

Open innovation and service dominant logic: application of foundational premises to innovative firms

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Abstract

Firms have been modifying their innovation management processes to generate, implement and exploit new technological knowledge. A gradual shift from a closed to an open model of technological innovation has been the recurring pattern of this change, which has also induced firms to a modification of managerial procedures and business models. The Service-Dominant (SD) logic can offer a useful guideline to firms in the implementation of an Open Innovation (OI) model. In this paper we analyze the bases of the OI paradigm by means of the SD logic mindset. Each of the ten foundational premises (FP) of the SD logic are described, interpreted for high-tech firms and analyzed to suggest how they translate to the OI approach with the help of real world examples.

Key words

Service-Dominant Logic, Open Innovation, Value co-creation, Technological capabilities.

Resumen

Las empresas han estado modificando sus procesos de gestión de la innovación para generar, implementar y explotar el nuevo conocimiento tecnológico. Estamos evidenciando un cambio constante, de un modelo cerrado a un modelo abierto de la innovación tecnológica, lo cual ha inducido a las empresas a modificar también sus procesos y modelos de gestión. La lógica dominante de servicio (DS) puede ofrecer una guía útil para que las empresas implementen sus modelos de innovación abierta (IA). En este artículo analizamos las bases del paradigma de la IA por medio del marco de la lógica DS. Las diez premisas fundamentales de la lógica DS son descritas, interpretadas para las empresas de alta tecnología y analizadas para sugerir cómo deberían trasladarse al enfoque de la IA utilizando ejemplos reales.

Palabras clave

Lógica dominante de servicio, innovación abierta, cocreación de valor, capacidades tecnológicas.

Nota

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1. Introduction

During the last decade, the radical changes undergone in the international economic arena have induced the formulation of new theoretical approaches, both in the marketing and in the management fields. New and broader theories and paradigms, such as the Service-Dominant (SD)¹ logic for marketing and Open Innovation (OI), have been developed to explain phenomena that hardly could be justified by traditional theoretical constructs. Against this background, this paper leverages the SD logic to provide a complementary understanding of the OI paradigm.

Since its original introduction (Vargo & Lusch, 2004), the new SD logic has been enriched by several authors and additional perspectives, adapted to specific contexts and related to different approaches signaling its usefulness in understanding the essence of exchanges. This logic represents a transition from the Goods-Dominant (GD) logic to a new philosophy or “mindset” that better fits the new tendencies and needs in the global economy. The GD logic has been rooted in the economic view of exchanges: firms producing and selling tangibles to customers with the goal of maximizing profits. Instead, the SD logic centers in the process of serving other parties (firms, customers, network partners), where each one’s skills, knowledge and capabilities interact with the others to co-create value and benefits for all of them (Lusch & Vargo, 2008).

The SD logic is founded on ten premises that offer a mindset to re-evaluate what is exchanged, what is offered and how interactions between stakeholders should work in an efficient manner (Vargo & Lusch, 2004; Vargo & Lusch, 2008; Vargo, Maglio & Akaka, 2008). This SD logic emerges as a result of a theoretical approach that sees marketing as a social and economic process (Vargo & Lusch, 2004). Ballantyne and Varey note that SD logic’s “outstanding contribution to marketing thought has been to put ideas together that previously did not seem to belong together” (Ballantyne & Varey, 2008, p. 11). It encompasses previously fragmented thinking in a perspective that is consistent, transparent, open and dynamic. The SD logic thus offers an interesting setting that can be leveraged to assess the OI paradigm (Chesbrough, 2003b), mainly because the ten premises by which the SD logic has been derived present remarkable similarities with those specific aspects that differentiate OI from the traditional closed model of technology development and exploitation. It has to be noted that while the OI paradigm has been extended to contexts like business models and services in general (Chesbrough, 2007; Chesbrough, 2011), in this study we focus on technological innovations resulting from the firms’ effort to develop new technologies (Dosi, 1982; Freeman & Soete, 1997).²

Analyzing OI through the lenses of the SD logic’s foundations can help to enrich the OI paradigm of theoretical and practical content (Chesbrough, 2006b). While most research on OI has explored the outside-in process (i.e., the technology development stage), little attention has been paid to the inside-out process (i.e., the technology exploitation stage) (Enkel, Gassmann & Chesbrough, 2009). The SD logic can provide useful insights at this regard, given the emphasis it poses on customers, relationship among actors, and processes of co-creation of value.

In our view, the main advantage of adopting the SD logic perspective lies in clarifying the influence that potential technology users play in shaping the preferred strategy for technology exploitation. The upsurge of specialized markets for technology has made explicit the rewards arising from technology commercialization (Arora, Fosfuri & Gambardella, 2001; Gans & Stern, 2003). Several strategic alternatives are available to firms, ranging from out-licensing to

¹ The following abbreviations will be used throughout the article: SD logic: Service Dominant Logic, GD logic: Goods Dominant Logic, FP: Foundational Premise, OI: Open Innovation, and R&D: Research and Development.

² Different definitions of knowledge and related terms are provided in the Appendix.

Analyzing OI through the SD logic lenses can help to better conceptualize the OI paradigm

spin-off creation. The analysis of such alternatives, however, has mainly focused on drivers that are either internal to the firm or related to the external technological and competitive environment (Arora & Fosfuri, 2003; Chesbrough, 2003a; Fosfuri, 2006; Lichtenthaler, 2007; Herzog, 2008; Lichtenthaler, 2008; Bianchi, Chiaroni, Chiesa & Frattini, 2011). Potential customer's characteristics that might affect firms' choices have been largely ignored. The application of the SD logic to the OI paradigm can offer a contribution on this aspect.

The remaining of the paper is organized as follows. We first briefly introduce the OI paradigm and its theoretical bases. Then we focus on the ten premises of the SD logic. They are described, interpreted for innovative firms and analyzed to suggest how they translate to the OI approach with the help of real world examples. We conclude by outlining some challenges for innovative firms under this framework.

2. From Closed to Open Innovation

The main essence of OI is that it contrasts with the traditional "closed innovation" approach, whose principles state that a firm invests in research and development (R&D) activity with the aim of developing new technologies that become the basis to create new products. Such new products are introduced either into existing market segments or into new markets. New technological developments and, in general terms, innovation capabilities represent a relevant source of sustaining competitive advantage. Monopolistic profits can be gained when products are radically new, both to the firm and the market. The time sustainability of such monopolistic conditions depends on how much the firm is able to prevent imitation from competitors by investing in effective appropriability mechanisms.³

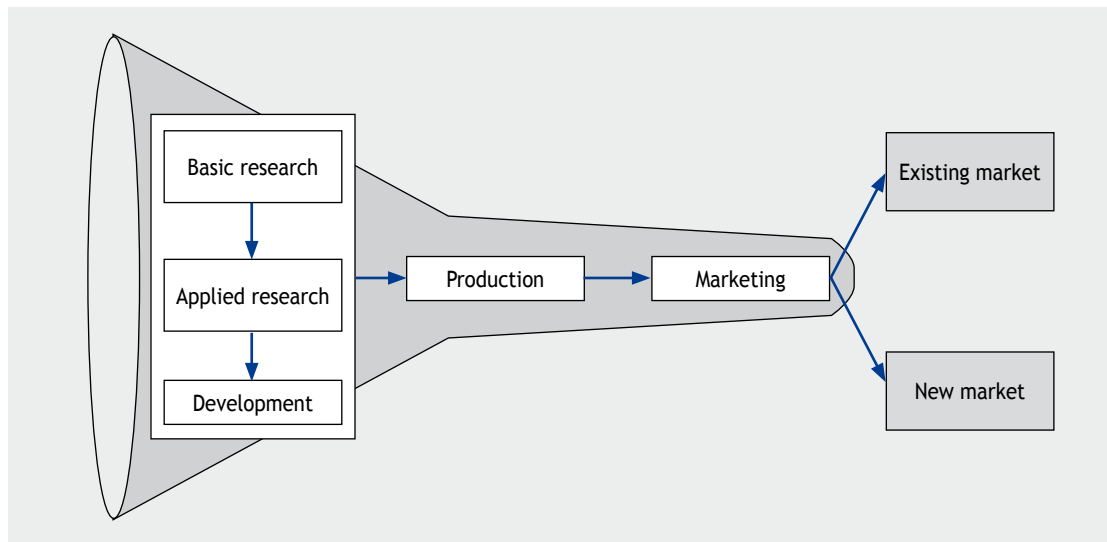
The most effective appropriability mechanism is "secrecy", a condition by which any uncontrolled public disclosure of information concerning the new technology is prevented. But secrecy can be maximized only if the firm develops the technology in-house and operates in a "closed" innovative environment. The resulting technology development process can be described as a funnel (see chart 1) bounded by the physical boundaries of the firm itself: several new product ideas are submitted to technical and market assessments; most of them are abandoned because they do not satisfy minimal success requirements; some of them are maintained and follow the remaining development process; few of them are eventually converted into new products and then introduced into the market; even fewer ideas become successful products.

Recent changes in the firm's external environment – advent of mass customization, increase of pace of technological change, strengthening of competition due to globalization – have emphasized the main limits of the CI model:

- a) From the technology development side, firms' internal technological resources and capabilities have resulted insufficient to face the development of complex technological projects. A large and increasing fraction of the needed knowledge is located outside the firm's boundaries. The capability to settle various forms of collaborations with different actors (universities, public research laboratories, technological partners, suppliers, customers and even competitors) has become key in order to apply such knowledge.

³ Appropriability mechanisms concern any strategy that innovative firms pursue to capture the value of an innovation. Typical strategies include secrecy, the ownership of complementary assets in marketing and manufacturing, being first to market, and filing intellectual property rights (patents). For an overview of the appropriability literature, see Winter, S. G. (2006). The logic of appropriability: From Schumpeter to Arrow to Teece. *Research Policy*, 35(8), 1100-1106.

Chart 1
The “closed innovation” paradigm

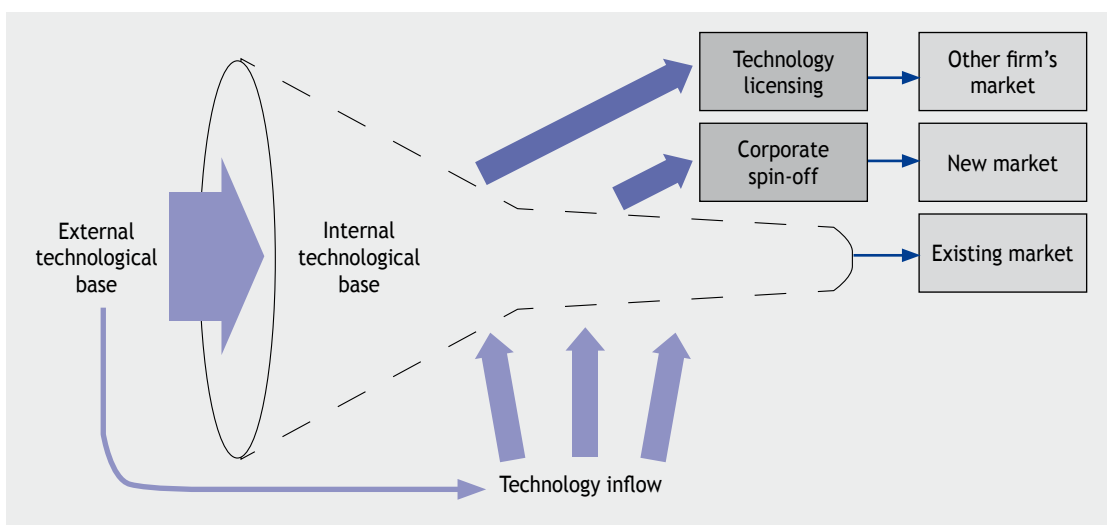


Source: adapted from Chesbrough (2003b).

- b) From the technology exploitation side, firms have found themselves lacking complementary assets needed to enter all the potential application markets. Besides traditional exploitation mechanisms, new forms of technology commercialization have turned out to be a viable strategic alternative.

Firms' boundaries have gradually become porous, and the entry and exit of scientific and technological knowledge more frequent (see chart 2). Consequently, firms have started to

Chart 2
The “open innovation” paradigm



Source: adapted from Chesbrough (2003b).

This analysis clarifies the role that customers play in shaping the strategy for technology exploitation

adopt an “open innovation” approach, whose main characteristics are presented in chart 3 (Chesbrough, 2006b).

Chart 3

Main differences between “open innovation” and “closed innovation”

1. External knowledge is as important as internal knowledge.
2. Continuous seeking of “genius people” inside and outside the firm.
3. False negative R&D projects can have a market.
4. New channels enabling flows of technologies that lack a clear path to market internally seek a path externally.
5. Knowledge is widely distributed and of high quality in general, so there is a need to connect with external sources of knowledge.
6. Proactive role of intellectual property management facilitating the use of markets to exchange valuable knowledge.
7. Intermediaries play a direct role in the innovation market: more intermediaries with more functions.
8. New metrics for assessing performance are needed (e.g. R&D in the supply chain, percentage of innovation generated outside the firm, time for an idea to get from the lab to the market and by channels, utilization of patents for others, value generated, investment in other firms).

Source: adapted from Chesbrough (2003b).

Despite its increasing relevance, the OI paradigm still undervalues the role that customers have in affecting the results of firms’ innovative activity and value creation processes. As recent literature has emphasized (Blazevic & Lievens, 2008; Bogers, Afuah & Bastian, 2010), customers are a crucial source of innovation and a stimulus for learning processes. They affect both technology development and technology exploitation. In the following sections we elaborate on these issues.

3. Open Innovation from the SD logic lenses

Based on the works of Vargo and Lusch (2004; 2008), Lusch, Vargo and O’Brien (2007), and Vargo, Maglio and Akaka (2008), this paper aims at offering an interpretation of the application of the ten foundational premises (FP) to the OI paradigm by emphasizing existing similarities between OI and SD logic. To illustrate how these premises can be translated into practice in the innovation context, for each premise we offer one or more examples of firms that have implicitly adopted the premises with successful results. The examples are drawn from the innovation literature, for which we followed a content analysis method and then conveniently selected the ones that fitted better to the ten premises. Chart 4 presents the summary of this discussion.

FP1. Service is the fundamental basis of exchange

The first premise posits that “service” is the heart of value-creation and reflects the process of doing something beneficial for and in conjunction with another entity (actors serve while being served). The parts involved (operant resources) apply their specialized competences to create the service, which is the essence of the exchange. The synergistic combination of actors’ knowledge enhances the ability to meet customers’ needs and also to create greater value (Melancon, Griffith, Noble & Chen, 2010).

The outcome of innovative activity – being it a tangible high-tech product or intangible technological knowledge – generates a value that depends on the level of novelty of the

Chart 4

Open Innovation from the SD logic lenses

SD logic's Foundational Premise	Application to OI	Examples
FP1. Service is the fundamental basis of exchange.	The ultimate goal of innovative activity is the generation of new technological knowledge, which represents the essence of service.	Patents represent one of the possible means by which the innovation service can be exchanged among actors.
FP2. Indirect exchange masks the fundamental basis of exchange.	Micro-specialization exists for innovative firms: i) At the sector level; ii) At the actor level; iii) At the contractual level. Micro-specialization masks the ultimate goal of the innovative activity.	Considering more value-creation options, Lockheed Martin Corp. transformed its innovation in flight simulators into video games.
FP3. Goods are distribution mechanisms for service provision.	Even if technological innovations are transformed in tangible products, the transfer of technological knowledge to users remains the essence of the service.	In the chemical processing industry, innovations are simultaneously exchanged through: i) New chemical products; ii) Technology licenses; iii) Chemical engineering; iv) Complementary materials.
FP4. Operant resources are the fundamental source of competitive advantage.	Collaborative agreements with a plethora of appropriate actors (operant resources) are a key source of competitive advantage in innovative contexts.	- ST Microelectronics became the center of a complex network of suppliers, technological partners and customers to catch up with leading competitors in semiconductors. - Procter & Gamble's innovation business model "Connect and Develop" favors the integration of disperse operant resources.
FP5. All economies are service economies.	Innovative activity represents a technology-based service aimed at solving practical problems, increasing efficiency and productivity.	Firms devoted to research and development activities are part of the so-called "Knowledge Intensive Business Services".
FP6. The customer is always a co-creator of value.	Users of innovations are involved in the value co-creation process both in the case of un-embedded and embedded technological knowledge. Users' participation to value creation depends on their technological skills and know-how.	- In the software industry, users do participate in the testing of "beta versions". - In the semiconductors industry, Application Specific Integrated Circuits (ASICs) allow users to customize technology.
FP7. The enterprise cannot deliver value, but only offer value propositions.	The outcome of innovative activity is technological knowledge, whose intrinsic value depends on how it will be applied/ adopted to solving specific practical problems.	The value of a patent (and of the technological knowledge it embodies) emerges only in the moment of its actual application.
FP8. A service-centered view is inherently customer oriented and relational.	The "demand-pull" model of innovation recognizes the role of customers in technology development - customers are a critical source of innovation.	- Fiat Research Centre (CRF) has adopted a customer centered business model aimed at transferring technological knowledge to local firms. - Bet-Co has based new product introductions on the results of CRM resources.
FP9. All social and economic actors are resource integrators.	OI emphasizes the importance of the complex network of actors participating in technology development. No actor represents the unique centre of a value constellation.	InnoCentive.com is a new type of value integrator, whose goal is to create a match between technological knowledge demand and supply.
FP10. Value is always uniquely and phenomenologically determined by the beneficiary.	The value of a General Purpose Technology results from summing up the marginal contributions to value arising from all contexts where the technology has been actually applied.	- The set of "claims" of a patent reflects the structure of possibilities of applying the same technological knowledge to different practical contexts. - A contest for new product ideas for baby products demonstrates that beneficiaries can define better products in terms of value and novelty than professionals.

Firms focusing on key aspects of the SD logic have achieved successful innovative results

innovation and on the capability it shows to solve practical problems more effectively than available technological solutions. In both cases, it is not the innovation outcome per-se that possesses a value but the creative adoption and implementation of it by the user that generates value. This process of value creation is strictly influenced by the developer's and user's competences and by the complementarities existing among them. The service at the basis of user-developer exchange is represented by the outcome of technological innovation and the enhanced ability it shows to solve current and future problems within the user's context.

This idea of technological innovation as a service is expressed in the OI paradigm, which also suggests that a good performance requires specialized competences (Chesbrough, 2003b). The need to connect with external sources of knowledge in order to produce the service is recognized. The nature of the service is the technological knowledge co-produced by the firm and a set of heterogeneous actors. The potential value of this service originates from its use as a tool for enhancing the user's productivity or efficiency.

The technological knowledge embedded in a *patent* represents a clear example of this point. Its potential utility can be converted in actual value depending on its application by any of the actors that have participated in its development or by any other firm that might adopt the same technology in the future. Such future adopters are often unknown at the beginning and might belong to sectors that are different from the developers' main sector. Thus, the total current value of that new technology is largely unpredictable.

FP2. Indirect exchange masks the fundamental basis of exchange

This premise indicates that around the direct exchange there are many products, processes, money, institutions and vertical marketing systems. These are only vehicles of exchange, which mask the service-for-service nature of the exchange. Micro-specialization is one of the illnesses that firms may have since the main basis of exchange can be sometimes forgotten.

In the case of innovative contexts, the main incentive of a firm to innovate is developing new technologies to be embedded in a product in order to meet the needs of (current or future) customers. The firm thus creates or strengthens its competitive advantage. This model implies micro-specialization at different levels:

- i) at the sector level, the outcome of innovative processes is technologies to be applied to markets in which the firm operates or in which it aims at entering in the future;⁴
- ii) at the actor level, each actor is specialized in one activity. Manufacturing firms develop technologies to create new products; engineering or R&D consulting firms develop technologies to provide customized technological services; universities and other public research organizations develop scientific knowledge that remains in the public domain and that can be freely used by any other actor;⁵

⁴ Notice, however, that such a sectorial specialization at the output side does not imply specialization at the input side. As shown in the case of multi-technology corporations, if the product to be developed is a complex system it is very likely that a firm needs to integrate different technologies arising from several technological domains. Cfr. Granstrand, O., Patel, P., & Pavitt, K. (1997). Multi-technology corporations: Why they have 'distributed' rather than 'distinctive core' competencies. *California Management Review*, 39(4), 8-25.

⁵ However, it has been recognized since long ago that, in order to develop adequate absorptive capacity, firms need to spend at least a part of their R&D effort in producing scientific knowledge similar to that developed by the scientific community. Cfr. Cohen, W. M., & Levinthal, D. A. (1989). Innovation and learning: The two faces of R&D. *The Economic Journal*, 99(397), 569-596; Rosenberg, N. (1990). Why do firms do basic research (with their own money)? *Research Policy*, 19(2), 165-174.

Competitive advantage of actors is based on their abilities to cause the expected changes

- iii) at the contract level, each type of exchange requires specialized contractual arrangements, like market contracts in the case of innovative products, licensing and/or service agreements in the case of technology transfer, research grants in the case of scientific knowledge.

Within the OI context, the final outcome of a firm's innovative activity is new technologies to be exploited in different forms and through different means. The same technology can be creatively applied to several sectors, by different types of actors and by means of alternative contractual (and pricing) arrangements. This situation overcomes the traditional limits of micro-specialization and transforms the firm in a more complex organization. The key to manage such a complexity is to recognize that at the core of a firm's innovative activity stands a service and that any combination of sectors, actors, and contracts is indeed a service-to-service exchange.

As an example, consider the aircraft manufacturer Lockheed Martin Corporation.⁶ A critical component of an aircraft is its avionics system, which controls the functioning of the whole aircraft. Given that any aircraft is characterized by specific physical features, a customized avionics system is always required. By recognizing the strict aircraft-avionics system interdependence and the fact that any future pilot needs a training with the new system before piloting the aircraft, Lockheed-Martin typically develops a flight simulator that is sold as a complementary service together with the new aircraft. To further exploit its knowledge in flight simulators, the company decided to use the same technology to develop video games – that is, a product targeting a different market, with different customers, and with different contractual and commercial arrangements.

As this example suggests, from the macro-economic perspective, the adoption of OI expands the concept of value created. What characterizes the production and use of technologies is a high development cost and a close to zero reproduction cost. By limiting the exploitation possibilities to one sector/one contractual solution, as implicit in the micro-specialization pattern suggested by the traditional innovation model, a firm loses an opportunity to create higher value.

At the same time, in order to expand the possibilities of adoption, use and value creation of new technologies, the intervention of new actors – such as intellectual property intermediaries⁷ – is often a necessary condition. Their role is that of assisting technology developers to search for and interact with potential users that might be dispersed in distant geographical and sectorial markets. From the macro-economic perspective, the costs associated to such intermediaries represent a drawback of OI.

FP3. Goods are distribution mechanisms for service provision

This premise separates the “service” from the product, services or processes that transmit the service value. They are only mechanisms embodying knowledge or skills that render the service. This premise is useful for focusing on the essence of the service.

The outcome of innovative activities is exchanged by means of different commercialization mechanisms, ranging from the selling of innovative products to the provision of engineering

⁶ This example has been drawn from Rivette, K. G., & Kline, D. (1999). *Rembrandts in the attic: Unlocking the hidden value of patents*. Boston: Harvard Business School Press.

⁷ For examples and references, see Chesbrough, H. W. (2003b). *Open innovation: The new imperative for creating and profiting from technology*. Boston: Harvard Business School Press.

The SD logic centers in the collective process of value co-creation

consultancy. Even in the former case, the “service” at the basis of the exchange remains the same: the transfer of new technological solutions that users apply to solving technical problems. The specific technology transfer mode does not modify the essence of the service. Only if firms accept and adopt this principle, they can correctly interpret the value creation process and promote the maximization of value created. By contrast, if each transfer mechanism is conceived independent from any other, then sub-optimal choices of value creation can be made.

Firms adopting the CI paradigm typically embrace the latter view. Technology transfer through mechanisms different from the introduction of innovative products is perceived as a residual strategic option, which is usually confined to geographically distant markets, to *old* technologies, or to non-core technologies resulting from processes of technological diversification (Granstrand, Patel & Pavitt, 1997; Patel & Pavitt, 1997). As a consequence, the value creation process is not the result of an integrated assessment of the various technology transfer mechanisms in which potential synergistic effects are considered.

Conversely, firms adopting OI combine the various technology transfer possibilities. If user’s specific needs and characteristics are properly considered, OI allows firms to enhance the overall value created.

Firms operating in the chemical processing industry have since long ago understood and applied this principle. Lots of chemical firms exploit the outcomes of their innovative activity by simultaneously introducing new chemical compounds into the market, by licensing-out the related manufacturing technology, by providing services of chemical engineering needed to set-up the plant on the basis of the licensed technology, and often by selling to licensees the complementary materials (e.g., catalyzers) to run the plant (Arora, 1995; Arora, 1996). Chemical firms correctly interpret the outcome of their innovative activity as a service, whose provision by means of different mechanisms generates greater total value. Such transfer mechanisms are modulated according to the user’s needs. Each transfer mechanism activates different value co-creation processes according to the user’s specific characteristics.

FP4. Operant resources are the fundamental source of competitive advantage

Competitive advantage of actors is based on their abilities to cause the expected changes. It includes human skills, logistic capabilities, knowledge bases, supply chain relationships and non-imitable strengths. This competitive advantage of actors focuses on finding the own distinctive competencies as the source, while working with strategic partners to provide unique offerings (Lusch & Webster, 2011).

The firm’s capability to develop, adopt and use new technologies have been outlined as fundamental bases of competitive advantage (Rumelt, 1984; Prahalad & Hamel, 1990; Barney, 1991; Teece, 2006). In a context of increasing technological complexity and dynamics, internal innovative capabilities have to be combined with skills and knowledge provided by other actors. It is the efficient integration of this broad set of innovative capabilities that becomes the source of competitive advantage.

The OI paradigm stresses the importance of collaborative agreements. The true source of competitive advantage lies in the firm’s ability to monitor the external environment, to set-up relationships with different actors, and to integrate several knowledge components. Key in this is an appropriate management of intellectual property rights, which are often used as a contractual weapon to enhance the firm’s bargaining power.

**Better value
is to be
gained from
collaboration
with and
co-creation of
the exchange
actors**

The example provided by the semiconductors producer ST Microelectronics is a case in point (Cesaroni, Di Minin & Piccaluga, 2005). ST Microelectronics has been a late entrant in the industry of semiconductors, which is dominated by U.S. and Japanese giants. After having exploited the opportunities offered by the niche market of MPEG encoders and decoders, the company soon realized that an enduring international expansion path fed by a persistent innovative activity could be sustained only by developing a vast and diverse network of partners to be involved in a complex value chain. This implied the development of strong relational capabilities, which allowed ST Microelectronics to become the strategic center of a complex and geographically dispersed network of suppliers, technological partners and customers (Lorenzoni & Baden-Fuller, 1995). Furthermore, the company understood that significant improvements in chip design could be obtained only by investing in basic research. Thus, an active participation to public research programs was encouraged, and collaborations were established with universities and public research laboratories.

Also firms in more traditional consumer markets have successfully adopted similar approaches. An example is that of Procter & Gamble's (P&G's) and the "Connect and Develop" innovation business model that was launched in 2000 (Dodgson, Gann & Salter, 2006; Huston & Sakrab, 2006). According to the new model, P&G's opened its innovation process by favoring the integration of knowledge coming from external sources. The change resulted to be successful, and the company could leverage its internal technological capabilities and eventually improve the efficiency of its innovation activity. P&G's story offers an example of how a firm can apply and use technological knowledge from external sources, through different means and at different levels of involvement (embedded vs. un-embedded technological knowledge). Recognizing the contribution of disperse operant resources has been one key of success of P&G's case.

FP5. All economies are service economies

Service has been central to the economy but is becoming more salient as specialization and outsourcing increase.

Innovative activity can be considered a service-based economy whose main objective is creating technologies to solve problems, to increase efficiency and productivity, and to satisfy needs. The basis of any exchange is the technology-based service itself irrespective of the means by which new knowledge is exchanged.

In an OI context the heterogeneity of technology exploitation possibilities and of technology creation conditions makes it explicit that any firm is indeed contributing in the development, diffusion, adoption and use of technologies. Technological knowledge is the unifying element of the entire innovative value system and the unit of exchange among the complex network of actors. Obviously, such a complex network will function better if these actors possess proper relational skills and capabilities, and also a strategic vision devoted to value co-creation of the technology-based service.

FP6. The customer is always a co-creator of value

This premise is based on the interaction of operant resources and their contribution to the co-creation of value. This means that the service will be best off if the user is involved in the service provision process, even though appropriate contractual mechanisms – such as the adoption of a systems view – are often needed to achieve consistently higher benefits that are shared among parties and to minimize potential inefficiencies and costs (Ng, Maull & Yip, 2009).

**Customers are
a relevant source
of innovation
and a stimulus
for the firm's
learning process**

The involvement of customers in the value creation process has characterized the innovative activity since long ago. Also in the case of innovative service provision by means of tangible innovative goods, users are largely involved in the process of value co-creation. Innovative firms have often tried to exploit this situation for their own benefits. Let us consider two cases.

In the software industry for the consumer market it was a common practice to launch a new software package with the anticipated release of a reduced “beta version”, which is given for free either to a reduced number of lead users or, more commonly, to every user, under the implicit and informal agreement that they will report back any problem and inconsistency they might find in using the software. Currently, provided that lifecycles of software have become shorter, this approach is much more dynamic and interactive, and users and producers interact continuously in software design and development. Thus users contribute to generating higher value along the entire software development process. The open source software is an extreme case of the example outlined above (Von Hippel & Von Krogh, 2003; Von Krogh & Von Hippel, 2006). Open source software is created by a vast and geographically dispersed group of users-developers, who offer their skills and experience to benefit themselves and any other potential user. The participation of end users in the co-production of service and in the co-creation of service value is thus the founding element of the (open source) software industry.

The second example is drawn from the semiconductors' business market. One of the most relevant changes promoted by semiconductors' producers over the last decades has been the introduction of Application Specific Integrated Circuits (ASICs) that allow users to create customized circuits (Von Hippel, 1994; Von Hippel & Katz, 2002). The process works in three stages. First, the semiconductors manufacturer designs and produces “standard” silicon wafers that contain an array of unconnected circuit elements. Second, by using a user-friendly CAD software package provided by the manufacturer, the user designs its custom interconnection layer to be applied to the standard wafer and uses the same software to conduct trial-and-error experiments. Finally, a silicon foundry produces the integrated circuit, according to the layer specified by the user. This process reduces the need for information exchange because each agent independently uses its tacit knowledge to solve its specific sub-problem. The technology supplier provides the user with a “technology package” containing a standardized technology and a tool kit that enables technology customization according to the user's needs.

The example of ASICs brings attention to the more general consideration that any final user can participate in technology provision and can contribute to the process of value co-creation only if two conditions apply:

- a) The user must have enough skills and know-how (operant resources) in that specific technological field or, at least, the technology developer has to provide a specific tool to the user to apply the technology according to his or her specific needs.
- b) The technology has to remain at a level that is general enough to be subsequently customized according to diversified needs – it has to be less context-dependent (Arora & Gambardella, 1994). In this sense, the technology represents the infrastructure of the value co-creation process, and not the final product.

Customer involvement in technology development and value creation, however, also conveys inherent risks that reduce the possibility to enhance the competitive advantage (according to FP4). Such risks range from an excessive focus on incremental innovations at the expenses of

It is the creative adoption and implementation of innovation outcomes that generates value

more radical solutions, to an increasing dependence of firms on lead users and customers, to an uncontrolled disclosure of knowledge and the consequent lessening of appropriability conditions. If not correctly managed by means of appropriate risk management methods (Enkel, Kausch & Gassmann, 2005), such risks could offset the potential benefits arising from customer integration in innovative contexts.

FP7. The enterprise cannot deliver value, but only offer value propositions

Firms cannot create and deliver value alone; they can only offer value propositions that create the service only following end user's acceptance, participation and consumption. A value proposition is the communication of how the firm will affect other actors, thus it should have an appeal for the stakeholders to see its potential value (Lusch & Webster, 2011). It is through a transparent dialog where all the actors state what they want and what they can offer.

This premise immediately applies to the case of a technology development, where the actual value depends on how the new technology permits to solve existing practical problems better any other available alternative. The new technology only represents the possibility to create value but it does not provide any value per-se.

A key example is that of patented technologies. A patent represents a property right granted to a technological invention, which protects the inventor from uncontrolled imitation. It can be traded among economic agents as it is an intellectual property right. One of the typical contracts by which patents are exchanged are licensing agreements, whose specific pricing method exactly fits the idea of technology as value proposition rather than delivered value. Because the effective application of the technology is not known ex-ante, it results difficult to determine an exact price for it. Licensing contracts, on the other hand, distinguish two components of price, a fixed fee and a royalty component. The latter is usually computed as a percentage of sales that the licensee will obtain in the future by using the technology. It represents the means by which the technology developer participates to the value co-created by the user. In sum, any patented technology can be described as a value proposition, whose actual value strictly depends on the user's application decisions.

There are other contractual solutions in an OI context that replicate the same pricing mechanism applied to licensing agreements. When a company decides to leave a newly-created corporate spin-off to further develop a technology and to bring it to the market, that company is offering a value proposition to the spin-off. By maintaining an equity share in the spin-off, the company then receives a part of the generated profits and captures a share of the value co-created by the spin-off resulting from the original technology development.

FP8. A service-centered view is inherently customer oriented and relational

The firm and the end-user are considered in a relational context since both create value in an interactive process. In combination with FP7, where value is finally determined by the end-user, the exchange is inherently customer oriented. The SD logic suggests that personal and interpersonal relationships lie at the core of service co-production and value co-creation processes, because mutual adaptation is often needed to solve unexpected changes and uncertainties that cooperative agreements imply (Guo & Ng, 2011).

Innovative firms have recognized the central role of consumers since the 1960s when a "demand-pull" model of innovation started to replace the traditional "science-push" model (Rothwell et al., 1974). Even though that distinction can be considered largely dated, recent studies confirm that consumers still play a dominant role in innovation development (Roberts, 2001). They represent a fundamental source of innovation and participate in different forms

The same technological knowledge can be creatively applied to several industrial sectors

along the entire process of idea generation, technology development and technology implementation.

An exemplification of this approach is offered by Fiat Research Centre (CRF – the corporate R&D centre of the Italian car manufacturer) (Cesaroni, Di Minin & Piccaluga, 2004). During the 90s, CRF converted itself from a “cost centre” to a “profit centre” by exploiting internal technological capabilities outside the group’s boundaries and by acting as a technological consultant on behalf of local firms. One key aspect of CRF’s successful strategy has been that of recognizing the centric role of customers. In defining customer’s technological needs to be satisfied, CRF was used to take into account not only customer’s explicit requirements but also customer’s latent needs, customer’s competitiveness conditions and (most importantly) the expectations of “customer’s customers”. This meant a relevant technological, organizational and managerial effort for CRF because its researchers were required not only to integrate skills and know-how from different technological areas but also to analyze the complex environment in which customers were operating.

The online betting market in the UK represents another example in this respect (Maklan & Knox, 2009). After an entry of a strong competitor, Bet-Co relaunched its services relying on dynamic capabilities and customer relationship management: they started by recruiting betters, developed a deep insight about preferences and behaviors and then designed specific services for key betters, which make its best customers to visit the site several times a day. The frequent visits of customers and betters allowed Bet-Co to know them better and to create different treatments for each group, thus the relationships between them evolved to network marketing. These capabilities were the bases of its competitive advantage that helped them grow from 4% to 30% of market share in a year.

At first glance OI seems to underestimate the active role of customers. By stressing the idea that a firm can exploit its technological capabilities through different means even in situations of “false negatives” (that is, when a new R&D project fails to meet the criteria in earlier stages of the development process), OI seems to adopt a pure “science-push” approach. However, this conclusion may be incorrect for at least two reasons:

- a) Irrespective of which actors will eventually appropriate the returns arising from the technology, any R&D project has to start from and conclude with an active involvement of end users, because only this condition can maximize the likelihood of functionality and success.
- b) A false negative R&D project that exits the firm’s boundaries and follows an external exploitation path still needs further development and implementation. Such additional stages are managed by actors other than the firm that originally launched the R&D project. However, these actors will have to adopt a customer-centered view just like the original firm if they aim at generating a technological solution that offers a value proposition to their customers. The problem only shifts from the original firm to such external actors but remains key for guaranteeing the success of the R&D project.

FP9. All social and economic actors are resource integrators

Organizations and individuals motivate and constitute the service exchange. All entities participating in the service production are considered social or economic actors. They should integrate resources to develop or co-develop solutions to problems in order to improve their well-being (Lusch & Webster, 2011).

In OI contexts, the basis of any exchange is the technology-based service itself

In any innovative activity several actors participate in technology development (such as universities, public research laboratories, providers, partners, competitors, and customers) and it can hardly be asserted that a single firm may possess all the needed resources and capabilities to manage the development process entirely in-house. Each actor offers its specialized technological, organizational, relational resources and capabilities. The value created emerges as the composition of various marginal contributions.

The OI paradigm recognizes and emphasizes the importance of the complex network of actors that participate in technology development. Contrary to the “value constellation” approach (Normann & Ramírez, 1993), which identifies one actor as the main value integrator within the constellation, OI also recognizes that each actor represents a value integrator. Furthermore, it detects new resource integrators that act as intermediaries among other actors and whose business model is based on the management of intellectual property rights.

One of the most cited examples in this respect is that of InnoCentive (Chesbrough, 2006a; Lakhani, 2008), which acts as a virtual innovation marketplace. The function of the InnoCentive business model is rather simple: it facilitates meetings between firms (“Seekers”) that need to find timely solutions to their technological problems (“Challenges”) and a vastly dispersed group of technicians (“Solvers”) willing to offer their technological expertise. As soon as a Seeker poses a Challenge, external Solvers submit their proposed solutions. Solutions that are judged acceptable are then rewarded by the Seeker with a cash prize. InnoCentive manages the process to facilitate the transmission of intellectual property from the Solver to the Seeker. It has also recently created some tools to facilitate collaboration among potential Solvers. InnoCentive’s role is that of a resource integrator, which contributes to value creation by allowing the exploitation of technological capabilities otherwise unexploited.

FP10. Value is always uniquely and phenomenologically determined by the beneficiary

This premise indicates that value is always judged by the end-user depending on the specific situation (time, place and network relationships) the actor is in. Value is defined in terms of value-in-use and value-in-context that depends on the needs and goals of each beneficiary under some specific circumstances, which can also change over time.

This last premise fits the innovation context perfectly. A new technology must be considered a potential solution to practical problems, whose actual usefulness and value strictly depend on the context in which it will be practically applied. The more a technology is general purpose (Helpman, 1998), the higher the number of contexts where it can be applied and the higher the overall value generated.

As an example take a patent protected technology and consider the structure of “claims” included in the patent documentation. Each “claim” represents a possible specification of the same technological knowledge, from the most general – that explains the content of the technological base – to the most specific – that explains how the technology can be used to obtain a determined product. Each claim represents a potential context where to apply the same technology. Actual technology’s value, however, only results from how end users will be able to adopt that technology to satisfy their particular needs. That is, how each claim will be effectively transformed into an actual and valued product. Once again, without end user’s intervention, a patent only remains a value proposition.

An interesting example that demonstrates that value is determined by the beneficiary is provided by Poetz and Schreier (forthcoming), who made an experiment with a contest for new

Service will be best off if the user is involved in the provision process

baby product ideas. They found that the generated ideas by beneficiaries scored significantly higher than those of the area professionals in terms of novelty and customer value; only somewhat lower in terms of feasibility. This example shows that crowdsourcing might generate higher value with respect to closed innovation processes (Afuah & Tucci, 2012).

4. Conclusion

We have explored how the Open Innovation Paradigm and the Service-Dominant Logic Paradigm relate one to the other. Both perspectives see the value-in-use as the center of exchange and also consider that better value is to be gained from collaboration and co-creation of actors. These perspectives represent a step forward in the way of doing businesses, leaving behind the orientation to products and manufacturing that now are seen just as vehicles of service. A contribution of this study is then the integrated view of two different areas of knowledge (marketing and innovation) that allows us to think in terms of the essentiality of the service. The examples presented for each premise demonstrate that innovative firms that have implicitly focused efforts on key aspects of the S-D logic have achieved successful results. This is another contribution of this work that encourages innovative firms to consider improving practices of the various premises. It is very likely that the better the performance based on the premises, the higher the competitive advantage of the involved actors.

Many challenges based on the SD logic are now opened for innovative firms. We outline at least four. One challenge is to think of new and more efficient ways to get other actors more involved in the co-creation processes of the service. Managing intellectual property rights in order to prevent opportunistic behavior from other parties may minimize potential conflicts among partners and create incentives to participate in collaborative agreements.⁸ A second one is to identify efficient ways for selecting actors to collaborate with. Interactions with different stakeholders and intermediaries become critical in creating value. Relationships based on trust, transparency and symmetry are the foundations of successful exchanges between involved parties and this promotes long-term collaborations that are beneficial to all concerned. A third challenge relates to the value propositions and the new forms to communicate them. Efforts should be made by firms to create rational expectations of the exchanges. Clear and straightforward messages may increase actors' satisfaction and enhance their ensuing positive behaviors. A fourth challenge regarding operant resources resides in recognizing the role that each of the operant resources play in producing services. Investing in training of employees and collaborators (for example, through internships, joint participation to research programs) will increase the value created in exchanges.

We believe that the SD logic mindset helps a firm in focusing on the real reasons of its function. In particular, the SD logic makes innovative firms think of more open ways of conducting exchanges, creating more value not only for end customers and the firm, but also for society at large. Research on the challenges outlined above is the beginning of innovative managerial practices that will fit the current trends of the global economy.

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⁸ On the effectiveness of intellectual property rights, see Bessen, J., & Meurer, M. J. (2008). *Patent failure: How judges, bureaucrats, and lawyers put innovators at risk*. Princeton: Princeton University Press and Ziedonis, R. H. (2008). On the apparent failure of patents: A response to Bessen and Meurer. *The Academy of Management Perspectives*, 22(4), 21-29.

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