of respective constructs as antecedents (information sharing competence, joint innovation competence, and coordination competence) on the

development of service innovation (exploitative and explorative) and comparative advantages (internal and external advantages). Second, some research has indicated that PLS is an appropriate means for estimating a causal subsystem sequence of paths when the sample size is small ($n = 142$).

A. Measurement

This study used a self-administered questionnaire. All measures were perceptual, and the managers of OEM suppliers completed the evaluations. All independent and dependent variables were obtained from the existing literature and measured using multiple items (all items are presented in Table 2). All of the constructs were measured with a five-point Likert-type scale. With regard to measures of the three types of organizational competence, we measured information sharing competence with four items that came from Selnes and Sallis [9] and Li [61], adopted a four-item scale from the study of Li [61] to measure joint innovation competence, and used three items adopted from Kandemir Yaprak and Cavusgil [62] to measure coordination competence. Finally, the construct of the OEM supplier's service innovation consisted of two constructs: exploitative service innovation and explorative service innovation. The scales for exploitative service innovation and explorative service innovation were measured with the three items individually. Items measuring exploitative service innovation were modified from Avlonitis, Papastathopoulou, and Gounaris [19]; Yalcinkaya et al. [63]; and He and Wong [64]. For measuring explorative service innovation, we used three items modified from Matthyssens and Vandenbempt [65] and Liu et al. [1] to show the characteristics of substitution. The measure of *external competitive advantage* was mainly developed from Chen and Tsou [55], using three items to assess the extent to which an OEM supplier gains an advantage compared to external competitors. The measure of *internal competitive advantage* was mainly adopted from Atuahene-Gima [57] and Van Riel, Lemmink, and Ouwersloot [66], with three items including improvements to employee innovation, domain knowledge, and job satisfaction.

Two control variables were included in this study. Chandy and Tellis [67] reported that large firms are more likely to leverage existing competences or to build new competences. Hence, we included firm size as a control variable to control for potential effects. This variable was measured by the number of employees at the firm. In addition, Dyer and Singh [68] suggested that firms can build a competitive advantage by engaging in long-term inter-firm cooperation. Therefore, we also included length of collaboration as a control variable.

B. Sample and data collection

One thousand Taiwanese manufacturing firms listed in the "2008 Top 1000 manufacturing corporations in Taiwan" (published by *Common Wealth* magazine) were selected as the sample population for this paper. The final version of the questionnaire was mailed to 975 manufacturing firms. Two weeks after the initial mailing, we used e-mail, fax, or telephone in follow-up contacts to improve the response rate. Finally, we received 142 usable questionnaires (electronic

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firm). The resulting effective response rate is 14.5%. The organizations represented in the sample included information on the average length of collaboration and number of employees (size). Most organizations had cooperated with their buyers for 1 to 3 years. The majority had 101 to 500 employees (see Table 1).

Because we collected all data on the study constructs from a single resource (including dependent and independent constructs), we used two methods, recommended by many researchers, to determine whether common method bias was likely to be a serious concern in this study. First, Harmon's one-factor test was used to determine the potential for

common method bias. In exploratory factor analysis, the 7 extracted factors accounted for 73% of the variance, and the first factor accounted for 16% of the total variance; no single factor emerged. Additionally, we used the marker variable assessment approach to assess the potential for common method bias, as recommended by Lindell and Whitney [69]. A theoretically unrelated construct, internationalization, was measured by three items. The correlation analysis showed that there was no significant correlation between the focal constructs and internationalization (see Table 2). According to the results of these two methods, we concluded that common method bias was unlikely to be a serious concern in this study.

TABLE 1 RESPONDING COMPANY DEMOGRAPHICS.

Variables	Category	rate
Length of collaboration (N=142)	1 year and fewer	1.4 %
	Over 1-3 years	40.1 %
	Over 3-5 years	35.2%
	Over 5-10 years	21.8%
	Over 10-15 years	1.4%
Number of employees (people) (N=142)	50 and fewer	0%
	51-100	4.9%
	101-500	52.8%
	501-1000	36.6%
	Over 1000	5.6%

TABLE 2 RESULTS OF MEASUREMENT PROPERTIES.

Construct identifier	Items	Factor loading	Composite reliability (ρ_c)	AVE
Exploitative service innovation (ETSI)	(1="strongly disagree" and 5="strongly agree") <i>For the past few years, our company has often</i>			
	ETSI1	0.861	0.91	0.77
	ETSI2	0.886		
	ETSI3	0.895		
Explorative service innovation (ERSI)	(1="strongly disagree" and 5="strongly agree") <i>For the past few years, our company has offered new practice to</i>			
	ERSI1	0.858	0.88	0.65
	ERSI2	0.754		
	ERSI3	0.775		
	ERSI4	0.853		
Information sharing competence (ISC)	(1=much worse than major competitors, 5=much better than major competitors)			
	ISC1	0.841	0.89	0.73
	ISC 2	0.911		
	ISC 3	0.821		
Joint innovation competence (JIC)	(1=Very low, 5=Very high)			
	JIC1	0.804	0.80	0.52
	JIC2	0.785		
	JIC3	0.651		
	JIC4	0.617		
Coordination competence (CC)	(1=much worse than major competitors, 5=much better than major competitors)			
	CC1	0.792	0.86	0.69
	CC2	0.868		
	CC3	0.827		
Internal competitive advantage (ICA)	(1="strongly disagree" and 5="strongly agree") <i>our company has been able to provide new services ...</i>			
	ICA1	0.764	0.85	0.66
	ICA2	0.815		
	ICA3	0.856		
External competitive advantage (ECA)	(1="strongly disagree" and 5="strongly agree") <i>our company has been successful in providing new services ...</i>			
	ECA1	0.761	0.83	0.63
	ECA2	0.795		
	ECA3	0.832		

C. Construct reliability and validity

To determine the quality of the methods of measurement of all constructs, we used Cronbach's alpha and composite reliability to test internal consistency [70] and average variance extracted (AVE) [71] to test discriminant validity. The Cronbach's alpha values for the eight constructs ranged from 0.617 to 0.911. All of the p_c values (composite reliability) for the constructs exceeded the criterion threshold of 0.7, demonstrating that the measures were reliable (see Table 2). To show that each construct had adequate convergent validity, AVE should be at least 0.50; in addition, the square roots of AVE (reported on the diagonal) should be greater than the construct correlations [71]. As show in Table 3, all of the constructs reached these standards, supporting the discriminant validity of these constructs.

D. Results for direct effects

Figure 3 shows the results of PLS estimation, including path coefficients, statistical significance, and R^2 values. The

explained variance (R^2) for endogenous constructs indicates the predictive power of the research model. The path coefficient between service innovation and information-sharing competence, joint-innovation competence, and coordination competence was positive and statistically significant apart from the relationship between information-sharing competence and explorative service innovation. Thus, H1, H3, H4, H5 and H6 were supported. This indicates that competences contribute to a supplier's service innovation but only explorative service innovation contributes to a supplier's external competitive advantages. There was a significant positive relationship between two service innovation and internal competitive advantages, supporting H9 and H10. However, only explorative service innovation contributed to supplier's external competitive advantages; thus, H8 was supported. Table 4 and Fig. 2 show the results for individual paths and results.

TABLE 3. RESULTS OF MEASUREMENT PROPERTIES

Construct	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ETSI (1)	3.41	0.58	0.88									
ERSI (2)	3.62	0.53	0.34	0.81								
ISC (3)	3.52	0.57	0.47	0.47	0.85							
JIC (4)	3.54	0.49	0.51	0.67	0.50	0.72						
CC (5)	3.59	0.54	0.46	0.59	0.39	0.63	0.83					
ICA (6)	3.38	0.58	0.44	0.46	0.38	0.46	0.40	0.81				
ECA(7)	3.60	0.50	0.38	0.68	0.31	0.65	0.62	0.51	0.79			
SIZE (8)	3.40	0.84	-0.0.3	0.08	0.03	0.35	-0.10	0.03	-0.03	-		
Collaborative year (9)	2.81	0.68	0.24	0.023	0.21	0.24	-0.19	0.10	0.10	0.23	-	
Marker(Internation)	4.00	0.70	0.02	0.10	0.03	0.00	-0.05	-0.04	-0.04	0.16	0.14	-

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$. Note: N=142.

1. Zero-order correlations are below the diagonal; adjusted correlations for potential common method variance (Lindell & Whitney, 2001) are above the diagonal.

2. Figures in shaded diagonal are values of the square root of the AVE.

TABLE 4. STANDARDIZED PATH COEFFICIENTS

		Path coefficient (b)	Results
Information sharing competence – exploitative service innovation	H1	0.267*** (t=3.66)	Supported
Information sharing competence – explorative service innovation	H2	0.148 (t=1.88)	Non-Supported
Joint innovation competence – exploitative service innovation	H3	0.259** (t=2.60)	Supported
Joint innovation competence – explorative service innovation	H4	0.445*** (t=4.60)	Supported
Coordination competence – exploitative service innovation	H5	0.177* (t=1.98)	Supported
Coordination competence – explorative service innovation	H6	0.239** (t=3.04)	Supported
Exploitative service innovation – external competitive advantage	H7	0.149 (t=1.80)	Non-Supported
Explorative service – external competitive advantage	H8	0.678** * (t=11.34)	Supported
Exploitative service innovation – internal competitive advantage	H9	0.343*** (t=3.69)	Supported
Explorative service – internal competitive advantage	H10	0.358*** (t=4.58)	Supported
Collaborative length – internal competitive advantage		-0.04	
Collaborative length – external competitive advantage		-0.08	
Firm size – internal competitive advantage		0.03	
Firm size – external competitive advantage		-0.05	

* $p < 0.05$. ** $p < 0.01$. *** $p < 0.001$.

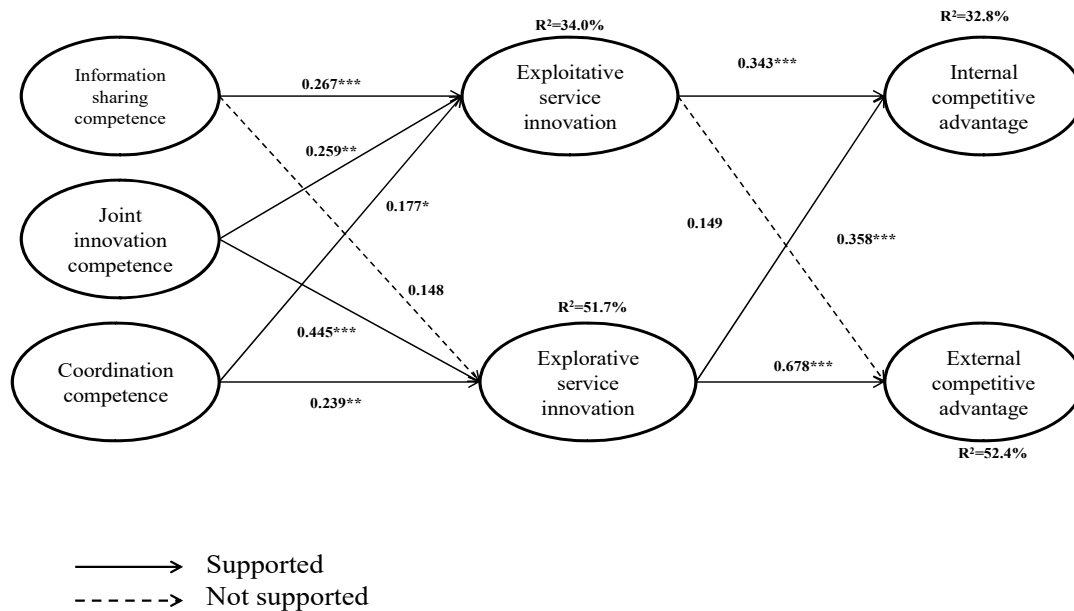


Figure 3. PLS results for direct effects (Service innovation)

With regard to R^2 , three competences explained 34.0% of the variance in exploitative service innovation and 51.7% of the variance in explorative service innovation. These values were all significant. On the other hand, both service innovations together explained 32.8% of the variance in external competitive advantage and 52.4% of the variance in internal competitive advantage. These values were all significant.

IV. DISCUSSION AND CONCLUSIONS

To remain competitive, many firms look for ways to increase their capacity for and commitment to innovation. The volume of research into service innovation has increased. Some investigations of the service innovation of manufacturers tackle the general buyer-supplier relationship, with some of them using OEM relationships as empirical contexts. Research has addressed the factors that lead to the success or failure of product innovation in the OEM supplier context in depth but has almost entirely ignored those factors that affect the success or failure of service innovations. To examine how an OEM supplier can increase the value of its offerings and apply them to buyers' operations, a relationship-learning approach is employed in this study. In empirical terms, one important contribution of this paper consists in its providing evidence for the antecedents necessary for the innovation of services by manufacturing firms, a neglected topic in the literature. We adopt a relationship-learning view to state that a OEM supplier should develop three relational competences, including the information-sharing competence, joint-innovation competence, and coordination competence, to improve the level of relationship learning and thus service innovation

within a buyer-supplier relationship. In fact, these three competences have been discussed as important determinants of innovations in some research findings [72, 73]. Such evidence, however, focuses on the context of manufacturers' product innovation. The question that remains to be answered is whether such "innovation-related" competences also apply to the service-innovation process of manufacturing firms looking to develop new services. One of our major contentions is that once an OEM supplier innovates a service, its performance can be more fully understood by examining its three organizational competences in facilitating learning-based relationships, integrating the resources of external buyers, and synthesizing its activities with its buyers.

The role of OEM suppliers has acquired importance in a situation where their buyers face commoditization, slowing growth, and declining profitability in end-product markets [74–76]. Hypothesis 1 showed that the ability to share information with expressed needs and change allowed OEM suppliers to pool existing internal knowledge and resources to fine-tune their competences engaging in existing services faster, more efficiently, and with better quality [77]. Nevertheless, the findings for Hypothesis 2 show that explorative service innovation is not significant in information competence. Korhonen and Kaarela [52] stated that it is usually difficult for corporate customers to begin accepting service innovations provided by their supplier. Especially when the content of explorative service innovation is complex, differing from the past. Hence, as Hypothesis 4 and 6 showed, joint-innovation and coordination competences are needed for breadth and quality information and confusion reduction in order to avoid conflict, when OEM suppliers are trying to move forward to substitute within buyer's existing activities.

The findings of Hypothesis 3 and 4 suggested that joint innovation competence has positive effects on service innovation. According to the competence-based marketing view, OEM suppliers should make buyers realize that the benefits of collaboration can be greater, which convinces buyers to expand the collaborative relationship to exploit these benefits [1]. The competence-based marketing view posits that a supplier should realize that the development of core competencies is an important step, and that the communication of these competencies to buyers is even more important [78–80]. A higher level of joint innovation can enable OEM suppliers and buyers to better understand each other's resources and abilities, along with their strengths and weaknesses. In particular, suggested by H4, when OEM suppliers want to move forward to substitute buyers' existing activities, they need to demonstrate to buyers that they can act as strategic partners when acquiring a good understanding of their buyers' resources and abilities, through joint innovation. Having an ability to engage in joint innovation with buyers gives suppliers a chance to show they can be trusted to respond to buyers' further requirements and in turn enhance collaboration with new services between themselves and buyers.

Additionally, Hypothesis 5 suggested that good and effective communication and coordination among partners are needed to make employees from both sides work together and innovate with each other efficiently, knowledgeably, and smoothly. One aim of coordination should be to develop a common understanding of the message from the perspective of both the sender (supplier) and the receiver (buyer). With effective coordination, OEM suppliers can perceive exactly what buyers want and thus engage in services more quickly and efficiently and with better quality by fine-tuning their competences to react to buyers' needs.

Finally, the findings of Hypothesis 7 and 8 remind suppliers to attempt to achieve "balance" between exploitative and explorative service innovations in their organization under conditions of increasing external competition. The external competitive advantage of OEM suppliers must be rooted in explorative service innovation rather than in exploitative service innovation. In fact, thanks to increased competition, many OEM suppliers have begun to pay more attention to manufacturing service innovations such as process innovations using new IT systems. Nevertheless, OEM suppliers must innovate more in the service domain, providing their buyers with integrated product-linked service packages, i.e., "total solutions." At this time, OEM suppliers who can offer a unique set of total solutions derived from relationship learning are more attractive to buyers than their competitors.

V. MANAGERIAL IMPLICATIONS

Our study reiterates that managers should persuade two-pronged service innovations in dealing with the pressure of potential supplier replacement, because only explorative service innovation yields significant external competitive

advantage. That is, in a competitive outsourcing market, the role of a sustained "complementary" partner is difficult to attract buyers to take part in; a long-term collaboration relationship appears less attractive in the face of increasingly changing market. An attractive OEM supplier needs to create new modes of doing business that can be applied to buyers' value chains with the operation of substitute buyers.

It is important for OEM suppliers to continuously learn lessons from experiences and the best practices of their buyers [81]. To transform such learning into better service innovation, managers should develop information sharing competence, joint innovation competence, and coordination competence to foster relationship learning and thus discover and analyze what buyers want and then provide buyer-centric services effectively and efficiently. These competences need to be developed by appropriate strategies for resource deployment. For example, improving employee's *relational skills*, which are personal abilities such as communication ability, extroversion, conflict management skills, empathy, emotional stability, self-reflection, a sense of justice, and cooperativeness [44], is important to joint innovation and coordination competence building.

While many authors have covered the classification of servitization, the drivers of servitization in a manufacturing context [81], and the guidelines and methods for the implementation of servitization strategies [82], the effects of manufacturer's service innovations have been less explored [83]. From our study, we see that managers are able to use service innovation as a stimulation for servitization, because a service-innovation orientation will push an OEM supplier to interact with individual buyers to discover and analyze what buyers want, then providing customer-centric information effectively and efficiently. The firm can eliminate organizational barriers by utilizing pools of different resources led by project teams. These teams would include members from across the organization, including design, operations, product management, materials, quality control, and suppliers, to collaboratively develop or launch new innovative services. By doing this, the service innovation-oriented OEM supplier pools existing internal knowledge and resources to engage in services faster and with better quality having knowledgeable and creative employees to work and innovate together with buyers.

VI. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Three shortcomings of this study should be noted, although this research has made some valuable contributions to the literature on the OEM supplier/buyer relationship. First, although we used PLS to justify the findings due to the relatively small sample size of our study, the response rate should be improved in future studies to derive more meaningful conclusions. Second, we focused on the role of a supplier's service innovation for existing buyers. Future research might be needed to investigate both existing and new

relationships. Third, many OEM suppliers design and integrate externally supplied products and service components into a customer-specific solution [84]. Such a service emphasizes the advantages of specialization and modularity in the component supply, standardization of interfaces, and the ability to specify and integrate the sources of technology and product supplies of multiple partners. Future studies can use value network partners such as supplier partners, competitors, consultants, universities and research institutions, and the like, are potential innovative partners with specific resources and knowledge.

REFERENCES

[1] Liu, F.H., H.T. Tsou and L.J. Chen.; "The impact of OEM supplier initiatives on buyer competence development: The moderating roles of collaborative relationship and competitive environment," *Asia Pacific Journal of Management*, vol. 30, pp. 1285–1303, 2013.

[2] Mathieu, V.; "Service strategies within the manufacturing sector: Benefits, costs and partnerships," *International Journal of Service Industry Management*, vol. 12, pp. 451–475, 2001.

[3] Roy, S., K. Sivakumar and I. F. Wilkinson.; "Innovation Generation in Supply Chain Relationships: A Conceptual Model and Research Propositions," *Journal of the Academy of Marketing Science*, vol. 32, pp. 61–79, 2004.

[4] Lusch, R. F. and S. L. Vargo.; *The Service-Dominant Logic of Marketing: Dialog, Debate, and Directions*, Armonk, NY: M. E. Sharpe, 2006.

[5] Lusch, R. F. and S. L. Vargo.; "The Service-Dominant Mindset," in *Service Science, Management and Engineering Education for the 21st Century*, B. Hefley and W. Murphy, Ed. Springer, 2008.

[6] Lusch, F. L., S. L. Vargo and M. O'Brien.; "Competing through service: Insights from service-dominant logic," *Journal of Retailing*, Vol. 83, pp. 5–18, 2007.

[7] Carroll, G. R.; "A sociological view on why firms differ," *Strategic Management Journal*, vol.14, pp. 237–249, 1993.

[8] Chen, Y.S., M.J. J. Lin and C.H. Chang.; "The positive effects of relationship learning and absorptive capacity on innovation performance and competitive advantage in industrial markets," *Industrial Marketing Management*, vol. 38, pp. 152–158, 2009.

[9] Selnes, F., and J.Sallis.; "Promoting relationship learning," *Journal of Marketing*, vol. 67, pp. 80–95, 2003.

[10] Oliva, R. and R. Kallenberg.; "Managing the transformation from products to services," *International Journal of Service Industry Management*, vol. 14, pp. 160–172, 2003.

[11] Grönroos, C.; "Adopting a service logic for marketing," *Marketing Theory*, vol. 6, pp. 317–333, 2006.

[12] Gebauer, H., B. Edvardsson, A Gustafsson and L. Witell.; "Match or mismatch: Strategy–structure configurations in the service business of manufacturing companies," *Journal of Service Research*, vol. 13, pp. 198–215, 2010

[13] Baines, T.S., H.W. Lightfoot, O. Benedettini and J.M. Kay.; "The servitization of manufacturing: A review of literature and reflection on future challenges," *Journal of Manufacturing Technology Management*, vol. 20, pp. 547–567, 2009.

[14] Malleret V.; "Value Creation through Service Offers," *European Management Journal*, vol. 24, pp. 106–116, 2006.

[15] Cheng, C. C. and D. Krumwiede.; "The role of service innovation in the market orientation—new service performance linkage," *Technovation*, vol. 32, pp. 487–497, 2012.

[16] Benner, M. J. and M. L. Tushman.; "Exploitation, exploration, and process management: The productivity dilemma revisited," *Academy of Management Review*, vol. 28, pp. 238–256, 2003.

[17] Salavou, H., G. Baltas, and S. Lioukas.; "Organizational innovation in SMEs," *European Journal of Marketing*, vol. 38, pp. 1091–1112, 2004.

[18] Atuahene-Gima, K.; "Resolving the capability-rigidity paradox in new product innovation," *Journal of Marketing*, vol. 69, pp. 61–83, 2005.

[19] Yalcinkaya, G., R. J. Calantone and D. A. Griffith.; "An examination of exploration and exploitation capabilities: Implications for product innovation and market performance," *Journal of International Marketing*, vol. 15, pp. 63–93, 2007.

[20] Matthyssens, P. and K. Vandenbempt.; "Moving from basic offerings to value-added solutions: Strategies, barriers and alignment," *Industrial Marketing Management*, vol.37, pp. 316–328, 2008.

[21] Teece, D. J.; "Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance," *Strategic Management Journal*, vol. 28, pp. 1319–1350, 2007.

[22] Fang, S.R., S.C. Fang, C.H. Chou, S.M. Yang and F.S. Tsai.; "Relationship learning and innovation: The role of relationship-specific memory," *Industrial Marketing Management*, vol. 40, pp. 743–753, 2011.

[23] Tsou, H. T., J. S. Chen and W. H. Liao.; "Market and technology orientations for service delivery innovation: The link of innovative competence," *Journal of Business & Industrial Marketing*, vol. 29, pp. 499–513, 2014

[24] March, J. G.; "Exploration and exploitation in organizational learning," *Organization Science*, vol. 2, pp. 71–87, 1991.

[25] Salavou, H., G. Baltas, and S. Lioukas.; "Organizational innovation in SMEs," *European Journal of Marketing*, vol. 38, pp. 1091–1112, 2004.

[26] Capaldo, A.; "Network structure and innovation: The leveraging of a dual network as a distinctive relational capability," *Strategic Management Journal*, vol. 28, pp. 585–608, 2007.

[27] Jean, R. J. and R.F. Sinkovics.; "Relationship learning and performance enhancement via advanced information technology: The case of Taiwanese dragon electronics firms," *International Marketing Review*, vol.27, pp.200–222, 2010.

[28] Heide, J.B. and A.S. Miner.; "The shadow of the future: effects of anticipated interaction and frequency of contact on buyer-seller cooperation," *Academy of Management Journal*, vol. 35, pp. 265–291, 1992.

[29] Redondo, Y. P. and J.J. Cambra Fierro.; "Importance of company size in long-term orientation of supply function: An empirical research," *Journal of Business and Industrial Marketing*, vol. 22, pp. 236–248, 2007.

[30] Mohr, J. and R. Spekman.; "Characteristics of partnership success: Partnership attributes communication behavior and conflict resolution techniques," *Strategic Management Journal*, vol. 15, pp. 135–152, 1994.

[31] Morgan, R. M. and S. D. Hunt.; "The commitment-trust theory of relationship marketing," *Journal of Marketing*, vol. 58, pp. 20–38, 1994

[32] Chen, Y. C., P. C. Li, and K. R. Evans, "Effects of interaction and entrepreneurial orientation on organizational performance: Insights in market driven and market driving," *Industrial Marketing Management*, vol. 41, pp. 1019–1034, 2012

[33] Wernfeld, B.; "A resource-based view of the firm," *Strategic Management Journal*, vol. 5, pp. 171–180, 1984.

[34] Chen, Y. C., P. C. Li and T. J. Arnold.; "Effects of Collaborative Communication on the Development of Market-relating Capabilities and Relational Performance Metrics in Industrial Markets," *Industrial Marketing Management*, vol. 42, pp. 1181–1191, 2013.

[35] Grant, R.M.; "Prospering in dynamically competitive environments: Organizational capability as knowledge integration," *Organization Science*, vol. 7, pp. 375–87, 1996.

[36] Leonard-Barton, D.; *Wellsprings of Knowledge: Building and Sustaining the Sources of Innovation*, Harvard Business School Press, Boston, MA, 1995.

[37] Ramani, G. and V. Kumar.; "Interaction Orientation and Firm Performance," *Journal of Marketing*, vol. 72, pp.27–45, 2008

[38] Lederer, A. L., D. A. Mirchandani and K. Sims.; "The search for strategic advantage from the World Wide Web," *International Journal of Electronic Commerce*, vol. 5, pp. 117–133, 2001.

[39] Tsou, H. T. and J. S. Chen.; "The influence of interfirm codevelopment competency on e-service innovation," *Information & Management*, vol. 49, pp. 177–189, 2012.

[40] Vargo, S., and R. Lusch.; "Evolving to a new dominant logic for marketing," *Journal of Marketing*, vol. 68, pp. 1–17, 2004.

[41] Hong, P., W.J. Doll, A.Y. Nahm and X. Li., "Knowledge sharing in integrated product development," *European Journal of Innovation*

- Management*, vol. 7, pp. 102–112, 2004.
- [42] Penttinen, E. and J. Palmer; “Improving firm positioning through enhanced offerings and buyer-seller relationships,” *Industrial Marketing Management*, vol. 36, pp. 552–564, 2007.
- [43] Li, L.Y.; “Marketing of competence-based solutions to buyers in exploratory relationships: Perspective of OEM suppliers,” *Industrial Marketing Management*, vol. 40, pp. 1206–1213, 2011.
- [44] Walter, A., M. Auer and T. Ritter; “The impact of network capabilities and entrepreneurial orientation on university spin-off performance,” *Journal of Business Venturing*, vol. 21, pp. 541–567, 2006.
- [45] Human, G. and P. Naudé; “Exploring the relationship between network competence, network capability, and firm performance: A resource based perspective in an emerging economy,” *Management Dynamics*, vol. 18, pp. 1–15, 2009.
- [46] Hallen L., J. Johanson and N. Seyed-Mohamed.; “Interfirm adaptation in business relationships,” *Journal of Marketing*, vol. 55, pp. 29–37, 1991.
- [47] Sivadas, E. and F. R. Dwyer; “An examination of organizational factors influencing new product success in internal and alliance-based processes,” *Journal of Marketing*, vol. 64, pp. 31–49, 2000.
- [48] Claycomb, C. and G.L. Frankwick; “A contingency perspective of communication, conflict resolution and buyer search effort in buyer-supplier relationships,” *Journal of Supply Chain Management*, vol. 40, pp. 18–34, 2004.
- [49] Wang, Q., K. Bradford, J. Xu and B. Weitz.; “Creativity in buyer-seller relationships: the role of governance,” *International Journal of Research in Marketing*, vol. 25, pp. 109–118, 2008.
- [50] Sanzo, M.J., M.L. Santos, L.I. Alvarez and R. Vazquez; “The effect of a buyer’s market orientation on attitudinal loyalty toward a supplier: Is dependence a moderator?” *Supply Chain Management*, vol. 12, pp. 267–283, 2007.
- [51] Gunday, G., G. Ulusoy, K. Kilic, and L. Alpkan.; “Effects of innovation types on firm performance,” *International Journal of Production Economics*, vol.133, pp. 662–676, 2011.
- [52] Korhonen, H. M. E. and I. Kaarela.; “Corporate customers’ resistance to industrial service innovation,” *International Journal of Innovation Management*, vol. 15, pp. 479–503, 2006.
- [53] Bolton, N.R.; “A dynamic model of the duration of the customer’s relationship with a continuous service provider: The role of satisfaction,” *Marketing Science*, vol. 17, pp. 45–65, 1998.
- [54] De Brentani, U. and E. Ragot; “Developing new business-to-business professional service: What factors impact performance?” *Industrial Marketing Management*, vol. 25, pp. 517–531, 1996.
- [55] Chen J.S. and H.T. Tsou.; “Information technology adoption for service innovation practices and competitive advantage: The case of financial firms,” *Information Research*, vol. 12, pp. 1368–1613, 2007.
- [56] Brown, J. S. and P. Duguid.; “Organizational learning and communities-of-practice: Toward a unified view of working, learning and innovating,” *Organization Science*, vol. 2, pp. 40–57, 1991.
- [57] Atuahene-Gima, K.; “Differential potency of factors affecting innovation performance in manufacturing and services firms in Australia,” *Journal of Product Innovation Management*, vol. 13, pp. 35–52, 1996.
- [58] Van Riel, A. C. R., J. Lemmink and H. Ouwersloot.; “High-technology service innovation success: A decision-making perspective,” *Journal of Product Innovation Management*, vol. 21, pp. 348–359, 2004.
- [59] Ringle, C. M., S.Wende, and A. Will., “SmartPLS 2.0 (beta)”, <http://www.smartpls.de>, 2005
- [60] O’Cass, A. and P. Sok.; “Exploring innovation driven value creation in B2B service firms: The roles of the manager, employees, and customers in value creation,” *Journal of Business Research*, vol. 66, pp. 1074–1084, 2013.
- [61] Li, L. –Y.; “Relationship learning at trade shows: Its antecedents and consequences,” *Industrial Marketing Management*, vol. 35, pp. 166–177, 2006.
- [62] Kandemir, D., A. Yaprak, and S.T. Cavusgil.; “Alliance orientation: conceptualization, measurement, and impact on market performance,” *Journal of the Academy of Marketing Science*, vol. 34, pp. 324–340, 2006.
- [63] Avlonitis, G.J. P.G. Papastathopoulou, and S.P. Gounaris.; “An empirically-based typology of product innovativeness for new financial services: Success and failure scenarios,” *Journal of Product Innovation Management*, vol. 18, pp. 324–342, 2001.
- [64] He, Z. and P. Wong.; “Exploration vs. exploitation: An empirical test of the ambidexterity hypothesis,” *Organization Science*, vol. 15, pp. 481–494, 2004.
- [65] Matthyssens, P. and K. Vandenbempt.; “Moving from basic offerings to value-added solutions: Strategies, barriers and alignment,” *Industrial Marketing Management*, vol. 37, pp. 316–328, 2008.
- [66] Van Riel, A. C. R., J. Lemmink and H. Ouwersloot.; “High-technology service innovation success: A decision-making perspective,” *Journal of Product Innovation Management*, vol. 21, pp. 348–359, 2004.
- [67] Chandy, R. K. and G. J. Tellis.; “Organizing for radical product innovation: The overlooked role of willingness to cannibalize,” *Journal of Marketing Research*, vol. 35, pp. 474–488, 1998.
- [68] Dyer, J. H. and H. Singh.; “The relational view: Cooperative strategy and sources of interorganizational competitive advantage,” *Academy of Management Review*, vol. 23, pp. 660–679, 1998.
- [69] Lindell, M. K. and D. J. Whitney.; “Accounting for common method variance in cross-sectional research designs,” *Journal of Applied Psychology*, vol. 86, pp. 114–121, 2001.
- [70] Nunnally, J. C.; *Psychometric theory* (2nd Edition). New York: McGraw-Hill, 1978.
- [71] Fornell, C. and D. Larcker.; “Evaluating structural equation models with unobservable variables and measurement error,” *Journal of Marketing Research*, vol. 18, pp. 39–50, 1981.
- [72] Lau, A. K. W., R. C. M. Yam and E. P. Y. Tang.; “Supply Chain Integration and Product Modularity: An Empirical Study of Product Performance for Selected Hong Kong Manufacturing Industries,” *International Journal of Operations & Production Management*, vol. 30, pp. 20–56, 2010.
- [73] Ruel, S., K. Evrard-Samuel, and N. Vignard.; “Collaboration and Information Sharing in an Internal Supply Chain during an Innovation Project,” *Supply Chain Forum: An International Journal*, vol 14, pp.32–41, 2013
- [74] Fang, E., R. Palmatier and J. B. Steenkamp.; “Effect of service transition strategies on firm value,” *Journal of Marketing*, vol. 72, pp. 1–14, 2008.
- [75] Spohrer, J. and P. Maglio.; “The emergence of service science: Toward systematic service innovations to accelerate co-creation of value,” *Production and Operations Management*, vol. 17, pp. 238–246, 2008.
- [76] Spring, M. and L. Araujo.; “Beyond the service factory: Service innovation in manufacturing supply networks,” *Industrial Marketing Management*, vol. 42, pp. 59–70, 2013.
- [77] Auh, S. and B. Menguc.; “Top management team diversity and innovativeness: The moderating role of interfunctional coordination,” *Industrial Marketing Management*, vol. 34, pp. 249–261, 2005.
- [78] Ritter, T.; “Communicating firm competencies: Marketing as different levels of translation,” *Industrial Marketing Management*, vol. 35, pp. 1032–1036, 2006.
- [79] Golfetto, F. and M. Gibbert.; “Marketing competencies and the sources of customer value in business markets,” *Industrial Marketing Management*, vol. 35, pp. 904–912, 2006.
- [80] Zerbini, F., F. Golfetto and M. Gibbert.; “Marketing of competence: Exploring the resource-based content of value-for-customers through a case study analysis,” *Industrial Marketing Management*, vol. 36, pp. 784–798, 2007.
- [81] Malleret V.; “Value Creation through Service Offers,” *European Management Journal*, vol. 24, pp. 106–116, 2006.
- [82] Gebauer H. and T. Friedli.; “Behavioural implications of the transition process from products to services,” *Journal of Business and Industrial Marketing*, vol. 20, pp. 70–80, 2005.
- [83] Santamaria, L., M. Jesús Nieto and I. Miles.; “Service innovation in manufacturing firms: Evidence from Spain,” *Technovation*, vol.32, pp.144–155, 2012.
- [84] Salonen, A.; “Service transition strategies of industrial manufacturers,” *Industrial Marketing Management*, vol. 40, pp. 683–690, 2011.