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Case Study Analysis for Chile
Innovation in Services *
Short Version

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Towards Productivity and Competitiveness”**

**Case Study Analysis for Chile
Innovation in Services ***

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1. Introduction

The service sector is increasingly important in Latin America, accounting currently for more than 60 percent of the continent's GDP (IADB, 2012). However, despite its size, services is the sector with the largest productivity gap with respect to the technological frontier, namely the US (IADB, 2010). On the other hand there is vast evidence that innovation activities have extremely high social returns in developing economies, making it possible to transform these activities in a powerful engine of economic growth. Thus, boosting innovation in services seems to be central in order to improve the performance of Latin American economies. This is doubly important given the significant share of employment hired in the sector. Indeed, in Chile the service sector employs 70% of the labour force.

The traditional view of the service sectors considered it non-innovative or simply as a technology user, rendering it uninteresting for innovation policies. Recently, these traditional views are being challenged by research in developed countries suggesting that services are more innovative than previously thought and that in some subsectors (e.g. KIBS) they are even more innovative than the goods-producing sectors of the economy (IADB,2012). In the case of Chile we have some evidence that confirms this pattern (See Alvarez et al, 2013; and Iacovone et al, 2013). However, we still know very little of how innovation takes place in practice, what are its drivers and what is the role, if any, of public policy in fostering its innovation or in removing obstacles for its flourishing. This lack of insight for the service sector is particularly acute in developing economies.

Our research aims to contribute to fill this gap, first by seeking to determine the drivers of innovation and productivity in services markets, with special emphasis on the role of public policy. Second, giving emphasis to SMEs in the selection of the case studies. This is justified not only by the importance of SMEs in the service sector (Tacsir, 2011) but also because they employ a significant amount of labor in LAC. This emphasis is also important because SME productivity lags behind large firms.

Through case study analysis we will try to address seven questions. 1) How does innovation occur inside firms? 2) What types of innovations has the firm undertaken? 3) What innovation strategies are successful in terms of increasing productivity and competitiveness? 4) What are the key drivers and barriers to innovation (available necessary skills, framework conditions for entrepreneurship, culture and society, legislation and regulation, ad-hoc alliances, lack of finance, risk aversion, competing business priorities, etc.)? 4) What is the role of supporting institutions and infrastructure (e.g., research centres, ICT infrastructure, software, training, marketing investments)? 5) How do existing government policy practices and innovation-promotion policies affect the direction and propensity of innovative practices? 6) What is the role of sector institutions (business associations, specialized technology transfer institutions, etc.) in promoting the occurrence and diffusion of innovations that eventually proved successful? and 7) What types of interactions with public officials have taken place?

The Chilean cases analyse four major services subsectors: mining services, logistics, retail and KIBS (ICT sector). With the exception of retail , the criteria for selection of case studies consider sub-sector and firms that respond to the need of showing SMEs with the ability of conduct innovation initiatives that have undergone private or public interventions, and where it is possible to identify lessons and factors supported upon successful or failure experiences. In the case of retail we do analyse large firms. Nevertheless, we selected this sub-sector due to the successful evolution that it has demonstrated in the last decade, where the retail has increased its participation, productivity and global orientation, particularly within South America. We consider that it is important to understand those factors and dimensions upon which retail companies innovate and enhance their competitiveness in the global market.

Our first case study investigates the port and logistic services sector in the Arica Parinacota region (northeast region in the country), as part of a service subsector of particular relevance for a small open

economy as Chile. Port and logistics activity in Chile have lagged behind with respect to world and regional leaders. Indeed, the liner shipping connectivity index¹ ranked Chile 49th worldwide and 7th in Latin America, after Panama, Mexico, Brazil, Argentina, Colombia y Uruguay (UNCTAD, 2012a; 2012b). As part of this, and reflecting insufficient improvements, a major port as Arica has faced an increasing demand during last decades that has been satisfied with important problems in the quality of the final service provided. For instance, recent measurement of administrative processes established in 15 hours the time that a truck can expend within port's facilities. Consequently, a more efficient process could reduce the total time to 4 hours per truck.

The port and logistics activities in Arica and Parinacota have received attention from policy makers, who in 2009 formulated a strategic development plan. The Arica y Parinacota's regional competitiveness programme –PMC- in logistics is a private-public initiative aimed to consolidate a long-term development strategy, facilitating the co-ordination of different public tools and agencies, and private actions oriented to infrastructure and services enhancement. All of the above with the goal of optimizing freight flows in transit to and from the macro region, positioning Arica as a regional logistics hub.

In this case study we approach the main agents that were involved in the PMC, and investigate what has been the innovative behaviour of the firms and the performance of the port before and after the PMC was launched, and how the PMC has affected them.

Our second case study deals with the mining services sector that gives support to cooper mining. Currently Chile is the world leader in copper production, extracting 5,700 thousands of tons per year. One third of the known copper reserves worldwide are concentrated in Chile. The importance of the mining sector for the national economy lies on its international competitiveness, level of investments related to mineral projects and the increasing labour demand for different stages of the value chain. Indeed, mining sector accounted for 12% of the national GDP in 2011 and peaked at 15% in 2007 – constant prices-, and accounts for close to 60% of total exports for 2008-2011

Along with the energy sector, mining investments in copper will be the main destination direct investment for the period 2010-2015, accounting for more than US\$ 50 billion, including CODELCO (COCHILCO, 2010). With regard to employment, the sector employs around 90.000 people directly and 200.000 indirectly (COCHILCO, 2012). In line to this, there is huge expectation about services demand from mining companies due to projected investment for the next 5 years in Chile. Indeed, mining companies are progressively focusing more on their core business by delegating what is not strategic to third parties, using outsourcing arrangements, which create new business opportunities for suppliers (COCHILCO, 2009).

Within this context, we study the case of ENAEX, a firm that provides rock blasting services to mining companies and that also makes explosives. This case shows a firm that has made efforts to systematize and manage the innovative process successfully, and that in the process has become a world class service provider. We believe that Enaex trajectory is enlightening for the process that should experience all mining services providers in order to upgrade and become world class.

Our third subsector is retail services. This has been a very dynamic industry in Chile during the last decades and it has witnessed interesting local and global developments, where some Chilean companies have disembarked in several countries in the LAC region. The competitiveness of this industry can also be witnessed through several indexes that try to measure the attractiveness and stability for location of retail investments. For example, the 2012 Global Retail Development Index

¹The Liner shipping connectivity index indicates a country's integration level into global liner shipping networks. Countries' access to world markets depends largely on their transport connectivity, especially as regards regular shipping services for the import and export of manufactured goods (UNCTAD, 2012b).

(GRDI) ranked Chile as the second best destination for developing retail investments among 30 location alternatives in emerging economies and second in Latin America (AT Kearney, 2012).

Complementary to this, the high level of concentration in the industry –the three biggest companies represent a large proportion of market share in grocery, department stores and home improvement formats-, the strong competition among local retail firms and the limited market size in Chile are some of the arguments that explain the internationalization process of large Chilean retail companies. Large retailers have thus located subsidiaries in Argentina, Peru, Colombia and Brazil.

Within this sector we analyse what we consider a successful innovation case of CENCOSUD, to unfold whether innovation has played a key role in strengthening the regional advantages of the Chilean companies.

Our fourth case is the offshoring services subsector, where we will analyse the impact of a public initiative to strengthen it. Offshoring has been a fast growing activity in Chile consistent with global trends. Indeed, companies are increasingly using shared services and outsourcing (SSO), activities that are not at the core business, seeking to reduce costs and streamline their practices in an effort to improve the overall business productivity and to strengthen their market position. This worldwide trend of outsourcing and delocalization processes, particularly by large companies, has implications in the global division of labour but also in the learning curve where firms from different countries assume new tasks. In fact, many basic and non-critical processes have been relocated in low-cost countries like China, India, Malaysia and Easter Europe.

In Chile, global services are highly concentrated in Santiago Metropolitan area, which represents approximately 95% of the ICT firms who facilitate accessibility to a geographically concentrated supply (ARDP Region Metropolitana, 2007). Services that have major representation are call centres, outsourcing data processing and storage, design and management of websites, credit card management, product design and packaging, customer assistance, among others (Piña, 2005).

In 2008, the Program for Regional Competitiveness Enhancement –PMC- in global services was launched by the Regional Government of Santiago. It had the goal of creating a strategic change in business from transactional-business logic to analytical-business activities, that is to say a transition from low to high value-added. With the help of interviews to key actors we investigate whether the PMC had results in global services sector in Santiago, with focus on possible links with firms' capabilities to innovate.

2. Analytical Section: Some insights about the context where local firms develop innovations.

The case studies analyse different firms, from those which has a long trajectory of almost 90 years of participation in its economic activity, like Enaex, to those who are recently designing their first business model to commercialize their services and outcomes, after years of R&D. This variability is not just about time, but also is about the type of innovations that firms develop. Indeed, the four cases studied helped us to realize how different process and organizational improvements, and not just product or marketing innovations, have been ways in which firms socialize their enhanced services (for example through new forms of relationship with customers) aimed to ensure the best shopping or service experience. In some cases, technology has been a crucial component in developing new products or processes, but in others non-technological experiences have generated effective ways to implement solutions. For the former, we identify experiences like Enaex and Click Educa, which support their new product development - for mining sector or for educational purposes -upon technology. For the latter we find the experience of Jumbo supermarket, a firm that seeks to recover its client-based service culture.

Complementary, the industrial context where they develop their services is also diverse. Herein some cases like logistics and retail we found relative small groups of firms that are highly competitive,

which contrasts with firms embedded in a more collaborative environment. Then, environment and institutional factors are also relevant in facilitating or limiting the establishment of new solution among firms. In this vein, regardless of the role that service firms play in their value chain, the effort of discovering and implementing innovation always implies the use and exploitation of internal assets that equip them to evolve into related or improved services, as a path that enrich its business strategy. For instance, port logistics firms in Arica and Parinacota region find it difficult to develop new services and improved delivery, since the weak social capital between firms does not enable the development of virtuous exchanges of experiences and learning derived from successful or failed experiences of innovation. On the contrary, this sub-sector is characterized by high levels of competition and almost inexistent forms of intra-industry collaboration. Something similar is appreciated in the retail sector, which is very successful in its business strategy (for large firms), but it has developed generating a huge institutional distance –in relation to local firms- where industrial linkages are hard to recognize.

In all four cases studied firms self-recognize themselves as innovative units, and we certainly have identified evidences of that experience. Nonetheless, the level of maturity in innovation work is different in each case. For instance, the innovation path developed by Enaex, Cencosud, and Sodimac is very distant from the experience developed by firms inserted in the difficult environment of peripheral regions of the country, which are characterized by weak access to specialized human capital, lack of dynamic supporting institutions to find the best alternatives to develop effective and consistent innovations, according to their capacity to absorb new knowledge and its stage of development. The capabilities present in each firm to innovate are also very different.

In the same line, it seems that firms are becoming increasingly aware of the importance of innovation, a slow cultural change that has been expanding since the second half of 2000s. In fact, consolidated and relatively new firms list their innovations as something recent, which implies new dynamism service improvement. This phenomenon could have its starting point in the public effort to sensitize firms about the importance of introducing improvements that will benefit them by enhancing their performance and competitiveness. Indeed, firms frequently mention that among sources and motivations are personal motivations –mainly in small firms-, competitiveness improvement, experience in foreign markets, and the availability of public policies aimed at promoting and consolidating innovation in firms.

Also, it is relevant to take into account the influence played by local or foreign partners, since the joint development of related or improved services may be crucial for firms in adopting new processes, new technology or new forms of organizing the relationship with clients. One example of this is the experience developed by Cencosud in introducing a new service format for its technological department, where new ideas from foreign firms were crucial. In a similar vein, Sodimac developed a format of home-improvement inexistent in Chile until late-80s. In the logistic sector, JBLogistics new solutions and cargo layout were developed in association with and supported on the experience of international partners, so to perform the service according to clients' requirements. In mining services, Enaex develops new blasting technologies and equipment to ensure high standard of safety and quality; this knowledge is accessed from global pipelines developed by the managerial level of the firm with international partners and scientific groups.

Summarizing, the cases presented show that in a developing economy such as Chile, we do observe clear innovative activity in services subsectors that are relatively competitive. This activity is mostly financed internally, but where collaborations with international partners and local suppliers are very important both as sources of information and as key partners for the implementation of the innovation. The role of public policies is mild, and in some cases inexistent, something consistent with interviews to policy makers we provide in a parallel part of the study, where past and current policymakers regards services as important but where there are no policies, strategy or thought on services innovation as a particular issue.

3. Taxonomy of innovation applied to four Chilean Service sectors.

Innovation in service sector has been a topic of wide academic discussion in the last decade. Some research seek to achieve a distinct conceptualization of innovation in service sector, which has been developed as a successive approximation including new data and current learning about service sectors (Gallouj, 2002; Djellal et al, 2003; Gallouj and Savona, 2009). Complementarily, other research looks to define whether technological or non-technological capabilities of firms are crucial for service provision (Djellal and Gallouj, 2012; Aboal and Garda, 2012) or the distinction between the macro and meso level for innovation and its link with the decision-making processes (Smits, 2002). Also, there are analyses aimed to contribute to a better understanding about how technological capabilities, human and organizational capabilities make differences between standardized products or customized services (Hertog, 2000; Hipp and Grupp, 2005). Among them, one of the most helpful distinctions of service innovation dimensions and categories is that of presented by Hertogin 2010, who creates a taxonomy of innovation in services.

The effort of Hertog (2010) to create a taxonomy of innovation in services helps in the understanding of how to analyse different pieces or factors that generate innovation in firms and sectors. The model he develops can vary between *4D or 6D categories of innovation*, according to its main solutions.

The 4D model helps us in mapping and analysing the diversity of innovations in a structured way to understand new solutions developed by firms. Then, this approach to service innovation comprises intangible characteristics of a new service –new ideas or concepts to solve a problem-, the design of new interfaces for interactions between service provider and clients, the internal organizational arrangements that enable better performing of service employees and the relevant technological opportunity for service innovation.

Similarly, the 6D service innovation model is useful in mapping and managing the outcome of service innovation process in six key dimensions or characteristics of discrete service innovations, like new service concept, new customer interaction, new value system/business partners, new revenue model, new organizational or technological delivery system.

Within this framework, the identification and classification of innovations in each four service sector analysed in Chile allow us to distinguish patterns in firm's strategy of innovation, in terms of their motivations, restrictions to innovate and its results.

In this regard, the case of Port Logistics in Arica and Parincota region show a profound component of new clients interface and an incipient development of new service delivery system, both technological and organizational. Most of firms' innovations have a pattern of *supplier originated innovations*. Moreover, the innovations in this sector are small and frequent, situation that makes it difficult to categorize them in a unique model, since many of individual dimensions are strongly interrelated, like new service concept, new locations and the technological options adopted by firms. Indeed, and as example, Arica's port terminal (TPA) has developed innovations related to the improvement of the port's layout, slot allocation for trucks management at the port, price negotiations with customers and suppliers, automation of electronic records of the port loads entered, design of a traceability system for load, developing an application to have a digital records of cargo movements within the port, introducing intra-port mechanisms for safety enhancement, measurement of the port's carbon footprint and the recent establishment of a department of innovation. According to Hertog's (2010) 4D classification these innovations can be categorized into the creation of new clients interface and an incipient development of new service delivery system, both technological and organizational.

Most of the service innovations in the case of Enaex, can be classified as typical types of innovation – process or product-. However, following Hertog, major strategic solutions developed by Enaex –

MILODON Truck², Intelliblast³ - can be classified as well as new *service concept and new technological service delivery system*. Indeed, **MILODON** is the world's largest truck for mixing and loading of explosives. Also called *truck factory*, because it is an explosives factory-mounted on a truck. Its development was made entirely by professionals from the equipment development area of the firm. Some of the factors that differentiate this truck from the rest of the equipment available in the industry is the implementation of a series of safety measurement systems, automation equipment to minimize risks for operators and its size (it is the largest available in the industry). Hence, this truck reduces the number of people, truck and equipment moving through the mine in each loading cycle. From the point of view of safety of the mine, the latter factor is a sensitive area. For example, to load 10.000 tons of explosives the number of involved trucks is reduced from 20 to 14, approximately. This improvement has positive effects on operations management. By the same token, **Intelliblast** consists of a software development in accordance with a set of input data, such as compression, fracture frequency, among others, which determines the type of rock fragmentation to develop. This information is transmitted to the truck factory, which has a GPS device mounted on the arm allowing detecting the location of the perforation, the type and volume of explosives to charge. Through this system it is possible to develop customized designs of the blasting processes according to the obtained field data. The whole process is supported by the communication system "INTELLIBLAST"® with satellite support, a global pioneer in achieving efficiencies by ensuring the location, proper mixing and dosing with simultaneous transmission of data and process traceability. Other innovations include **INTELLIDRILL**, which is a mix of software and hardware used in the drilling process for adding explosives. The application measures a number of parameters related to the strength and characteristics of rock used later for the optimal fragmentation through the blasting process. This application reduces overall cost and improves the outcomes of rock fragmentation. For the execution of this process drilling sensors are used, which capture information as electrical signals, derived from the rotational speed of the drill, power consumption, etc. This information is translated into a characterization of the rock quality that helps the design of the blasting and eases the fragmentation.

The retail experience shows us in many cases solutions aimed to generate a new client interface –how the client interacts with the retailer during purchase- where *new formats* are developed to achieve the client's best possible shopping experience. Likewise, innovations on the delivery systems are linked to intra-extra organizational changes and the need for new skills to supply new retailing services. Additionally, *new technological innovations* include *new logistic optimization systems, consumer profiling, self-service devices and development of e-commerce*. For example, let's take the case of an innovation in the client's interface. Before the intervention the electronics section of Paris store consisted on a brand promoter -who mostly sold his brand and repairing in defects of the rest- and a seller who had access to execute the sales that the promoter made. In this context, delays in customer purchases were concentrated in two key milestones (1) coordination between the promoter and the seller to complete the sale, and (2) the delivery of product, as the promoter of the brand had to hold the customer's receipt to find, pick-up and deliver the product to the customer. This process could easily take 25 minutes on average. In the solution that was implemented both sources of time delays were eliminated. Customer average waiting time was reduced to 5 minutes. The model of innovation defined six different roles. One of them was that of a hostess, who received and guided the customer according to the type of product she wanted; an adviser who advised clients on the best product suited for her needs; an expert who is available to answer technical questions and to train the customer in-store –at no additional cost- in the use of purchased products. Also, three support roles were considered to complement the buying process, such as cashbox, storage and delivery of the purchased product.

²MILODON has been catalogued as the world's largest truck for mixing and loading of explosives. This solution is considered one of the most important innovations of ENAEX, because its development was made entirely by professionals from the equipment development area of the firm.

³Intelliblast is a communication system with satellite support. Enaex has categorized it as a global pioneer in achieving efficiencies by ensuring the location, proper mixing and dosing with simultaneous transmission of data and process traceability to support more efficient blasting processes.

The offshoring service shed light about strategies followed by firms in introducing new services concepts, new customer interaction and new technological delivery system. Indeed, Click Educa –a technological firm specialized in developing internet-based interactive environments for educational purposes- and Orca –a firm that provides services to update clients’ capabilities in IT services management and safety- develop two different strategies with the same goal. Click Educa establishes its strategy upon the interaction with clients, in order to achieve a deep understanding of their needs and requirements for education in the classroom or at home. After this process the firm is able to develop *new service concepts* and *new service delivery* like customizable tools for clients. In fact, Orca relationship with client starts through the installation of an IT tool. Along this process, Orca develops a thoughtful diagnosis of client’s service management bottlenecks. As a result, service provider builds up a long-standing relationship with client in a form of collaboration for the design and implementation of tailor-made solutions, such as *new service concept* and *new service delivery system* –organizational and technological.

All four cases covered similar dimensions of service innovations, such as new service concepts; new technological solutions linked to internal processes and service delivery; new organizational delivery systems that generally enables to develop new customer interactions through the service provision.

4. Factors that facilitate or hinder the innovation process

Evidence derived from case studies allow us to identify at least three group of factors that facilitate or limit innovation process in service firms, like human capital, the nature and organization of innovation activities, and the internal R&D and innovation processes of firms.

4.1 Human capital

Irrespective of the sector, human capital is one of the most relevant factors that determines the establishment of regular routines of firms’ R&D activities. Then, the production of new or improved capabilities and necessary skills is one of the tasks that firms must consider if they want to expand their in services. In this vein, logistic sector faces a regional lack of skilled workers to generate new and improved operational processes in Port activities and related services. Consequently, the attraction of *foreign* professionals is a strategy followed by big firms like TPA. Then, buying human capital outside of the firm – and even outside of the country - is one way in which knowledge needs are satisfied for innovation. Within the same sector, JBLogistics exploits its linkages with international partners covering the lack of required professionals, in order to solve clients’ requirements under Just in Time (JIT) schemes. Then, rather than piggybacking on regional or systemic strategies (which are unavailable) to solve common needs that imply constraints to innovate, individual firms develop *ad-hoc* human capital strategies to implement improved services, mainly in topics like engineering, project design and management.

Enaex faces a different challenge. Its business is in the area of operations in the mining services industry faces the tension of recruiting appropriate people to develop and enhance innovation initiatives within firms with a holistically perspective. Then, to strengthen innovation processes and their management the firm requires skills different to and complementary to engineering. In this regard, Enaex has seen that sociologists and professionals from related areas have complementary capabilities and more holistic approaches to processes and its consequences. Therefore, the company recently has been developing talent retention strategies, especially those who have soft skills such as teamwork and flexibility. As a result, firm’s process of human capital selection (i.e. workers) for generating innovation projects establishes the availability of soft skills as as an important requirement.

A different way of addressing the scarcity of skills can be seen in our retail sector case studies. In a different context, when the retail sector aims to set up new service formats or the re-design of internal processes, then training opportunities for current or new hired employees –depending on the goals of

the new solution- are crucial to effectively achieve new forms of relationship with clients. Thus they opt to upgrade the required skills in-house.

The retail sector experience of human resource development is then structured on clearly defined roles, functions and commitments of every single person who works in the company, with the goal of successfully introducing new services delivery. Specifically Jumbo and Techno-Paris introduced gave new responsibilities to workers but also trained them to be able to meet commitments, in lieu with actual possibilities to develop personnel careers in a dynamic environment. Within the same company there were different ways of implementing this. In Techno-Paris the entire department was rebuilt and there was an external recruiting process, where new selected candidates were trained for 45 days in every possible technical issue in fields of electronics, computers, televisions, mobile phones, etc. Training took place every day in a policy of alliance with suppliers of brands products according to a defined agenda. This implied an important change since there were no instances of regular training for sellers or promoters before the implementation of this innovation.

The experience in the Offshoring service sector shows that despite of having professionals with technical abilities in software development and coding, there is a progressive need to include complementary knowledge and skills. For instance, Orci personnel, with a strong base of engineers, in the last year has varied its internal composition including professionals from social sciences that bring a complementary perspective in the relation with clients. Click Educa is based on engineers but as the innovation is evolving more diverse professionals are included, like teachers and designers, in order to respond to clients requirements of pedagogical contents, friendly design and platform interactivity.

In general, concerning the human capital hired, there are no gender distinctions with regard to the introduction of innovations. Notwithstanding, firms recognize that female personnel help to deepen the scope and consequences of decisions made or improvements needed for developing services. This is based on the ability of women in the implementation of an inclusive view of services, their ability to focus on detail and persistence to implement the best possible innovations.

4.2 Organization of Innovation activities.

The nature and organization of innovative activities is highly dependent of firms' capacity to absorb technological opportunities currently available in the service sector and in the country. Also, firm's motivations and available resources, coupled with the institutional framework, are key factors that determine firms trajectories and capacity to innovate. For instance, few service firms have established and invested in developing a R&D department that equip them in service improvement and the strengthening of their own assets. In this vein, it is common to find that service firms hire another service firms –consultants- to achieve the goal of setting up new solutions.

As a result, one can differentiate between two groups of firms. First, those who have not developed their internal capacities to build up successful new services, due to huge costs in formalizing previous knowledge to support innovation processes. Second, a group of firms that expand their service innovation capacity due to regular processes of in-house new solutions development, which is based on their internal assets, experience and knowledge accumulation. The former group defines dependant schemes to develop new or improved services mostly through external consultancies. The latter, can define those firms internally and usually are situated close to the frontier of service provision.

In the port logistic experience, main companies like TPA contract consultancies for specific analysis and/or improvements. A regional university developed applied research to reduce time and processes involved in cargo movement within the port. However, this firm is currently studying the possibility to develop an innovation department with the goal of managing internal processes and its improvement.

In the mining service sector, Enaex has established a R&D team that develops applied research to improve processes and quality control. According to their internal organization and the profile of

professionals involved in this department, the role of the head of R&D management is crucial, since he seeks to relieve a project portfolio and initiatives that invigorate innovative capacity within the firm. Then, this R&D team is focused on the core of the business but also is linked to the rest of the company. For instance, the firm has developed a mechanism of knowledge transfer which is a communication tool that facilitates the creation of participatory workspaces. Particularly, this experience allows employees' interactions and the exchange of their experiences on projects located in different regions of Chile, by the use of an online collaborative tool.

In this framework, a typical process to encourage innovative initiatives within Enaex considers four main stages, like (1) the reception of innovation projects, through an open mailbox, mail, etc.; (2) the development of a pre-assessment process oriented to strengthen the profile of the project; (3) the development of a pre-economic assessment, once the profile was enhanced; (4) the approval and development of the proposed innovation. This process is waiting for an instance of formal recognition of innovative ideas and proposals within Enaex, since incentives are not defined yet.

On the other hand, some innovations implemented by retail firms required the support of external consultancy. For instance, since 2005, Cencosud have contracted Stratam, a strategic alignment consultancy company which intervenes firms' processes to improve their output. Particularly, the consultancy was directed to develop experiences in customer service, with the focus of improving customers' shopping experience as business differentiator. The approach used by Stratam in various interventions is based in the same basic methodology of questioning "how better coordination within the company, without causing significant changes in available assets will impact in the company's performance?" This methodological approach was contextualized to the internal situation of Cencosud. In general terms, the intervention was based in a strategic diagnosis upon which a pilot experience was designed and proposed as an intervention in areas like Jumbo Supermarkets, Cencosud Card and webCenter, and Techno-Paris. Once the pilot was tested and improved, then the company decides about its extension to all stores.

In offshoring services, Click Educa has internally organized its R&D activities based on its engineers. However, lack of knowledge of commercial processes related to firms evolution play against its approach to the market. Currently, the firm is experiencing a fusion process with a bigger company that has developed the commercial skill.

4.3 Government Funding

Another factor that can play as facilitating or hindering innovations is the available funding. In this aspect, it is convenient to differentiate between big-sized firms and SMEs. In this direction, Retail firms –of this case study- have developed their innovations with their own funds. They rarely use loans to finance innovations. In that logic, government funds are not a source of funding, not even government incentives. such as the R&D tax discount. Public incentives were not mentioned at all, with exception of Enaex. As the size of the firm becomes smaller, though, accessing public funds becomes more important. For instance, Enaex has used various public instruments to finance the introduction of innovations, primarily those from INNOVA-CORFO⁴. In the 2000s, Enaex got public grants for funding several of its innovation projects, from the National Fund for Technology and Production-FONTEC. The funding helped to co-finance the construction of a pilot plant for manufacturing initiation mechanisms (CORFO, 2000) and the project INTELLIDRILL® (ENAEX, 2007). In 2008, the firm developed a project focused on enhancing the culture of innovation and the creation of a structure to manage it, which was also funded by FONTEC. This experience facilitated the identification of opportunities for innovation, the definition of a routine as participatory identification, the evaluation and the implementation of innovative ideas within the firm.

⁴The firm has not had experience with instruments from the Chilean Commission of Science and Technology -CONICYT.

Similarly, Clik Educa received various public funds to develop its innovations in educational contents, internet interface, the design of its educational software application, and the internationalization process of the business. Those funds came from the Chilean Economic Development Agency –CORFO-, from the Direction for the International Promotion –PROCHILE-, and from the Organization of American States –OAS.

4.4 Institutional development for innovation in services

Institutional aspects⁵ for enabling or hindering service innovations can be visualized from at least two perspectives. First, it is the type of relationship and linkages between firms and the service environment that enhances or restricts innovation. Second, we consider the public support through public policies and the support of public officials to firm's innovation.

Usually, innovation is not the outcome of the isolated effort of individuals, firms, Universities or the Government; on the contrary relations and interactions are crucial conditions for developing innovations. In this regard, it is relevant to identify the kind of relationships that enable the capability of different economic actors in contributing jointly and individually to the development and diffusion of innovation. Then, weak linking institutions would be characterized by few interactions among actors, and will make it difficult to create new knowledge, to create and enhance human capital, to bring together complementary knowledge, and to enhance networking, among others. The case of logistics shows how important is the strengthening of networking and social capital, since the weak integration of firms along the value chain hinders the exchange of information and sectoral knowledge that could boost the regional performance of firms. For instance, the Terminal Port of Arica –TPA- states that a major constraint to innovate has been its (lack of) integration with customers and suppliers. Furthermore, the relationship between institutions has not been all the expedited it should, because of poor integration of available information systems used by several stakeholders. As a consequence and to counteract this, sectoral firms are beginning to implement some forms of interaction like the Community Port of Arica, which convenes firms and public institutions directly linked to the Port's activities.

According to this experience, we presented two cases of failure at sectoral level: Port Logistics in Arica and Parinacota, and the Offshoring sector in Santiago Metropolitan area. Interestingly, we did find that firms innovate introducing solutions that improve their services, as it was presented above. This despite failed initiatives to generate institutional frameworks that were intended to facilitate innovation. This could be interpreted as a lack of need of this infrastructure (firms innovate irrespective of the infrastructure). But it could also reflect that innovation could have been higher with it, but what we observe are lower levels due to its absence.

Notwithstanding, in both regions, the individual innovations have consequently little link with main strategic definitions defined in the (failed) regional cluster programs (called PMC in Spanish) to enhance selected economic sectors competitiveness. For this policy the service sector value chain was the key approach sought to strengthen firms' competitiveness in Arica and Santiago, in order to expand intra-industry and inter-firms interactions and collaborations,. However, despite PMCs developed a very focused cluster analysis and defined strategic initiatives based on international sectoral analysis, it seems that this regional public-private program failed in hooking up local firms in order to gain great levels of participation in its design and legitimacy. For instance, PMC Santiago Global –offshoring- was designed in 2008, but its governance committee found difficult to hire a project manager due to competing interests. As a result, local firms progressively decreased in number when they saw that promises and initiatives to improve cluster competitiveness did not meet what was programmed. The experience in Arica and Parinacota, between 2010 and 2012, describe a well structured value chain analysis that did not take into account the level of investment for SMEs.. As a

⁵As institutional aspect we refer to factors that define the type of actors, normative and rules, relationships, networks, governance, among other that define specific environments where firms develop their services.

result, few firms supported the PMC's evolution and currently those firms are acting without considerations of strategic initiatives of the regional program. In the case of logistic services, all firms considered in the case study took part in the PMC design and implementation. Indeed, those firms are very critical about the enthusiasm and expectations that the program generated through measures oriented in developing a deep understanding of the regional logistic system and its improvement of opportunities. However, the PMC in logistics was notable to engage regional public services that were critical for an appropriate working and that delayed the execution of the initiative and public resources. Consequently, firms felt discouraged in regard to initial promises of the regional program.

In the same line, the public support through policies and the interaction with public officials is essential in facilitating the knowledge transfer or the enhancement of regulation of inputs and procedures that may enlarge the market and its accessibility. Then, the role of public agencies could be an incentive to service firms in facilitating the exchange of information and knowledge. However, case studies revealed that the experience related to public tools has one major shortcoming and it is the amount of human resources devoted to satisfy the high level of bureaucracy and budgetary control of the grants allocated. In other words, procedures defined by Corfo are too time demanding and then firms faced difficulties in obtaining effective support from public officials in funds orientations, projects management and development of innovations. This situation may act as a disincentive rather than a solution to promote the generation of new ideas and its funding.

5. Productive impact of innovation.

A common argument in cases studied was the relative difficulty to isolate impacts or results in productivity derived exclusively from the implementation of solutions. This argument is similar to current discussions about how to measure results of service innovations (focused on firms' productivity) considering its particular nature and the fact that it is a sector that is different from manufacture. Indeed, Djellal and Gallouj (2012) discuss the poor experience in measuring productivity gains in services due to the difficulties derived from the fact that is not consider a central issue by management in general, which in turn makes difficult to allocate resources to generate indicators and collect data for its measurement.

Consequently, the formal measurement or assessment of changes in productivity due to innovation is not at point of attention of any of firms in these four case studies. Most of firms did relate innovations with measures, such as changes in total sales –in volume (Enaex) or per square meters (retail)-, the increase number of clients per year (logistics and offshoring) or more qualitative measurement like changes in clients' satisfaction indexes (retail).

6. Patenting experience

In general terms, intellectual property protection is not an issue for service firms. Patenting opportunities have not been in the sight of firms because this is not an area of their interest or because they feel that the process is too long and complicated. Despite of that, some firms have mentioned that they implemented protection techniques like secrecy clauses in employees' contracts.

Enaex is the only firm that has explored ways to protect their developments. Indeed, they consider that patenting is a positive externality of the developments of the company, but it is not considered as a goal in itself. Indeed, patenting is considered a double-edge sword. While in the one hand protecting innovations generated by the company is considered an advance, on the other hand putting information in the public domain is considered as revealing an important part of the strategy that the firm is implementing. Thus, there is a sense of being unprotected against competition in a broader sense.

7. Conclusions

These case studies document and the paper of Alvarez et al (2013) have shown that the Chilean services sector is much more innovative than previously thought. Moreover, Alvarez et al (2013) show that there are no significant differences in the levels of innovations between manufactures and services. This, bearing in mind that the overall level of innovation in Chile is relatively low.

In our case studies we have been able to depict an interesting picture of how services firms innovate, some of the constraints and difficulties they face and the role of public policy. . The cases have shown us that some firms get trapped in everyday tasks and that have big difficulties to implement innovations. They also face “environmental” difficulties to coordinate and to develop agents to propitiate a regional and micro level innovation system. On the other extreme we find companies that have been developing and implementing innovations for several decades and that slowly have tried to make the organizational arrangements to embed within the firm a pro innovation culture and assure the mechanisms to sustain in the long run the competitiveness of firm based on innovation.

A second characteristic of our cases is that they show that innovation in the service sector emerges with high levels of cooperation between firms, universities, consulting firms, gremial associations, and government bodies, particularly in small and medium sized firms, i.e. ENAEX has developed its main innovation within a collaborative scheme with suppliers and agents from its own networking. This pattern is something Alvarez et al (2013) also find in the Chilean innovation survey and in their empirical estimations. Although these authors also find that services are more prone to use public support schemes, and we find evidence in this regard, we also find the while these are in some cases essential to start the innovative culture and process, in other cases important innovations have emerge without any sort of public support.

A third finding is that Chilean service companies do not have much experience in how to consciously organize innovative processes within the firm. In most of them there are no R&D divisions, and innovations are managed in case-by-case basis. We also find that most of the firms have a lack of formal learning mechanisms that would allow to sustain innovation efforts beyond particular leaderships that could emerge within the firm.

Fourth, regarding the last point as well, we find that companies in general lack managers with formal training in how to manage innovation within the firm, and that is hard for them to allocate workers and engineers to do R&D exclusively. In some cases this pushes them to outsource innovations.

Fifth, we find two cases of firms that clearly are globally competitive with significant growth potential that could be enhanced with efficiency gains and a systematization of innovation but that are in general unaware on the potential that innovation plays to increase productivity, open new niche markets and increase global leadership.

Sixth, related to the recent points we found that all firms lack of the mechanisms to establish measurable indicators of the benefits generated by their innovations. Indeed, none of them had a concrete idea of the impacts on productivity of the innovations they had implemented or were implementing at the time of this study. Having this in mind, it is possible to understand why firms do not pursue innovation more decidedly and organize the business strategy around it.

The lessons we draw from these case studies have important policy implications. First, the cases of port logistics and ICT show the relevance of coordinated and sustained efforts to help articulate the collaboration of firms that finally implies a stable policy framework over which the firms can plan and increase their level of R&D activity. A non-stable, non-articulated system of public support might end difficulting rather than fostering innovation. Second, as we show in the case of ENAEX, it is clear that firms in the service are prone to sector collaborate more often than in manufacturing, more analysis about this aspect could be useful in identifying types and the intensity of this collaboration in other

service sector (documented also by Alvarez et al (2013)). However, the collaboration can be for in-house or subcontracted innovation. Third, the case of ENAEX and ICT show that although public support instruments are important, they are no by any means a pre condition for innovation as the case of CENCOSUD shows. We also found that beyond the utility of the existing public support programs, firms find the bureaucratic burden to apply and manage public funds discouraging. Fourth, we believe that our findings highlight that the competitive pressure is a major determinant of the innovations. This is particularly true in the retail sector. On the other hand the lack of competition that could disrupt the rents if present, makes large mining companies more innovation averse, and hence makes it difficult for ENAEX to sustain high levels of innovation because of insufficient demand. Fifth, a natural resource sector can perfectly accommodate a high level of innovative activity as shown by EANEX activities. Sixth, the cases of ENAEX and CENCOSUD show us that Chilean firms can be truly innovative and able to compete successfully in a global scale once they start innovating systematically, hence the importance to promote innovation. Seventh, we find that there is a need for broader public goods provision from the state that could be oriented to sub-sectoral needs. In particular, for the case of mining services, we observe a need for the provision of public infrastructure related to mining pilot plants. The high cost of stopping a plant to test and generate process innovations is a deterrent of innovation and inventiveness. Logistics seem to be a major area of interest for a large number of productive activities in the country that well deserve a more conscious effort to sustain innovations in this area, for example, providing public funds for applied research in this area. For the retail case, and given the national and regional relevance of the sector, we found it could be extremely useful to support programs that could strengthen the regional position of these actors, while at the same time avoiding levels of concentration that can affect consumers. Eighth, the theoretical frameworks of Dejellal, Gallouj, Savona and Hertog can be extremely useful in the design of specific public instruments by identifying clearly scope and where the actions are developed.

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