KIBS AND NTBF IN MEXICO: COMBINING GVC AND RIS TO STUDY MARKET ENTRY MECHANISMS AND UPGRADING

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ABSTRACT

Knowledge-Intensive Business Services (KIBS) and New Technology-Based Firms (NTBF) demand large investments in knowledge capital. Particularly critical for their market entry and upgrading are their linkages within the Regional Innovation System (RIS) and with Multinational Enterprises (MNE), since both linkages reduce structural lacks. On one side, MNE are among the most important carriers of knowledge and for technology transfer across countries and regions, through FDI knowledge spillovers, by investing in human capital, training and development skills in technicians, engineers and managers in the multinational, therefore employees become direct agents of technology transfer, because when they move out to another company or create their own firm, they brought with them learning, knowledge and skills (Blomström, Globerman and Kokko, 1999:12). And on the other, upgrading in high-tech firms in Mexico is associated with the development and maturation of RIS, through the science, technology, and innovation policies (STI). Additionally, since the implementation of NAFTA, a high percentage of FDI inflows has produced important knowledge spillovers and promoted technological capabilities (SE, 2016:1517; UNCTAD, 2015:202). In this paper we analyze the market entry mechanisms and upgrading of KIBS and NTBF, either Startups or Spinoffs, in Mexico. We combine two commensurable approaches: Global Value Chains (Gereffi, Humphrey and Sturgeon, 2005) and Regional Innovation Systems (Cooke, Uranga and Etxebarria, 1997; Cooke, 2001). We found at least four points of convergence by combining these perspectives: 1) user-producer interactive learning to product innovations; 2) upgrading; 3) building technological capabilities, and; 4) RIS institutional arrangement influence the GVC governance. We tested three hypotheses about market entry and upgrading using Probit models on a database of 100 Spinoffs and Startups firms collected in 11 Mexican cities.

Keywords: KIBS, NTBF, GVC, RIS, Upgrading.

1. INTRODUCTION

Since the early 1990s, there has been an intense debate, mainly in Europe, about knowledge-intensive Business Services (KIBS) and New Technology-Based Firms (NTBF)[1], both by academics and policy-makers, mainly as a result of socio-economic changes such as: i) greater preponderance of intellectual work, technology and the innovation systems; ii) transition to new forms of organizational management, from bureaucratic structures, hierarchical and standardized work to self-managed organizations, flat or unidimensional hierarchies and flexibilization of work and production; iii) expansion of the service sector, mainly the ICT sector; iv) general interest in the knowledge economy and the globalization of value chains (Miles et al., 1995:32; Alvesson, 2000:1103).

Additionally, there is a growing interest since 1980s in high tech Spinoffs and Startups as market entry mechanisms, technology transfer, development of medium and high technology industrial clusters, and in general as means to foster regional economic development (Klepper and Sleeper, 2005:1292). In general, Spinoffs are important for technology transfer since the new firm has been formed from processes of interactive learning and innovation, in order to commercialize a technology that originated in a research center, a university, or a private organization (Rogers et al, 2001:224). In this paper, we only deal with business Spinoffs, not with university or academic Spinoffs, especially those founded by ex-employees of Multinational Enterprises (MNE) and individual Startups which are based on resources such as knowledge and capabilities that mainly originate from the entrepreneur, mainly by linkages with the Regional Innovation System (RIS) (Sierdjan, 2004:5)

We make an effort to develop a theoretical framework for the analysis of Business Spinoffs and Startups in knowledge-intensive and technological sectors in Mexico. There has been discussion of the role of Spinoff and Startups as a modes of creation of new technology-based services, with numerous examples of ITC service firms that emerged from in-house departments of large (parent) companies or from individuals with strong links with actors of the innovation systems such universities, public and private funds for technology firms (Miles et al, 1995:42). Therefore, in this research KIBS and NTBF are treated as Spinoffs and Startups, which may belong to one group or another, these two theoretical categories of firms will be empirically distinguished in terms of: a) their activity, production of goods or production of services; b) origin, by knowledge spillovers from MNE or by individual entrepreneurship supported by RIS, and; c) sectors they belong, especially those identified through industrial classification systems.

In order to study market entre mechanisms and upgrading, we combine the approaches CGV (Gereffi and Korzeniewicz, 1994; Gereffi, Humphrey and Sturgeon, 2005), and Innovation Systems (Lundvall, 1992, 2007) with emphasis on RIS (Cooke, 1992, 2001; Cooke, Uranga and Etxebarria, 1997). The objectives of this paper is to analyze the market entry mechanisms and process and product upgrading in Spinoffs and Startups in Mexico. The empirical evidence is

[1] Den Hertog and Bilderbeek (2000:223) use the acronym T-KIB to refer to both Technological-Based Firms (TBF) and Knowledge-Intensive Business (KIB). They note that both categories of companies contribute to the distribution of power in the national innovation system and have an important role in innovation processes in interaction with its customers and knowledge infrastructure which generates dynamic process between T-KIB and National Systems of Innovation.

provided by a survey of 100 Spin-offs and Startups in Mexico, mostly are small and medium enterprises (SME) belonging to metalworking, ITC and logistics sector.

This work is divided into five sections. The first corresponds to the introduction. In the second, some traits of KIBS and NTBF are discussed, and an effort to combine the approaches of CGV and RIS is performed. In the third section, the methodology is explained. In the fourth section, empirical evidence based in the survey of 100 Spin-offs and Startups in Mexico is analyzed. Finally, in the fifth section, some conclusions are presented.

2. LITERATURE REVIEW

How KIBS and NTBF are defined?

Starbuck (1992:715) coined the term knowledge-intensive firm and its acronym KIF, imitating the labels used by economists when they refer to capital-intensive or labor-intensive enterprises, and these labels describe the relative importance of inputs. By analogy, the label knowledge-intensive firm implies that this input is more important than the others. In order to make useful this category, Starbuck argued that a person has to have exceptional skills and experience to make important contributions. In that sense, Starbuck defines an expert as "a person with formal education and experience equivalent to a doctoral degree; And defines the knowledge-intensive enterprise (KIF) as "a company in which such experts represent at least one-third of the staff" (Starbuck, 1992:719). In the same sense, Alvesson points out that this category refers to companies where work is mostly of intellectual nature and where employees with higher education and qualified make up the greater part of the workforce of the business (Alvesson 2000:1103).

In the 1990s, with the increase in productivity and automation of manufacturing activities, the relative importance of the services sector grew, mainly in advanced countries, generating a new composition in the structure of global GDP. The globalization not only increased competition in markets but transformed them into markets mainly competing in knowledge and innovation (Lundavall and Borrás, 1997:28). New technology-based professional services flourished like service companies that are related to emerging technologies, challenges and technological problems, in areas such as; biotechnology, genetic engineering, new materials, nanotechnology, information and communication technologies, consultancy involving new technologies, design and prototypes, R&D services, environmental technologies, among others. These services are more associated with new technology and less with specific professions.

In that global scenario, Miles et al., (1995:18) proposed the concept of KIBS and defined them as "services involving economic activities aimed at producing results with the creation, accumulation or dissemination of knowledge." Some debatable aspects of the category are related to three ambiguities: 1) ambiguity in its key concept, knowledge; 2) ambiguity with regard to what knowledge-intensive companies do, since it is difficult to specify the knowledge involved and demonstrate its value, or to weigh the value of the activities that people perform, and; 3) ambiguity in the results of work and its meaning (Alvesson, 2011:1644). However, despite these ambiguities, it is a significant and valid category for at least two reasons: 1) because it allows

variations between high-tech companies and professional services, and; 2) because it distinguishes between non-routine, routine and manufacturing services. In addition, the category does not lend itself to a rigid definition or delimitation, which is common when social scientist investigate organization´s issues, which are neither homogeneous nor unique (Alvesson, 2000:1103).

Regarding to NTBF, according to Storey and Tether the term seems to have been coined by the Arthur D. Little Group in 1977, when they produced a path-breaking report comparing NTBF in the United States with those in the UK and West Germany. They defined an NTBF as having the following characteristics: 1) it must not have been established for more than 25 years; 2) it must be a business based on potential invention or one having substantial technological risk over and above those of a normal business; 3) it must have been established by a group of individuals and so must not be a subsidiary of an established company, and; 5) it must have been established for the purpose of exploiting an invention or technological innovation (Storey and Tether, 1996:4).

During 1980 difficulties arose over the early definition for NTBF, mainly in the word "new" and "technology", as well as whether it had to be established by a group of individuals or could be an individual enterprise. Storey and Tether refer to these criticisms and propose the following characteristics for NTBF in 1996: 1) NTBF can be considered as high tech SMEs; 2) there are sector identified as high tech according to NACE codes; 3) this high tech sectors have significantly higher than average expenditure on R&D as a proportion of sales; 4) have a significantly greater than average proportional employment of workers who are qualified scientist and engineers, and; 5) the definition should also include firms which are new (less than 10 year old) and which are independent (Storey and Tether, 1996:5).

KIBS and NTBF as Spinoff and Startups

According to Miles et al., (1995) KIBS can be seen as business Spinoffs, they proposed a stages model which can be summarized as follows: 1) in-house department of large companies initially provide services in-house on a utility basis; 2) then they move into being profit centers and begin to trade some of their services externally, and; 3) finally, they spin out from the parent corporation (Miles et al., 1995:42). They encountered evidence in their case studies that had spun-off from large corporate bodies. Despite the fact that generalizations cannot be made from the KIBS samples they have studied, there are pressures in the market as externalization of functions and Spinoff are very important in releasing technological capabilities in the economy. Aditionally, the competition between KIBS creates pressures on the firms to continuously try to enlarge their functional domain through continuous innovation.

With regard to NTBF, these can be associated with individual Startups in high tech industries, Bollinger, Hope and Utterback (1983:13) argue that governments tend to stimulate industrial innovation through a program or set of policies that encourage, stimulate and assist NTBF. Policies must take in account, the environment existing in the nation or the region, and its industry. The general climate of support for entrepreneurship is clearly of primary importance and conditions the effects of more specific measures. Story and Tether (1996:6) in their definition

of NTBF identify a much narrower range of high-tech sectors with mainly independent SMEs, or owned by individual entrepreneur. This is based on pragmatism and data availability. Pragmatic because a substantial range of sectors can be viewed as new and the firms in them have broadly similar problems, but ones which differentiate them from SMEs more generally. And since there are data restrictions in most countries it is no possible to isolate firms by age and ownership and make direct comparisons. Hence the NTBF as Startups, based on size (SMEs), is pragmatic and allows us to access to available databases in the country or build one based on a narrow definition and with more accessible criteria.

Combining GVC and RIS

The approach of Global Value Chains (GVC) focuses on the analysis of international linkages between companies within the framework of global production and distribution systems, emphasizing the role of the leading companies that carry out functional integration and coordination of spatially dispersed activities (Gereffi and Korzeniewicz, 1994; Gereffi and Kaplinsky, 2001; Giuliani, Pietrobelli and Rabelloti, 2005). To the extent that operate in highly competitive globally markets, the leading companies (MNE) need to transfer technical and managerial capabilities to their affiliates and suppliers in countries and regions where they establish their manufacturing operations, so that its local suppliers are able to meet quality standards and reduce production costs (Ernst, 2000; Schmitz, 2004; Ernst and Kim, 2002).

The CGV describes "the full range of activities that firms and workers do to bring a product/good or service from its conception to its end use and beyond. This includes activities such as design, production, marketing, distribution and support to the final consumer" (Gereffi and Korzeniewicz, 1994:1; Gereffi and Fernandez-Stark, 2016:7). In the CGV, these activities are divided between different companies, generally MNE, that carry out the functional integration and coordinate the activities in different countries.

The debate on GVC in Latin America has been particularly focused on industrial upgrading processes, trying to explain how local companies can participate in global markets and thereby improve their productivity, wages and profits, by developing skills to make better products, more efficient or move to higher value activities. According to Humphrey and Schmitz (2000) industrial upgrading refers to innovation processes that increase the added value generated by firms; there are four types: 1) product, it is to move to more sophisticated product lines in terms of units increased value; 2) process, transforming inputs into outputs more efficiently through the reorganization of production systems or the introduction of superior technologies; 3) functional, it is to acquire new higher value-added functions, such as design and marketing, leaving lower-value functions added, as the assembly and; 4) inter-sectoral, denotes the application of skills acquired in one industry or sector (low value-added and labor-intensive) to move to a new sector (capital-intensive and technology).

Another central concept in the literature is the GVC governance. This concept is key to the analysis of the relationships between the various actors in the chain, and particularly to evaluate the potential of upgrading of local actors (Humphrey and Schmitz, 2000). GVC governance can

be defined as "relations of power and authority to determine how the human, material and financial resources are allocated and their influence on the cooperation of companies along the chain" (Gereffi, 1994:97).

The typology most commonly used is the proposed by Gereffi, Humphrey and Sturgeon (2005:8), whom identify five types of governance of value chains (market, modular, relational, hierarchical, captive) according to three parameters: 1) the complexity of information and knowledge transfer for the product and process specifications; 2) the extent to which this information and knowledge can be codified, and 3) the current and potential supplier's capabilities in relation to the requirements of transactions.

Regarding to Innovation Systems (IS), this is based on the premise that technological learning and innovation are not based solely on market relations governed by the price, but in a complex network of interactive learning between different actors, where the institutional environment and organizational framework have a crucial role. The relevant institutions are not limited to formal organizations such as universities, research centers and laboratories, but also include all those relating to dissemination, absorption and use of innovation as well as norms, habits and rules that shape interactions among agents. Innovation, therefore, is not generated in isolated firms, by otherwise companies participate in dense networks with a continuous interaction with the environment. Moreover, the innovation processes include not only new technologies but also product and process innovations, as well as other non-technological forms of innovation, such as those developed in the services organizations (Oslo Manual, 2005; Lundvall, 2007:99; Edquist, 2011:1729).

Among the central assumptions of this approach are the following: 1) the relevant knowledge for economic performance is territorially embedded and it cannot easily move from one place to another; 2) some of the most important components of knowledge are embodied in the minds and bodies of the agents, in the form of organizational routines and relationships between people and organizations; 3) learning and innovation processes are socially embedded and should be understood as a result of the interaction (Lundvall, 2007:100). Whether it relates to national, regional or local level, the perspective of IS emphasizes the crucial role of technological trajectories and institutional assets in collective learning, providing an important explanatory power to the institutional environment that stimulates or inhibits technological learning and the innovation.

The National Innovation System (NIS) is defined as "the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies" (Freeman, 1987:1); According to Lundvall (1992:12) NIS consists in "the elements and relationships which interact in the production, diffusion and use of new, and economically useful, knowledge and are either located within or rooted inside the borders of a nation state". Firms are the basic units of the innovation system, which, in interaction with other firms, organizations, universities and technological institutes, develop innovation processes that ultimately affect the overall economic performance; innovation activities of enterprises (modes of

innovation and learning) depend on the national education system, labor markets, product, financial, property rights and institutional arrangement (Lundvall, 2007:113).

Between local and national level, we found the Regional Innovation System (RIS) that emphasize the importance of geographical proximity to facilitate the exchange of tacit knowledge and other externalities, and the trust generated through informal networks and formal organizations; proximity, networks and trust stimulate learning and interaction focused on innovation, so that firms, organizations and individuals on the network can join to learn, criticize, pursue specific projects or collective practices (Cooke, 1992:369) and Cooke et al, 1997:481).

Recently there have been some efforts to combine the GVC and IS approaches (Pietrobelli and Rabellotti, 2009, 2011; Malerba and Nelson, 2011; Lundvall et al, 2014), which argue that the perspective of IS can be enriched with the dimension of exchange and international collaboration for the generation and dissemination of knowledge and innovation, surpassing their confinement to national limits, while GVC approach can be strengthened by including in the analysis the organizational and institutional context at local and national levels, and influence of innovation policies on the forms of governance in the GVC, and the processes of learning and industrial upgrading.

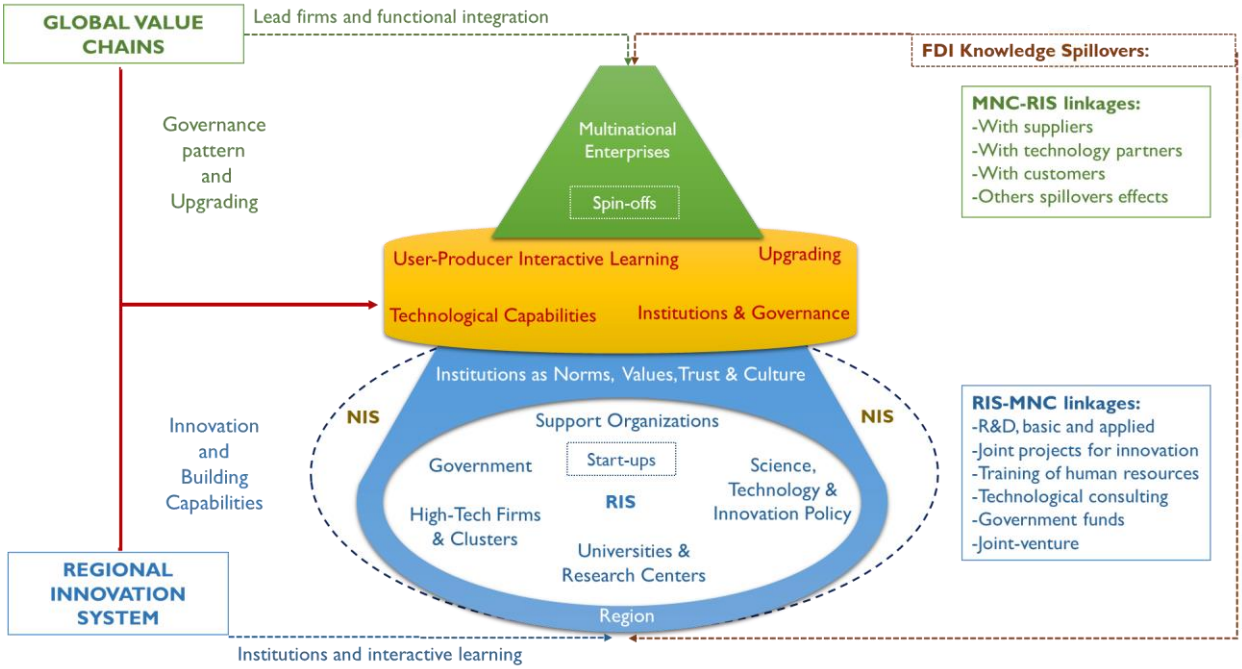
Pietrobelli and Rabellotti (2011) seek to integrate both approaches to analyze the role of innovation systems at national, regional or local level and different patterns of governance of the GVC, together, mechanisms influence learning and innovation of enterprises. Meanwhile, Lundvall, Jurowetzki and Lema (2014) found many similarities and overlaps, but little exchange between the GVC perspectives and IS, and argue that the new combination will be useful both to improve knowledge about socioeconomic processes in developing countries and build a useful knowledge base for action; despite some theoretical and methodological differences (explained partly because the focus SI was proposed by economists, while the GVC analysis was proposed by sociologists), both can complement each other as part of the tradition of studies addressing economic phenomena from the conceptual tools of sociology (Smelser and Swedberg, 2005).

In the GVC approach, governance, upgrading, and articulation of inter-enterprise networks are the key concepts (Gereffi and Fernandez-Stark, 2011), while the IS approach favors the concepts of interactive learning, joint innovation among enterprises and institutions (Lundvall, 2007). While both perspectives have as one of its main analytical axes the improvement processes (firms, regions, countries), the NIS approach gives a fundamental importance to the construction of absorption capabilities, while the GVC analysis focuses on upgrading processes, understood as climbing to higher value activities in the GVC to increase the benefits of participation in global production (Gereffi, Humphrey and Sturgeon, 2005:82).

For this paper we propose four points of convergence between GVC and RIS perspectives are four: 1) interactive learning process, user-producer interaction for innovations; 2) upgrading, in

process and product; 3) absorption, technological and organizational capabilities, and; 4) the RIS institutional arrangement influence the GVC governance and vice versa.

Figure 1. Combining Global Value Chains and Regional Innovation System.



Sources: own elaboration based on Blormström & Kokko, (1998), Cooke (1998), Gereffi, Humphrey & Sturgeon (2005), Lundvall (2007), Pietrobelli & Rabellotti (2011), Jurowetzki, Lundvall & Lema (2015), De Marchi, Giuliani and Rabellotti (2015).

In this research, the GVC-RIS combination is useful to identify processes of interactive learning for innovation and upgrading, as well to analyze high-tech firms market entry mechanisms. The four areas of convergence were included in the interview script applied to the 109 owners of KIBS/NTBF in Mexico.

3. METHODOLOGY

The field research was conducted from October 2011 to September 2013 and consisted in carrying out semi-structured interviews to 109 owners of SMEs, KIBS and NTBF, in 11 Mexican cities: Tijuana, Ensenada, Mexicali, Hermosillo, Ciudad Obregon, Guadalajara, Querétaro, San Luis Potosí, Ramos Arizpe, Saltillo and Monterrey

Those owners interviewed were selected according to the following criteria: a) They belong to one of the selected NAICS industries and are: micro, 1-10 employees; small, 11-50 employees, and; medium, 51-250 employees, enterprises; b) the firm is located in Mexican regions characterized by the massive presence of MNE; c) the firms are supplying high value added products or services to at least one MNE, and; d) their upgrading process is associated with the

development and maturation of RIS, through the science, technology, and innovation policies (STI).

We used the "snowball technique" and key informants from business environment as well 5-digit codes of the North America Industrial Classification System (NAICS, 2013)[2] to identify industries and firms where is more likely to find KIBS and NTBF. After transcribing and analyzing the interviews, we selected the 100 firms that best met the selection criteria. These are distributed as follows:

Table 1: 100 Mexican firms, 5-digit NAICS, and its distribution.

5-digit codes	Industry	Freq.
33271, 33324, 33351, 33399, 33431, 33599, 33631-9, and 33641	Metalworking and manufacture specialized	48
51121, 51821, 54138, 54151 and 54169	Information technology and communications (ITC)	36
48422, 48851 and 48899	Specialized services for the transport sector (Logistics)	16
		100

Source: Own elaboration.

Based on the GVC-RIS convergence areas, the questionnaire contains the followings modules: educational and labor trajectory of the owner; origin of the firm; products, services and processes; competitive strategies; links with multinational firms; staff education and training; technological capabilities; innovation in product and process, and; links with local institutions and government programs, among others. In order to facilitate the quantitative analysis of the data, a database with 48 variables was processed in Eviews 9.5 (HIS Inc., 2016). Then we tested Probit models in order to contrast hypothesis related to market entry mechanisms and upgrading in KIBS/NTBF or Spinoffs/Startups.

4. EMPIRICAL EVIDENCE

We formulated three hypotheses to analyze the relationship between market entry mechanisms and the factors associated with the total product and process innovation of KIBS/NTBF as an approximation to their upgrading processes. These hypotheses are also derived from the GVC-RIS areas of convergence.

H1. Business Spinoff as a market entry mechanism is linked with FDI knowledge spillovers through employee mobility. The main factors associated with the probability of occurrence of this mechanism are: experience obtained in MNE; specific learning acquired while working in the multinational, particularly those related to manufacturing processes and quality systems, and the region where the entrepreneur stablishes his company.

[2] http://www.beta.inegi.org.mx/app/mapa/denue/#

H2. Individual Startups as a market entry mechanism is linked with the RIS in which it interacts, where the entrepreneur exploits diverse tangible and intangible resources to create his own company. The factors associated with this mechanism are: formal academic training; general work experience, and linkages with universities, research centers and government programs.

H3. Total product and process innovation (as a proxy variable for upgrading in Spinoffs and Startups) is related to: technological capabilities of the firm; linkages with universities, research centers and government programs for innovation projects, and internationalization of the firm through direct sales into the foreign market.

Table 2: Spinoffs and Startups in 100 Mexican firms.

Dependent variable			The owner had work experience in MNE?		Total
			Yes	No	
y*	1	Spinoff	48 (90.6%)	5 (9.4%)	53
	0	Startup	20 (40%)	27 (57.4%)	47
Total			68	32	100

Source: Own elaboration.

Probit models

We performed three Probit models: In Model 1, the dependent variable (SOSU) takes value of 1 if Spinoff and 0 if Startup, then we tested H1 with the explanatory variables described above; in Model 2, the dependent variable (SOSU) takes value of 1 if Spinoff and 0 if Startup and we tested H2, and in Model 3, as a proxy variable of process and product upgrading (INNTD), the total innovation in product and process performed in every firm takes the value of 1 if the firm is highly innovator and 0 if the it is low innovative, according to a Likert scale constructed, then we tested with the independent variables described for H3. The results are presented below.

Table 3: Probit model 1. Business Spinoff, as a market entry mechanism, the probability of factors associated with MNE and GVC.

Regression equation: y* = SOSU = 1 = C(1) + C(2)*LMNC + C(3)*REGO + C(4)*EXTR

Independent Variables	Coefficient	Probability
C	0.3571604	0.0167
LMNC	1.000066	0.0002
REGO	0.722434	0.0167
EXTR	1.242593111	0.0201

Source: Probit estimation with Eviews 9.5 from transformed variables of 100 Startups and Spinoffs cases in Mexico.

The regression coefficients (sign, z-statistic and LR statistic) confirm the probability of influencing the creation of Spinoffs from MNE. Therefore, the probability of occurrence of event y*, business Spinoffs, as a mechanism of market entry in knowledge-intensive or technology-

based sectors, is related to: LMNC = knowledge acquired in the MNE, particularly in quality systems and projects for product and process certifications as well as managerial skills; REGO = In the region there is a massive presence of MNE; usually the entrepreneur establishes socio-professional networks with other MNE employees, and; EXTR = The entrepreneur had training in subsidiaries of the MNE abroad.

Table 4: Model 2. Startups, as a market entry mechanism, the probability of factors associated with the RIS.

Regression equation: y* = SOSU = 0 = C(1) + C(2)*FOACD + C(3)*VINC + C(4)*GFOND

Independent Variables	Coefficient	Probability
C	-0.651284	0.1789
FOACD	0.668482	0.0405
VINC	0.169749	0.6108
GFOND	0.228595	0.4585

Source: Probit estimation with Eviews 9.5 from transformed variables of 100 Startups and Spinoffs cases in Mexico.

The regression coefficients (sign, z-statistic and LR statistic) do not entirely confirm the probability of influencing the creation of Startups from SRI. Only FOACD (formal academic education, undergraduate and graduate) is positive and statistically significant to explain high-tech Startups. But there was no jointly and individual significance for: VINC = linkages with universities and/or public research centers, and; GFOND = government funds to establish his company.

One plausible explanation is that these SMEs have 14 years (on average) in the market; they were created when STI policies were still incipient, and linkages between RIS actors remained weak. On the other hand, the RIS involved in the 11 cities selected for the study have different degrees of maturation, and we do not have enough cases to test the relationship at individual RIS level.

Table 5: Model 3, Upgrading in Spinoffs and Startups, proxy variable from total product and process innovation, the probability of factors associated to linkages with RIS and GVC.

Regression equation: y*= INNTD = 1 = C(1) + C(2)*CAPE + C(3)*VINC2 + C(4)*INTEM

Independent Variables	Coefficient	Probability
C	-1.338393	0.0000
CAPE	0.668482	0.0138
VINC2	0.169749	0.0241
INTEM	0.228595	0.0110

INNTD if 1 = 65 highly innovative firms and if 0 = 35 non-innovative firms)

Source: Probit estimation with Eviews 9.5 from transformed variables of 100 Startups and Spinoffs cases in Mexico.

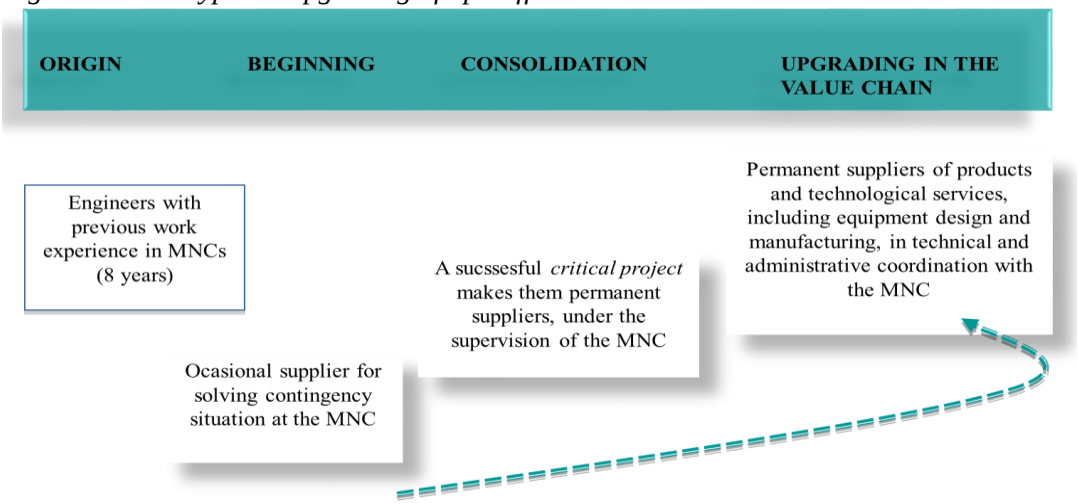
The coefficients are statistically significant (individually and jointly) for the probability of innovating both in product and processes in the firm. Technological capabilities of the company, especially in product design, linkages with universities and research centers to joint innovation projects and the internationalization of the company through overseas sales, respectively, are the factors that affect the probability of innovating in the firms. The model behaves as we expected in concordance with the theory about innovation and upgrading presented in the approaches of GVC and RIS.

5. CONCLUSIONS

Interactive user-producer learning for successful product innovations, product and process upgrading, technological capabilities and, governance and institutions are the main theoretical-analytical tools that we use to analyze the effects and interactions of GVC and RIS for new high-tech spinoffs and startups in 11 cities in Mexico. Using the data collected in a survey of 100 firms, we constructed three models to explain the main factors associated with these high value entrepreneurships. Additionally, we developed two differentiated stylized trajectories for upgrading in spinoffs and startups in Mexico: based in the interaction with MNE and GVC, and based in the interaction with RIS.

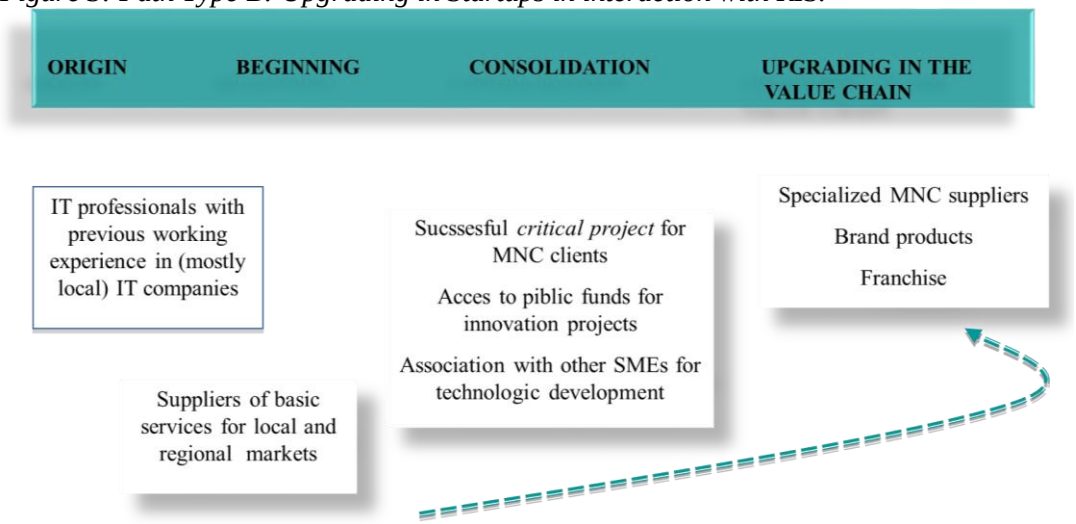
We found that there are three main activities in which local firms participate in the MNEs supply chains: metalworking, ICT and logistics. During the last 15-20 years this type of technology-based knowledge-intensive SMEs have emerged in Mexico, in close interaction with the operation of large MNE and the maturation of RIS, most of them supplying highly value added products and services. Knowledge spillovers from MNE to the local territory are critical to increase the number of KIBS and NTBF, and their upgrading within these interactions. We have identified two differentiated trajectories for upgrading in spinoffs and startups in Mexico.

Figure 2: Path Type A: Upgrading of Spinoffs in interaction with MNE and GVC.



Source: Own elaboration, based on 100 Startups and Spinoffs cases in Mexico (Contreras, 2013).

Figure 3: Path Type B: Upgrading in Startups in interaction with RIS.



Source: Own elaboration, based on 100 Startups and Spinoffs cases in Mexico (Contreras, 2013).

Based on the facts stylized in trajectory B, we identified a new trend in the creation of new technology-knowledge-based firms, emerging from different regional innovation systems in Mexico, created by professionals trained in local institutions, initially dedicated to local markets and later integrated to some extent to MNE supply chains. In Mexico, this is a new generation of local entrepreneurs; they are younger, most of them had academic training in engineering and their companies use are more linked with MNE and RIS key agents as government institutions for innovation and carry out more collaborative projects with universities and research centers.

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