

AMERICAN UNIVERSITY OF BEIRUT

TOWARDS AN IMPROVED UNDERSTANDING OF
INNOVATIVENESS INDEX IN THE MIDDLE EAST:
EXPLORATION OF INNOVATION CONSTRUCT IN THE
CONTEXT OF LEBANESE FIRMS

by
ZEINA AOUN BECHARA EL KHOURY

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submitted in partial fulfillment of the requirements
for the degree of Master of Business Administration
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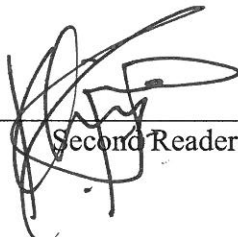
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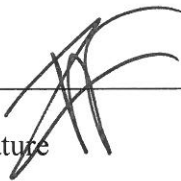
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AN ABSTRACT OF THE PROJECT OF

Zeina Aoun Bechara El-Khoury for Master of Business Administration
Major: Business Administration

Title: Towards an Improved Understanding of Innovativeness Index in the Middle East:
Exploration of Innovation Construct in the Context of Lebanese Firms

In this research study we attempt to explore factors associated with innovation in Lebanese firms to better understand the construct of innovation in Lebanon. We employed a variety of instruments that measure multiple aspects of innovativeness on a firm-level, and we designed ‘The Lebanese Innovation Survey Questionnaire (2009 – 2013)’, allowing us to collect valuable data on 70 Lebanese firms that pertain to 22 industries. Our primary goal in designing and conducting this Survey is to shed greater light on the *facilitators* and *inhibitors* of innovation in Lebanon, and investigate the existing capabilities of Lebanese firms to introduce product, process, organisational and marketing innovations. Our results are tentative, preliminary and have limitations. However, they have opened the path towards developing a more comprehensive and yet highly contextualized set of innovation measures for Lebanon. This is regarded as a first modest step towards developing a ‘Lebanese Innovation Index’.

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CHAPTER I

INTRODUCTION

A. Innovation Landscape in Arab Countries and Lebanon

The innovation landscape in most of the Arab countries is concentrated on public and private scientific research institutions and centres that are mainly linked to the higher education systems, while no serious effort has been made to create such a linkage with the production and service sectors. In addition, these scientific research agencies have focused their efforts on the notion of technology transfer without investing their efforts on increasing the production of local knowledge. This has created a deficiency in establishing a pan-national monitor that can channel the research efforts to address economic and social needs, which has resulted in positioning the Arab innovation performance at a disadvantage with respect to setting proper regional quantitative and qualitative innovation indices (Arab Knowledge Report, 2009).

In the midst of these circumstances all Arab countries are urged to improve their knowledge performance and deploy their efforts to develop a strong connection with the global knowledge arena and increase their overall innovation stand. Especially that in comparison to 1995, twelve Arab countries showed a decrease in their index value on the World Bank's Knowledge Assessment Methodology (KAM) Innovation System Index in 2009, while only five Arab countries showed an increase. Lebanon, ranking sixth on the KAM Innovation System Index of Arab countries, was among the countries that showed a decrease in its index value for this innovation pillar (Arab Knowledge Report, 2009; World Bank (KAM), 2009). This is a clear indication that Lebanon has

not yet been able to establish the needed ecosystem to develop its human capital so as to enhance its national performance in regards to innovation.

In fact, Lebanon is no exception to other Arab countries in concentrating its scientific research efforts on the higher education system; where, the National Council of Scientific Research (CNRS), since its establishment in 1962, has allocated the largest sum of its research funds to academic institutions, as shown in Figure 1. This came as a result of the limited capabilities of specialized research centres, and the lack of interest from the production sectors and private institutions to invest in scientific research (STIP for Lebanon, 2008).

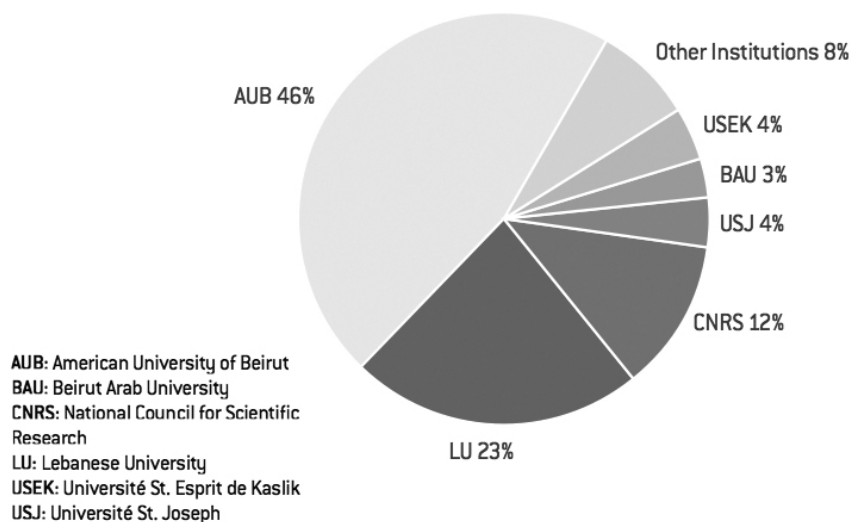


Fig.1. CNRS Research Funds by Institution (2002-2007)

Source: CNRS Research, updated October 2008

Despite these constraints, Lebanon has set forth in April 2006 its Science, Technology and Innovation Policy (STIP) “to enhance and diversify science, technology and innovation input in economic activities resulting in the creation of high-quality jobs and investment opportunities”. This initiative came about as a collaborative

effort between the CNRS, the United Nations Educational Scientific and Cultural Organization (UNESCO), and the Arab League Educational, Cultural and Scientific Organization (ALECSO) with the aim of building partnerships between all the Lebanese stakeholders (STIP for Lebanon, 2008). In addition, during the past years the government has set a plan to strengthen the enforcement of the law that protects intellectual property rights (IPR) to encourage more Lebanese firms to register trademarks, patents and industrial designs (MoET Report 1, 2013).

B. The Need to Create an Innovation Index for Lebanon

In Lebanon, like in other developing countries, governmental and academic institutions use traditional Science and Technology (S&T) indicators that emphasize the supply-side aspects and inputs of the Lebanese S&T systems. On the other hand, Innovation indicators are still considered a novelty to the Lebanese ecosystem of scientific and academic research even though there is an improved propensity in developing and diffusing new technologies in Lebanon that have increased its productivity and competitiveness (STIP for Lebanon, 2008). In fact, the main lack lies in creating a clear understanding of the processes that led to the development and dissemination of these scientific and technological innovations. This aspect has not allowed for these technological changes to be reflected properly in the Lebanese total factor productivity and the output growth rates on a global level (STIP for Lebanon 2008: 210; Global Innovation Index 2013).

With intense global competition and an increase in the dependency of nations on a knowledge-based economy, the traditional S&T indicators currently used in Lebanon have become of a limited utility, as they do not reflect the scientific and technological improvements that have occurred during the last decades (STIP for Lebanon, 2008). In

addition, these indicators do not take into account non-technological innovations that are on the rise in Lebanese small and medium enterprises (SMEs). Accordingly, there is a need to formulate and implement a sound STIP plan of action that relies on accurate information concerning the national S&T systems being employed, and aligning them with the regional and international trends to sustain the Lebanese productivity and competitiveness (STIP for Lebanon, 2008; Global Innovation Index, 2013). In that respect, the United Nations Economic and Social Commission for Western Asia (ESCWA) that acts as the regional hub for national observatories to monitor STI activities and creates national databases to set up STI Indicators, has encouraged Lebanon to move forward in this direction, and establish trainings related to collecting and analyzing STI indicators to incorporate them in national policies and strategies (STIP for Lebanon, 2008).

During the years 2010-2011, CNRS with the support of the World Bank, conducted a survey of Lebanese industrial enterprises to investigate the “Policy directions for innovation in Lebanon’s industrial sector”. Although this survey has not been published yet, some brief insights about the study have been presented by Omar Bizri, a consultant with CNRS, at the “How-to of Innovation, Technology and Entrepreneurship” Cambridge event of June 20-21, 2013 (Bizri, 2013). These insights led him to propose a vital question: “Are we simply seeking to enhance links between research centres, universities, on the one hand and industrial enterprises, on the other, or do we wish to transform the country into an innovation-driven economy?”

To answer this question, it is important to highlight that Lebanon according to The Global Competitiveness Report 2013 – 2014 is currently situated among the countries that are experiencing a transition from an efficiency-driven economy to an

innovation-driven economy (WEF Insight Report, 2013). In addition, we need to consider that although innovations can take place on a sectorial level in an economy, those that occur on the individual firm-level have mainly been acknowledged to produce the highest impact on the national economic growth (STIP for Lebanon 2008). Thus, to achieve an innovation-driven economy our main focus should be on evaluating innovation on the enterprise level to formulate benchmarking and progress assessment modalities (STIP for Lebanon 2008; Bizri 2013).

In this research study we attempt to explore factors associated with innovation in Lebanese firms at the individual firm-level to better understand the construct of innovation in Lebanon, driving factors that have led to these innovations, and factors that have contributed in hindering innovation activities in Lebanese firms. Taking into consideration that major occurrences of technological and non-technological innovations usually take place on the level of SMEs, and in Lebanon SMEs constitute about 98% of business enterprises (Ahmed and Julian, 2012). Accordingly, we should observe some interesting innovation activities in Lebanese SMEs. Nevertheless we need to distinguish that Lebanese SMEs are not identical to the SMEs of developed countries.

In the European Union, for example, 1) a Micro enterprise has maximum 10 employees, with a turnover that is less than or equal to € 2 Million, 2) a Small enterprise has between 11 and 50 employees, with a turnover that is less than or equal to € 10 Million, and 3) a Medium enterprise has between 51 and 250 employees, with a turnover that is less than or equal to € 50 Million (MoET Report 2, 2013). “It is important to note here the difference between a European SME and a Lebanese SME, which size in terms of number of employees and turnover is very small compared to the former”. In fact, in Lebanon “the SME sector consists mainly of tiny enterprises, about

90% have fewer than five employees” (UNDP Report on Lebanon, 2013). So, for the purpose of this study it is also important to take into account the innovation activities of Large Lebanese enterprises, where the majority of these firms are closer in size and turnover to Medium European enterprises. This will allow us to provide a more inclusive perspective of the innovation constructs and drivers on a broader spectrum of Lebanese firms, as these innovation activities may be the driving force of the economic development in Lebanon.

Moreover, to leverage this study we conducted an exploration of the ‘Community Innovation Survey (CIS)’ in alignment with the ‘Capability Measure’ (Hansen and Birkinshaw, 2007) and the ‘Innovation Metrics for the IVC’ (Roper et al., 2008, 2009; Love and Roper, 2010) to set up ‘The Lebanese Innovation Survey’. This has allowed us to explore the internal and external factors that drive or hinder the innovation activities of 70 Lebanese firms that pertain to diverse industries and offer some preliminary recommendations to develop a ‘Lebanese Innovation Index’.

The next chapter starts by a review of the literature that focuses on the role of innovation and competitiveness from a firm-level perspective, an overview of the internal and external factors that influence innovativeness in firms, an exploration of frameworks and surveys that have been set to measure firm-level innovation performance, and the proposed research questions. Chapter III identifies the research settings and methodology by looking into the data collection and sample, in addition to the questionnaire design to devise ‘The Lebanese Innovation Survey Questionnaire’. Chapter IV describes the results of the empirical study by providing an overview of the survey results, and a thorough descriptive analysis of these results across sector, size and age of involved firms; in addition, to providing a discussion that highlights the

thrust of the results, and describes the limitations of this research study. Finally, Chapter V elaborates the contributions with respect to previous studies, and provides suggestions and guidelines for future research directions.

CHAPTER II

LITERATURE REVIEW AND RESEARCH QUESTIONS

The review of the literature in this study is divided in four sections. The first two sections clarify the role of innovation and competitiveness on the firm-level, and how these two aspects interrelate to sustain the development of the firm's organizational capabilities and market positions. The third section focuses on the internal and external factors that influence a firm's innovation stand. The fourth section explores useful frameworks and surveys that have been set to measure firm-level innovation performance in developed countries, and recommendations on how to adapt these performance tools in developing countries. To be followed by the research questions section that allow us to investigate the internal and external factors that influence the choice of innovation in Lebanese firms, in addition to understand the context in which Lebanese firms achieve their innovations.

A. Firm-level Innovation

1. Innovation Definitions:

Innovation is often defined as “the successful introduction of a new or improved product, process or service to the marketplace” (Hobday, 2005). Uzokurt (2013) observed that many researchers, such as Damanpour (1991), Salavou (2004) and Van de Ven and Rogers (1988), have looked at innovativeness and innovation as two inseparable terms, the first investigates the end result of the innovation process and the second focuses on the process of innovation itself. He referred to Thompson (1965), asserting that

“innovativeness is the generation, acceptance and implementation of innovations”; in addition he referred to Lumpkin and Dess (1996), emphasizing that innovativeness determines how far firms are adapted and willing to uphold creativity, novelty and new ideas leading to innovation in the newly adopted technology, products, or processes. Furthermore, Uzokurt (2013) synthesized from the studies of Daft (1978), Damanpour (1991), Thompson (1965) and Zaltman et al. (1973) that organizational or firm-level innovation could be “defined as new product, service, ideas, technology, process, and structure and includes their generation, acceptance, adoption, or implementation”.

2. Innovation Forms and Types:

Innovation encompasses two distinct forms, product innovation and process innovation. Both innovation forms share two fundamental features, their degree of novelty and their impact on society (Mars, 2013; Uzokurt, 2013). In this context, Uzokurt (2013) referred to Damanpour (1996), emphasizing that “organizational innovation is viewed as a pervasive and embracing process, which includes research, development, and implementation of new ideas and behaviors”.

According to Mars (2013), “product innovations are recognized as novel, tangible structures that are made of material goods”. In addition, Zakic et al. (2008) emphasized that the majority of product innovations that are market focused are innovations that implement improvements on existing products, and innovations that develop and commercialize new products. Therefore, product innovations, can be categorized under radical or incremental types of innovation; where, Uzokurt (2013) synthesized from the studies of Dewar and Dutton (1986), Ettlie et al., (1984) and

Wilson et al. (1999) explain that whenever the innovations are the result of gradual changes in already existing products and adopted practices, they hence fall in the category of incremental innovations; Whereas the practices that are discontinuous from ideas and behaviors adopted by the organization previously, are classified in the category of radical innovations. In that respect, Hobday (2005) observed that incremental innovations are the bases that engender structural change, economic growth and catching up, which allow the firm to achieve high benefits and gains on both productivity and product quality levels. He contended as well that in developing countries innovation comes about from 'behind the technology frontier' that have been previously established by leaders of advanced countries.

On the other hand, Mars (2013) pointed out that "process innovations involve novel approaches or strategies designed to aid in achieving a particular goal or set of goals, and are thus intangible and often somewhat abstract". Moreover, Zakic et al. (2008) emphasized that process innovations are mainly led by effectiveness, mentioning that they entail developing new competences and routines, prioritizing therefore internal focus. The fact of improving existing processes as well as developing and implementing new ones, defines the meaning of business process innovations. Furthermore, they asserted that these process innovations can be brought in by companies aiming at improving process effectiveness which involves compliance of the process with different elements, including customer demand, strategy, other components of a business system, as well as inter-compliance of processes themselves. Consequently product innovations can be largely enhanced by process innovations.

3. Innovation Modes:

The concept of innovation modes that groups firms by taking into account a set of characteristics such as innovation activities, behaviors and strategies, while focusing on the sources of heterogeneity at the firm-level, has received growing attention in the empirical literature over the last decade (Filippetti, 2011). According to Filippetti (2011) this represents a clear shift from the previous studies of Pavitt (1984), Archibugi et al. (1991), Breschi et al. (2000), and Malerba (2004) who focused in their view on the dynamic of industrial structure and the patterns of firms' innovation to be the central outcomes of industry-specific factors. She further referred to Srholec and Verspagen (2008), asserting that despite the fact of presenting in the content of their literature significant and considerable insights regarding the means of firms' innovation, yet further analysis demonstrate that the issue is not restricted to sectors' role, but it rather involves heterogeneity among firms as a fundamental decisive factor within both sectors and countries. In that respect, she highlighted that related investigations have encompassed several diverse dimensions of heterogeneity, among which are listed the typology of innovation (e.g. product, process, service), the sources of innovation and the relevant strategies (i.e. in-house vis-a`-vis outsource R&D), and the increasing economic importance of non-technological innovation (Filippetti, 2011).

B. Firm-level Competitiveness

1. Resource-Based Theory:

According to Barney (1991, 2001) in the resource-based theory "a firm develops competitive advantage not only by acquiring but also developing, combining and effectively deploying its physical, human and organizational resources". He asserts that firms' particular resources and unique capabilities play a foremost role and influence

differences shown in firms' performances, regardless the industry's structural characteristics. Barney (2001) assumed that the differences in the acquired resources and developed capabilities that characterize each firm are unique if they are not greatly mutable across firms, constituting the platform of competitive advantage. Moreover, gaining a competitive advantage that is sustainable enough to ensure profitability and viability of the business is mainly related to the quality of the resources exploited by the organization. These resources must be valuable, expensive to imitate and rare. These criteria directly affect sustainable competitive advantage when valuable resources are 1) those that enable a given firm to profit from market opportunities and overcome external threats; and 2) those that are too expensive to imitate and accordingly other companies cannot afford to acquire, either because of high associated cost to acquiring these resources, or they are not profitable for them, rendering them into rare resources. Therefore, if an organization's resources have the above characteristics, and are used wisely, they will create a sustainable competitive advantage (Barney, 2001).

Furthermore, Della Corte et al. (2013) emphasized that some authors like Wernefelt (1984), Barney 1986 (2001, 2006); Dietrix and Cool (1989), Grant (1991), and Della Corte and Sciarelli (1999) speculate that once the firm possesses its own valuable, rare and priceless resources which are properly exploited, thus achieving a sustainable competitive advantage will be possible and realizable through applying new value-creating strategies that can hardly be identically imitated.

2. Dynamic Capabilities Approach:

Della Corte et al. (2013) identified that the dynamic capabilities approach is considered in the studies of Ambrosini et al. (2009), Eisenhardt and Martin (2000) and Teece et al. (1997) to represent an evolution of the Resource-Based Theory in highly

volatile markets. Della Corte et al. (2013) further observed that the typical position of the dynamic capability perspective emphasizes “the firm’s capability of switching its resources’ set in order to compete in a changing and hypercompetitive market”. This directs a firm to possess strategic resources either by acquiring them or creating them. In that respect, Della Corte et al. (2013) referred to Galunic and Rodan (1998), contending that “creating new resources depends on innovation, which in its turn relies on knowledge recombination as the source of new ideas”. They referred to Ahuja (2000), emphasizing that “more specifically, the relation between knowledge and innovation grounded several studies, with particular reference to the importance of knowledge sharing in order to develop innovation processes”. Furthermore, Zheng et al. (2011) emphasize the active role that innovation plays in the field of strategic management, and Della Corte et al. (2013) tribute the dynamic capabilities concept to have added to “our understanding of the challenges involved in following a resource-based approach to strategy”. In that respect, Della Corte et al. (2013) referred to Teece et al. (1997), pointing out that “strategy should also be a battle for sustained development of the firm’s organizational capabilities and not just a battle for strong market positions”. Therefore, firms cannot only rely on their strong resources and organizational capabilities from a long term perspective; they have to work on renewing these resources and capabilities, and hence possess strong organizational routines to reach this target (Della Corte et al., 2013).

3. Firm-size Competitiveness:

In their empirical investigation, Lichtenthaler and Ernst (2009) showed that firm size has an impact on the extent of both technology exploitation and exploration. In that respect, technological knowledge appropriate for commercialization is by far broader

and more exhaustive in larger companies than in smaller ones, seeing that they already possess a relatively larger array of technology. In addition, they asserted that using this diversity of technological knowledge prevents larger firms from relying totally on internal activities.

Nicholas and Ledwith (2011) signified the differences that exist between SMEs and large organizations that go beyond size. They referred to Ghobadian and Gallear (1997) and Gray and Mabey (2005), contending that these differences occur on several levels namely policies, management and structure. In addition, they referred to Ledwith (2000), emphasizing that “differences have been found between the new product development (NPD) process in small and large firms and also between the practices that are linked with new product success”. Nicholas and Ledwith (2011) also referred to Tidd et al. (2005), asserting that these existing differences entitle SMEs with noteworthy advantages, allowing them consequently to prevail large companies in developing new products. These powerful controlling advantages can be summarized as follows: 1) a faster decision-making process due to fewer layers of management, 2) a better functional integration, and 3) a more innovation friendly atmosphere with less resistance to change.

Nicholas and Ledwith (2011) also emphasized the disadvantages that SMEs have to overcome to successfully develop new products. By synthesizing the studies of Bartlett and Bukvi (2001), Hadjimanolis (1999), Kaufmann and Todtling (2002) and Tidd et al. (2005), Nicholas and Ledwith (2011), they concluded that these disadvantages relevant to SMEs are shown in the domination of the owner’s or chief executive’s personality, a lack of access to resources, and a lack of external contacts. Furthermore, they referred to Voss et al. (1998), highlighting that competitiveness for

SME's is mostly based on providing excellent service, since they lack economies of scale and thus can hardly ever compete on a cost basis.

C. Internal and External Factors of Innovation

While the aforementioned studies have contributed in clarifying the role of innovation and competitiveness on the firm-level, they have not addressed all the internal and external factors that influence a firm's innovation stand. According to Zakic et al. (2008) product innovations and business process innovations, whether separately or combined, can be affected by numerous external and internal factors; and in their study they focused their "attention on the following factors: industry maturity, customer needs and expectations, technological opportunities, investment attractiveness, intensity of competition, company size, origin of ownership and export orientation". They asserted that there are also other external factors to be considered, like "the influence of outer stakeholders and institutional environment"; in addition to inner factors that "include the personality, orientation and attitudes of relevant innovation decision makers (owners/managers), availability of resources, costs, etc." (Zakic et al., 2008).

D. Innovation Frameworks and Surveys

This section of the literature is dedicated to exploring some of the available innovation performance tools. In that respect, it is important to note that these tools present us with useful innovation frameworks and surveys, but most of which are focused on evaluating the innovation performance of firms in developed countries. Which brings forth the discussion of how we can adapt these frameworks and surveys to fit in developing countries as well to help in the creation of domestic innovation indexes that are comparable with the indexes of more developed countries.

1. Oslo Manual and Community Innovation Survey:

The Oslo Manual was introduced in 1992 under the joint guidance of the Organisation for Economic Co-operation and Development (OECD) and the Eurostat of the European Commission setting guidelines for collecting and interpreting innovation data at the level of the firm, while taking into consideration the complex and differentiated process of innovation. Since then it has been adapted to design many survey questionnaires, including the development of the Community Innovation Survey (CIS) that was organized by the Eurostat in close cooperation with several European and non-European countries with the aim of attaining a harmonized level of input, allowing for data comparability and trends analysis.

According to the third edition of Oslo Manual (2005) “*an **innovation** is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations*”. In addition, the innovation principle necessitates at least that the product, process, marketing or organizational methods which are either created and developed by the firm itself, or even adopted from other firms or organizations, must be new or extensively improved (Oslo Manual, 2005).

The four main types of innovation that are distinguished in the manual are defined as follows:

*a) A **product innovation** is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.*

*b) A **process innovation** is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.*

*c) A **marketing innovation** is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.*

*d) An **organisational innovation** is the implementation of a new organisational method in the firm's business practices, workplace organisation or external relations.*

Arundel (2007) asserts that these definitions of innovation do not distinguish between a firm that undergoes extensive in-house R&D, and another firm that exerts minimal effort and resorts to purchasing new technology. To solve this problem he emphasizes the need to know *how* firms innovate, and this can be achieved through elaborating and expanding a set of indicators to illustrate this process, allowing for the distinction between inventive firms and informal innovations. Normally, innovations based on a major technical advance are achieved by inventive firms, while unplanned innovations, such as through production engineering, are carried out by informal innovators (Arundel 2007).

On the other hand, the third edition of the Oslo Manual (2005) presents a useful “Innovation Measurement Framework”, highlighting the driving forces behind innovation by emphasizing the different types of innovation and their role, tracking flows of new knowledge and technologies and their diffusion from one industry to another, and viewing innovation as a system based on various innovation firm-based theories and approaches. Figure 2, depicts the components of the “Innovation

Measurement Framework”, having as its main components: a) innovation in the firm, b) linkages with other firms and public research institutions, c) the institutional framework in which firms operate, and d) the role of demand.

The manual also emphasizes the importance of linkages in the innovation process, where “the innovation activities of an enterprise depend in part on the variety and structure of its links to sources of information, knowledge, technologies, practices and human and financial resources. Linkages act as sources of knowledge and technology for an enterprise’s innovation activity, ranging from passive sources of information to suppliers of embodied and disembodied knowledge and technology to co-operative partnerships” (Oslo Manual, 2005). Furthermore, the manual presents across all the four main innovation types the factors relating to the objectives and effects of innovation, and the factors hampering innovation activities. Appendix I illustrates the tables of linkages and factors presented in the Oslo Manual (2005) that have been at the basis of setting the CIS 4 Harmonised Survey Questionnaire (2006).

In that respect, we need to highlight that the third edition of the Oslo Manual (2005) also provides recommendations for the implementation of innovation survey in developing countries. These recommendations are mainly based on the Bogota Manual (2001), designed by the Iberoamerican Network of Science and Technology Indicators (RICYT) as an adaptation of the second edition of the Oslo Manual, bringing about the standardization of indicators of technological innovation in Latin American and Caribbean countries.

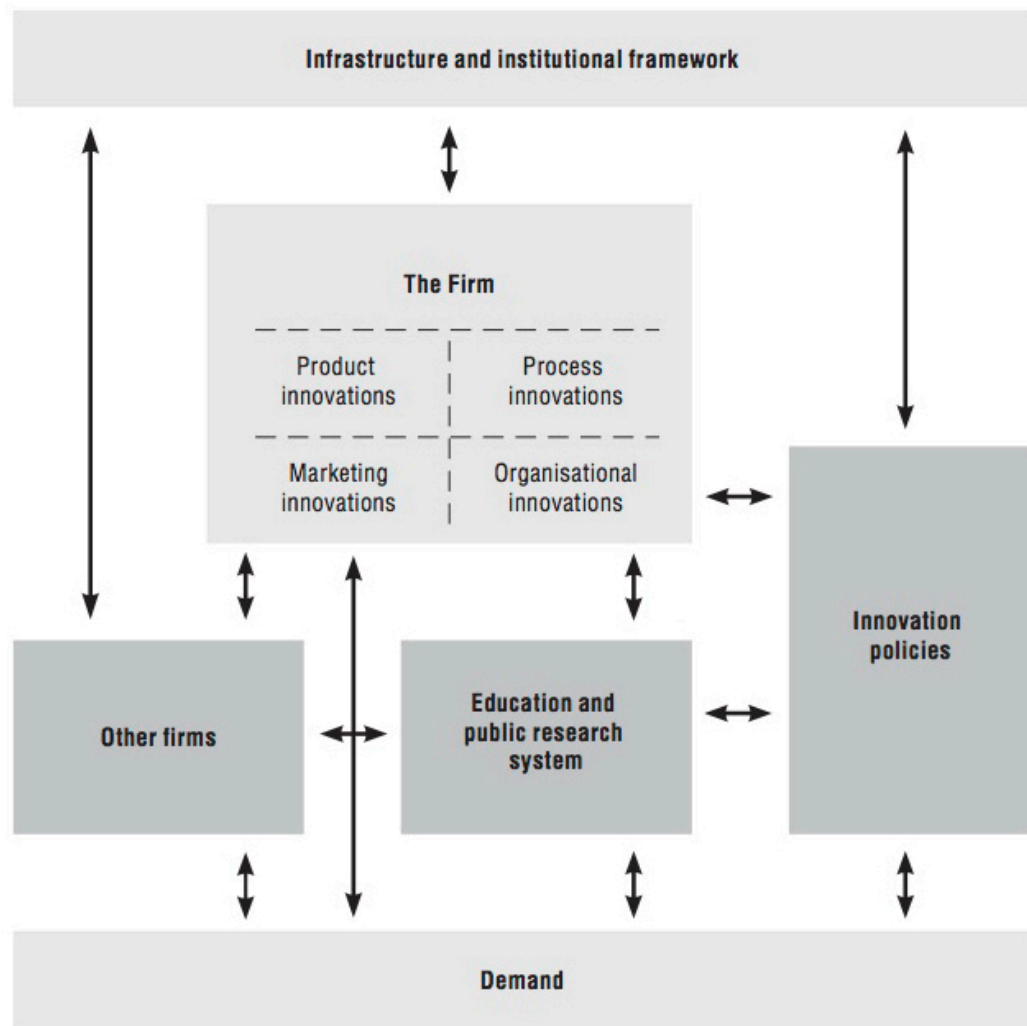


Fig.2. The Innovation Measurement Framework (Oslo Manual, 2005)

The third edition of the Oslo Manual (2005) recommends that innovation surveys in developing countries need to be based on methods and procedures that take into account the following considerations:

a) It is widely accepted that dissemination mechanisms and incremental change account for most of the innovation occurring in developing countries, owing to the particular characteristics of the society and the economy in many of developing countries which influence innovation processes in many ways.

b) While the sector of small and medium-sized enterprises (SMEs) is very significant (including a large number of micro and small and, in some countries, medium-sized businesses which are often not registered), even enterprises considered “large” in most developing countries usually operate at suboptimal production scales, with higher unit costs and far from optimal efficiency.

c) Competitiveness is mostly based on the exploitation of natural resources or cheap labour, rather than on efficiency or differentiated products. This leads to an informal organisation of innovation and fewer R&D projects.

d) A number of exogenous systemic factors shape the innovation landscape in developing countries, such as: macroeconomic uncertainty; instability; physical infrastructure (lack of basic services such as electricity or “old” communications technologies); institutional fragility; lack of social awareness about innovation; risk-averse nature of enterprises; lack of entrepreneurs; existence of barriers to business start-up; lack of public policy instruments for business support and management training.

e) Measurement exercises should therefore focus on the innovation process rather than its outputs and emphasise how capabilities, efforts and results are dealt with.

2. Hansen and Birkinshaw’s Capability Measure:

Hansen and Birkinshaw’s (2007) Capability Measure is based on the concept of the Innovation Value Chain (IVC), where “a company’s capacity to innovate is only as good as the weakest link in its innovation value chain”. They encourage executives to look at converting ideas into products or services as a full process similarly to the value

chain of Michael Porter (1985), where he illustrates how raw materials are transformed into finished goods.

Figure 3, demonstrates that the IVC is made up of three phases that sequentially progress along the value chain: a) starting from generating ideas that can happen inside a unit, across units in a company, or out-side the firm, b) moving into converting ideas by selecting the appropriate idea for funding and developing it into products or practices, and c) leading to diffusing those developed products and practices. Hansen and Birkinshaw’s (2007) assert that “viewing innovation as an end-to-end process rather than focusing on a part allows executives to spot both the weakest and the strongest links”. Appendix II depicts Hansen and Birkinshaw’s (2007) Innovation Value Chain Questionnaire.

	IDEA GENERATION			CONVERSION		DIFFUSION
	IN-HOUSE Creation within a unit	CROSS-POLLINATION Collaboration across units	EXTERNAL Collaboration with parties outside the firm	SELECTION Screening and initial funding	DEVELOPMENT Movement from idea to first result	SPREAD Dissemination across the organization
KEY QUESTIONS	Do people in our unit create good ideas on their own?	Do we create good ideas by working across the company?	Do we source enough good ideas from outside the firm?	Are we good at screening and funding new ideas?	Are we good at turning ideas into viable products, businesses, and best practices?	Are we good at diffusing developed ideas across the company?
KEY PERFORMANCE INDICATORS	Number of high-quality ideas generated within a unit.	Number of high-quality ideas generated across units.	Number of high-quality ideas generated from outside the firm.	Percentage of all ideas generated that end up being selected and funded.	Percentage of funded ideas that lead to revenues; number of months to first sale.	Percentage of penetration in desired markets, channels, customer groups; number of months to full diffusion.

Fig.3. The Innovation Value Chain: An Integrated Flow (Hansen and Birkinshaw, 2007)

3. NESTA Innovation Index and Framework:

The National Endowment for Science, Technology and the Arts (NESTA) Innovation Index also seeks to measure the wider forms of innovation that go beyond the traditional scientific research and development view of innovation, into addressing the hidden forms of innovation that include operations, delivery, services change, customer feedback, provided services, ways of doing this work, and many other aspects (Roper et al., 2009). At the same time it seeks to add a new perspective onto many surveys, including the CIS by “providing further contextual data of the specific type of wider innovation undertaken and the particular sources of external engagement”.

Moreover, the NESTA Innovation Index was focused on Roper et al (2008) previous study, “Modelling the innovation value chain” that was aimed at transforming the IVC of Hansen and Birkinshaw (2007) into a formal modelling framework. According to Roper et al (2008), translating knowledge and ideas into business value is a complex process where people’s skills, capital investment and other important resources play a determinant role into value creation.

In that respect, NESTA tracks the innovation process in a given company or sector using a certain model with specific measurements. Insights for their model are provided from individual companies among one or more sectors considering the following: 1) the company networks and their strength, 2) The percentage of investment made in research and development of new designs, products and services, and 3) The potential to sell those new products and services (Roper et al., 2009).

Figure 5, highlights Roper et al. (2009) innovation metrics for the IVC, where 16 firm-level metrics were identified for the NESTA Innovation Index: a) five of these metrics relate to Accessing Knowledge, b) six relate to firm’s Building Innovation, and

c) five relate to firm’s Commercialisation activities, were all the cross sectoral metrics are identified with a (C). Appendix III details the description and purpose of each of these “Sectoral Innovation Metrics”.

	Accessing Knowledge	Building Innovation	Commercialising Innovation
Cross sectoral	A1. Proportion of externally sourced ideas (C) A2. R&D intensity (C) A3. Design intensity (C) A5. Use of external partners in accessing knowledge (C)	B1. Process innovation intensity (C) B2. Percentage of sales from new products (C) B3. Diversity of innovation (C) B6. Use of external partners in building innovation (C)	C2. Spending on reputation and branding (C) C4. Use of external partners in commercialisation (C)
	Sector specific	B4. Multi-functionality (I) B5. Team-working (I)	C1. Types of customer relations (I) C3. Multi-functionality (I) C5. Use of IP protection (I)

Fig.4. Innovation Metrics for the IVC (Roper et al., 2009)

In their consequent working paper “Knowledge, openness, innovation and growth in UK business services” Love and Roper (2010) further developed the framework that encompassed the IVC structure and key indicators, which is depicted in Figure 6. Their focus was set to explore the firms’ process through which they create business growth by gaining knowledge, then transforming this knowledge into an innovative product or service, then reflecting back to learn how to optimize the process. Accordingly, they emphasized the importance of knowledge and linkages through the three phases of the IVC according to the following:

1st phase) ‘Exploratory linkages’ determine how firms seek new sources of knowledge that can provide the basis for innovation.

2nd phase) ‘Encoding’ linkages’ determine how firms focus on the effectiveness of the innovation process itself through transformational learning and knowledge.

3rd phase) ‘Exploitation linkages’ determine how firms focus on adding value through exploitative learning and knowledge.

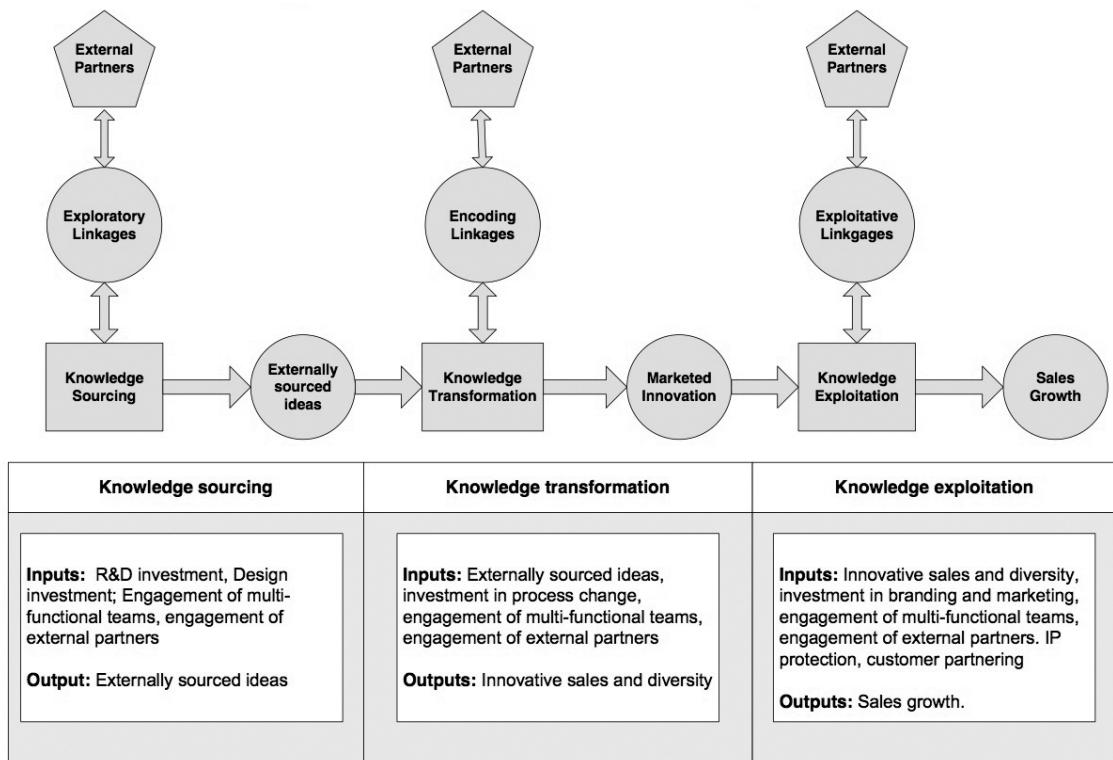


Fig.5. The Innovation Value Chain: Structure and Key Indicators (Love and Roper, 2010)

E. Research Questions

As the purpose of this study is to explore the constructs and drivers of innovation in Lebanon, the following research questions are intended to identify and evaluate the internal and external factors that influence the innovativeness of Lebanese firms; in addition, to highlight the impact of the micro and macro environment on their innovation activities and their respective outcomes.

Q.1: What are the factors that drive innovations in Lebanese firms?

Q.2: What are the factors that hinder innovations in Lebanese firms?

Q.3: Do innovations in Lebanese firms highly depend of their R&D investments?

Q.4: Does IPR protection contribute in the increase of innovations in Lebanese firms?

Q.5: Does the profile (Sector, Ownership type, Age, Size and Income) of Lebanese firms influence their choice of innovations?

Q.6: Do innovations decrease operational costs for Lebanese firms?

Q.7: Do innovations increase the competitiveness and market share of Lebanese firms?

Q.8: What is the impact of innovation on the regional and/or international growth of Lebanese firms?

Q.9: Does the Lebanese financial market encourage firms to invest in innovation?

CHAPTER III

RESEARCH SETTINGS AND METHODOLOGY

A. Data Collection and Sample

The empirical component of this study consists of an exploratory research that was conducted on a focused sample of Lebanese firms. In order to collect a relevant and useful data set we identified our sample from the Lebanese firms that are registered establishments and pertained to diversified economic sectors to be able to contribute to this research study. In that respect, a collaborative effort was established with the ‘Chamber of Commerce, Industry and Agriculture of Beirut and Mount Lebanon CCIA-BML’, ‘BERYTECH’, ‘Beirut Creative Cluster BCC’, and ‘KAFALAT’ to reach out to relevant firms.

Our main purpose was to identify and focus on 500 firms based on their sector, location, company age and size to invite them to take part in our online Survey entitled “The Lebanese Innovation Survey”, allowing us to explore drivers of innovativeness in Lebanon. Accordingly, our aim was focused on attaining a 10% to 20% ‘Response rate’. Especially that the process of recruiting firm was voluntary, anonymous and confidential; and only the data of respondents who submitted their responses can be used in the analysis, to attain the results of our research study.

Accordingly, an invitation was sent out via email to one representative (owner or executive) in each of the 500 firms in question, and a follow up was initiated throughout the one-week duration of the online Survey to make sure that we achieve our target. Interestingly, our online invitation attracted the attention of 55% of our sample, that is,

275 owners or executives of firms who started the Survey. However, not all of them actually completed it. Thus, we received a 14% 'Response rate', accounting to 70 respondents who provided us with their valuable input, and submitted their responses on behalf of their firms. As this is considered a relatively low response rate, our results and conclusions are considered tentative and preliminary.

B. Questionnaire Design

To be able to explore the Lebanese innovation ecosystem the questionnaire of this study was designed using available tools that have been elaborated in the 'Innovation Frameworks and Surveys' section of the literature review of this study. Furthermore, in this section we will explore the innovation constructs that will constitute the framework upon which this study relied on to design 'The Lebanese Innovation Survey Questionnaire'.

1. Innovation Framework in Lebanon:

The questionnaire of this study is intended to provide initial insights into the internal and external factors that affect the innovation performance of Lebanese firms. Accordingly, it explores the context of the 'Community Innovation Survey (CIS)' in alignment with the 'Capability Measure' (Hansen and Birkinshaw, 2007) and the 'Innovation Metrics for the IVC' (Roper et al., 2008, 2009; Love and Roper, 2010). Such an exploration process on the CIS and IVC is consistent with the recommendations from the 'Oslo Manual' and 'Bogota Manual' for measuring innovations in developing countries. Therefore, this questionnaire will allow us to better understand the links that exist between the context and outcome of innovations in Lebanese firms, as it focuses on the firm-level innovation process and emphasizes firm

capabilities and efforts. This will enable us to work towards developing a specific innovation construct of Lebanon.

The **Innovation Framework** that has been used to create a linkage between the CIS and the IVC encompasses the four constructs upon which the questionnaire of this study has been adapted:

a) **Accessing Knowledge:** explores the dimensions that are used by Lebanese firms to access knowledge and generate ideas

b) **Building Innovation:** explores the dimensions that are used by Lebanese firms to build innovation and convert ideas into product (good or service), process, organizational or marketing forms

c) **Commercializing Innovation:** explores the dimensions that are used by Lebanese firms to commercialize their innovative products or services and diffuse them in the market

d) **Measuring Innovation:** explores the dimensions that are used by Lebanese firms to seek feedback, assess their innovation capabilities and evaluate their performance

2. The Lebanese Innovation Survey Questionnaire:

As it was highlighted in the previous section, ‘The Lebanese Innovation Survey Questionnaire (2009 – 2013)’ is designed to explore the Community Innovation Survey in the context of Lebanese firms. In the first part of the Survey, we collect **demographic** data regarding the respondent Lebanese firms, covering their major sector, location, ownership type, relationship of owners, age, size and average annual turnover; these are organized in *seven questions that are of a Multiple Choice type*.

In the second part of the Survey, we start the section by collecting general information about the availability and type of **product and process innovations** in these firms during the five-year period 2009 to 2013 inclusive, which constitute *five questions that are of a Yes/No (If Yes – specify number) type*. If such innovation activities exist, the remaining part of this section focuses on the **Star*** product or process innovation that had the highest impact on the firms' turnover during the three-year period 2011 to 2013 inclusive, which constitute *fourteen elaborate questions that are either Yes/No, Yes/No (If Yes – specify number or percentage), Rating, Multiple Choice, or Percentage types*.

In the third part of the Survey, we start the section by collecting general information about the availability and type of **organisational and marketing innovations** in Lebanese firms during the five-year period 2009 to 2013 inclusive, which constitute *five questions that are of a Yes/No (If Yes – specify number) type*. If such innovations activities exist the remaining part of this section focuses on the **significant*** organisational or marketing innovation that was essential for the company's competitiveness during the three-year period 2011 to 2013 inclusive, which constitute *two elaborate questions that are of a Rating type*.

In the fourth and last part of the Survey, we start the section by collecting information regarding the **classification of hindered innovation activities** in Lebanese firms during the five-year period 2009 to 2013 inclusive, which constitute *four questions that are of a Yes/No (If Yes – specify number) type*. If such hindered innovation activities are observed, the remaining part of this section uses the **framework of the Innovation Value Chain in alignment with the CIS** to collect information about the cultural, managerial, knowledge, selection, development, cost,

institutional, organizational and market factors that hinder innovation activities in Lebanese firms over the duration of the five-year period 2009 to 2013 inclusive, which constitute *six elaborate questions that are of a Rating type*.

Accordingly, the far most of the *four three questions* in this Survey are asking for qualitative data, with very few questions that require quantitative data and these are asking for basic numbers and percentages. Appendix IV depicts ‘The Lebanese Innovation Survey Questionnaire (2009 – 2013)’ upon which the data collection and results of this study have been based.

CHAPTER IV

RESEARCH RESULTS AND ANALYSIS

A. The Lebanese Innovation Survey Results (2009 – 2013)

In this section we will illustrate the results of the 70 respondents to ‘The Lebanese Innovation Survey Questionnaire’, starting with the Demographics of the respondent firms. Moving on to their Product and Process Innovations, Organisational and Marketing Innovations, and Hindered Innovation Activities over the duration of the five-year period 2009 to 2013 inclusive.

In that respect, a multi-stage processing is applied to the acquired data of the 70 firms to be viewed in relation with the demographic data collected regarding the sector, size and age of the sample in question, to produce comparable results and allow for a more detailed analysis across each variable. Appendix V, illustrates all the comparable results that were obtained across the 70 firms, and subsequently in this section we will elaborate on some of these findings.

1. Demographics:

a) **Major Sector of Firms:** we can observe from our results, illustrated in ‘Figure 6’ that our 70 respondents represent 22 major sectors, and among these respondents 17% are from the Information Technology sector (12 firms); followed by 9% who are identified under the sector category Other Manufacturing (6 firms); and 7% who are from the Business Services, Insurance & Re-Insurance, Media sectors, along with the sector category Other (5 firms from each sector). In addition, among our respondents 6% are from the Telecom and Wholesale & Retail Trade sectors (4 firms from each

sector); 4% are from Agriculture, Banking, Distribution and Education & Research sectors (3 firms from each sector); 3% are from the Hotels & Restaurants and Trade sectors (2 firms from each sector); and 1% are from the Chemical, Construction, Electrical Equipment, Engineering and Architecture, Food Processing, Other Market Services, and Pharmaceutical sectors (1 firms from each sector, and these constitute more than 30% of our 22 sectors).

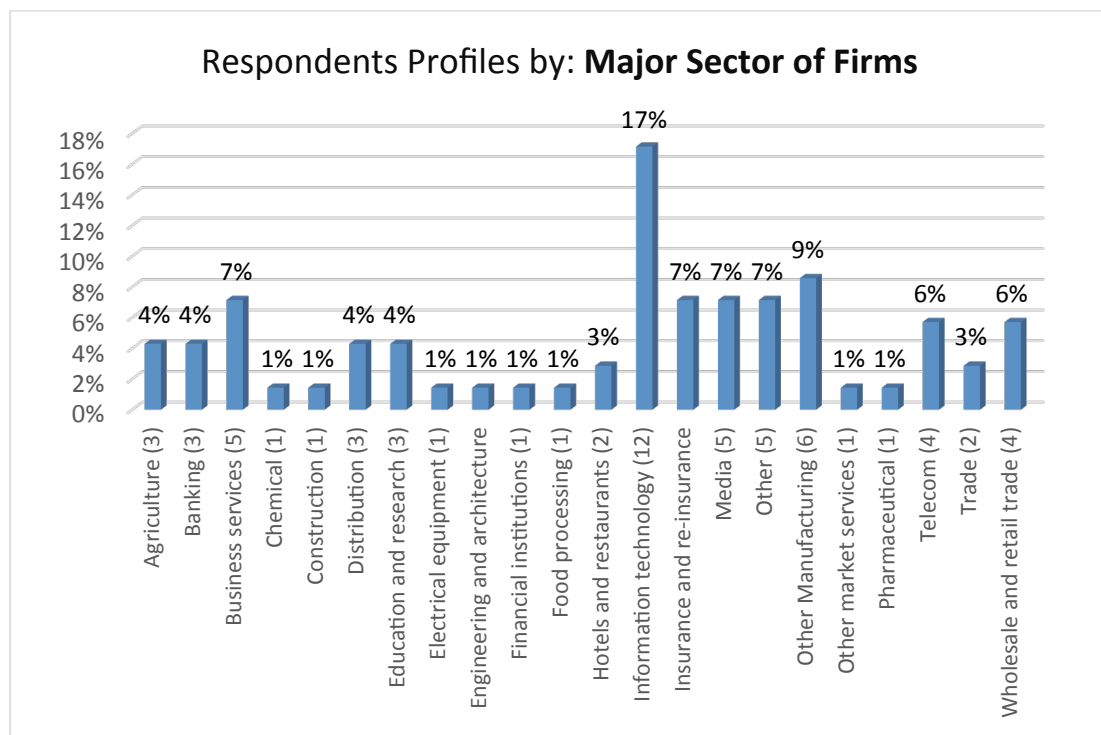


Fig.6. Demographics of 70 Firms based on their Sector (2014)

b) **Location of Firms:** we can clearly identify from ‘Figure 7’ that 60% of our respondents’ firms are located in Beirut (42 firms); followed by 36% that are located in Mount Lebanon (25 firms); 3% are located in North Lebanon (2 firms); and 1% are located in Bekaa (1 firm). It is important to note, that we did not receive any respondents from South Lebanon or Nabatiyeh.

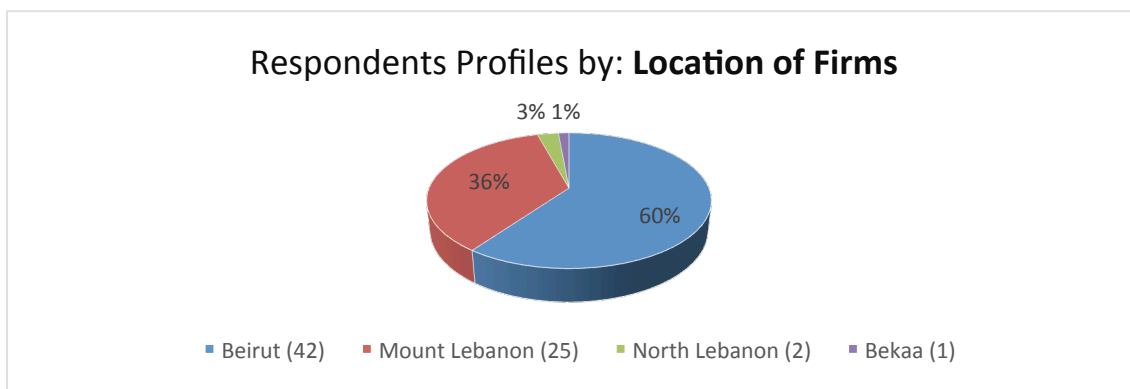


Fig.7. Demographics of 70 Firms based on their Location (2014)

c) **Ownership Type of Firms:** in reference to ‘Figure 8’, among our respondents there is a high percentage (24%) who are part of a Limited Liability Company (17 firms); followed by 19% who are part of a Limited Partnership (13 firms); 14% are part of a Holding Company (10 firms); 13% are part of a Sole Proprietorship (9 firms); 10% are part of a Joint Stock Company (7 firms); 9% are part of a General Partnership (6 firms); and 6% are part of either an Off-shore Company or an Other type (4 firms of each type).

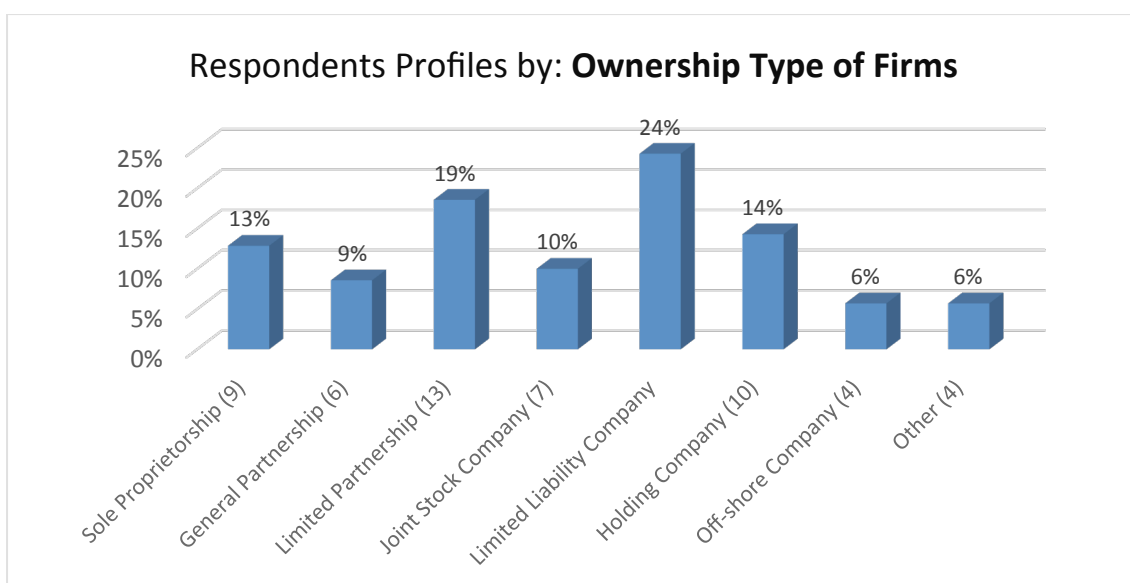


Fig.8. Demographics of 70 Firms based on their Ownership Type (2014)

d) **Relationship of Owners in Firms:** as this question was not mandatory, we had 6% of our respondents who did not provide us with an answer (4 firms). As we can see in 'Figure 9', for the rest of the respondents the majority (47%) among them represented 33 firms that were family owned businesses; followed by 37% who represented firms whose owners were not from the same family (26 firms); and 10% represented firms that had another type of relationship among the owners of their respective 7 firms.

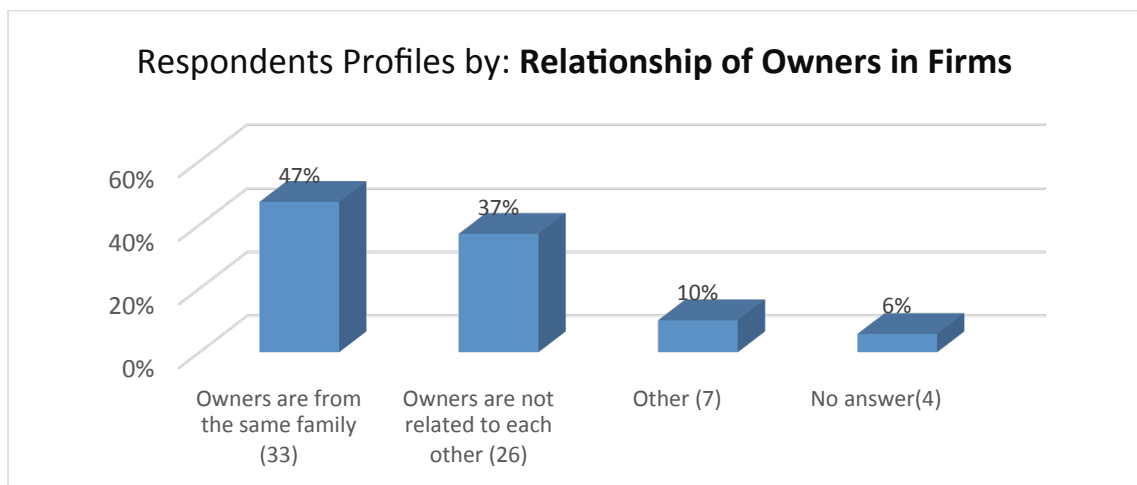


Fig.9. Demographics of 70 Firms based on Relationship of their Owners (2014)

e) **Size of Firms:** as it is illustrated in 'Figure 10' we have a clear domination of SMEs among our respondents, where 31% represent firms that are constituted of 10 to 49 employees (22 firms); followed by 20 firms that employ less than 10 employees (29%). While, the rest of the firms are distributed as follows: 10 firms are constituted of 100 to 249 employees (14%), 8 firms are constituted of 50 to 99 employees (11%); 4 firms are constituted of 250 to 499 employees (6%), 3 firms are constituted of 1000 to 4999 employees (4%), 2 firms are constituted of 500 to 999 employees (3%), and only 1 firm in our sample is constituted of more than 5000 employees (1%).

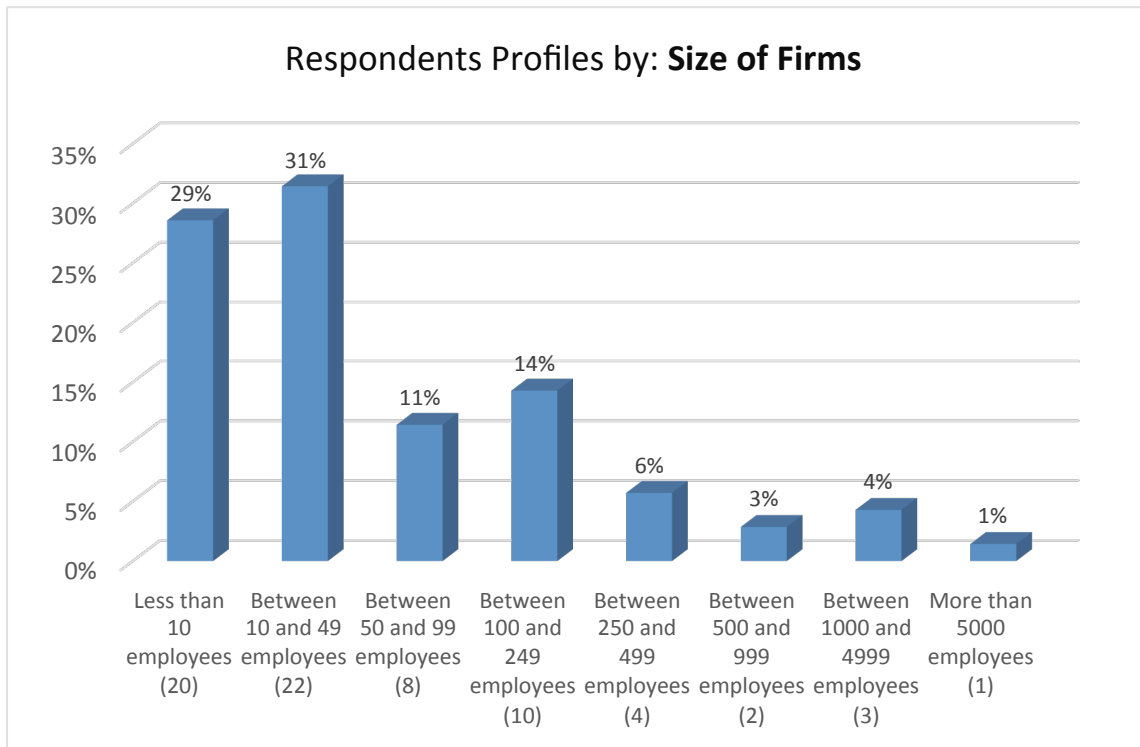


Fig.10. Demographics of 70 Firms based on their Size (2014)

f) **Age of Firms:** the distribution of the firms' age among our sample is also dominated by younger firms having 18 firms to be less than 5 years old (26%); followed by 14 firms that are between 5 and 10 years old (20%). Nevertheless, we have a balanced number of firms that pertain to different age groups; where, 12 firms are between 11 and 25 years old (17%); 11 firms are between 51 and 100 years old (16%); 10 firms are between 26 and 50 years old (14%); and 5 firms are more than a 100 years old (7%), as illustrated in 'Figure 11' below.

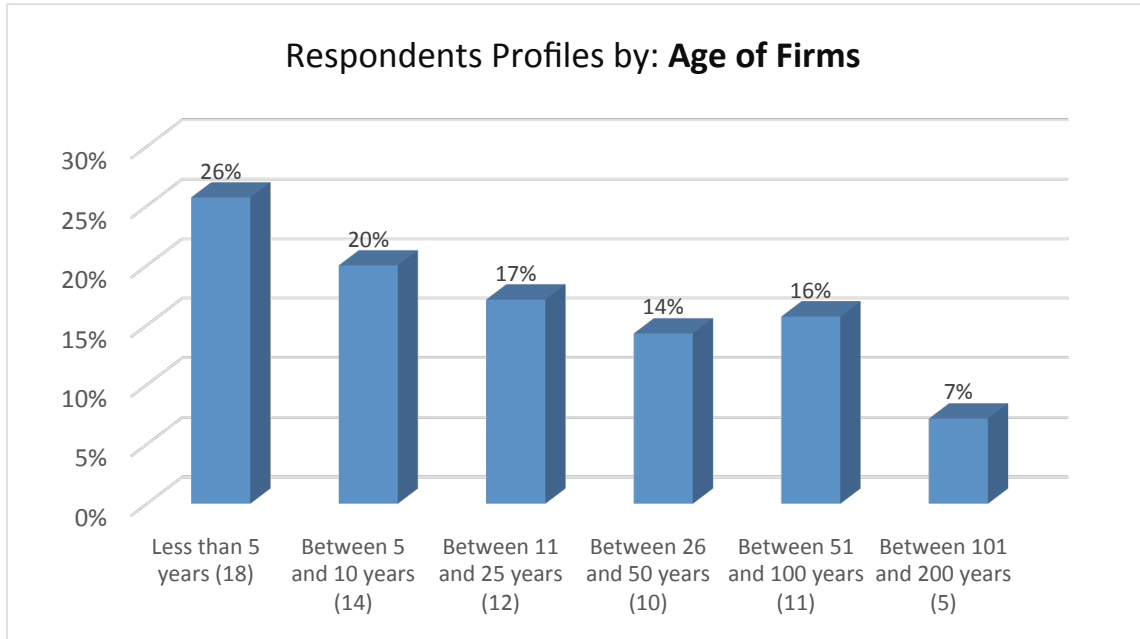


Fig.11. Demographics of 70 Firms based on their Age (2014)

g) **Average Annual Turnover of Firms:** the firms' annual turnover is very similar in distribution to that of the firms' size. Looking into 'Figure 12' we can see that a relatively large percentage (39%) of the respondent firms have an average annual turnover that is less than \$500,000 (27 firms). The rest of the respondent firms are evenly distributed in a decreasing order; where, 19% of firms earn between \$500,000 and \$2,500,000 (13 firms); 14% of firms earn between \$2,500,000 and \$7,500,000 (10 firms); 9% of firms earn between \$7,500,000 and \$20,000,000 (6 firms); 7% of firms earn between \$20,000,000 and \$50,000,000 (5 firms); and 4% of firms earn between \$50,000,000 and \$100,000,000, between \$100,000,000 and \$250,000,000, and more than \$250,000,000 respectively (3 firms per each range of annual turnover).

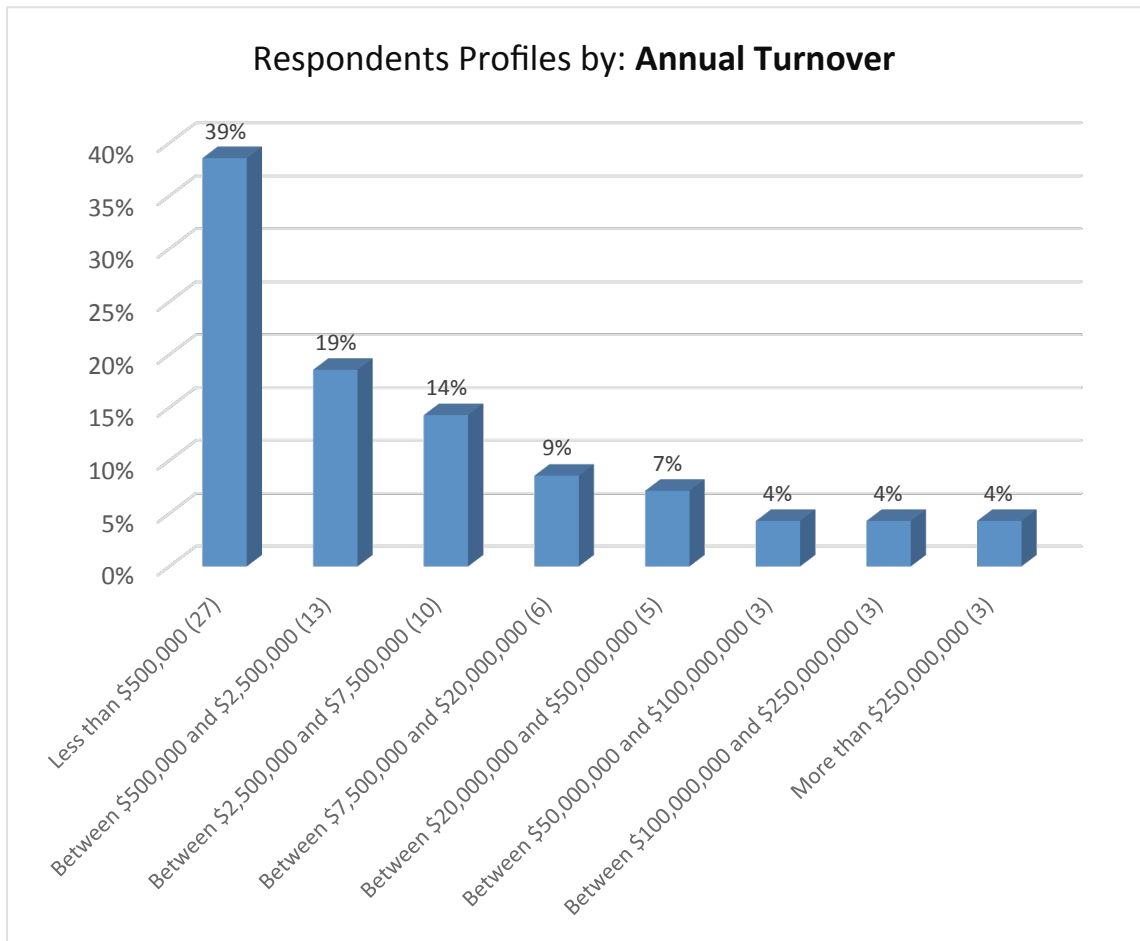


Fig.12. Demographics of 70 Firms based on their Annual Turnover (2009 – 2013)

2. Product and Process Innovations (2009 – 2013):

a) **Product Innovations:** in Lebanese firms during the five-year period 2009 to 2013 inclusive, 53 firms out of our 70 sample firms reported that they have undergone Product Innovations. As it is illustrated in ‘Figures 13 & 14’, 49% of these firms have introduced ‘New or significantly improved goods’, with a five years average of 35.6 innovations; and 70% of these firms have introduced ‘New or significantly improved services’, with a five years average of 9.5 innovations. Accordingly, we can witness that some of these firms have introduced both types of Product Innovations simultaneously, with a higher propensity in the average number of introduced ‘goods’.

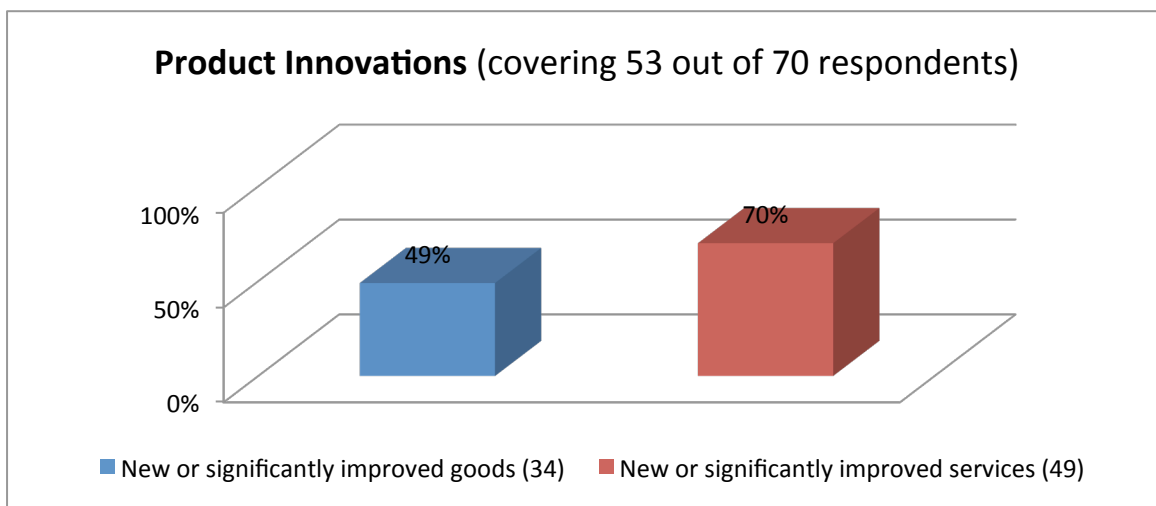


Fig.13. Product Innovations (2009 – 2013)

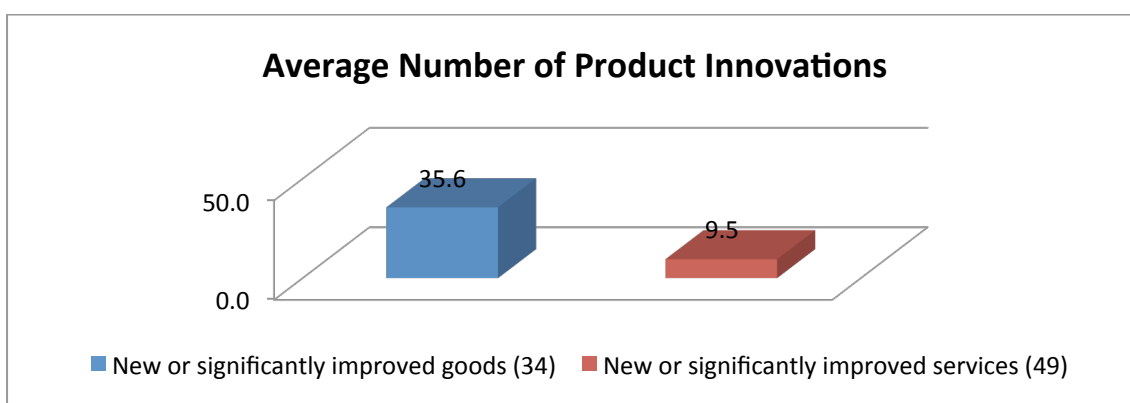


Fig.14. Average Number of Product Innovations (2009 – 2013)

In Appendix V (Figure 42), we can observe from a ‘Firm Sector’ perspective that firms pertaining to the Construction, Distribution, and Food Processing sectors, did not report product innovation activities. On the other hand, all respondent firms that pertain to the Chemical, Education & Research, Financial Institutions, Other Market Services, Telecom, and Wholesale & Retail Trade sectors have an equal incidence of both ‘New or significantly improved goods and services’; signifying a conformity

between firms within and across these sector groups, with some sector groups experiencing higher levels of incidence.

In other sectors, like the Electrical Equipment, Engineering & Architecture and Pharmaceutical sectors, they only have an occurrence of ‘New or significantly improved services’; signifying a conformity among these sectors. While, all the remaining firms in our sample that pertain to other sectors have an unequal incidence of both types of product innovations within their sector group.

Moreover, in Appendix V (Figure 43), we can distinguish from a ‘Firm Size’ perspective that all the firms that are constituted of more than 250 employees have an equal occurrence of both ‘New or significantly improved goods and services’, with variable levels of incidence; signifying a conformity between firms within each of these size groups.

Firms pertaining to size groups that are less than 249 employees have an unequal incidence of both types of product innovations. Highlighting that firms pertaining to size groups that are less than 49 employees show higher peaks of reliance on service oriented innovation, and this is extenuated by the fact that they represent the largest number of firms in our sample, which totals to 44 firms.

Furthermore, in Appendix V (Figure 44), we can identify from a ‘Firm Age’ perspective, younger firms that are less than 5 years old also tend to rely more on ‘service oriented innovations’ rather on ‘product oriented innovations’. In addition, firms in our sample that are more than 100 years old tend to balance out this reliance and eventually decrease their dependency on such innovations.

b) **Process Innovations:** in Lebanese firms during the five-year period 2009 to 2013 inclusive, 49 firms out of our 70 sample firms reported that they have undergone Process Innovations. As it is illustrated in ‘Figures 15 & 16’, 59% of these firms have introduced ‘New or significantly improved methods of manufacturing or producing goods or services’, with a five years average of 4.0 innovations; 44% of these firms have introduced ‘New or significantly improved logistics, delivery or distribution methods for their inputs, goods or services’, with a five years average of 3.5 innovations; and 49% of these firms have introduced ‘New or significantly improved supporting activities for their processes’, with a five years average of 5.7 innovations. Accordingly, we can observe that some of these firms have introduced several types of Process Innovations simultaneously, with a higher propensity in the average number of introduced ‘supporting activities for their processes’.

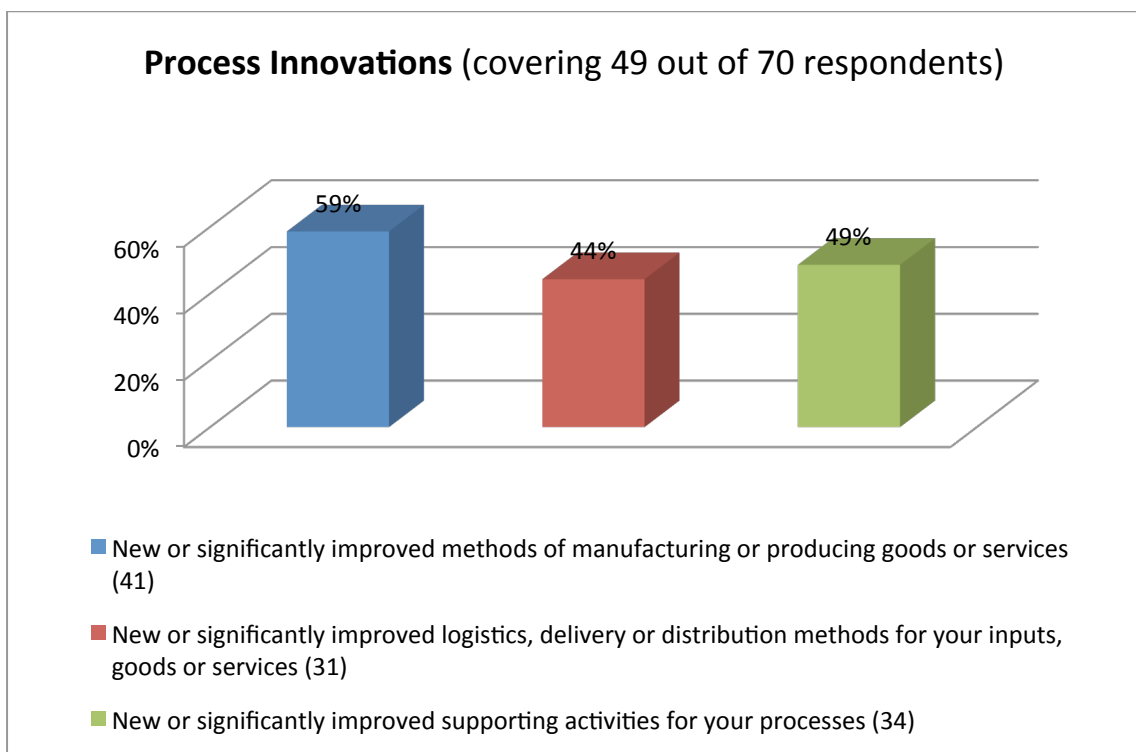


Fig.15. Process Innovations (2009 – 2013)

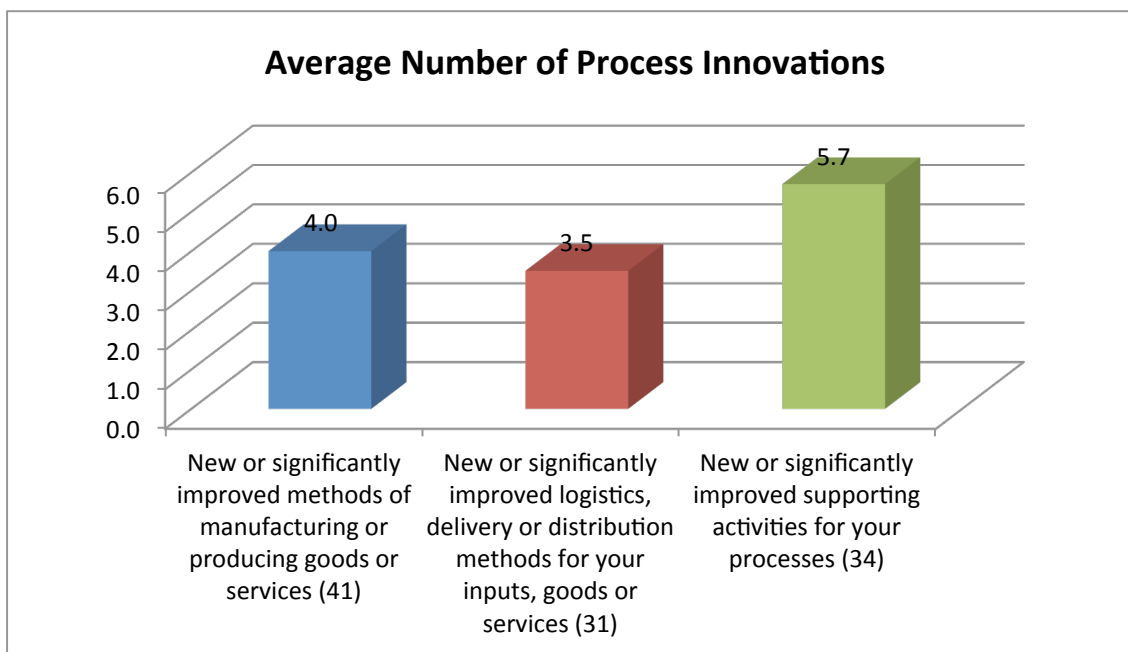


Fig.16. Average Number of Process Innovations (2009 – 2013)

In Appendix V (Figure 45), we can distinguish from a ‘Firm Sector’ perspective that firms pertaining to the Construction, Distribution, Engineering & Architecture, and Food Processing sectors, did not report process innovation activities. On the other hand, firms pertaining to the Electrical Equipment, Financial Institutions, Hotels & Restaurants, Other Market Services and Pharmaceutical sectors have high and equal incidences of all the three types of process innovations; signifying a conformity between firms within and across these sector groups. In addition, firms from the Trade sector also experience such an incidence but at lower levels.

Firms pertaining to the remaining sector groups are reliant on all three types of process innovation activities but at different degrees of intensity with respect to each type, with a distinction of three sectors that rely only on two types of process innovations. These sectors are: 1) Agriculture (focuses on ‘New of significantly improved methods of producing goods’ and ‘New of significantly improved supporting

activities’), 2) Chemical (focuses on ‘New or significantly improved logistics, delivery and distribution methods’ and ‘New or significantly improved supporting activities’), and 3) Telecom (focuses on ‘New or significantly improved methods of producing goods or services’ and ‘New or significantly improved logistics, delivery and distribution methods’).

Moreover, in Appendix V (Figure 46), we can observe from a ‘Firm Size’ perspective that all the firms that are constituted of more than 500 employees have an equal occurrence of all the types of process innovations, with an increase in the intensity of occurrence, as firms are larger in size; signifying a conformity between firms within and across these sector groups. On the other hand, firms with less than 499 employees have an unequal incidence of all three types of process innovations; highlighting that the larger firms are in this group the higher the intensity of reliance on process innovation activities.

Furthermore, in Appendix V (Figure 47), we can identify from a ‘Firm Age’ perspective that all age groups of firms experience unequal incidence of all three types of process innovations, with more intensity of reliance for firms that are between 51 and 100 years old. As for firms that are between 26 and 50 years old, we can observe an intense peak of reliance on ‘New or significantly improved methods of manufacturing or producing goods or services’.

3. Organisational and Marketing Innovations (2009 – 2013):

a) **Organisational Innovations:** in Lebanese firms during the five-year period 2009 to 2013 inclusive, 46 firms out of our 70 sample firms reported that they have undergone Organisational Innovations. As it is illustrated in ‘Figures 17 & 18’, 53% of these firms have introduced ‘New or significantly improved knowledge management

systems’, with a five years average of 3.9 innovations; 50% of these firms have introduced ‘A major change to the organisation of work within their company’, with a five years average of 4.7 innovations; and 41% of these firms have introduced ‘New or significant changes in their relations with other firms or public institutions’, with a five years average of 7.7 innovations. Accordingly, we can witness that some of these firms have introduced several types of Organisational Innovations simultaneously, with a higher propensity in the average number of introduced ‘changes in their relations with other firms or public institutions’.

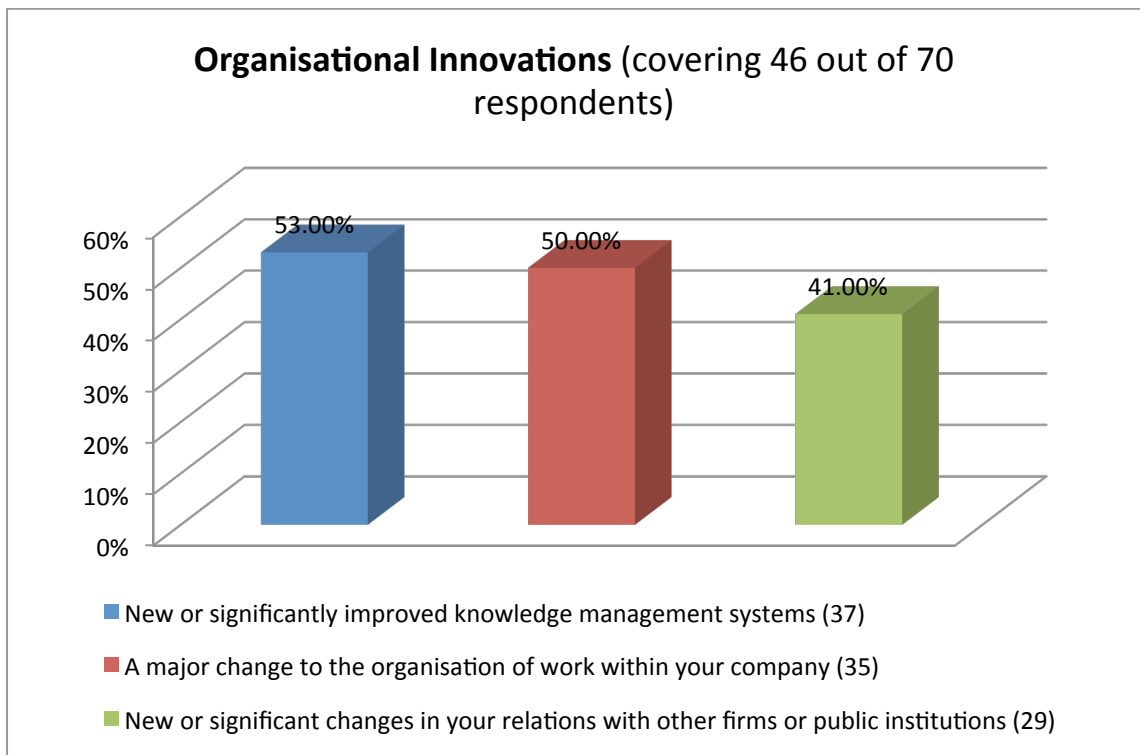


Fig.17. Organisational Innovations (2009 – 2013)

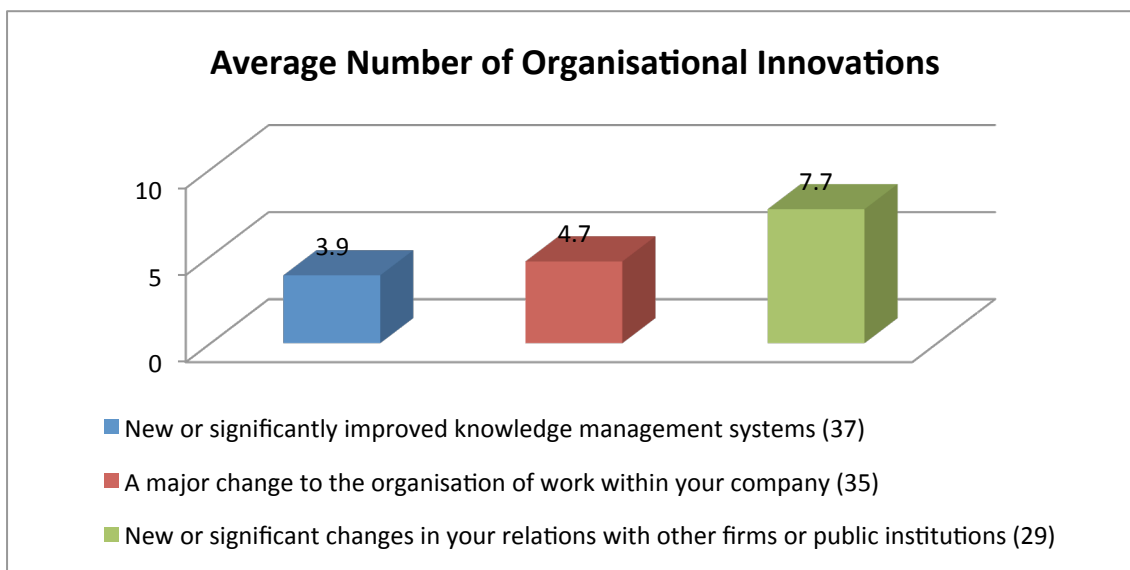


Fig.18. Average Number of Organisational Innovations (2009 – 2013)

In Appendix V (Figure 63), we can observe from a ‘Firm Sector’ perspective that firms pertaining to the Construction and Trade sectors did not report organisational innovation activities. On the other hand, respondent firms that pertain to the Banking, Financial Institutions, Other Market Services and Pharmaceutical sectors have high and equal incidences of all the three types of organisational innovations; signifying a conformity between firms within and across these sector groups. In addition, firms from the Wholesale & Retail Trade are experiencing also such an incidence but at a lower level of intensity.

Other firms from different sectors are reliant on several organisational innovation activities but at different intensities, with a distinction of three sectors that rely only one type. These sectors are: 1) Chemical (focuses on ‘Major change to the organisation of work’, 2) Distribution and Engineering & Architecture (focus on ‘New or significantly improved knowledge management systems’).

Moreover, in Appendix V (Figure 64), we can distinguish from a 'Firm Size' perspective that all the firms that are constituted of more than a 1000 employees have an equal occurrence of all types of organizational innovations, with an increase in intensity of occurrence with firms that are constituted of more than 5000 employees. The rest of the size groups of our sample have an unequal incidence of all types of organisational innovations, except for firms that are between 500 and 999 employees that mainly focus on 'Major change to the organisation of work' and 'New or significant changes in the relationship with other firms or public institutions'.

Furthermore, in Appendix V (Figure 65), we can identify from a 'Firm Age' perspective that all age groups in our sample rely on all three types of organisational innovation activities, but at different intensities. An exception is observed with respect to firms that are more than a 100 years old, as they rely only on 'New or significantly improved knowledge management systems' and 'Major change to the organisation of work' at lower intensities.

b) **Marketing Innovations:** in Lebanese firms during the five-year period 2009 to 2013 inclusive, 32 firms out of our 70 sample firms reported that they have undergone Marketing Innovations. As it is illustrated in 'Figures 19 & 20', 40% of these firms have introduced 'Significant changes to the design or packaging of a good or service', with a five years average of 5.7 innovations; and 31% of these firms have introduced 'New or significantly changed sales or distribution methods', with a five years average of 3.7 innovations. Accordingly, we can observe that some of these firms have introduced both types of Marketing Innovations simultaneously, with a higher propensity in the average number of introduced 'changes to the design or packaging of a good or service'.

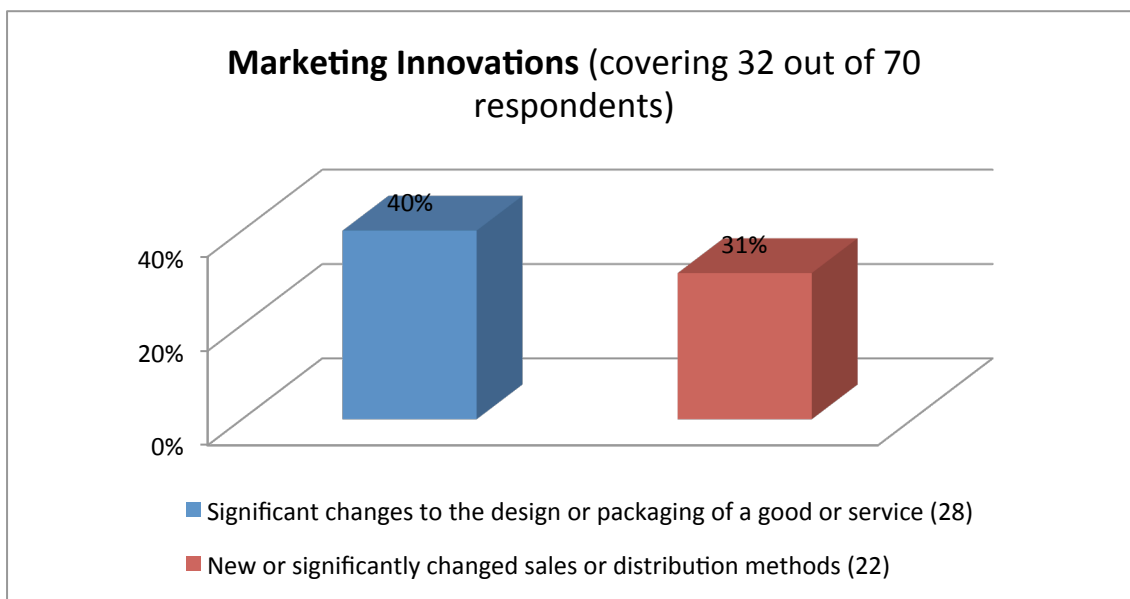


Fig.19. Marketing Innovations (2009 – 2013)

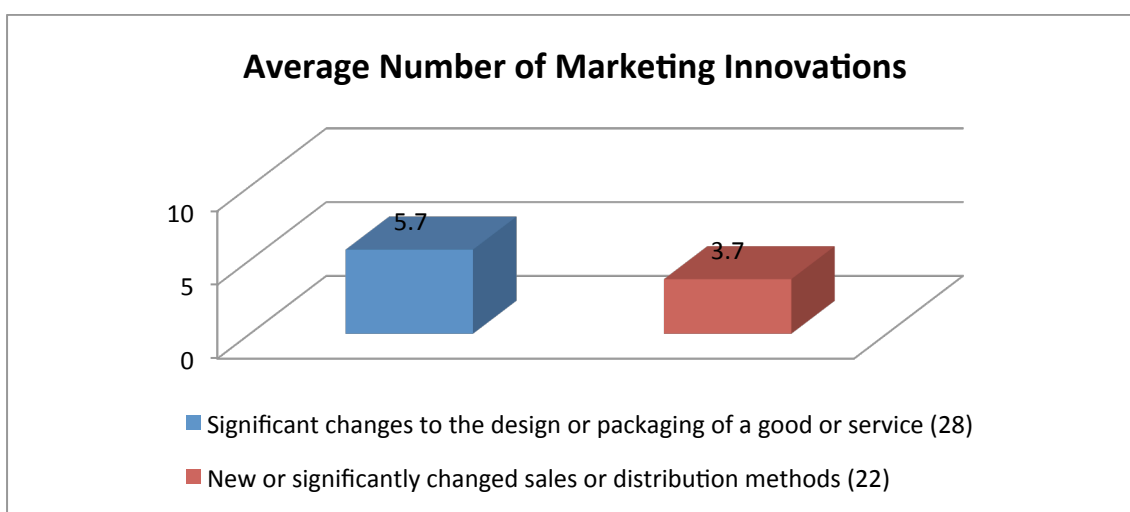


Fig.20. Average Number of Marketing Innovations (2009 – 2013)

In Appendix V (Figure 66), we can distinguish from a ‘Firm Sector’ perspective that firms pertaining to the Chemical, Construction, Engineering & Architecture, Financial Institutions, Telecom, and Trade sectors, did not report marketing innovation activities. On the other hand, firms pertaining to the Electrical Equipment, Food Processing, and Pharmaceutical sectors have high and equal incidences of both types of

marketing innovations; signifying a conformity between firms within and across these sector groups. In addition, firms from the Banking, Educational & Research, Hotels & Restaurants, and Wholesale & Retail Trade sectors also experience such an incidence but at lower levels.

Other firms from different sectors are reliant on both types of marketing innovation activities but at different degrees of intensity with respect to each type, with a distinction of three sectors that rely only on one type of marketing innovations. These sectors are: 1) Agriculture and Media (focus on ‘Significant changes to the design or packaging of a good or service’), and 2) Distribution (focuses on ‘New or significantly changed sales or distribution methods’).

Moreover, in Appendix V (Figure 67), we can also distinguish from a ‘Firm Size’ perspective that firms which are between 500 and 999 employees did not report marketing innovation activities, while all other firms that are constituted of more than 250 employees have an equal occurrence of both the types of marketing innovations, with an increase in the intensity of occurrence, as firms are larger in size. On the other hand, firms with less than 249 employees have an unequal incidence of both types of marketing innovations.

Furthermore, in Appendix V (Figure 68), we can identify from a ‘Firm Age’ perspective that most age groups of firms experience unequal incidence of both types of marketing innovations; with a distinction of firms that are between 5 and 10 years old which experience an equal incidence of both types at a medium level of intensity, and firms that are more than a 100 years old that only rely on ‘Significant changes to the design or packaging of a good or service’.

4. Hindered Innovation Activities (2009 – 2013):

a) **Hindered Innovation Activities:** in Lebanese firms during the five-year period 2009 to 2013 inclusive, 41 firms out of our 70 sample firms reported that they have undergone Hindered Innovation Activities. As it is illustrated in ‘Figures 21 & 22’, 33% of these firms have ‘Abandoned innovation projects in the concept stage’, with a five years average of 2.7 abandoned innovations; 30% of these firms have ‘Abandoned projects after the innovation activities began, with a five years average of 2.1 innovations; 44% of these firms have ‘Delayed innovation activities’, with a five years average of 2.7 innovations; and 11% of these firms have ‘Decided not to innovate’.

Accordingly, we can observe that some of these firms have experienced several types of Hindered Innovation Activities simultaneously, with a higher propensity in the average numbers of ‘Abandoned innovation projects in the concept stage’ and ‘Delayed innovation activities’.

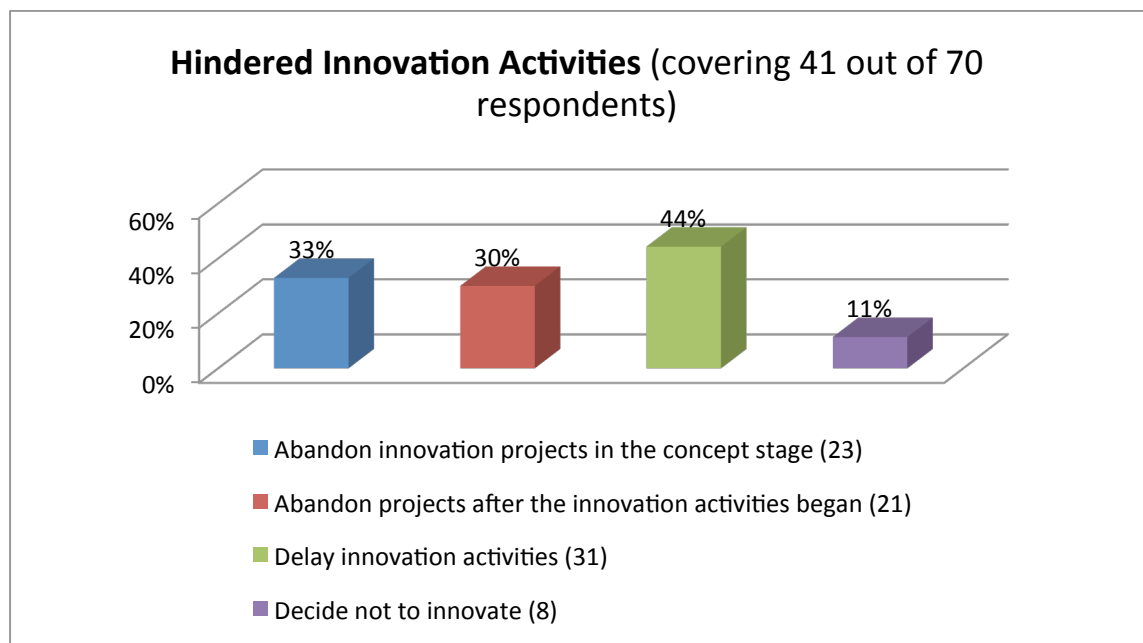


Fig.21. Hindered Innovation Activities (2009 – 2013)

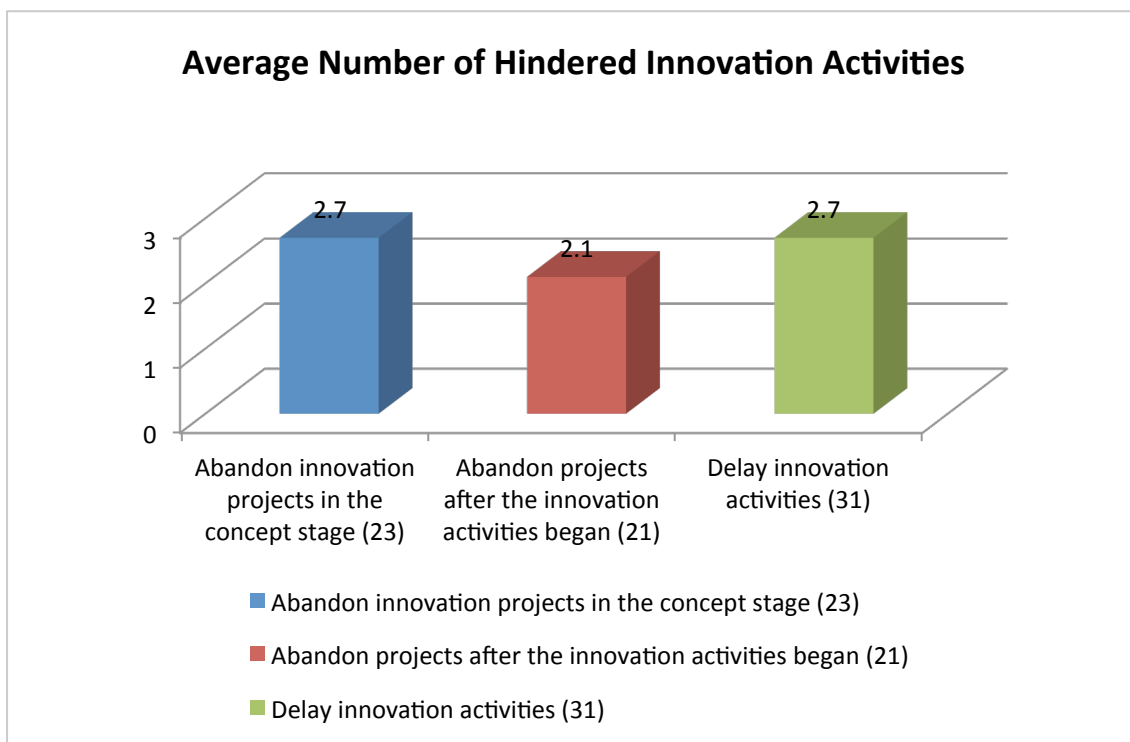


Fig.22. Average Number of Hindered Innovation Activities (2009 – 2013)

In Appendix V (Figure 69), we can observe from a ‘Firm Sector’ perspective that firms pertaining to the Chemical, Construction, Engineering & Architecture, Other Market Services, and Trade sectors did not report hindered innovation activities. On the other hand, respondent firms that pertain to the Banking, Business Services, Information Technology, Insurance & Re-insurance, and Media sectors have experience all these hindrances but at different intensities.

Other firms from different sectors also experienced some of these hindrances, with a distinction of firms within three sectors that reported particularly high intensities in one or two aspects. These sectors are: 1) Electrical Equipment (experiences ‘Abandoned projects after the innovation activities began’, 2) Financial Institutions (experiences ‘Delayed innovation activities’), where this heightened level of intensity is

also experienced by Banking, 3) Pharmaceutical (experiences both ‘Abandoned projects after the innovation activities began’ and ‘Delayed innovation activities’).

Moreover, in Appendix V (Figure 70), we can distinguish from a ‘Firm Size’ perspective that firms consisting of more than a 1000 employees have an increased intensity of hindered innovation activities, while firms that have more than 5000 employees do not report any ‘Decision not to innovate’ and have an equal intensity on all other levels. As for firms that have less than 249 employees they experience an unequal incidence of all types of hindered innovation activities, while firms that have between 100 and 249 employees do not report any ‘Decision not to innovate’.

A distinction of two size groups can be observed that reported only one or two aspects; where, firms between 250 and 499 employees experienced both ‘Abandoned innovation projects in the concept stage’ and ‘Delayed innovation activities’, and firms between 500 and 999 employees only experienced ‘Delayed innovation activities’.

Furthermore, in Appendix V (Figure 71), we can identify from a ‘Firm Age’ perspective that several age groups of our sample have an unequal incidence of all types of hindered innovation activities, with a decrease in their intensity as we move forward along the age groups; while, this situation is of no exception to firms that are between 11 and 25 years old, these firms do not report any ‘Decision not to innovate’. In addition, the only hindrance reported by firms that are more than a 100 years old is ‘Delayed innovation activities’.

b) Factors Hindering Innovation Activities: in Lebanese firms during the five-year period 2009 to 2013 inclusive, the 41 firms that have undergone Hindered Innovation Activities in our sample have evaluated the degree to which these hindering

factors have affected their 'Access to Knowledge', their 'Drive to Build Innovation', and their 'Ability to Commercialise Innovation'.

First, in 'Figures 23', there are several factors that stand out in the realm of 'Cultural and Managerial factors' with respect to hindered 'Access to Knowledge', and they are: 1) Lack in culture that encourages novel ideas, 2) Lack in collaboration with people outside their company, and 3) Inability to devote staff to innovation activities due to production requirements of existing products.

Second, in 'Figure 24' we can observe that in the realm of 'Knowledge factors' with respect to hindered 'Access to Knowledge', the factors that stand out are: 1) Difficulty in finding co-operation partners for innovations, 2) Lack in qualified personnel in the labour market, 3) Lack of information on markets, and 4) Lack in idea generation inside their company.

Third, in 'Figure 25', there are several factors that have been prioritized in the realm of 'Selection and Development factors' with respect to hindered 'Drive to Build Innovation', and they are: 1) Risk-averse attitude towards investing in novel ideas, 2) New product development often does not finish on time, 3) Tough rules for investment in new projects, and 4) Management has a hard time pushing forward the development of new ideas.

Fourth, in 'Figure 26' we can observe that in the realm of 'Cost and Institutional factors' with respect to hindered 'Drive to Build Innovation', the factors that stand out are: 1) Innovation costs are too high, 2) Lack of infrastructure, 3) Lack of funds within their company or group, and 4) Lack of finance from sources outside their company.

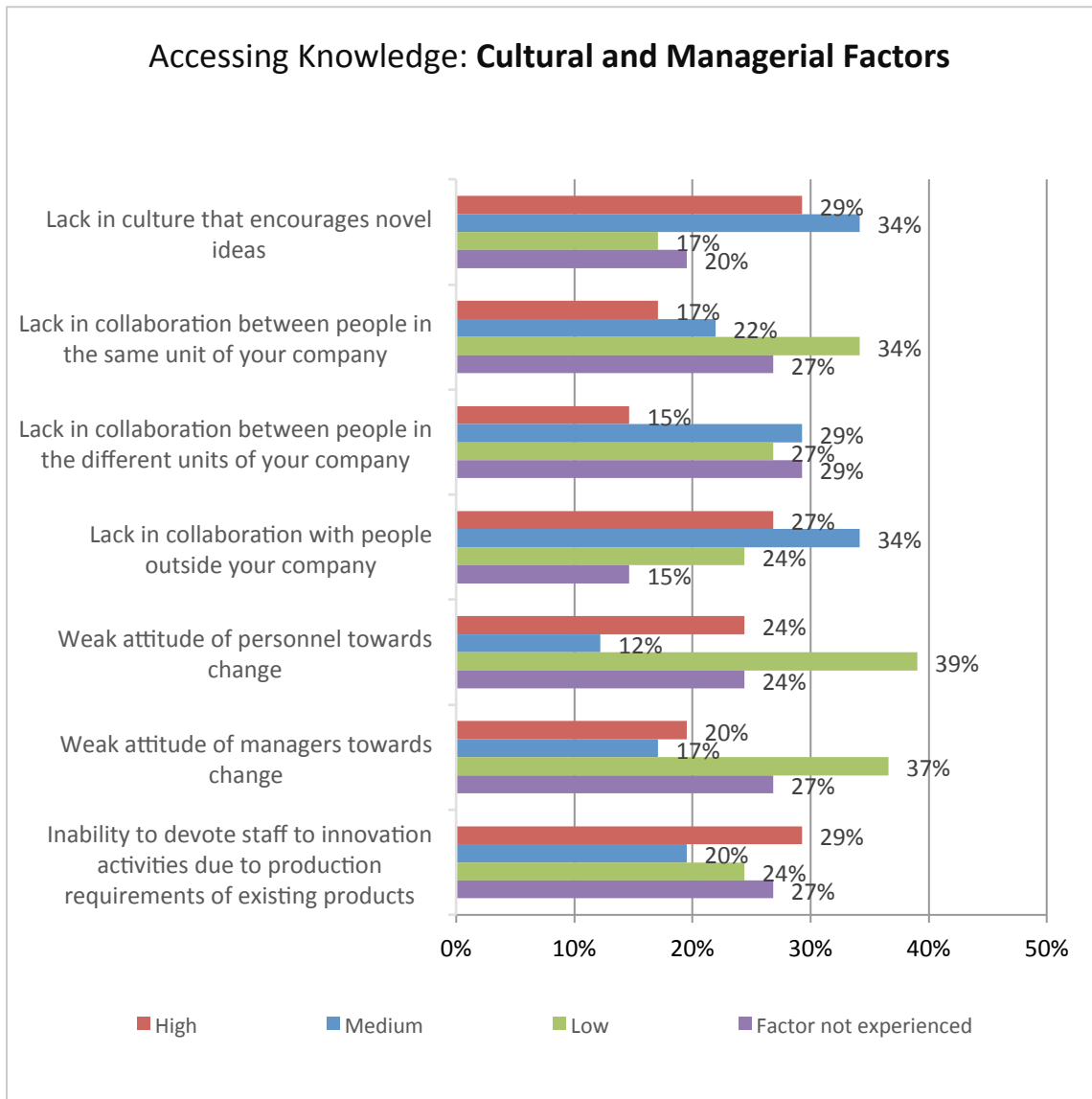


Fig.23. Accessing Knowledge: Cultural and Managerial Factors (2009 – 2013)

Fifth, in ‘Figure 27’, there are several factors that stand out in the realm of ‘Organisational and Market factors’ with respect to hindered ‘Ability to Commercialise Innovation’, and they are: 1) Delay in rolling out new products or processes, 2) Market dominated by established enterprises, 3) Competitors can quickly copy their company’s new product or process, and 4) Uncertain demand for innovative products.

Lastly, in ‘Figure 28’ we can identify that firms may decide not to innovate, but these factors do not stand out in the realm the 41 firms out of our 70 sample firms who

reported that they have undergone Hindered Innovation Activities. In fact, a high percentage of these firms has either not experienced these factors, or consider their impact to be low.

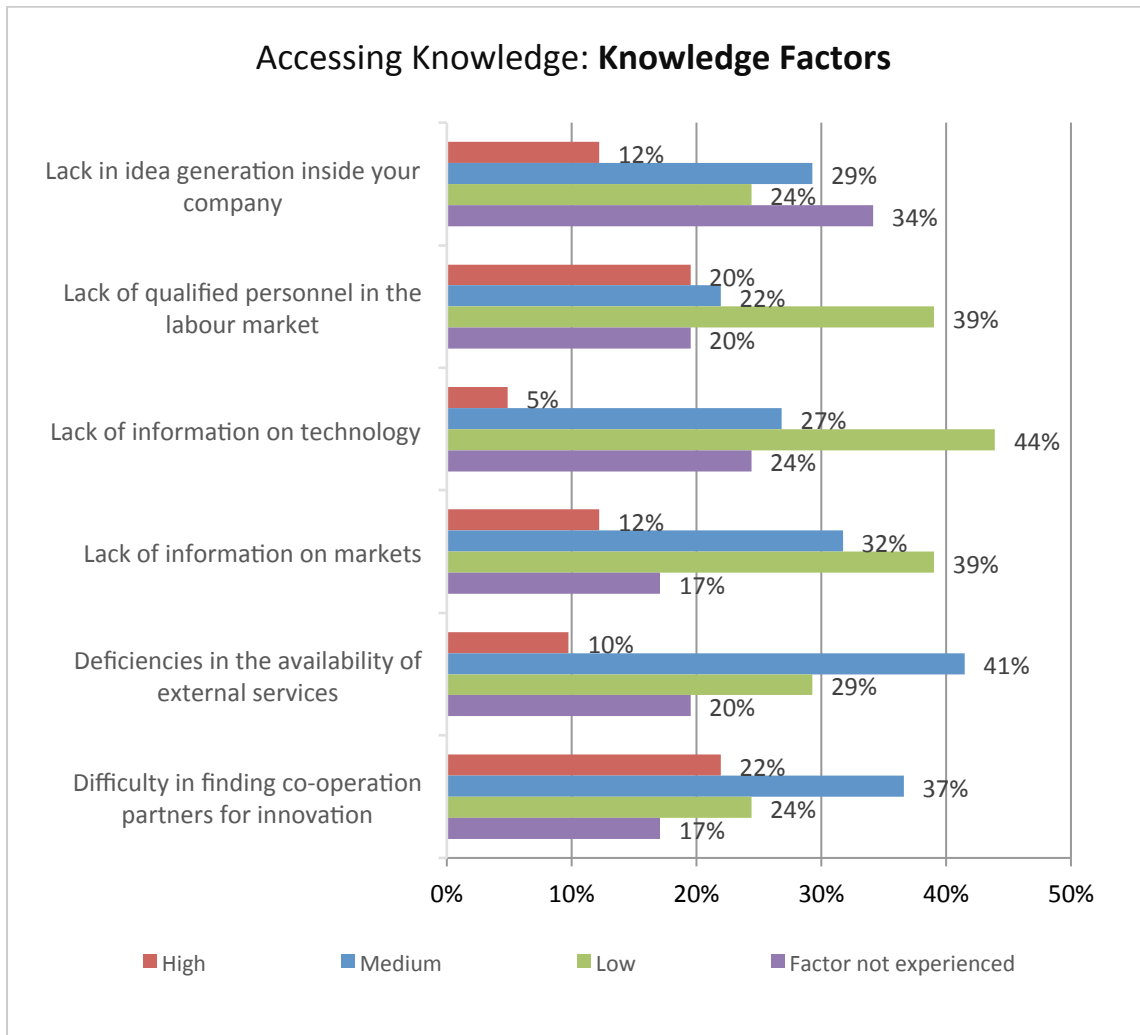


Fig.24. Accessing Knowledge: Knowledge Factors (2009 – 2013)

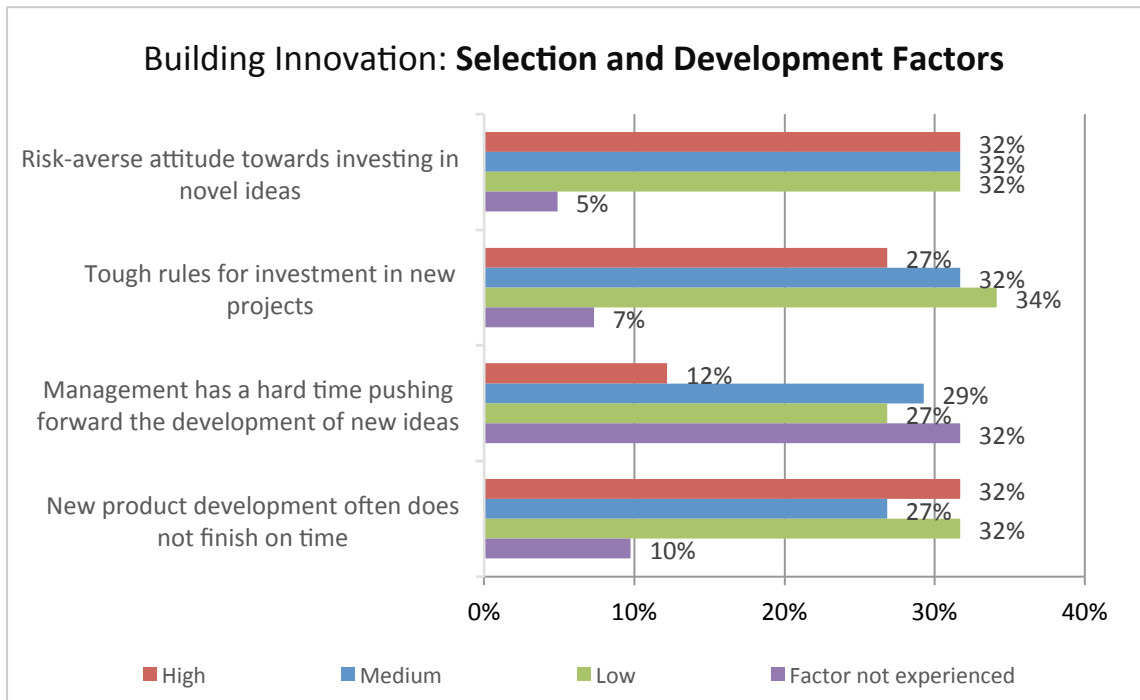


Fig.25. Building Innovation: Selection and Development Factors (2009 – 2013)

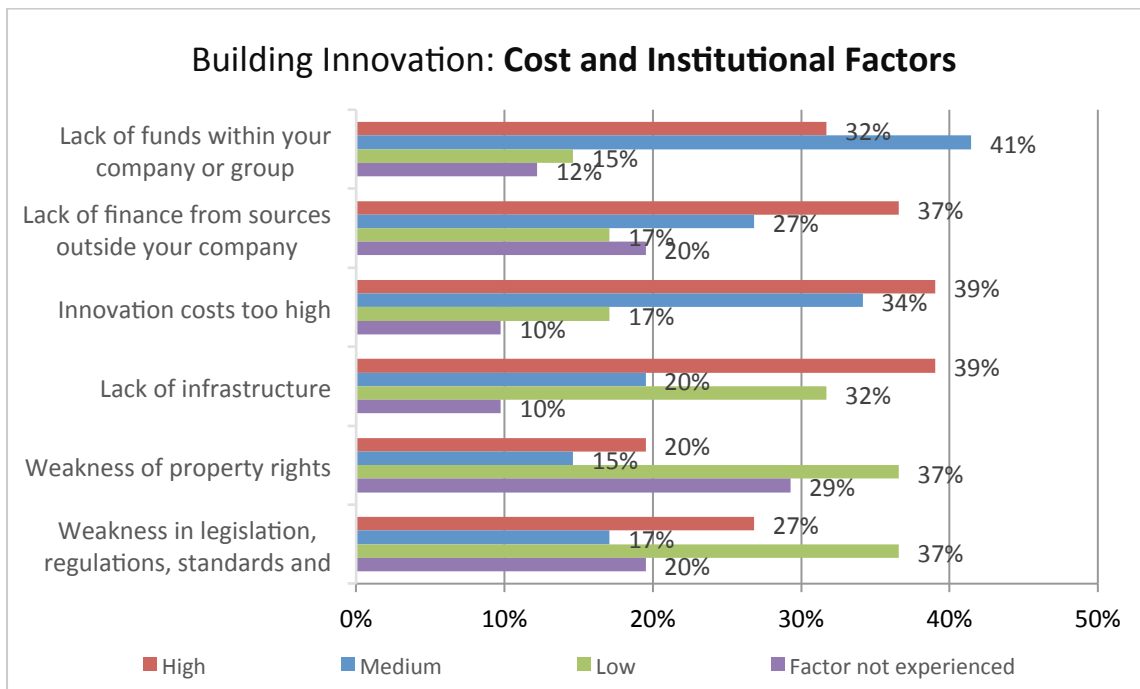


Fig.26. Building Innovation: Cost and Institutional Factors (2009 – 2013)

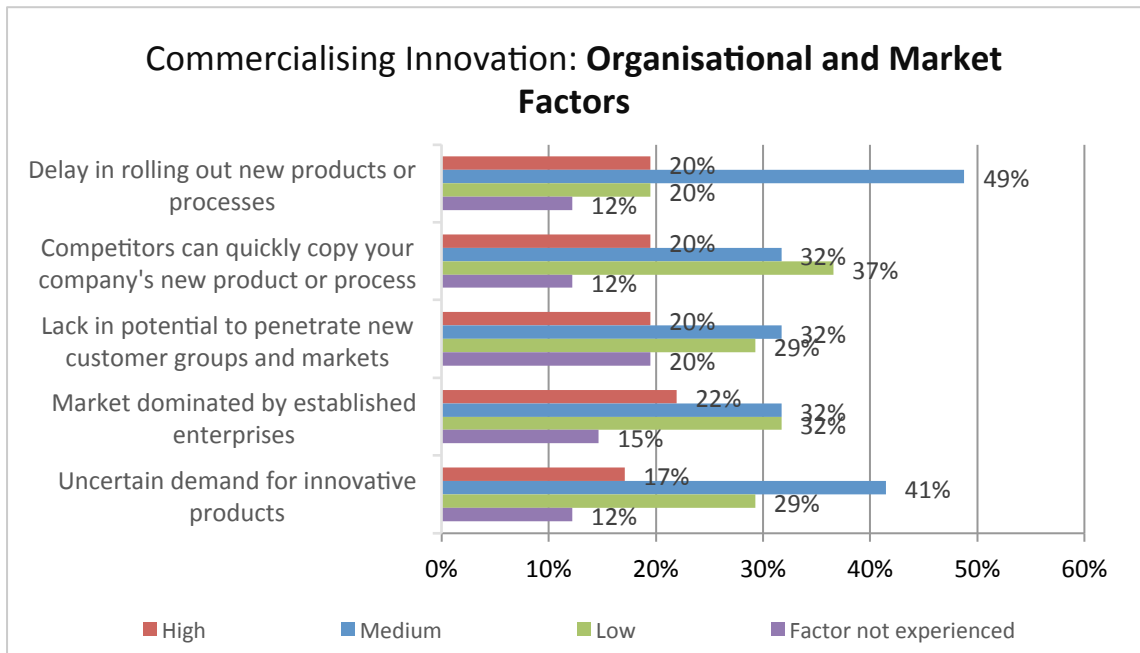


Fig.27. Commercialising Innovation: Organisational and Market Factors (2009 – 2013)

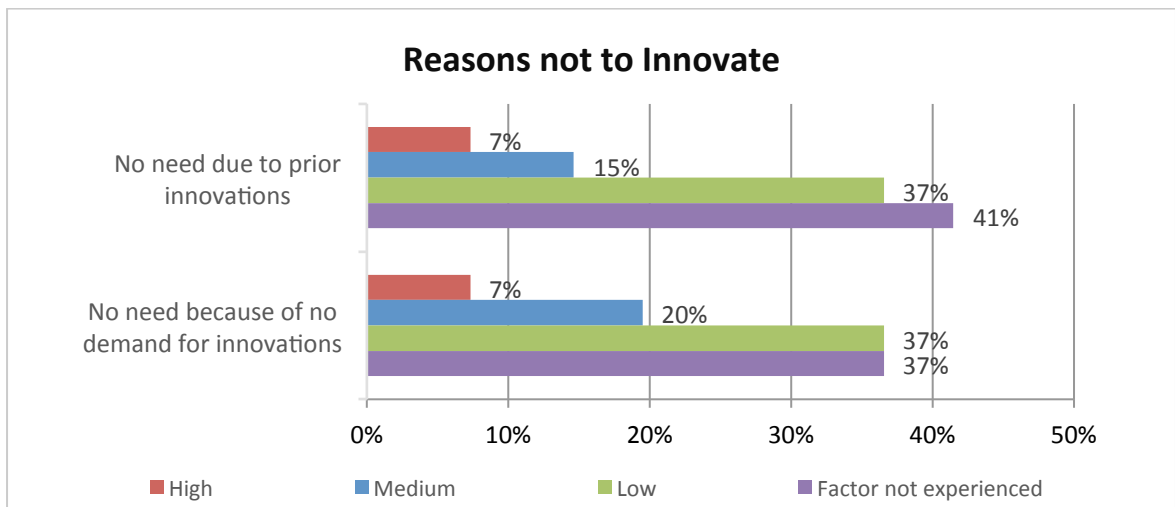


Fig.28. Reasons not to Innovate (2009 – 2013)

B. Descriptive Analysis (2011 – 2013)

1. Star Product or Process Innovation (2011 – 2013):

In this section we introduce a principal part of our findings in the form of a descriptive analysis that emphasizes the responses of 57 firm representatives, who

reported that their firms have introduced product and/or process innovations during the five-year period 2009 to 2013 inclusive. In that respect, the focus is here set on selecting either a product or a process innovation to allow for insightful explorations of a Star* innovation. Accordingly, in this part a multi-stage processing is also applied to the acquired data on the set of Star* innovations across the 57 firms to be viewed in relation with the demographic data collected regarding the sector, size and age of the sample in question, allowing for a more detailed analysis. This is of a particular importance as respondents were directed to select their Star* innovation based on the fact that it had the highest impact on the firm's turnover during the three-year period 2011 to 2013 inclusive.

In the subsequent discussion, we will elaborate on some of the findings that came about from this vital part of the 'The Lebanese Innovation Survey Questionnaire', which comprises 33% of the complete Survey questionnaire. Appendix V, illustrates all the comparable results that were obtained along the 57 firms in question.

a) **Sources for Star* Innovation:** there are several sources upon which firms rely to introduce their Star* innovations, and these sources are analyzed based on their degree of importance. Our analysis of the 57 respondents who are engaged in product or process innovation activities, shows that these firms consider the following sources as primary for the introduction of their Star* innovation, and are listed below in a descending order of importance.

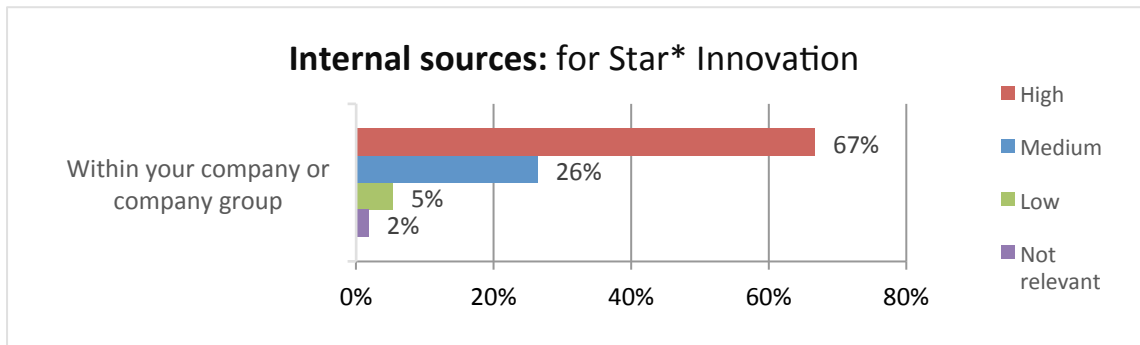


Fig.29. Internal Sources: for Star* Innovation (2011 – 2013)

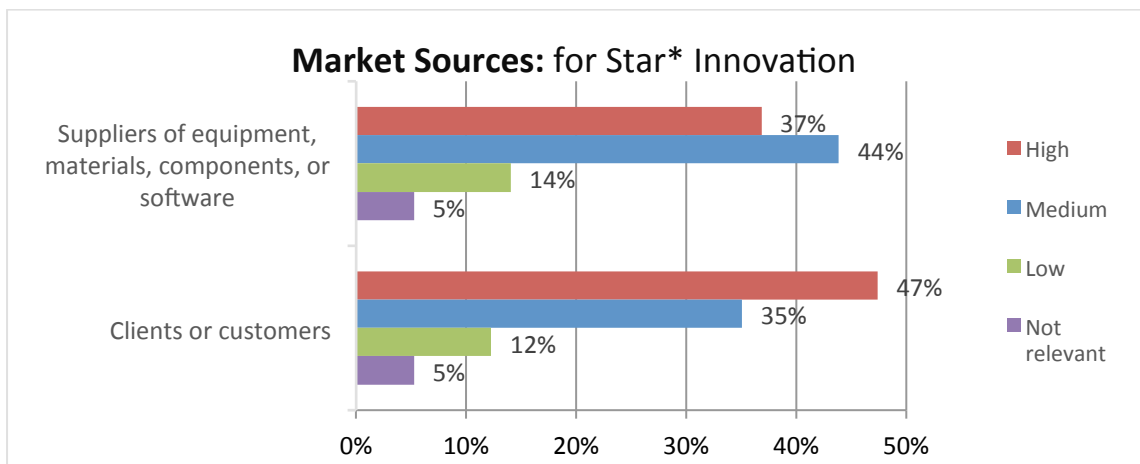


Fig.30. Market Sources: for Star* Innovation (2011 – 2013)

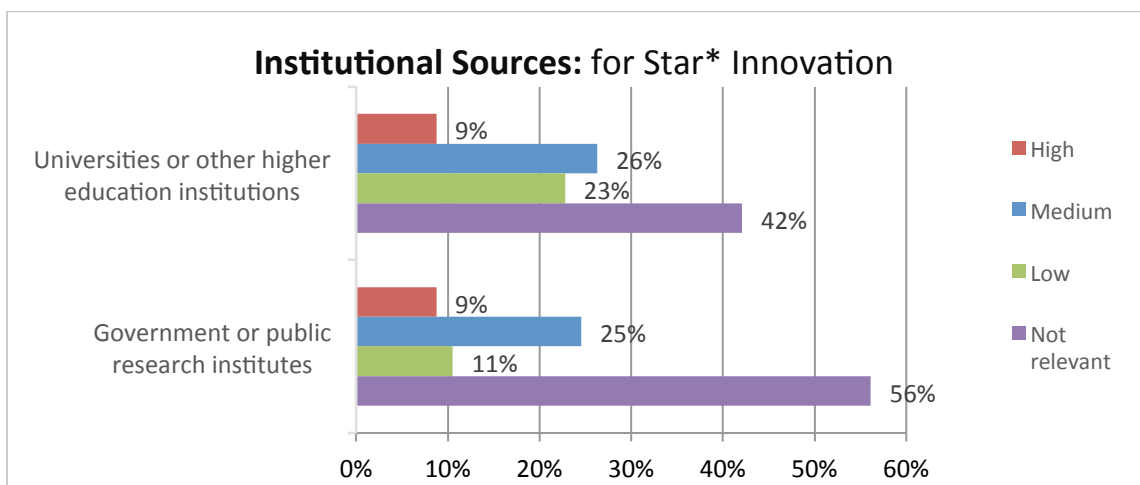


Fig.31. Institutional Sources: for Star* Innovation (2011 – 2013)

These sources are: 1) Internal sources (Figure 29), within their company or company group, 2) Market sources (Figure 30), such as clients, customers or suppliers, 3) Other sources (Figure 32), such as scientific journals and trade, in addition to professional and industry associations. On the other hand, very few of these firms tend to rely on Institutional sources (Figure 31), such as universities or government/public research institutes.

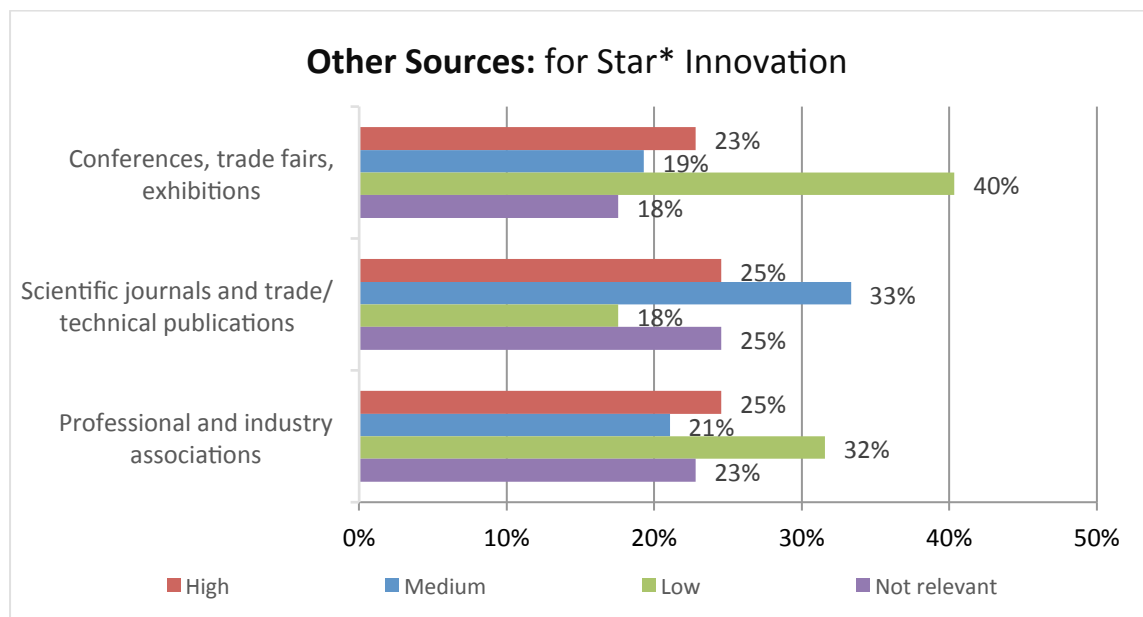


Fig.32. Other Sources: for Star* Innovation (2011 – 2013)

b) Requirement for Star* Innovation: most of the 57 respondents signified that their Star* innovations required ‘Intramural (in-house) R&D’ and/or ‘Extramural R&D’, in parallel to ‘Acquisition of machinery, equipment and/or software’, ‘Acquisition of external knowledge’, ‘Training’, and ‘Market introduction’. In Appendix V, ‘Figures 48, 49 & 50’, the comparable results are illustrated across the firms’ sector, size and age.

From a 'Firm Sector' perspective (Figure 48), we can observe that firms across the Chemical, Education & Research, Hotels & Restaurants, and Trade sectors only relied on 'Intramural (in-house) R&D' to introduce their Star* innovation; while, firms from other sectors relied on 'Intramural (in-house) R&D' and/or 'Extramural R&D'.

Moreover, from a 'Firm Size' perspective (Figure 49) only firms that are constituted of more than 5000 employees reported that they relied solely on 'Intramural (in-house) R&D'; while, firms from all other size groups relied on 'Intramural (in-house) R&D' and/or 'Extramural R&D', with a higher propensity of 'Intramural (in-house) R&D' for firms that are constituted of less than 10 employees.

Furthermore, from a 'Firm Age' perspective (Figure 50) only firms that are more than 100 years old relied on 'Intramural (in-house) R&D' only; while, firms from all other age groups relied on 'Intramural (in-house) R&D' and/or 'Extramural R&D', with a higher propensity of 'Intramural (in-house) R&D' for firms that are less than 5 years old and between 26 and 50 years old.

c) Financial Support for Star* Innovation: very few of our 57 respondents received financial support for their Star* innovations, with a higher propensity for firms to be funded by the 'Private sector' (16 firms). In Appendix V, 'Figures 51, 52 & 53', the comparable results are illustrated across the firms' sector, size and age.

From a 'Firm Sector' perspective (Figure 51) only firms that are from the Hotels & Restaurants, Information Technology, and Media sectors received financial support from the 'Public sector', 'Private sector, and/or 'Research Institutions', with a higher propensity for 'Research Institutions' for firms that are from the Information Technology and Media sectors. Firms that are from the Banking, Business Services,

Education & Research, Electrical Equipment, Other, Telecom, and Trade sectors received financial support that was concentrated on the 'Private sector' and/or 'Research Institutions', with a higher propensity for 'Research Institutions'.

Moreover, from a 'Firm Size' perspective (Figure 52) only firms that are constituted of less than 50 employees reported that they received financial support; where, firms with less than 10 employees received funding from the 'Public sector', 'Private sector, and/or 'Research Institutions', with a higher propensity for 'the 'Private sector'. Firms that are between 11 and 25 employees relied on funding from the 'Private sector' and/or 'Research Institutions', and firms that are between 26 and 50 employees relied on funding from the 'Public sectors' and/or 'Private sectors'.

Furthermore, from a 'Firm Age' perspective (Figure 53), firms across all age groups received funding from different sources for their Star* Innovation; and, only firms that are less than 5 years old received funding from the 'Public sector', 'Private sector, and/or 'Research Institutions', with a higher propensity for 'the 'Private sector'.

d) Development of Star* Innovation: many of the 57 respondents signified that their Star* innovations were developed within their firms, with a higher propensity for firms to utilize 'Several units of their company in collaboration with each other' (21 firms). In Appendix V, 'Figures 54, 55 & 56', the comparable results are illustrated across the firms' sector, size and age.

From a 'Firm Sector' perspective (Figure 54), we can observe that firms across the Chemical, Education & Research, Electrical Equipment, Engineering & Architecture, and Other sectors developed their Star* innovation only by utilizing 'Several units of their company in collaboration with each other'. Looking into the other

sectors we realize that firms within these sectors utilized different means to develop their Star* innovation.

For example, the 3 firms from the Agriculture sector utilized either ‘Mainly the R&D unit of their company’, ‘Mainly other companies or institutions’ or other non-specified means. The 12 firms from the Information Technology sector utilized either ‘Mainly the R&D unit of their company’, ‘Several units of their company in collaboration with each other’ or ‘The R&D unit of their company together with other companies or institutions’.

Moreover, from a ‘Firm Size’ perspective (Figure 55) only firms that are between 500 and 999 employees mainly depended on ‘The R&D unit of their company’ to develop their Star* innovation; while, firms with more than 5000 employees mainly depended on ‘Several units of their company in collaboration with other companies or institutions’. Firms that are between 250 and 499 employees, and those that are between 1000 and 4999 employees show similar dependencies on ‘Several units of their company in collaboration with each other’ or ‘Several units of their company in collaboration with other companies or institutions’. All other firm size groups show a wider range of dependency.

Furthermore, from a ‘Firm Age’ perspective (Figure 56), firms that are less than 5 years old have dependencies that range in a decreasing order from: 1) ‘Mainly the R&D unit of their company’, 2) ‘Several units of their company in collaboration with each other’, and 3) ‘The R&D unit of their company together with other companies or institutions’. Firms that are between 5 and 10 years old, depend on 1) ‘Mainly the R&D unit of their company’, 2) ‘Several units of their company in collaboration with each

other’, and 3) ‘Mainly other companies or institutions’. All other firm age groups show a wider range of dependency.

e) **Type of Star* Innovation:** many of the 57 respondents signified that their Star* innovations were ‘New to their market’ (37 firms) versus ‘Only new to their firm’ (20 firms). In Appendix V, ‘Figures 57, 58 & 59’, the comparable results are illustrated across the firms’ sector, size and age.

From a ‘Firm Sector’ perspective (Figure 57), we can observe that the Star* innovation of firms across the Agriculture, Banking, Chemical, Education & Research, Electrical Equipment, and Financial Institutions sectors was ‘New to their market’; where these firms introduced this innovation onto the market before their competitors.

On the other hand, all the represented firms from the Engineering & Architecture, Other Market Services, and Pharmaceutical sectors have reported that their Star* innovation was already available in the market from their competitors. All the remaining sectors in our sample show that firms within these sectors have either introduced innovations that were ‘New to their market’ or ‘Only new to their firm’.

Moreover, from a ‘Firm Size’ perspective (Figure 58) only firms that are between 50 and 99 employees and more than 5000 employees signified that their Star* innovations were ‘New to their market’; while, firms that are between 500 and 999 employees reported that their innovations were ‘Only new to their firm’.

All the remaining size groups showed that firms either introduced innovations that were ‘New to their market’ or ‘Only new to their firm’, with firms that are less than 10 employees and between 1000 and 4999 employees showing higher incidence of innovations that were ‘New to their market’.

Furthermore, from a 'Firm Age' perspective (Figure 59), only firms that are between 26 and 50 years old signified that their Star* innovations were 'New to their market'; while, for all the remaining age groups firms showed that they either introduced innovations that were 'New to their market' or 'Only new to their firm', with firms that are more than a 100 years old showing higher incidence of innovations that were 'New to their market'.

f) **Registration of Star* Innovation:** very few of our 57 respondents registered their Star* innovations, with a higher propensity for firms to register their innovation as an 'Industrial Design' (7 firms), followed by 'Trademark' (6 firms) and 'Patent' (4 firms). In Appendix V, 'Figures 60, 61 & 62', the comparable results are illustrated across the firms' sector, size and age.

g) **Product and Process Oriented Effects of Star* Innovation:** there are several product and process oriented effects that were observed by the 57 firms due to the introduction of their Star* innovations. These firms consider the following as the most important experienced effects, and we list them below in a decreasing order of importance.

The most important observed Product Oriented Effects are illustrated in 'Figure 33', and they are: 1) Improved quality of goods or services, 2) Entered new markets or increased market share, and 3) Increased range of goods or services. As for the observed Process Oriented Effects they are illustrated in 'Figure 34', and the most important ones are: 1) Improved flexibility of production or service provision, 2) Increased capacity of production or service provision, and 3) Reduced labour costs per unit output. In the case of the Other Effects that are illustrated in 'Figure 35', it can be observed that some respondents emphasized that their Star* innovation 'Met local and/or international

regulatory requirements, but very few of the respondents observed that it ‘Reduced environmental impacts or improved health and safety’.

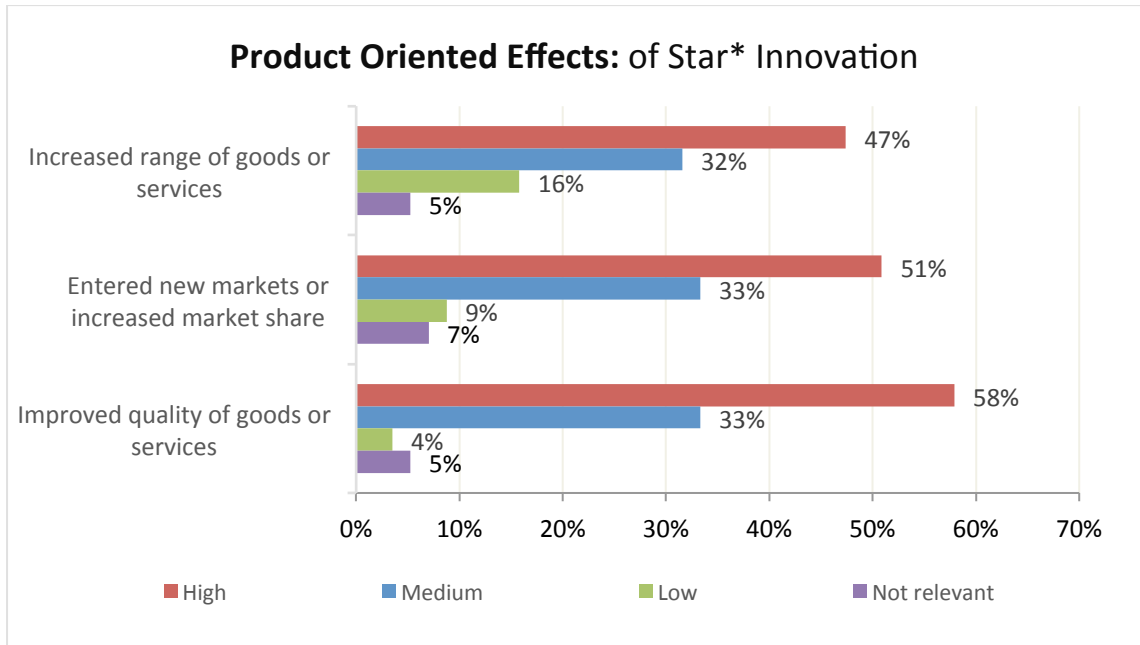


Fig.33. Product Oriented Effects: of Star* Innovation (2011 – 2013)

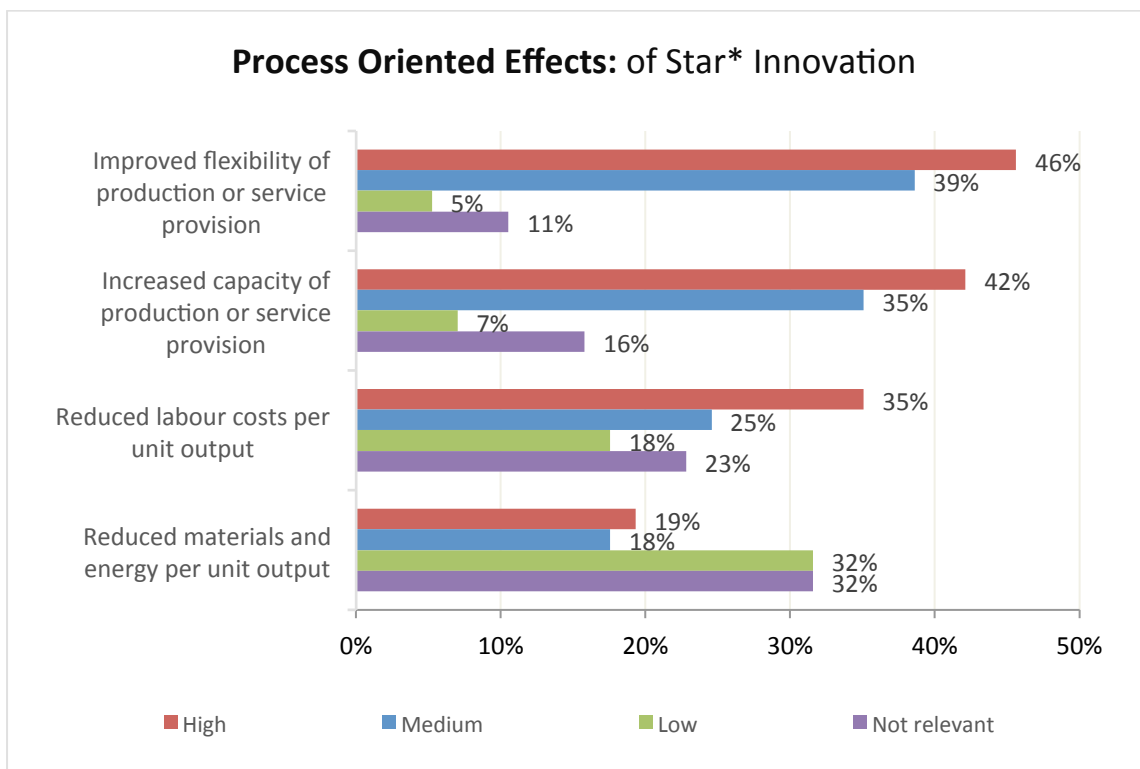


Fig.34. Process Oriented Effects: of Star* Innovation (2011 – 2013)

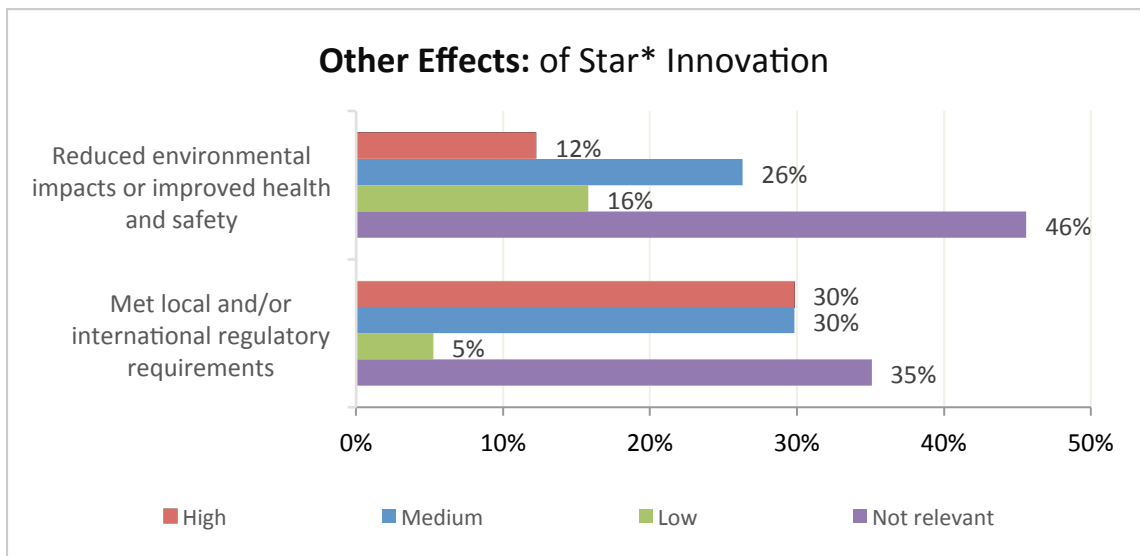


Fig.35. Other Effects: of Star* Innovation (2011 – 2013)

h) **Market Orientation of Star* Innovation:** it can be identified from ‘Figure 36’ that the Star* innovations of the 57 firms in question witnessed a continuous increase in ‘Local sales’ and ‘exports to Regional and Global Markets’ during the three year period 2011 to 2013 inclusive.

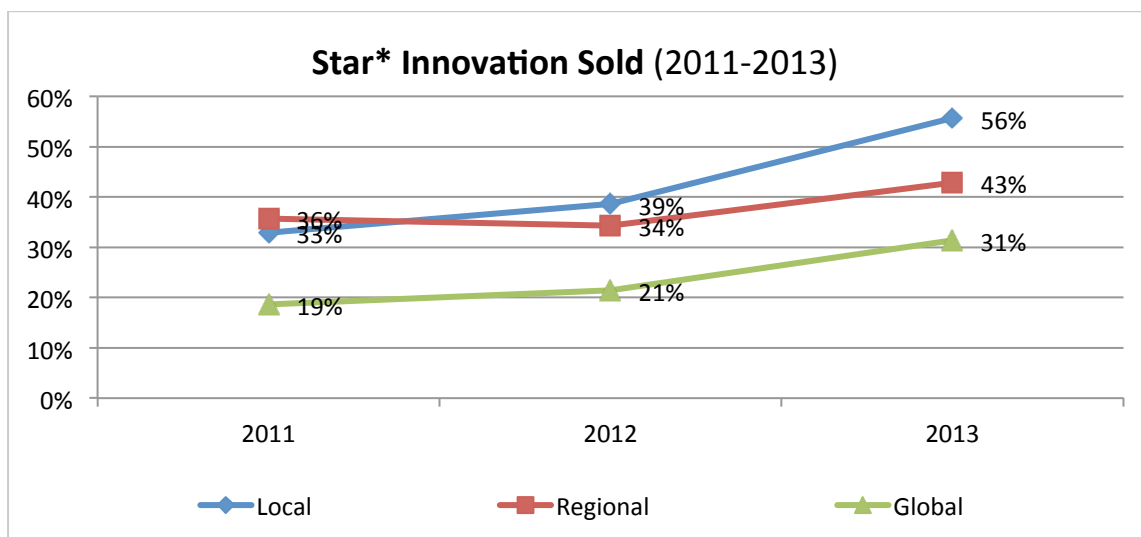


Fig.36. Star* Innovation Sold (2011 – 2013)

g) Impact of Star* Innovation on Annual Turnover: during the three year period 2011 to 2013 inclusive, the impact of the Star* innovation on the firm's Annual Turnover is viewed in this section, across the 57 firms in relation with the firm's sector, size and age.

In 'Figure 37', we can distinguish from a 'Firm Sector' perspective that firms pertaining to the Food Processing sectors, did not report any impact of the Star* innovation on their Annual Turnover. On the other hand, we can observe that firms pertaining to the remaining sectors experienced an increase in the trend of this impact from 2011 to 2013. Except for Financial Institutions that experienced a normalized upper trend; and Business Services, Electrical Equipment, and Other Market Services that experienced a downward trend.

Moreover, in 'Figure 38', we can observe from a 'Firm Size' perspective that firms in our set of 57 firms experienced an increase in the trend of impact of the Star* innovation on their Annual Turnover with respect to their size; with a slight deviation from firms that are between 250 and 499 employees, which decreased slightly in 2012 then went on an upward trend in 2013.

Furthermore, in 'Figure 39', we can identify from a 'Firm Age' perspective that all age groups of firms experienced an increase in the trend of the impact of the Star* innovation on their Annual Turnover.

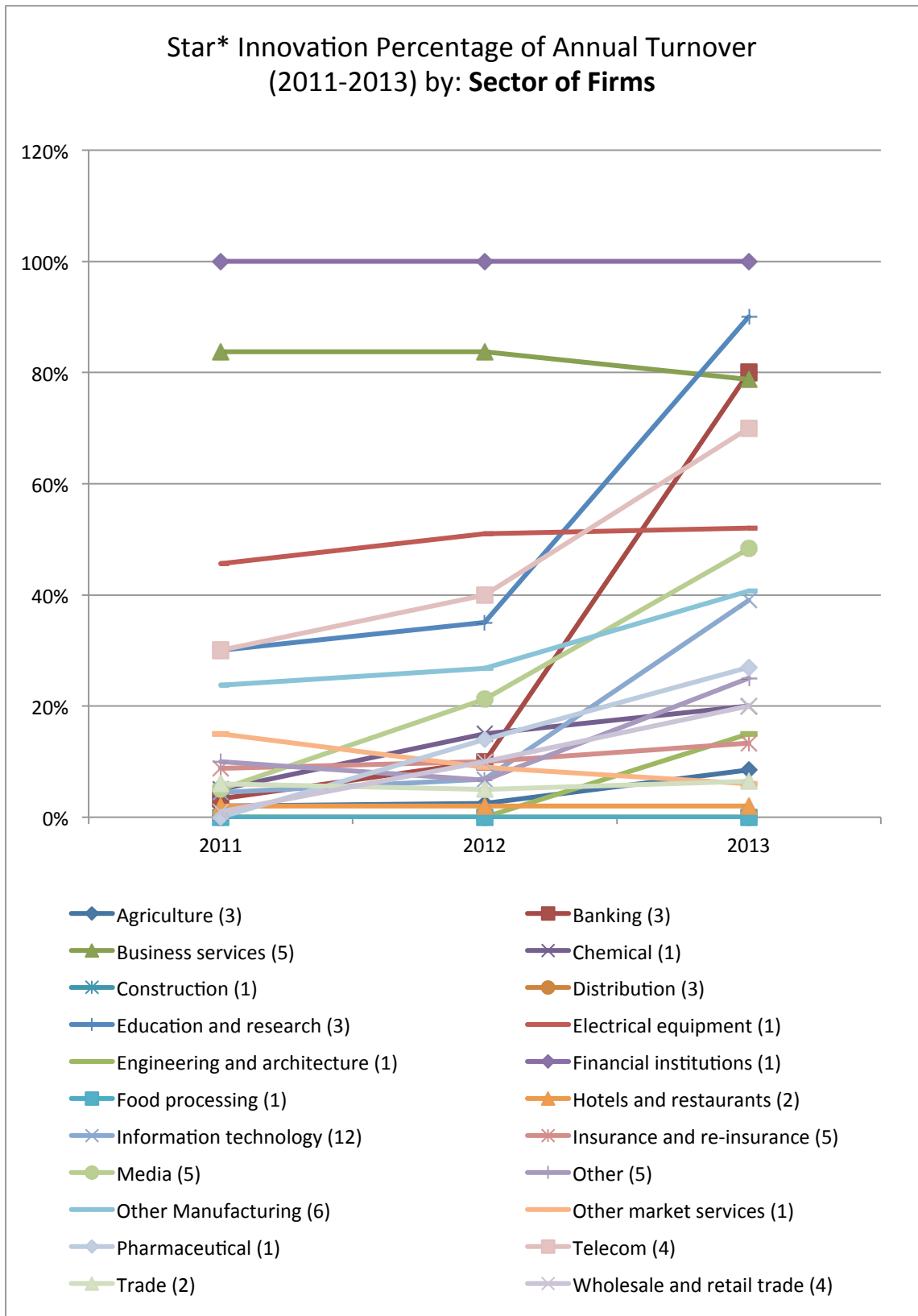


Fig.37. Star* Innovation Percentage of Annual Turnover (2011 – 2013) by: Sector of Firms

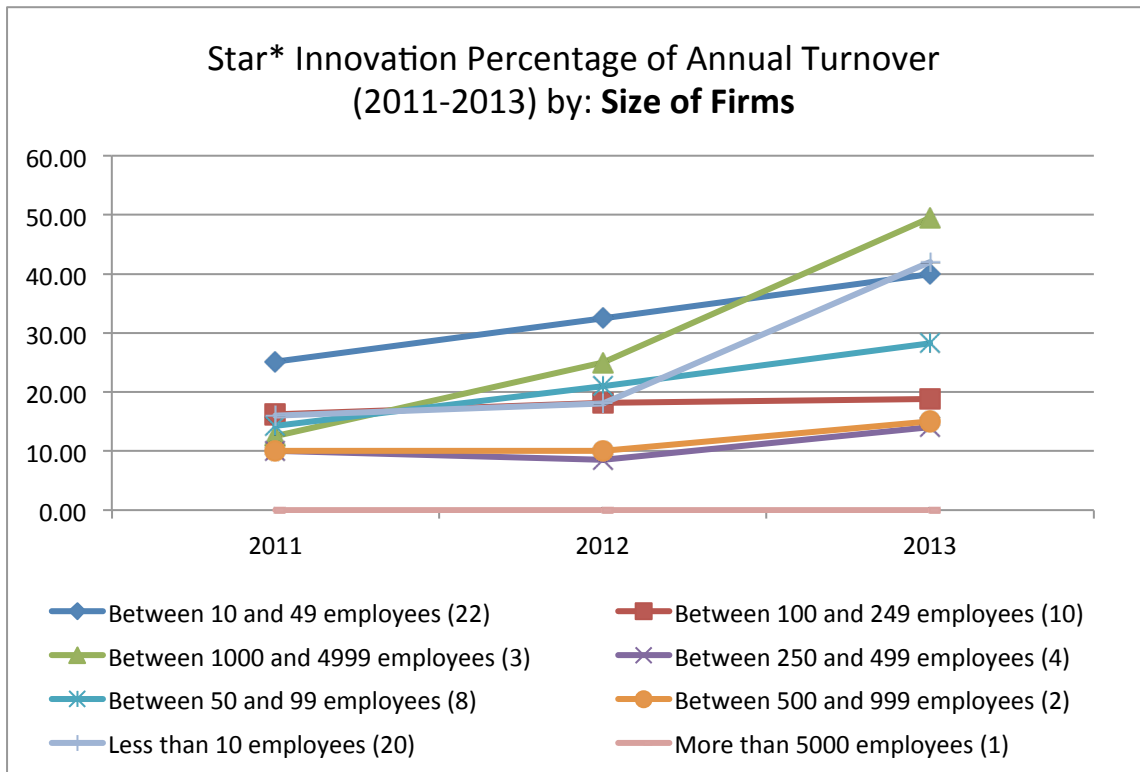


Fig.38. Star* Innovation Percentage of Annual Turnover (2011 – 2013) by: Size of Firms

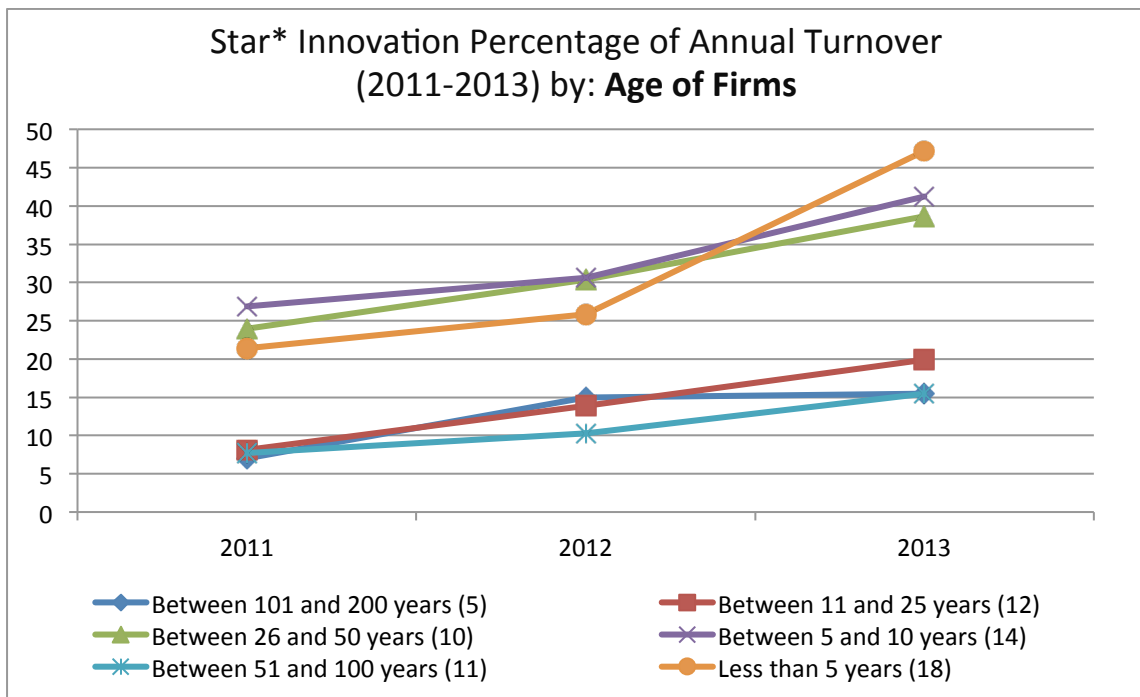


Fig.39. Star* Innovation Percentage of Annual Turnover (2011 – 2013) by: Age of Firms

2. Significant Organisational or Marketing Innovation (2011 – 2013):

In this section we introduce the findings in the form of a descriptive analysis that emphasizes the responses of 48 firm representatives, who reported that their firms have introduced organisational and/or marketing innovations during the five-year period 2009 to 2013 inclusive. In that respect, the focus is here set on selecting either an organisational or a marketing innovation to allow the exploration of a Significant* innovation. This is of a particular importance as respondents were directed to select their Significant* innovation based on the fact that it was essential for the company's competitiveness during the three-year period 2011 to 2013 inclusive.

a) **Organisational effects due to Significant* Innovation:** our analysis of the 48 respondents who engaged in organisational or marketing innovation activities, shows that firms have experienced several organisational effects that came about from their Significant* innovations. These effects are illustrated in 'Figure 40'; where, we can observe that 'Improved quality of their goods and services' and 'Improved communication or information sharing' are the most dominant effects.

b) **Marketing effects due to Significant* Innovation:** firms have also experienced several marketing effects that came about from their Significant* innovations. These effects are illustrated in 'Figure 41'; where, we can witness these effects in the following order of importance: 1) 'Improved customer satisfaction', 2) 'Strengthened relationships with customers', 3) 'Sales growth for their goods and services', 4) Increased visibility of products or business, and 5) 'Introduced products to new markets or customer groups'.

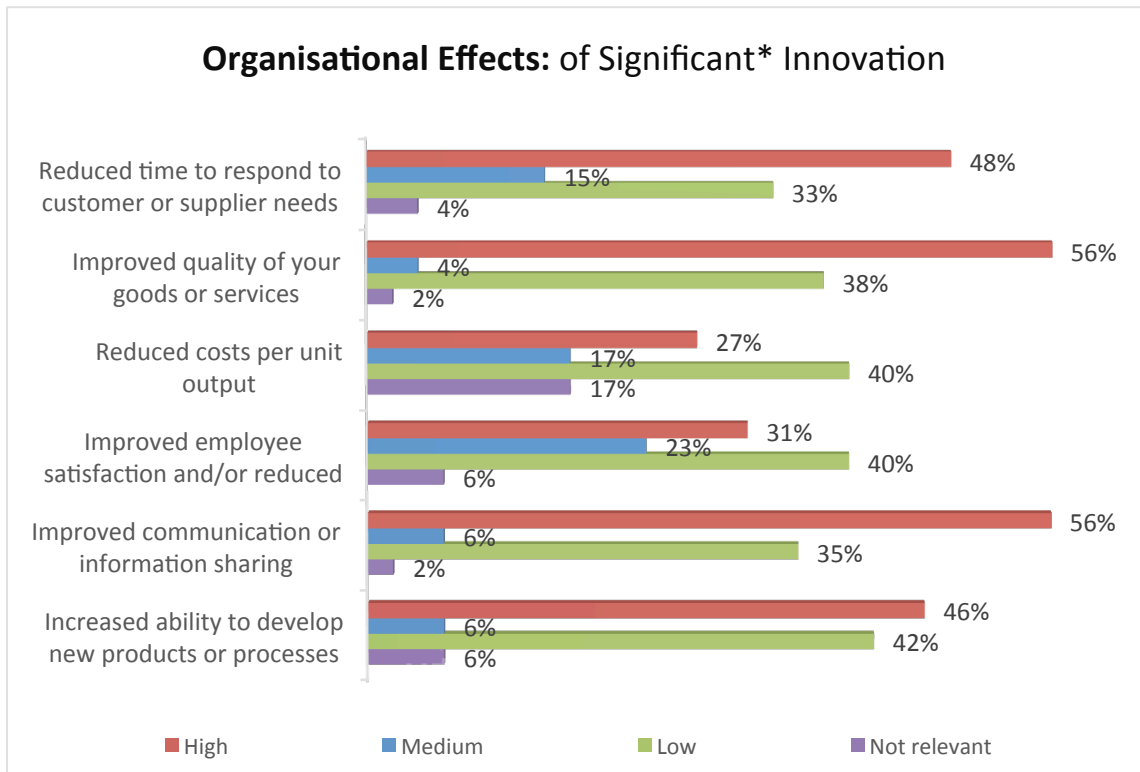


Fig.40. Organisational Effects: of Significant* Innovation (2011 – 2013)

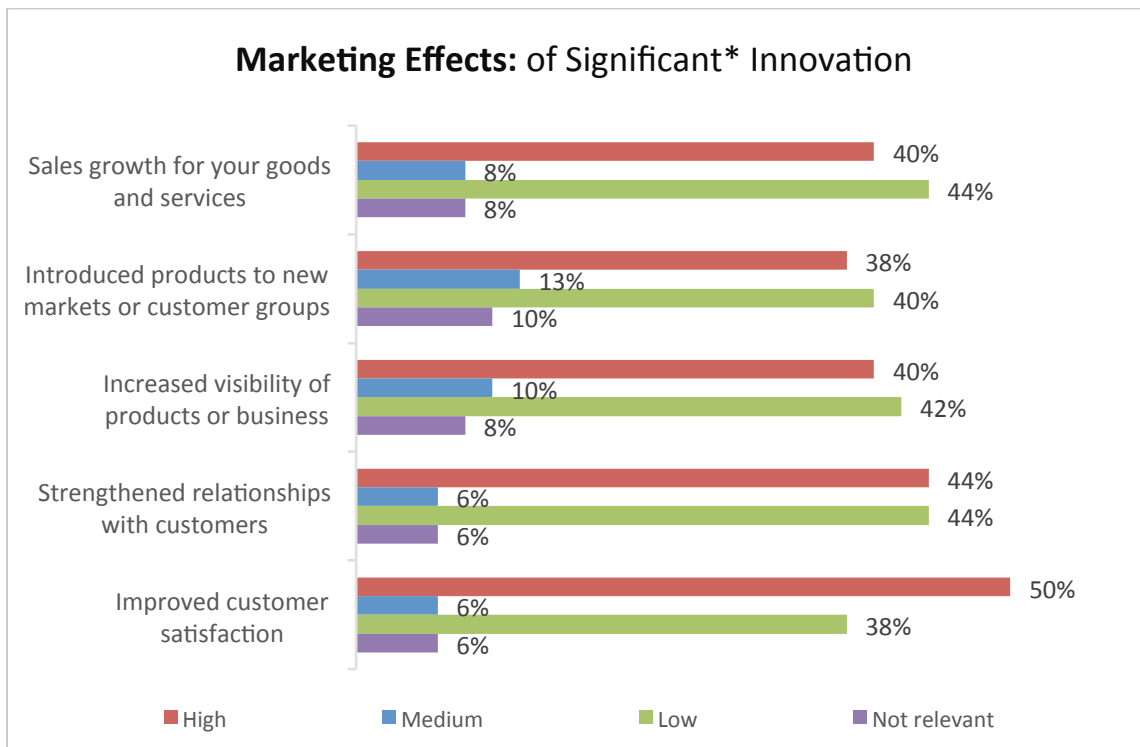


Fig.41. Marketing Effects: of Significant* Innovation (2011 – 2013)

C. Linkages to Research Questions

‘The Lebanese Innovation Survey Questionnaire’ proved to be an efficient tool to answer the research questions that are proposed in this study, as it provided us with a preliminary perspective of what are the internal and external factors that influence the innovativeness of a defined group of Lebanese firms. In addition, upon reflecting on our attained results we can verify that the 70 firms that constituted our sample were distributed along 22 major sectors, and they pertained to diverse firm ownership types, sizes, ages, and annual turnovers allowing for the comparable analysis to take place.

As our sample is relatively small we focused our comparable analysis on the ‘Firm Sector’, ‘Firm Size’, and ‘Firm Age’ perspectives as this data was collected based on the present state of the 70 firms in 2014. Moreover, in our analysis we decided not to tackle the ‘Firm Annual Turnover’ perspective as the data collected in this instance represents the firm’s average annual turnover during the five-year period 2009 to 2013 inclusive; which covers the same time interval of the data that we collected from the 70 firms regarding their product and process innovation activities, the organisational and marketing innovation activities, and the hindered innovation activities. On the other hand, the data that was collected regarding the Star* innovations and Significant* innovations pertained to the three-year period 2011 to 2013 inclusive, rendering our results not accurate.

Subsequently, we will highlight the linkages that were apparent between our research questions and attained results. A special focus will be set on the Star* innovations of 57 respondents, who reported that their firms have introduced product and/or process innovations; on the Significant* innovations of 48 respondents, who

reported that their firms have introduced organisational and/or marketing innovations; and on the Hindered Innovation Activities that were reported by 41 respondents.

a) **Internal Factors that Drive Innovations in Lebanese Firms:** there are several internal factors that drove the innovations in our sample firms, and these factors are:

1) Internal information sources were observed to contribute the most in the introduction of innovations,

2) Intramural (in-house) R&D was a pillar in the development of innovations in many firms,

3) Collaborative effort among several units in the company also was an important means to develop innovations,

4) Product oriented effects that tend to improve the quality of goods or services, and increase their range were highly observed,

5) Process oriented effects that tend to improve the flexibility and increase the capacity of production or service provision, in addition to reduced labour costs per unit output were also apparent,

6) Organisational effects that tend to improve the quality of goods and services, and improve communication or information sharing were highly observed,

7) Marketing effects that tend to improve customer satisfaction, and strengthen relationships with customers were highly apparent, and

8) Dependency on innovations to attain substantial sales growth was highly observed in many firms.

b) External Factors that Drive Innovations in Lebanese Firms: there are several external factors that drove the innovations in our sample firms, and these factors are:

1) Market information sources, mainly from clients or customers, were observed to contribute in the introduction of innovations,

2) Extramural R&D was utilized for the development of innovations in many firms,

3) Introduction of innovations that are oriented to new markets or customer groups was highly observed,

4) Marketing effects that tend to increase the visibility of products or businesses were also apparent,

5) Competitiveness of innovations reflected in an increase in ‘Local sales’ and ‘exports to Regional and Global Markets’ was observed,

6) Financial support from the ‘Private sector’ tended to be the most apparent source of funding for many innovations, and

7) Registration of innovations as ‘Patents’, ‘Industrial Designs’, or ‘Trademarks’ had a minimal effect on the introduction of innovations.

c) Internal Factors that Hinder Innovations in Lebanese Firms: there are several internal factors that hindered the innovation activities of firms in our sample. These factors are mainly deduced from 41 respondents, and they are:

1) Risk-averse attitude and lack in culture that encourages novel ideas,

- 2) Management has a hard time pushing forward the development of new ideas,
- 3) Tough rules for investment in new projects,
- 4) Innovation costs are too high,
- 5) Lack of funds within their company or group,
- 6) Lack in idea generation inside their company,
- 7) Inability to devote staff to innovation activities due to production requirements of existing products, and
- 8) Delay in rolling out new products or processes.

d) **External Factors that Hinder Innovations in Lebanese Firms:** there are several external factors that hindered the innovation activities of firms in our sample. These factors are mainly deduced from 41 respondents, and they are:

- 1) Lack in collaboration with people outside their company,
- 2) Difficulty in finding co-operation partners for innovations,
- 3) Lack in qualified personnel in the labour market,
- 4) Lack of information on markets, and uncertain demand for innovative products,
- 5) Market dominated by established enterprises,
- 6) Competitors can quickly copy their company's new product or process,
- 7) Lack of finance from sources outside their company, and

9) Lack of infrastructure.

Accordingly, these internal and external factors that drove or hindered the innovation activities of our 70 Lebanese firms can be viewed as preliminary points of focus to develop future studies on innovation that aim at setting up the quantitative and qualitative innovation indices in Lebanon.

D. Limitations of Survey and Results

Despite the linkages that were established between our research questions and our results, we need to emphasize that these linkages are very tentative and preliminary; especially, that our study faced various limitations that are put forth and analyzed in this section.

1) Our sampling method did not take into account the actual demographic distribution of firms in Lebanon. Instead, we focused on recruiting firms in collaboration with the ‘CCIA-BML’, ‘BERYTECH’, ‘BCC’, and ‘KAFALAT’, which rendered our sampling method purposely biased to be able to identify 500 firms to invite them to take part in our online Survey.

2) Due to time limitations, the online Survey was only available over the duration of one week for firms to submit their responses. Even though our invitation was able to attract the attention of 275 firms, only 70 firms submitted their full responses within the allocated timeframe. Consequently, the results of this research study are based on a relatively small number of respondents.

Accordingly, our 70 Lebanese firms sample are constituted of only major sectors, where we had 38 major sectors as part of our ‘Company Profile’ section in our Survey (Appendix IV, ‘Company Profile’). In addition, among these 22 major sectors

we only received one respondent for each of the Chemical, Construction, Electrical Equipment, Engineering & Architecture, Food Processing, Other Market Services, and Pharmaceutical sectors. Similar issues were faced with respect to the firm sizes and ages represented. These sample limitations did not allow for significance testing, and undermined the validity of our comparable analysis.

3) The design of 'The Lebanese Innovation Survey Questionnaire' mainly depended on an exploration of the context of the 'CIS' in alignment with the 'Capability Measure' and 'IVC'. In that respect, it is important to note that the 'CIS' was developed using the guidelines of the Oslo Manual, which was introduced by the OECD and the Eurostat for collecting and interpreting innovation data of firms, mainly in developed countries.

So, by selecting very specific sections from the 'CIS' and trying to fit them to the Lebanese context, we may have taken some questions out of their original context. In addition, by designing our Survey to take only 30 minutes to be completed by a respondent, this could have resulted in respondents to exercise some bias while answering in two instances: a) in case respondents are not familiar with some terminologies while answering qualitative questions that are of the Rating type, and b) in case respondents are not providing accurate values for the quantitative questions that are asking for percentages instead of actual numbers. This aspect is extenuated by the fact that our respondents are anonymous.

CHAPTER V

CONCLUSION

This research study worked towards developing an enhanced understanding of the construct of innovation for Lebanon. These results are tentative, preliminary and have several limitations. Nevertheless they point to several interesting directions to explore when scholars and practitioners embark on developing a distinctively ‘Lebanese Innovation Index’. It is worth noting that our study appears to be among the first to have attempted exploring the application of the Community Innovation Survey (CIS) in Lebanon, and collect data from Lebanese firms that span a five-year period.

According to Bizri (2013), in 2010-2011 CNRS conducted a Survey of Lebanese Industrial Enterprises that aimed at investigating the “Policy directions for innovation in Lebanon’s industrial sector”. He provided a brief presentation about this initiative; where, he indicates that this survey was composed of 66 sections that totalled to 140 questions, and was conducted on a sample of 479 enterprises that were distributed across 8 sectors: Chemical, Food Products, Metal Products & Industrial Equipment, Plastics & Rubbers, Printing & Publishing, Software Development & Computer Services, Textile & Garments, and Other Industries (Bizri, 2013). The reported findings were based on explorations of product and process innovations of Lebanese firms, and hindering factors that affected such innovations in 2010-2011; accompanied by some demographic and comparable analysis, and basic summary statistics (sample maximum and minimum).

In that respect, ‘The Lebanese Innovation Survey Questionnaire (2009 – 2013)’ that was designed for the purpose of this research study presents an initiative that complements the CNRS study, since it explores the potential of the CIS in providing a more comprehensive understanding of the ‘Capability Measure’ and the ‘IVC’. By integrating various instruments that measure multiple aspects of innovativeness at the firm-level, we were able to incorporate both *facilitators* and *inhibitors* of innovation in Lebanon in regards to the capabilities of Lebanese firms to introduce product, process, organisational and marketing innovations.

As a result, we present preliminary findings based on our sample of 70 Lebanese firms that pertain to 22 industries. These findings, while mindful of their limitations, can act as an initial building block for future adaptations of the CIS to the Lebanese context. It is recommended that, future research can aim at developing further quantitative and qualitative indicators for benchmarking the Lebanese national performance. This process may contribute to a better understanding of the innovation construct of the Lebanese situation in relation to its economic growth, and evolve into a highly contextualized ‘Lebanese Innovation Index’.

This is extenuated by the fact that the CIS collects data that is focused “on innovation in modern knowledge economies that are not adequately covered by R&D indicators” (Arundel, 2007), to better evaluate and compare the performance of technological and non-technological innovations. Moreover, as the CIS is directed towards “sustaining the production of internationally comparable data on innovation in enterprises” (UNESCO-UIS, 2012), the UNESCO Institute for Statistics has put in action ‘The 2011 UIS Pilot Data Collection of Innovation Statistics’, in which Egypt was among the 12 participating countries. Lebanon, in that respect, by employing the

CIS, can benefit from internationally comparable data to better assess and develop innovation policy.

Furthermore, SMEs dominate the Lebanese industrial scene, and our findings of the 70 Lebanese firms indicate that they appear to have a greater tendency to introduce innovations in Lebanon. As a result, it is worthwhile for the public and private sectors to collaborate to develop the needed infrastructure that can support the innovation capabilities of SMEs in Lebanon. In addition, the STIP can play an important role in encouraging the diffusion of technology, sharing information of value to promote innovation, and highlighting the economic importance to support formal and informal innovation activities simultaneously.

APPENDIX I

OSLO MANUAL: GUIDELINES FOR COLLECTING AND INTERPRETING INNOVATION DATA (2005)

Table 1. Factors Relating to the Objectives and Effects of Innovation (Oslo Manual, 2005)

Relevant for:	Product innovations	Process innovations	Organisational innovations	Marketing innovations
Competition, demand and markets				
Replace products being phased out	*			
Increase range of goods and services	*			
Develop environment-friendly products	*			
Increase or maintain market share	*			*
Enter new markets	*			*
Increase visibility or exposure for products				*
Reduced time to respond to customer needs		*	*	
Production and delivery				
Improve quality of goods and services	*	*	*	
Improve flexibility of production or service provision		*	*	
Increase capacity of production or service provision		*	*	
Reduce unit labour costs		*	*	
Reduce consumption of materials and energy	*	*	*	
Reduce product design costs		*	*	
Reduce production lead times		*	*	
Achieve industry technical standards	*	*	*	
Reduce operating costs for service provision		*	*	
Increase efficiency or speed of supplying and/or delivering goods or services		*	*	
Improve IT capabilities		*	*	
Workplace organisation				
Improve communication and interaction among different business activities			*	
Increase sharing or transferring of knowledge with other organisations			*	
Increase the ability to adapt to different client demands			*	*
Develop stronger relationships with customers			*	*
Improve working conditions		*	*	
Other				
Reduce environmental impacts or improve health and safety	*	*	*	
Meet regulatory requirements	*	*	*	

Table 2. Factors Hampering Innovation Activities (Oslo Manual, 2005)

Relevant for:	Product innovations	Process innovations	Organisational innovations	Marketing innovations
Cost factors:				
Excessive perceived risks	*	*	*	*
Cost too high	*	*	*	*
Lack of funds within the enterprise	*	*	*	*
Lack of finance from sources outside the enterprise:				
Venture capital	*	*	*	*
Public sources of funding	*	*	*	*
Knowledge factors:				
Innovation potential (R&D, design, etc.) insufficient	*	*		*
Lack of qualified personnel:				
Within the enterprise	*	*		*
In the labour market	*	*		*
Lack of information on technology	*	*		
Lack of information on markets	*			*
Deficiencies in the availability of external services	*	*	*	*
Difficulty in finding co-operation partners for:				
Product or process development	*	*		
Marketing partnerships				*
Organisational rigidities within the enterprise:				
Attitude of personnel towards change	*	*	*	*
Attitude of managers towards change	*	*	*	*
Managerial structure of enterprise	*	*	*	*
Inability to devote staff to innovation activity due to production requirements	*	*		
Market factors:				
Uncertain demand for innovative goods or services	*			*
Potential market dominated by established enterprises	*			*
Institutional factors:				
Lack of infrastructure	*	*		*
Weakness of property rights	*			*
Legislation, regulations, standards, taxation	*	*		*
Other reasons for not innovating:				
No need to innovate due to earlier innovations	*	*	*	*
No need because of lack of demand for innovations	*			*

Table 3. Sources for Transfers of Knowledge and Technology (Oslo Manual, 2005)

	Open information sources	Sources for purchases of knowledge and technology	Co-operation partners
Internal sources within the enterprise:	*		
R&D	*		
Production	*		
Marketing	*		
Distribution	*		
Other enterprises within the enterprise group	*	*	*
External market and commercial sources:			
Competitors	*	*	*
Other enterprises in the industry	*	*	*
Clients or customers	*		*
Consultants/consultancy firms		*	*
Suppliers of equipment, materials, components, software or services	*	*	*
Commercial laboratories	*	*	*
Public sector sources:			
Universities and other higher education institutions	*	*	*
Government/public research institutes	*	*	*
Private non profit research institutes	*	*	*
Specialised public/semi-public innovation support services	*	*	*
General information sources:			
Patent disclosures	*		
Professional conferences, meetings, branch literature and journals	*		
Fairs and exhibitions	*		
Professional associations, trade unions	*		
Other local associations	*		
Informal contacts or networks	*		
Standards or standardisation agencies	*		
Public regulations (<i>i.e.</i> environment, security)	*		

APPENDIX II

HANSEN AND BIRKINSHAW’S INNOVATION VALUE CHAIN QUESTIONNAIRE (2007)

Rate Your Company’s Innovation Value Chain

If you want to improve your company’s innovation performance, here is a good place to start. Have about 30 employees from a cross-section of functions within the company fill out this questionnaire. Calculate the average score for each activity, and focus your attention on the highest one or two numbers—these are your weakest links.

	Do not agree	Partially agree	Agree	Activity	Phase
Our culture makes it hard for people to put forward novel ideas.	1	2	3	In-house idea generation	High scores indicate that your company may be an idea-poor company .
People in our unit come up with very few good ideas on their own.	1	2	3		
Few of our innovation projects involve team members from different units or subsidiaries.	1	2	3	Cross-pollination among businesses	
Our people typically don’t collaborate on projects across units, businesses, or subsidiaries.	1	2	3		
Few good ideas for new products and businesses come from outside the company.	1	2	3	External sourcing of ideas	
Our people often exhibit a “not invented here” attitude—ideas from outside aren’t considered as valuable as those invented within.	1	2	3		
We have tough rules for investment in new projects—it’s often too hard to get ideas funded.	1	2	3	Selection	High scores indicate that your company may be a conversion-poor company .
We have a risk-averse attitude toward investing in novel ideas.	1	2	3		
New-product-development projects often don’t finish on time.	1	2	3	Development	
Managers have a hard time getting traction developing new businesses.	1	2	3		
We’re slow to roll out new products and businesses.	1	2	3	Diffusion	High scores indicate that your company may be a diffusion-poor company .
Competitors quickly copy our product introductions and often make pre-emptive launches in other countries.	1	2	3		
We don’t penetrate all possible channels, customer groups, and regions with new products and services.	1	2	3		

APPENDIX III

NESTA SECTORAL INNOVATION METRICS (ROPER ET AL., 2009)

Name of metric	Description of metric	Purpose of metric
Accessing Knowledge		
A1 The proportion of externally sourced ideas (%)	Proportion of new products or services typically coming from ideas initially developed outside the firm	Reflects the openness of firm's knowledge gathering activities
A2 R&D intensity (%)	R&D expenditure as a percentage of sales	A measure of firms' commitment to technological innovation
A3 Design intensity (%)	Design expenditure as a percentage of sales	A measure of firms' commitment to design as part of their innovation activities
A4 Multi-functionality in accessing knowledge (%)	Firms score 100 per cent if all of the five or six identified skill groups were involved in accessing knowledge	An intensity index intended to reflect firms' use of multiple skill groups in accessing knowledge
A5 External knowledge sources for accessing knowledge (%)	Firms reporting all eight potential external partners as either 'very important' or 'fairly important' score 100 per cent	An intensity index intended to reflect firms' engagement with external knowledge sources for innovation
Building Innovation		
B1- Process innovation intensity (expenditure per sales) (%)	Expenditure on process development as a percentage of sales	A measure of firms' commitment to process innovation
B2 Percentage of sales of innovative products (%)	Percentage of firms' sales derived from new or improved products or services over the last three years	An output measure of how successfully the firm 'builds' innovative products and services
B3 Diversity of innovation activity (%)	Takes value 100 if a firm engaged in all six types of innovation activity, 50 if the firm undertook three different forms of innovation etc.	An intensity index designed to reflect the range of innovative activities carried out by the firm
B4 Multi-functionality in building innovation (%)	As A4 for building innovation	
B5 Embeddedness of team-working in building innovation (%)	Takes value 100 if firms engaged in all five different attributes of firms' team working activity	Intended to reflect the extent of commitment to team-working
B6 External knowledge sources for building innovation (%)	As A5 for building innovation	
Commercialising Innovation		
C1 Range of customer relation modes (%)	An intensity index. Firms using all of the modes of customer interaction score 100 per cent etc.	Reflects the range of customer interaction that firms employ
C2 Branding, marketing intensity (expenditure per sales)	Expenditure on branding, marketing as a percentage of sales	A measure of firms' commitment to commercialisation through their spending on branding and marketing
C3 Multi-functionality in commercialising innovation (%)	As A4 for commercialisation	
C4 External knowledge sources for commercialisation (%)	As A5 for commercialisation	
C5 Use of IP protection (%)	Firms using all six forms of IP protection score 100 per cent etc.	Reflects the diversity of firms' use of different forms of legal IP protection

APPENDIX IV

THE LEBANESE INNOVATION SURVEY QUESTIONNAIRE (2009 – 2013)

The Lebanese Innovation Survey Questionnaire

Towards an Improved Understanding of Innovativeness Index in the Middle East:
Exploration of Innovation Constructs in the Context of Lebanese Firms

You are invited to participate in a research study entitled "Towards an Improved Understanding of Innovativeness Index in the Middle East: Exploration of Innovation Construct in the Context of Lebanese Firms" conducted by Dr. Bijan Azad, Associate professor and Ms. Zeina El-Khoury, Graduate student at Suliman S. Olayan School of Business (OSB) at the American University of Beirut (AUB).

The purpose of the study is to develop a preliminary Innovation Index for Lebanon that evaluates innovations on the individual firm-level to better understand the processes and factors that have led to these innovations. The conduct of this study will adhere to the Institutional Review Board (IRB) approved conditions and terms, which is the committee that protects the rights of people in research studies.

Would you be willing to take 20 to 30 minutes to fill out the questionnaire attached to this introduction? This survey questionnaire is being used to collect information about the availability and characteristics of product and process innovations as well as the organisational and marketing innovations in Lebanese firms. Most of the information being asked is of a qualitative nature, and only the data you provide in the questionnaire will be collected and analyzed.

Taking part in this study is voluntary. If you start the study, you can stop at any time. We will only be able to view your responses only after you have completed and submitted them. You will not receive payment for the participation in this study. The risks of the study are minimal. Your name will not be asked, and your confidentiality will be maintained. Accordingly, your responses will be anonymous; there is no way for us to know who filled out a survey.

You can choose whether to be in this research study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. If you refuse to participate in this research study this will involve no penalty or loss of benefits to which you are otherwise entitled and neither will affect your relationship with AUB.

To contact the research team for questions, concerns, or complaints about this research study – please find below their contact details:

Dr. Bijan Azad | Suliman S. Olayan School of Business | PO Box 11-0236, Riad El-Solh 1107 2020, Beirut Lebanon | Tel: +961-1-350000 Ext: 3745 | Fax: + 961-1-750214 | Cel: +961-3-825800 | Email: ba20@aub.edu.lb | www.aub.edu.lb

Ms. Zeina El-Khoury | Cel: +961-3-692213 | Email: zae03@mail.aub.edu

To contact someone independent of the research team for questions, concerns, or complaints about this research study; questions about the subjects' rights; to obtain information; or to offer input – please find below the contact details of the IRB:

IRB Office | American University of Beirut | Gefinor Block B, 5th Floor | PO Box 11-0236 F15 Riad El-Solh 1107 2020, Beirut Lebanon | Tel: +961-1-738024 or 01-350000 Ext: 5445 | Fax: +961-1-738025 or 01-350000 Ext: 5444 | Email: irb@aub.edu.lb | www.aub.edu.lb/irb

If you consent to participate, please click "Next" at the bottom of the screen to begin the survey. Thank you in advance for your time.

A note on privacy

This survey is anonymous.

The record kept of your survey responses does not contain any identifying information about you unless a specific question in the survey has asked for this. If you have responded to a survey that used an identifying token to allow you to access the survey, you can rest assured that the identifying token is not kept with your responses. It is managed in a separate database, and will only be updated to indicate that you have (or haven't) completed this survey. There is no way of matching identification tokens with survey responses in this survey.

[Load unfinished survey](#)

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[Exit and clear survey](#)

The Lebanese Innovation Survey Questionnaire

Towards an Improved Understanding of Innovativeness Index in the Middle East:
Exploration of Innovation Constructs in the Context of Lebanese Firms

0% 100%

Company Profile

***Which of the following represents your company's major sector?
Choose one of the following answers**

- | | |
|--|--|
| <input type="radio"/> Agriculture | <input type="radio"/> Entertainment |
| <input type="radio"/> Hunting and Fishing | <input type="radio"/> Media |
| <input type="radio"/> Food processing | <input type="radio"/> Tourism |
| <input type="radio"/> Construction materials | <input type="radio"/> Housing |
| <input type="radio"/> Electrical equipment | <input type="radio"/> Other market services |
| <input type="radio"/> Industrial machinery | <input type="radio"/> Trade |
| <input type="radio"/> Jewelry | <input type="radio"/> Wholesale and retail trade |
| <input type="radio"/> Leather and footwear | <input type="radio"/> Hotels and restaurants |
| <input type="radio"/> Paper and packaging | <input type="radio"/> Hospitals and healthcare |
| <input type="radio"/> Printing | <input type="radio"/> Banking |
| <input type="radio"/> Furniture | <input type="radio"/> Financial institutions |
| <input type="radio"/> Chemical | <input type="radio"/> Insurance and re-insurance |
| <input type="radio"/> Pharmaceutical | <input type="radio"/> Business services |
| <input type="radio"/> Other Manufacturing | <input type="radio"/> Real Estate |
| <input type="radio"/> Electricity, gas and water | <input type="radio"/> Telecom |
| <input type="radio"/> Engineering and architecture | <input type="radio"/> Information technology |
| <input type="radio"/> Construction | <input type="radio"/> Education and research |
| <input type="radio"/> Transportation | <input type="radio"/> Government services |
| <input type="radio"/> Distribution | <input type="radio"/> Other |
| <input type="radio"/> Communication | |

***Where is your company located?
Check any that apply**

- Beirut
 Mount Lebanon
 North Lebanon
 Bekaa
 South Lebanon
 Nabatiyeh

**Which of the following represents your company's ownership type?
Choose one of the following answers**

- Sole Proprietorship
 General Partnership
 Limited Partnership
 Joint Stock Company
 Limited Liability Company
 Holding Company
 Off-shore Company
 Other

**Which of the following represents your company's relationship of owners?
Choose one of the following answers**

- Owners are from the same family
 Owners are not related to each other
 Other

***Which of the following represents your company's age?**

Choose one of the following answers

- Less than 5 years
- Between 5 and 10 years
- Between 11 and 25 years
- Between 26 and 50 years
- Between 51 and 100 years
- Between 101 and 200 years
- More than 200 years

***Which of the following represents your company's size?**

Choose one of the following answers

- Less than 10 employees
- Between 10 and 49 employees
- Between 50 and 99 employees
- Between 100 and 249 employees
- Between 250 and 499 employees
- Between 500 and 999 employees
- Between 1000 and 4999 employees
- More than 5000 employees

***During the five years 2009 to 2013, which of the following represents your company's average annual turnover?**

Turnover is defined as the market sales of goods and services (including all taxes except VAT)

Choose one of the following answers

- Less than \$500,000
- Between \$500,000 and \$2,500,000
- Between \$2,500,000 and \$7,500,000
- Between \$7,500,000 and \$20,000,000
- Between \$20,000,000 and \$50,000,000
- Between \$50,000,000 and \$100,000,000
- Between \$100,000,000 and \$250,000,000
- More than \$250,000,000

Resume later

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The Lebanese Innovation Survey Questionnaire

Towards an Improved Understanding of Innovativeness Index in the Middle East:
Exploration of Innovation Constructs in the Context of Lebanese Firms

0%  100%

Product and Process Innovations

Definitions of product and process innovations:

A **product innovation** is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.

A **process innovation** is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.

During the five years 2009 to 2013, did your company introduce:

Product innovations

*New or significantly improved goods

(Exclude the simple resale of new goods purchased from other companies and changes of a solely aesthetic nature)

Check any that apply

Yes

If Yes -- specify the number of

No

innovations

*New or significantly improved services

Check any that apply

Yes

If Yes -- specify the number of

No

innovations

Process innovations

*New or significantly improved methods of manufacturing or producing goods or services

Check any that apply

Yes

If Yes -- specify the number of

No

innovations

*New or significantly improved logistics, delivery or distribution methods for your inputs, goods or services

Check any that apply

Yes

If Yes -- specify the number of

No

innovations

*New or significantly improved supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, or computing

Check any that apply

Yes

If Yes -- specify the number of

No

innovations

Please answer the remaining questions in this section by focusing on the star* innovation (product or process) that had the highest impact on your company's turnover during the five years 2009 to 2013.

How important were the following information sources to introduce your star* innovation?
(Identify information sources that provided information for your new innovation project or contributed to its completion)

Degree of importance
(Select 'Not used' if no information was obtained from a source)

***Internal:**

	High	Medium	Low	Not used
Within your company or company group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***Market sources:**

	High	Medium	Low	Not used
Suppliers of equipment, materials, components, or software	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Clients or customers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***Institutional sources:**

	High	Medium	Low	Not used
Universities or other higher education institutions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government or public research institutes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***Other sources:**

	High	Medium	Low	Not used
Conferences, trade fairs, exhibitions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scientific journals and trade/technical publications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professional and industry associations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Did your star* innovation require:

***Intramural (in-house) R&D:** Creative work undertaken within your company to increase the stock of knowledge and its use to devise new or significantly improved products and processes

Yes No

***Extramural R&D:** Same activities as above, but performed by other companies or institutions

Yes No

***Acquisition of machinery, equipment and/or software:** Needed to produce new or significantly improved products and processes

Yes No

***Acquisition of external knowledge:** Purchase of licensing of patents and non-patents inventions, know-how, and other types of knowledge from other companies or institutions

Yes No

***Training:** Internal or external training for your personnel specifically for the development and/or introduction of new or significantly improved products and processes

Yes No

***Market introduction:** Activities for the market introduction of your new or significantly improved products and processes, including market research and launch advertising

Yes No

Did your star* innovation receive financial support from:

***Public sector:** Including national agencies, like the Investment Development Authority of Lebanon (IDAL)

Yes No

***Private sector:** Including Kafalat, Berytech, Chamber of Commerce Industry and Agriculture (CCIB), Association of Lebanese Industrialist (ALI), and/or Venture Capital

Yes No

***Research institutions:** Including the National Center for Scientific Research (CNRS), Industrial Research Institute (IRI), other organizations, and/or Universities

Yes No

***Who developed your star* innovation?**

Choose one of the following answers

- Mainly the R&D unit of your company
- Several units of your company in collaboration with each other
- The R&D unit of your company together with other companies or institutions
- Several units of your company in collaboration with other companies or institutions
- Mainly other companies or institutions
- None of the above

***Was your star* innovation:**

Choose one of the following answers

- New to your market: Your firm introduced this innovation onto your market before your competitors - it may have already been available in other markets
- Only new to your firm: It was already available from your competitors in your market

***Was your star* innovation registered as a:**

Choose one of the following answers

- Patent
- Industrial design
- Trademark
- None of the above

How important were each of the following effects on your star* innovation?

Degree of observed effect

***Product oriented effects:**

	High	Medium	Low	Not relevant
Increased range of goods or services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Entered new markets or increased market share	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved quality of goods or services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***Process oriented effects:**

	High	Medium	Low	Not relevant
Improved flexibility of production or service provision	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased capacity of production or service provision	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced labour costs per unit output	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced materials and energy per unit output	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***Other effects:**

	High	Medium	Low	Not relevant
Reduced environmental impacts or improved health and safety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Met local and/or international regulatory requirements	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Was your star* innovation sold in:

During 2011

Total Sold should be equivalent to 100%

***Local Market:
Check any that apply**

- Yes
 No

If Yes -- specify percentage of Total Sold

***Regional market:
Check any that apply**

- Yes
 No

If Yes -- specify percentage of Total Sold

***Global market:
Check any that apply**

- Yes
 No

If Yes -- specify percentage of Total Sold

During 2012

Total Sold should be equivalent to 100%

***Local Market:
Check any that apply**

- Yes
 No

If Yes -- specify percentage of Total Sold

***Regional market:
Check any that apply**

- Yes
 No

If Yes -- specify percentage of Total Sold

***Global market:
Check any that apply**

- Yes
 No

If Yes -- specify percentage of Total Sold

During 2013

Total Sold should be equivalent to 100%

***Local Market:
Check any that apply**

- Yes
 No

If Yes -- specify percentage of Total Sold

***Regional market:
Check any that apply**

- Yes
 No

If Yes -- specify percentage of Total Sold

***Global market:**

Check any that apply

Yes

If Yes -- specify percentage of Total

No

Sold

***Sales of your star* innovation were what percentage of:**

Percentage of your Total Annual Turnover

Company's total
annual turnover in
2011

Company's total
annual turnover in
2012

Company's total
annual turnover in
2013

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0%  100%

Organisational and Marketing Innovations

Definitions of organisational and marketing innovations:

An **organisational innovation** is the implementation of a new organisational method in the firm's business practices, workplace organisation or external relations.

A **marketing innovation** is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.

During the five years 2009 to 2013, did your company introduce:

Organisational innovations

***New or significantly improved knowledge management systems to better use or exchange information, knowledge and skills within your company**
Check any that apply

- Yes
 No

If Yes -- specify the number of innovations

***A major change to the organisation of work within your company, such as changes in the management structure or integrating different departments or activities**
Check any that apply

- Yes
 No

If Yes -- specify the number of innovations

***New or significant changes in your relations with other firms or public institutions, such as through alliances, partnerships, outsourcing or sub-contracting**
Check any that apply

- Yes
 No

If Yes -- specify the number of innovations

Marketing innovations

***Significant changes to the design or packaging of a good or service (Exclude routine/ seasonal changes such as clothing fashions)**
Check any that apply

- Yes
 No

If Yes -- specify the number of innovations

***New or significantly changed sales or distribution methods, such as internet sales, franchising, direct sales or distribution licenses**
Check any that apply

- Yes
 No

If Yes -- specify the number of innovations

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0% 100%

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Check any that apply

- Yes
 No

If Yes -- specify the number of innovations

***A major change to the organisation of work within your company, such as changes in the management structure or integrating different departments or activities**
Check any that apply

- Yes
 No

If Yes -- specify the number of innovations

***New or significant changes in your relations with other firms or public institutions, such as through alliances, partnerships, outsourcing or sub-contracting**
Check any that apply

- Yes
 No

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Check any that apply

- Yes
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Check any that apply

- Yes
 No

If Yes -- specify the number of innovations

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***New or significantly improved knowledge management systems to better use or exchange information, knowledge and skills within your company**
Check any that apply

- Yes
 No

If Yes -- specify the number of innovations

***A major change to the organisation of work within your company, such as changes in the management structure or integrating different departments or activities**
Check any that apply

- Yes
 No

If Yes -- specify the number of innovations

***New or significant changes in your relations with other firms or public institutions, such as through alliances, partnerships, outsourcing or sub-contracting**
Check any that apply

- Yes
 No

If Yes -- specify the number of innovations

Marketing innovations

***Significant changes to the design or packaging of a good or service (Exclude routine/ seasonal changes such as clothing fashions)**
Check any that apply

- Yes
 No

If Yes -- specify the number of innovations

***New or significantly changed sales or distribution methods, such as internet sales, franchising, direct sales or distribution licenses**
Check any that apply

- Yes
 No

If Yes -- specify the number of innovations

Please answer the remaining questions in this section by focusing on the significant* innovation (organisational or marketing) that was essential for your company's competitiveness during the five years 2009 to 2013.

How important were each of the following effects on your significant* innovation?

***Organisational effects:**

	High	Medium	Low	Not relevant
Reduced time to respond to customer or supplier needs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved quality of your goods or services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reduced costs per unit output	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved employee satisfaction and/or reduced rates of employee turnover	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved communication or information sharing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased ability to develop new products or processes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***Marketing effects:**

	High	Medium	Low	Not relevant
Sales growth for your goods and services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Introduced products to new markets or customer groups	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increased visibility of products or business	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strengthened relationships with customers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved customer satisfaction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>


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0%  100%

Hindered Innovation Activities

During the five years 2009 to 2013, did your company?

***Abandon innovation projects in the concept stage:
Check any that apply**

- Yes
 No

If Yes -- specify the number of
abandoned innovation projects

***Abandon projects after the innovation activities began:
Check any that apply**

- Yes
 No

If Yes -- specify the number of
abandoned innovation projects

***Delay innovation activities:
Check any that apply**

- Yes
 No

If Yes -- specify the number of
delayed innovation activities

***Decide not to innovate:**

- Yes No

Please answer the remaining questions in this section by focusing on the five years 2009 to 2013.

How important were each of the following factors in hindering your innovation activities?

Accessing Knowledge

***Cultural and Managerial factors:**

	High	Medium	Low	Factor not experienced
Lack in culture that encourages novel ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack in collaboration between people in the same unit of your company	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack in collaboration between people in the different units of your company	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Lack in collaboration with people outside your company	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weak attitude of personnel towards change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weak attitude of managers towards change	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inability to devote staff to innovation activities due to production requirements of existing products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***Knowledge factors:**

	High	Medium	Low	Factor not experienced
Lack in idea generation inside your company	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of qualified personnel in the labour market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of information on technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of information on markets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Deficiencies in the availability of external services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Difficulty in finding co-operation partners for innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Building Innovation

***Selection and Development factors:**

	High	Medium	Low	Factor not experienced
Risk-averse attitude towards investing in novel ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tough rules for investment in new projects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Management has a hard time pushing forward the development of new ideas	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
New product development often does not finish on time	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

***Cost and Institutional factors:**

	High	Medium	Low	Factor not experienced
Lack of funds within your company or group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of finance from sources outside your company	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Innovation costs too high	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weakness of property rights	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Weakness in legislation, regulations, standards and taxation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Commercialising Innovation

***Organisational and Market factors:**

	High	Medium	Low	Factor not experienced
Delay in rolling out new products or processes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitors can quickly copy your company's new product or process	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack in potential to penetrate new customer groups and markets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Market dominated by established enterprises	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Uncertain demand for innovative products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Reasons not to Innovate

***Reasons not to Innovate:**

	High	Medium	Low	Factor not experienced
No need due to prior innovations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No need				

because of no demand for innovations

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0% 100%

Overview of the Survey Questionnaire

Survey questionnaire design and sources:

This survey is an exploration of the 'Community Innovation Survey' - CIS 4 Harmonised Survey Questionnaire (2006), which has been aligned with the 'Capability Measure' (Hansen and Birkinshaw, 2007) and the 'Innovation Metrics for the IVC' (Roper et al., 2008, 2009; Love and Roper, 2010).

This survey has collected information about your company's:

- Profile
- Product and Process Innovations
- Organisational and Marketing Innovations
- Hindered Innovation Activities

To record your responses, please click "Submit" at the bottom of the screen.

Resume later Submit Exit and clear survey

APPENDIX V

THE LEBANESE INNOVATION SURVEY COMPARABLE RESULTS (2009 – 2013)

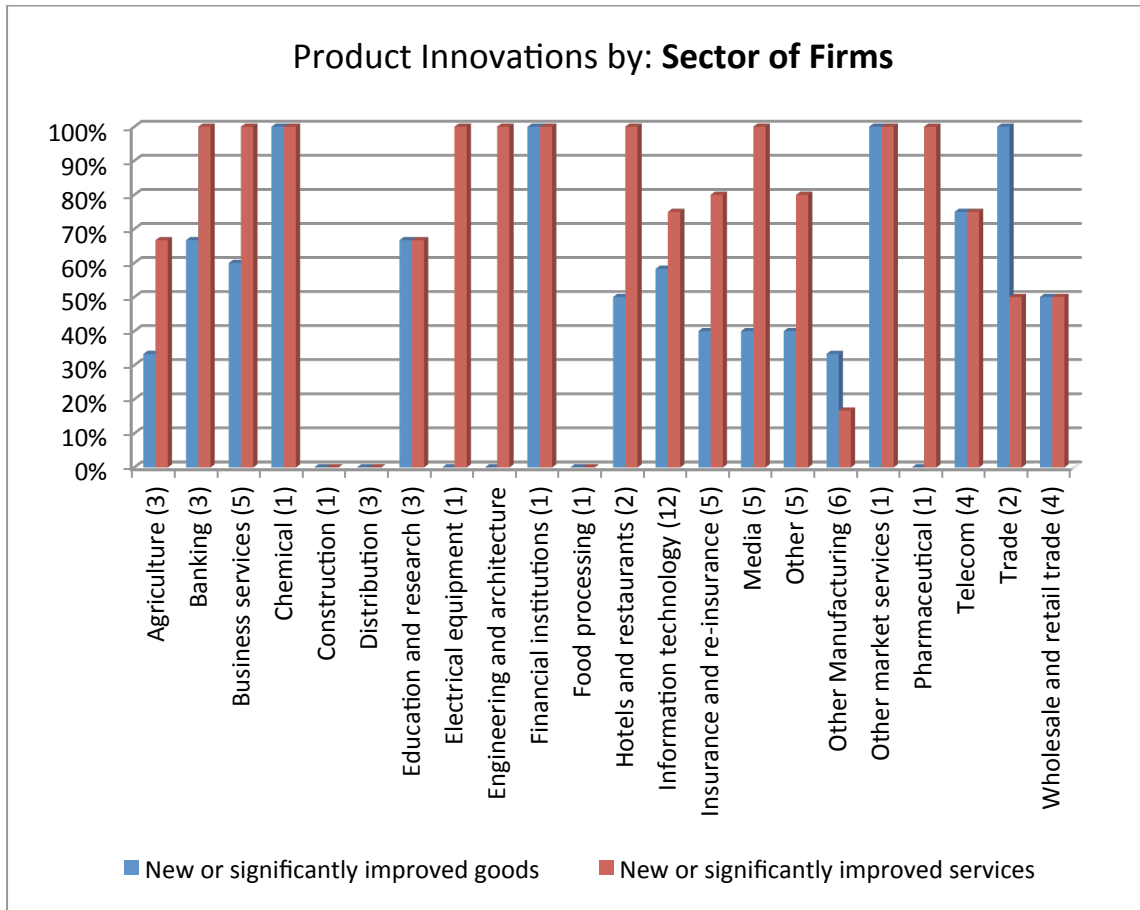


Fig.42. Product Innovations by: Sector of Firms (2009 – 2013)

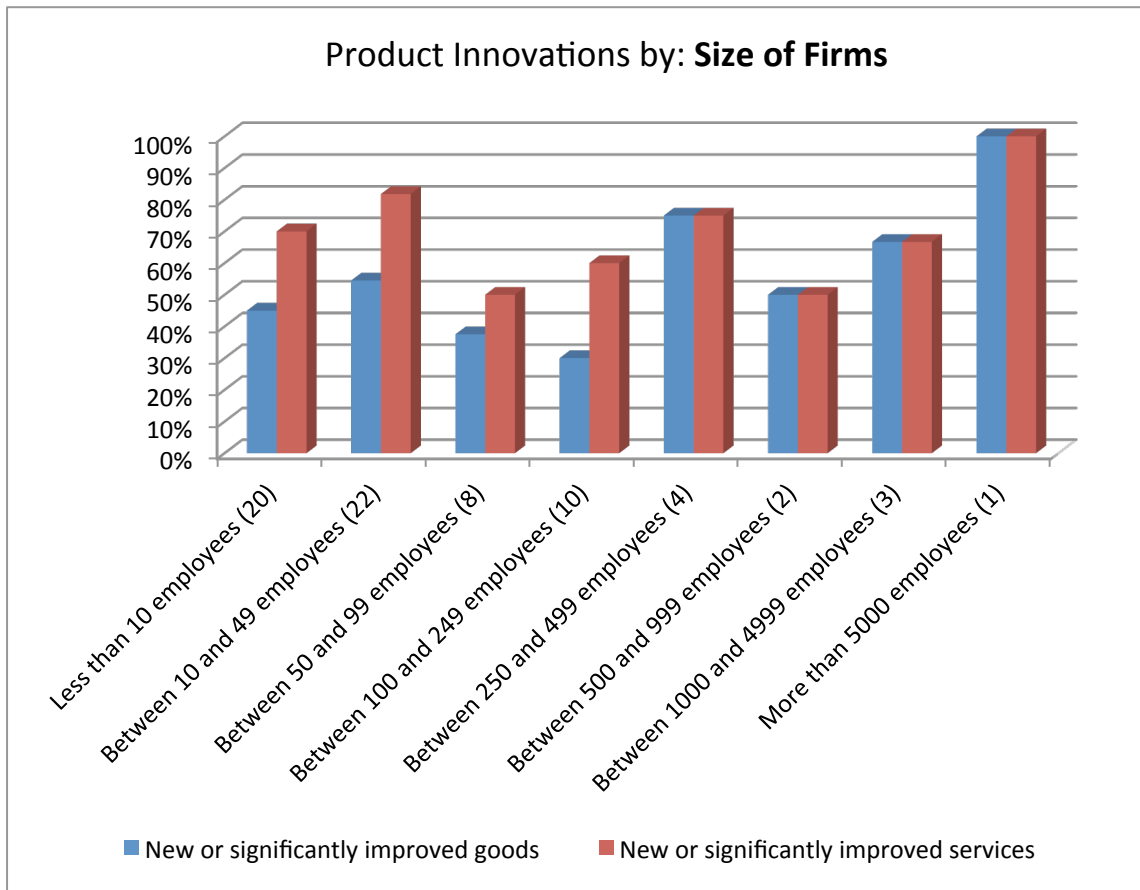


Fig.43. Product Innovations by: Size of Firms (2009 – 2013)

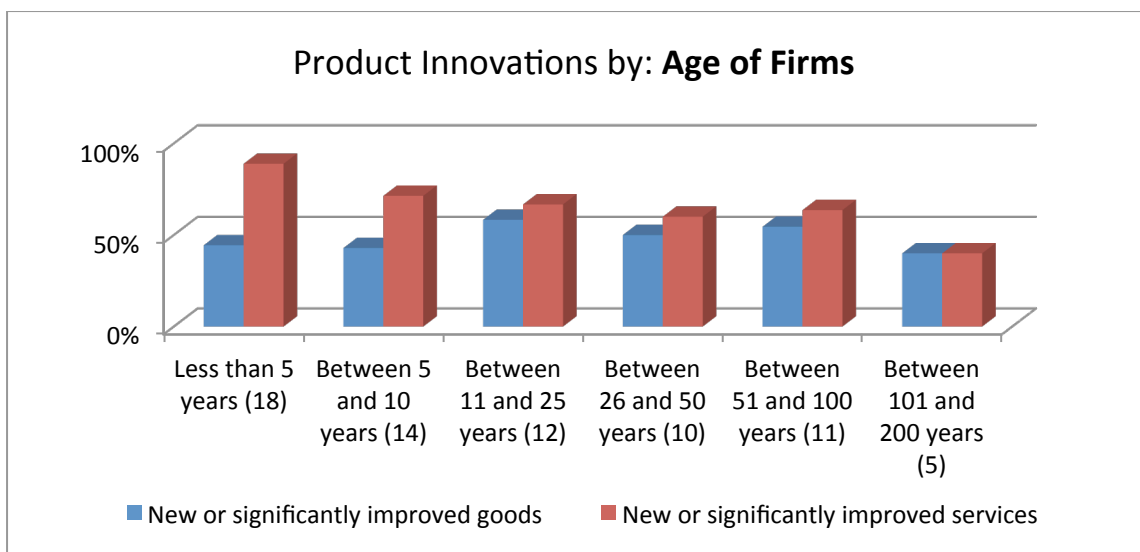


Fig.44. Product Innovations by: Age of Firms (2009 – 2013)

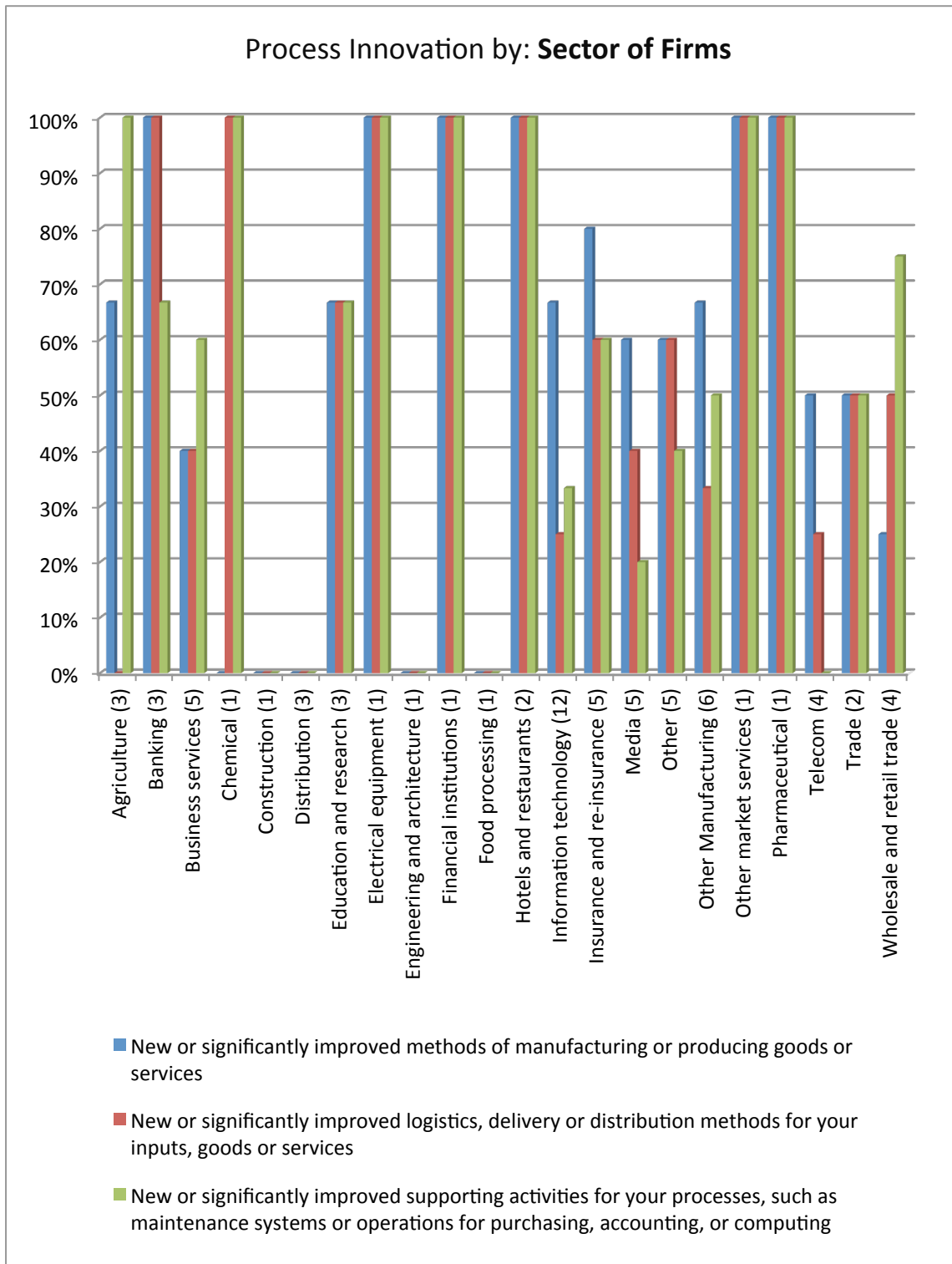


Fig.45. Process Innovation by: Sector of Firms (2009 – 2013)

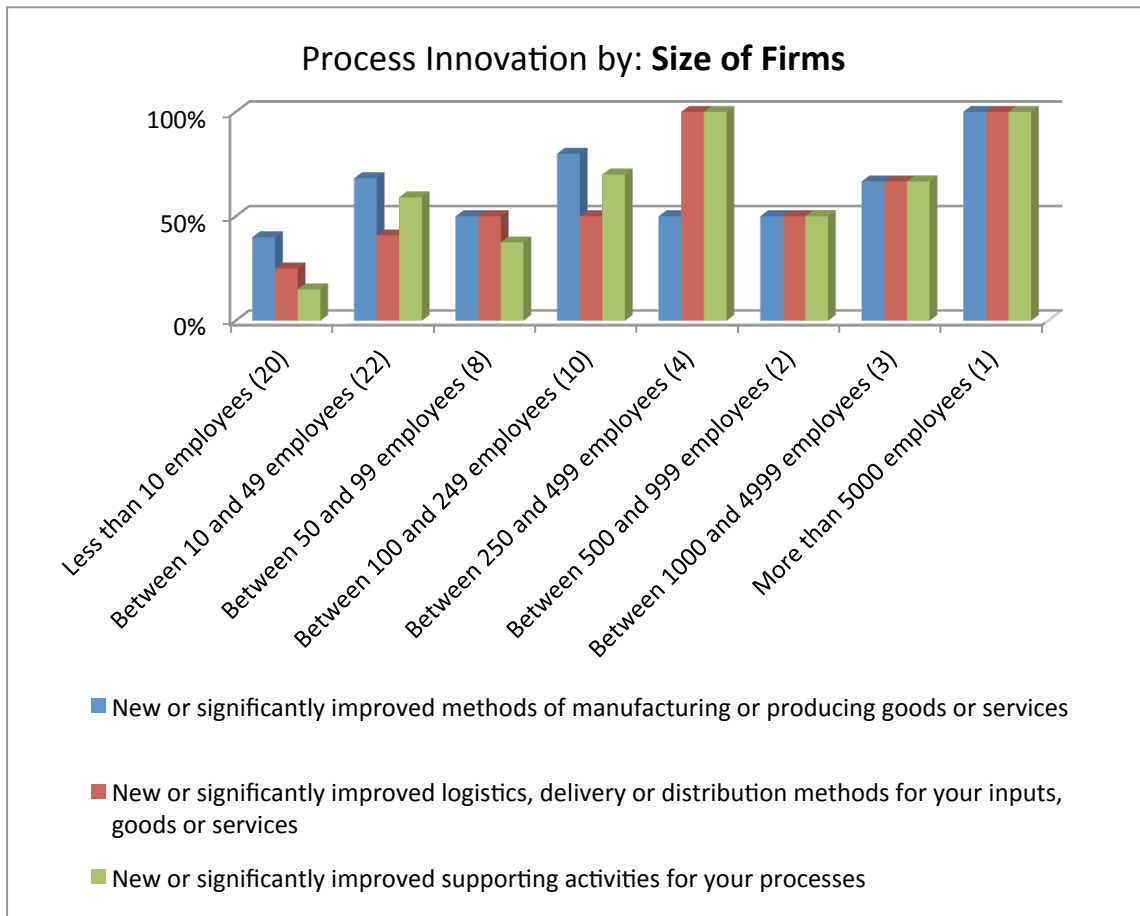


Fig.46. Process Innovation by: Size of Firms (2009 – 2013)

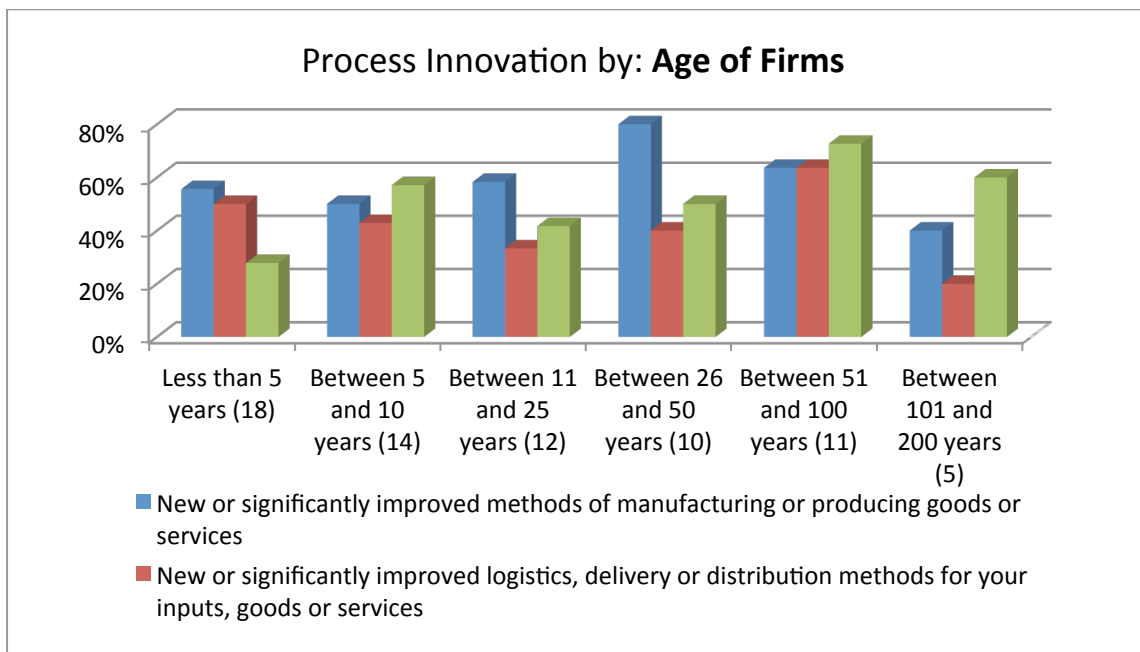


Fig.47. Process Innovation by: Age of Firms (2009 – 2013)

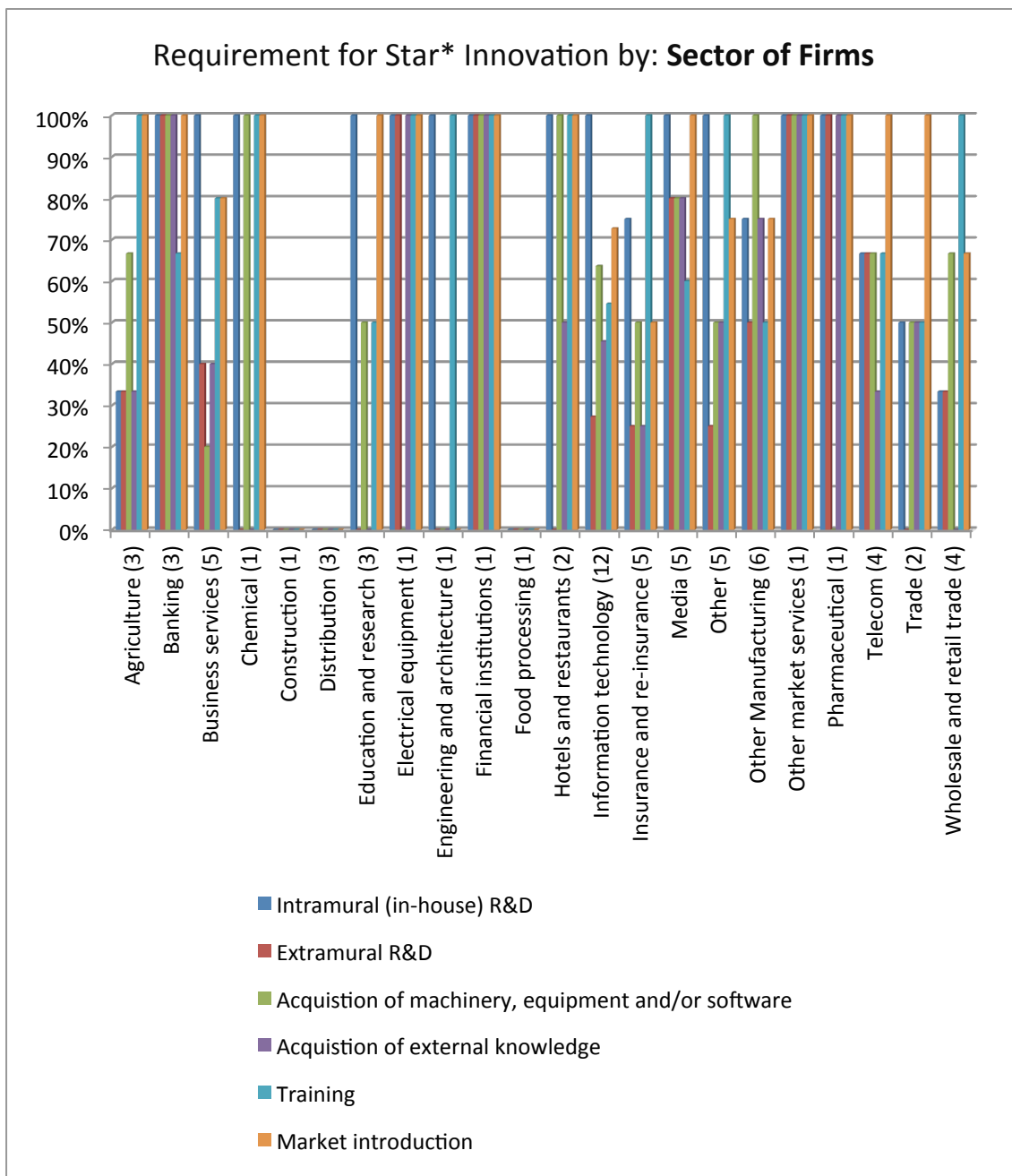


Fig.48. Requirement for Star* Innovation by: Sector of Firms (2011 – 2013)

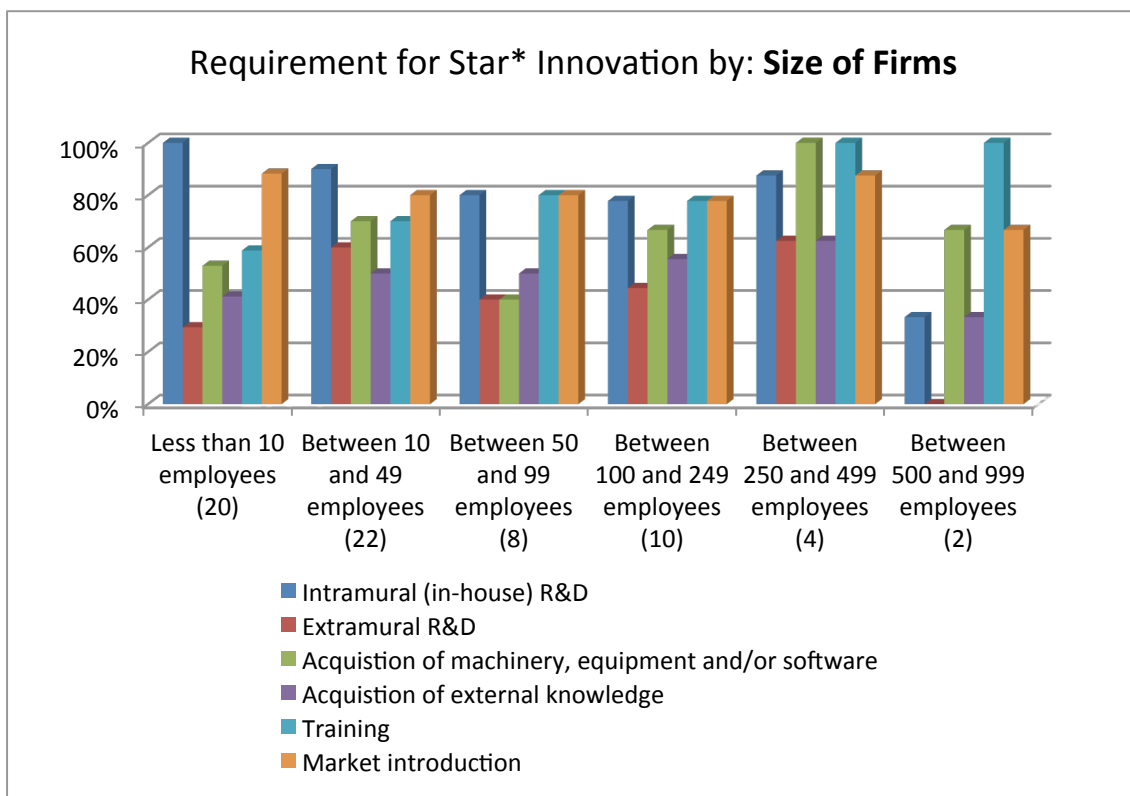


Fig.49. Requirement for Star* Innovation by: Size of Firms (2011 – 2013)

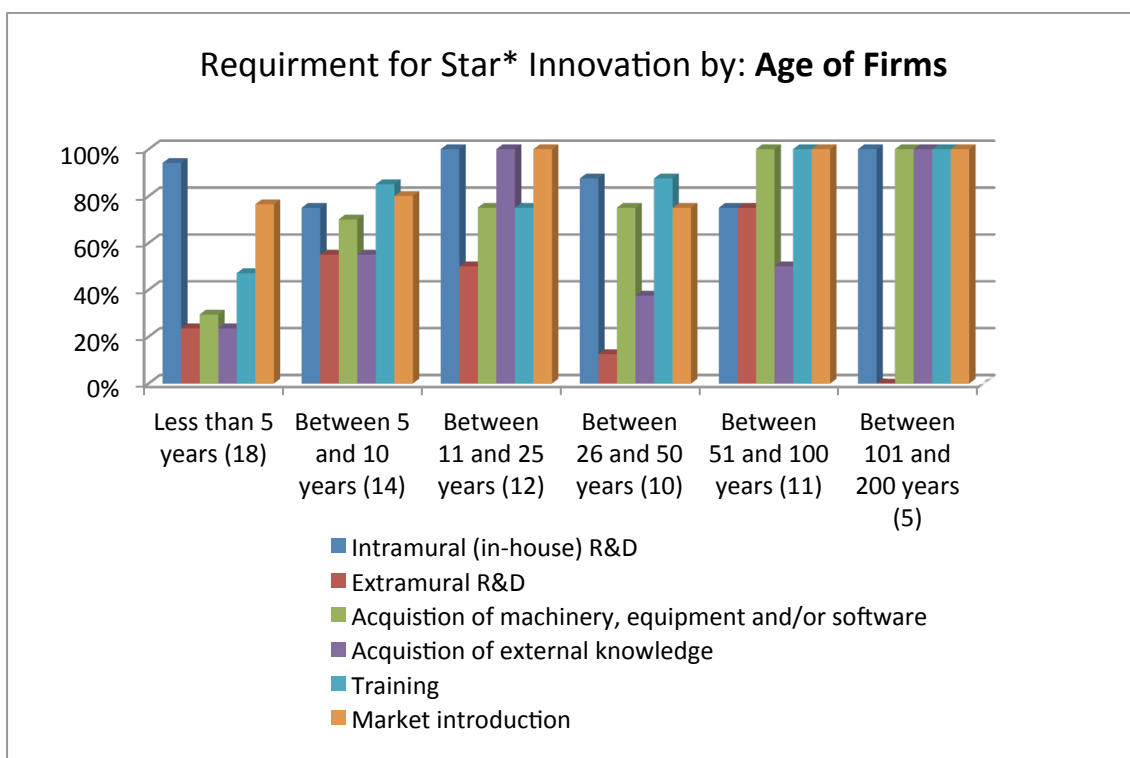


Fig.50. Requirement for Star* Innovation by: Age of Firms (2011 – 2013)

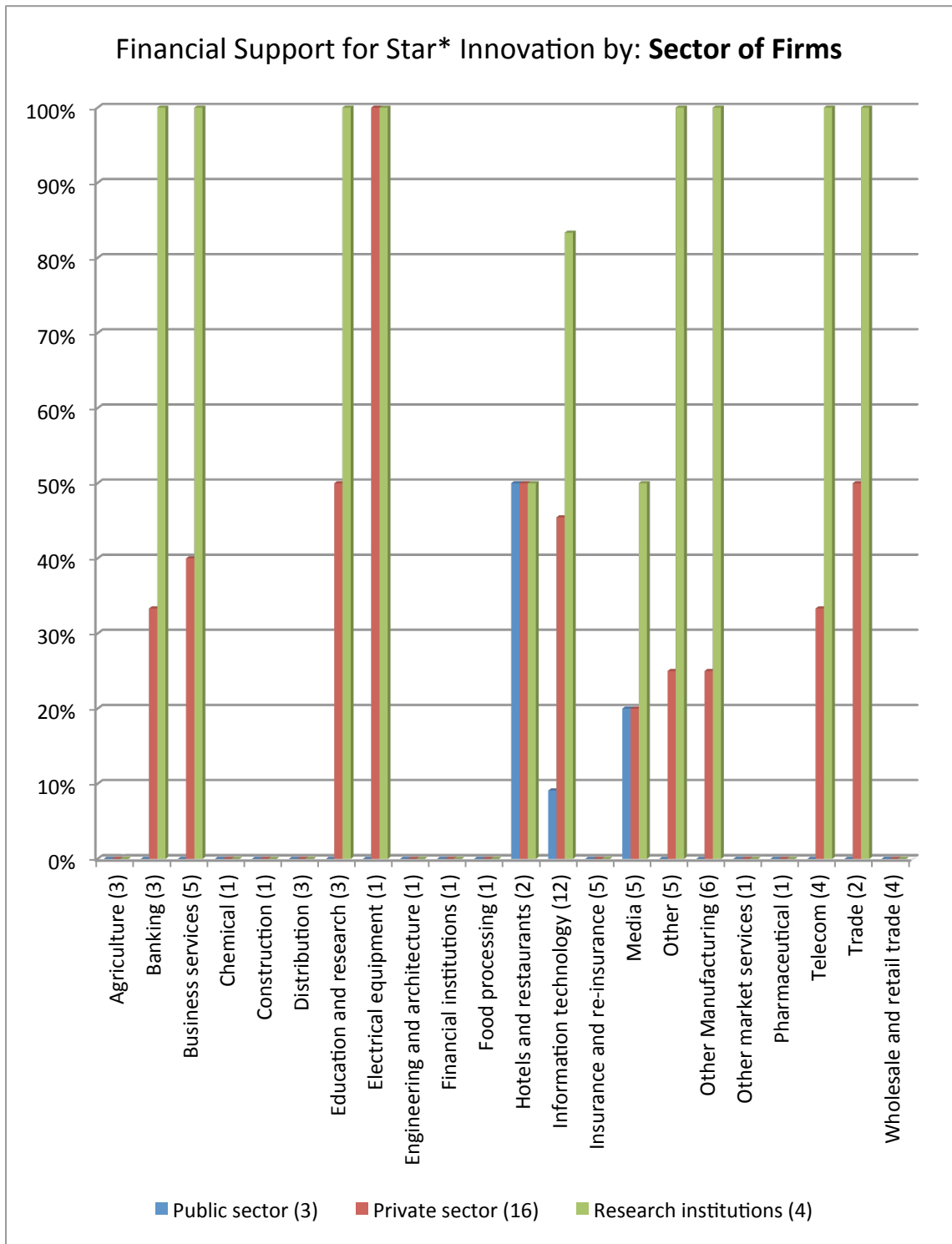


Fig.51. Financial Support for Star* Innovation by: Sector of Firms (2011 – 2013)

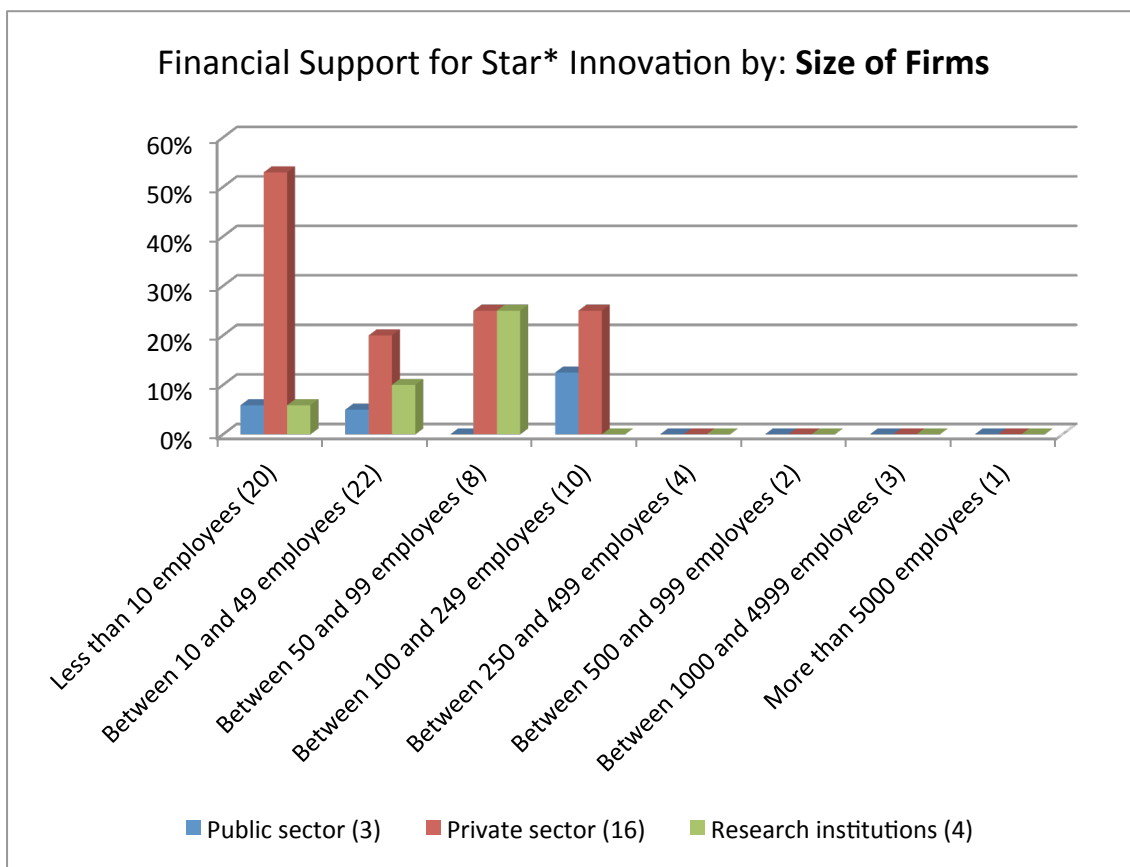


Fig.52. Financial Support for Star* Innovation by: Size of Firms (2011 – 2013)

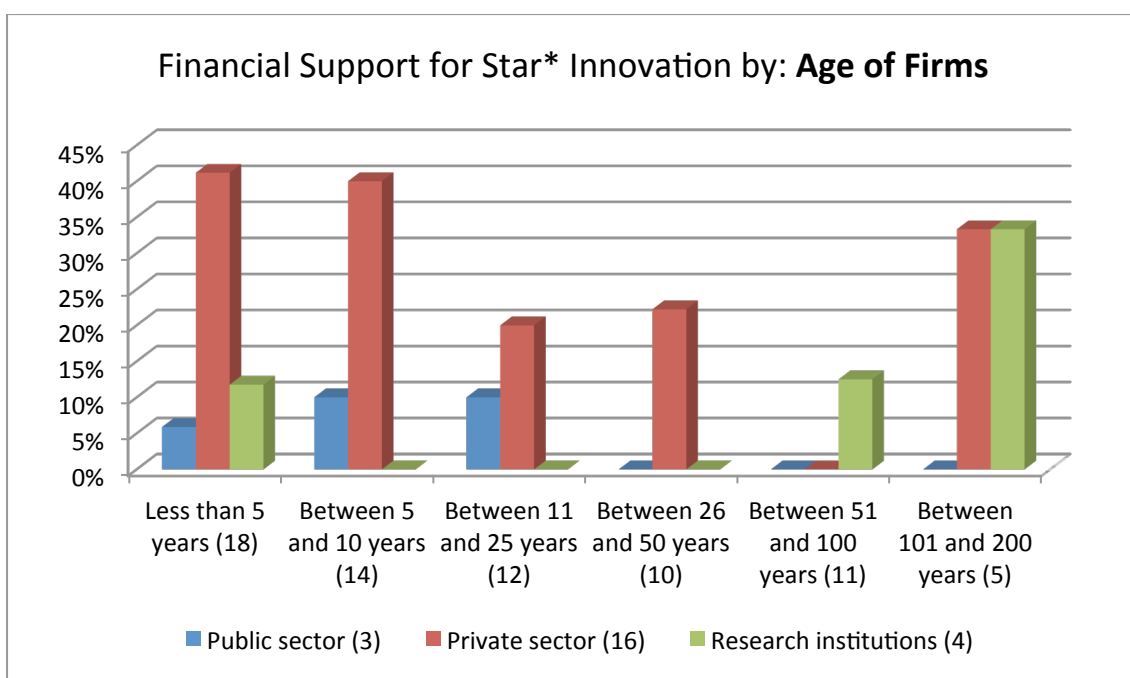


Fig.53. Financial Support for Star* Innovation by: Age of Firms (2011 – 2013)

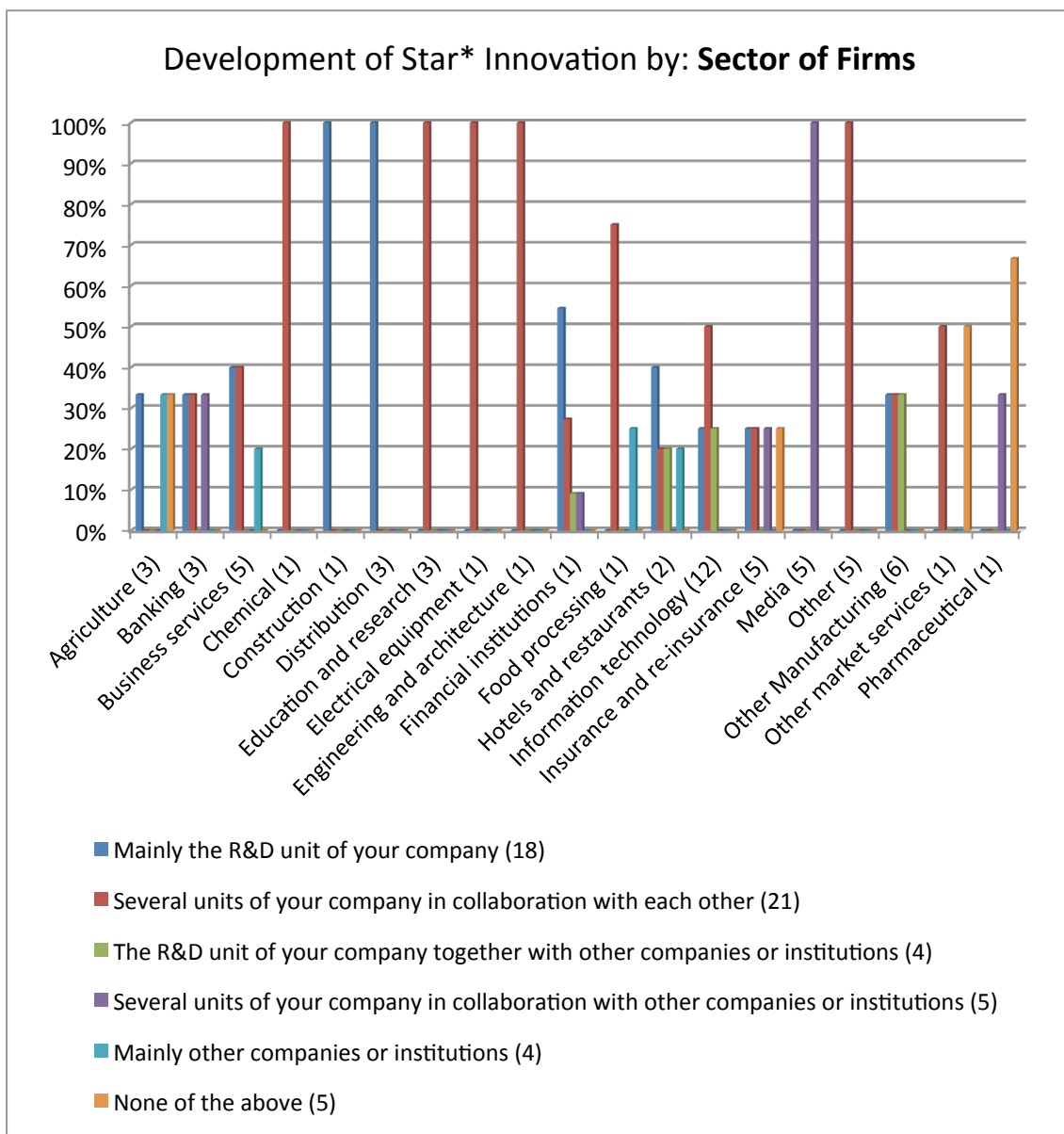


Fig.54. Development of Star* Innovation by: Sector of Firms (2011 – 2013)

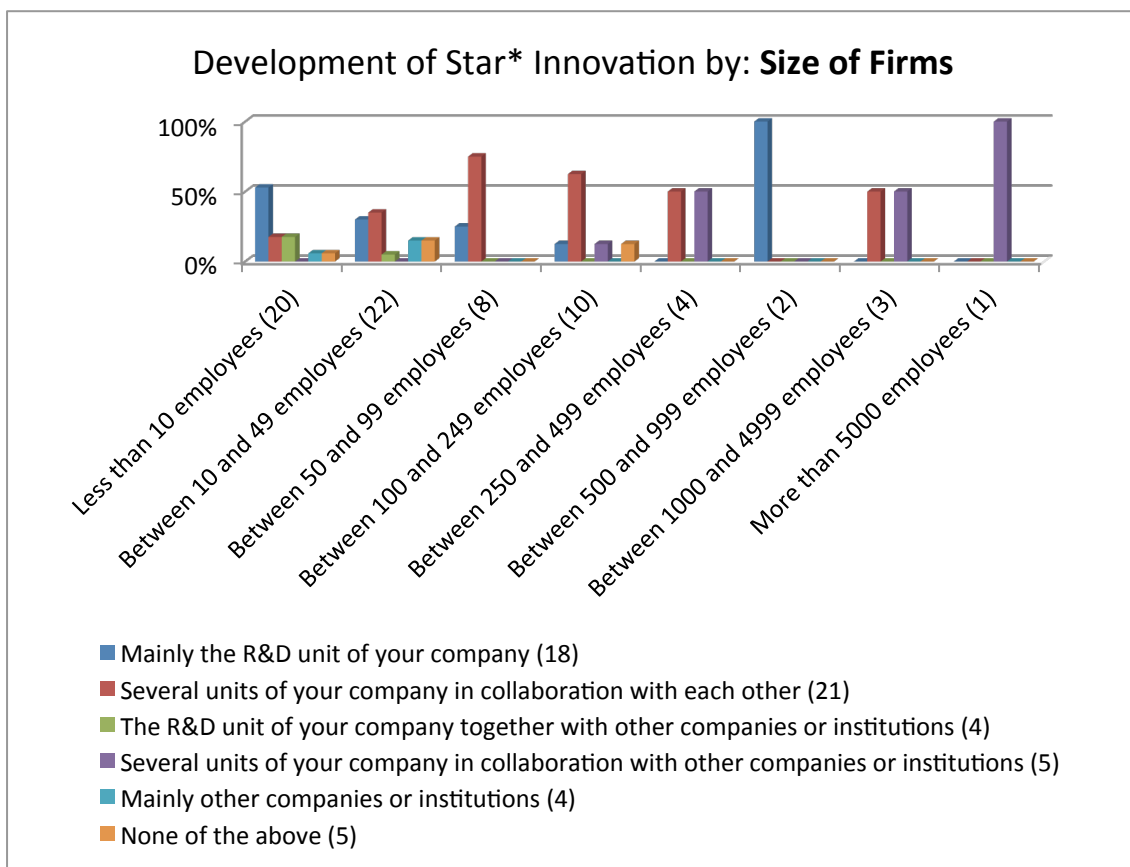


Fig.55. Development of Star* Innovation by: Size of Firms (2011 – 2013)

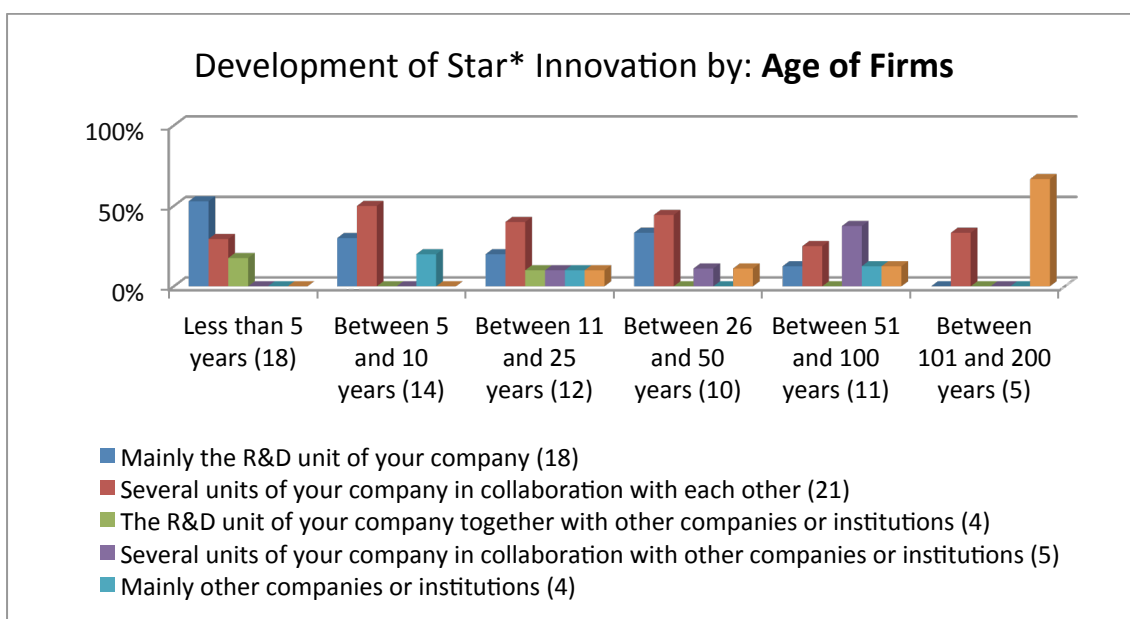


Fig.56. Development of Star* Innovation by: Age of Firms (2011 – 2013)

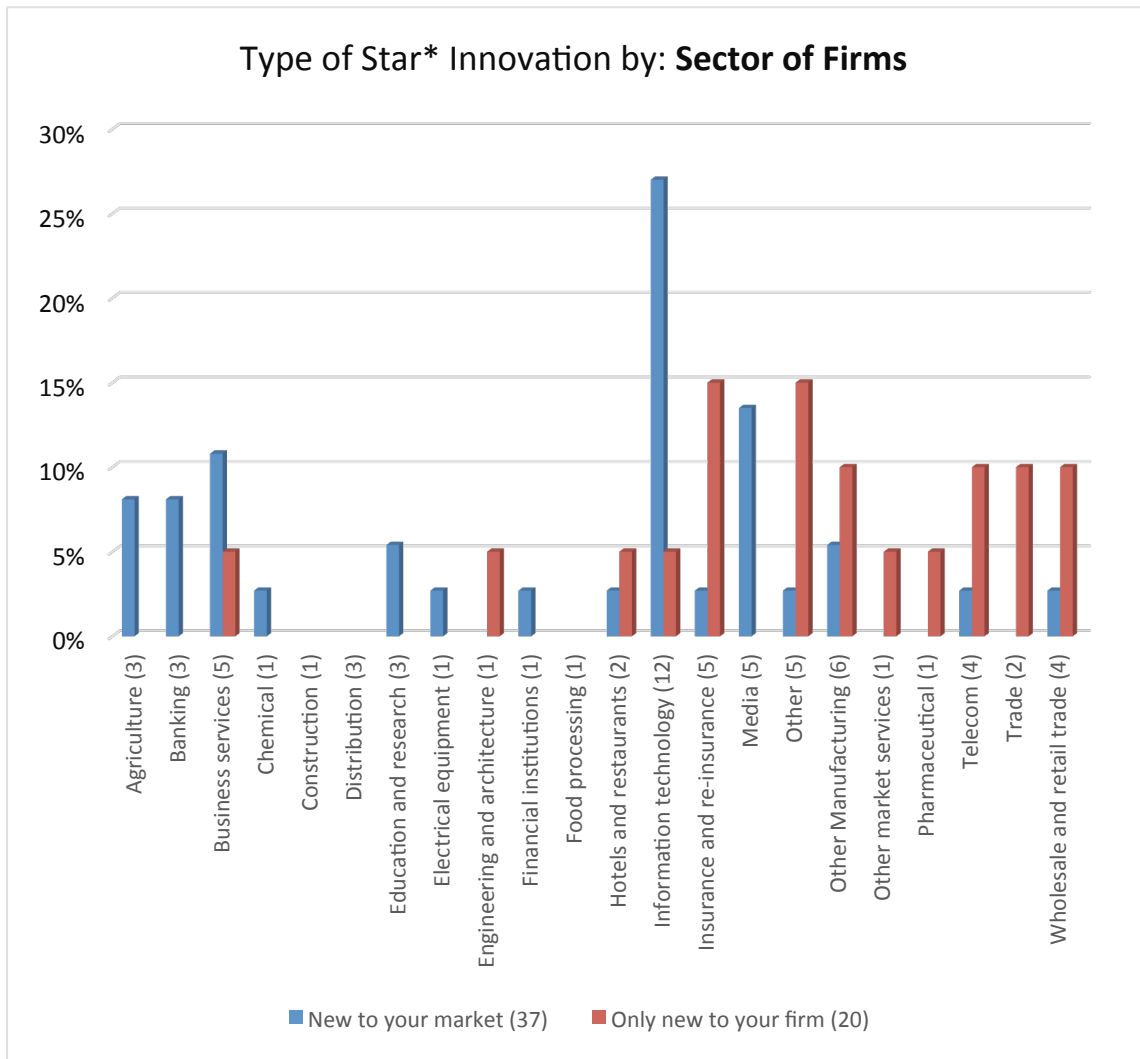


Fig.57. Type of Star* Innovation by: Sector of Firms (2011 – 2013)

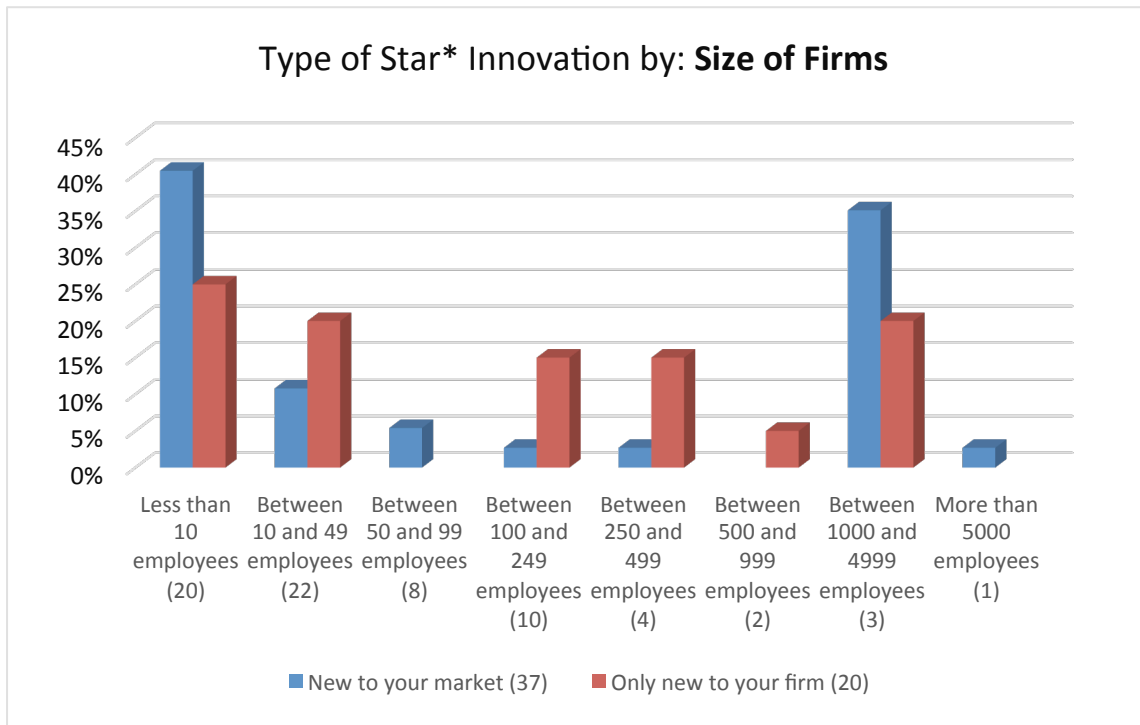


Fig.58. Type of Star* Innovation by: Size of Firms (2011 – 2013)

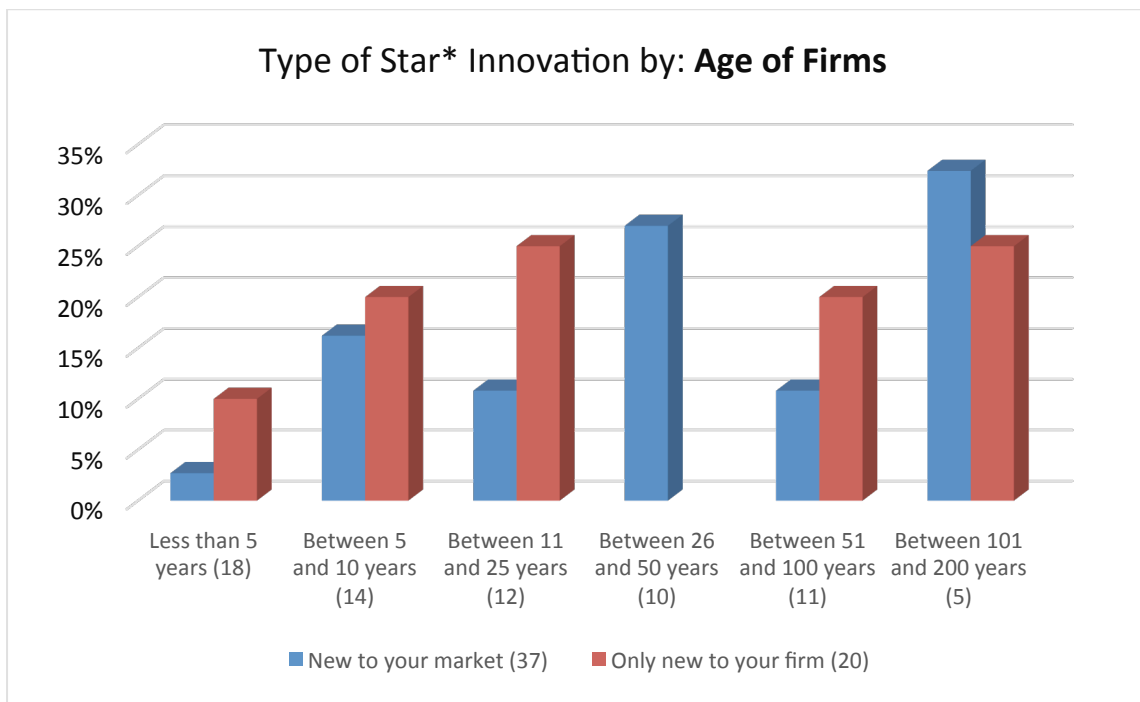


Fig.46. Type of Star* Innovation by: Age of Firms (2011 – 2013)

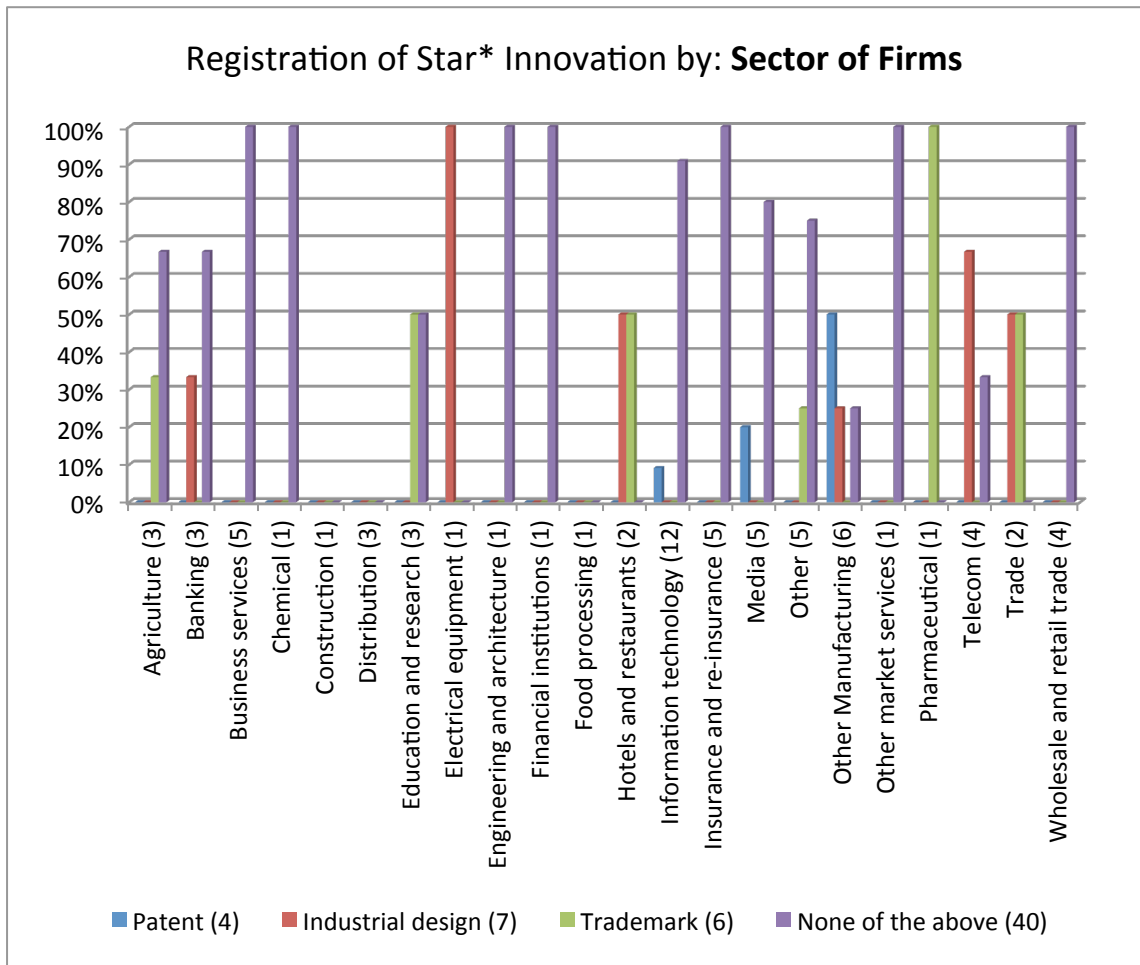


Fig.60. Registration of Star* Innovation by: Sector of Firms (2011 – 2013)

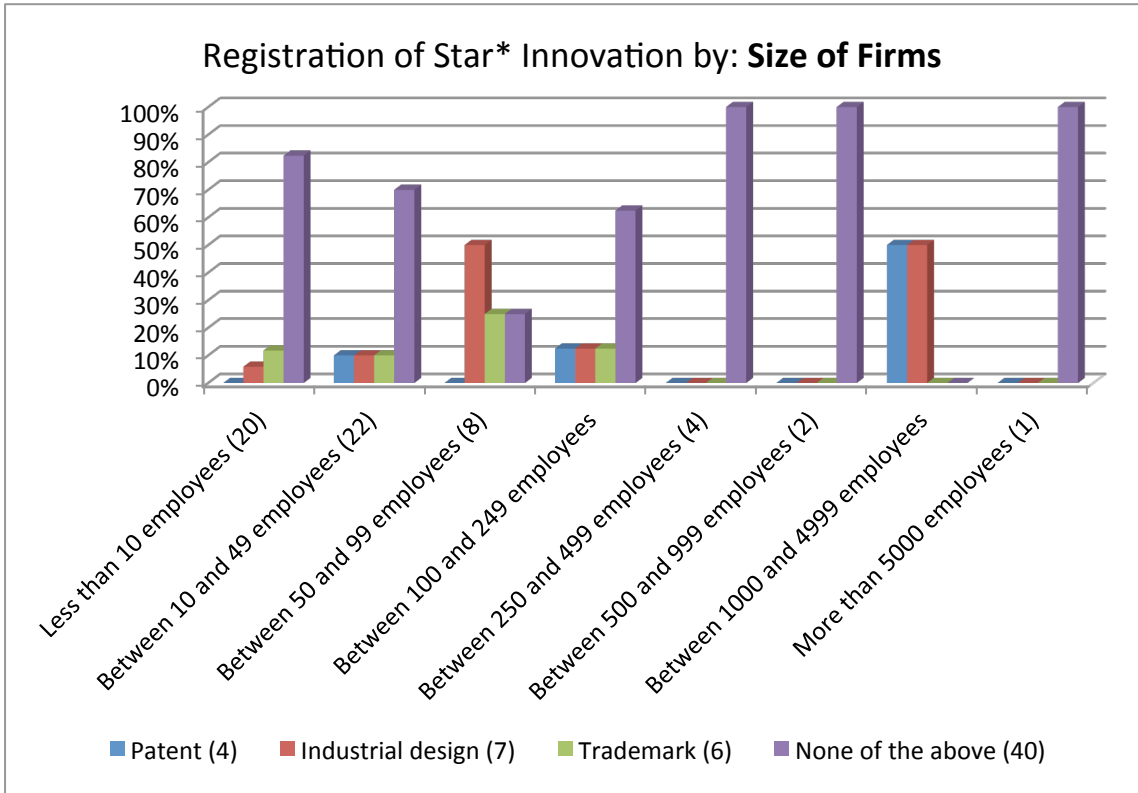


Fig.61. Registration of Star* Innovation by: Size of Firms (2011 – 2013)

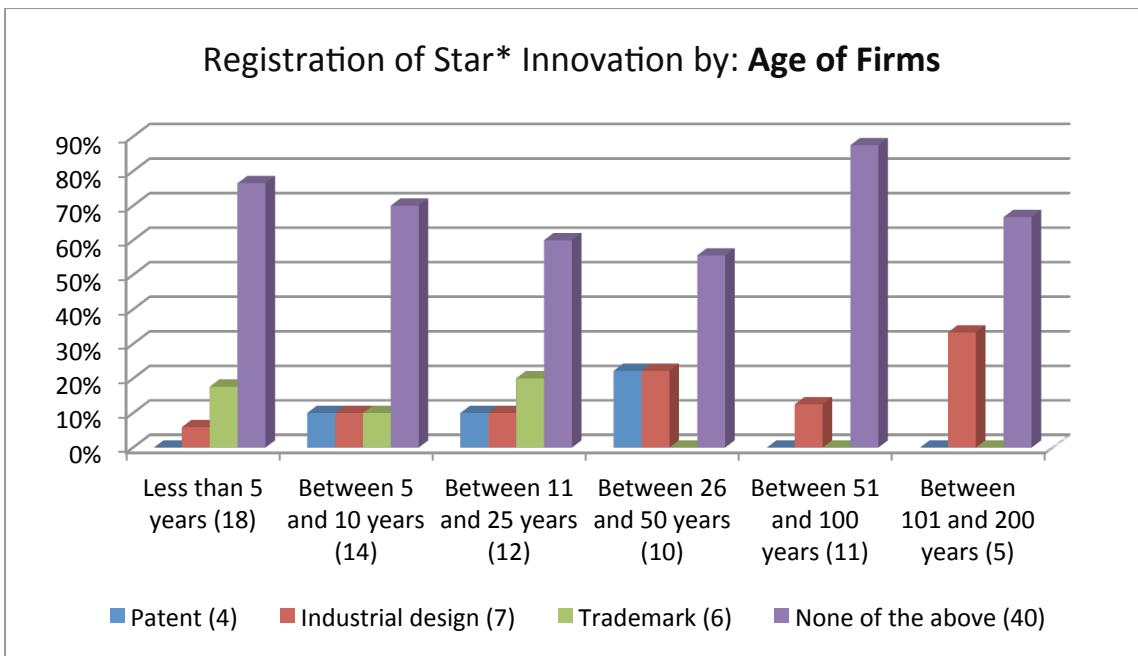


Fig.62. Registration of Star* Innovation by: Age of Firms (2011 – 2013)

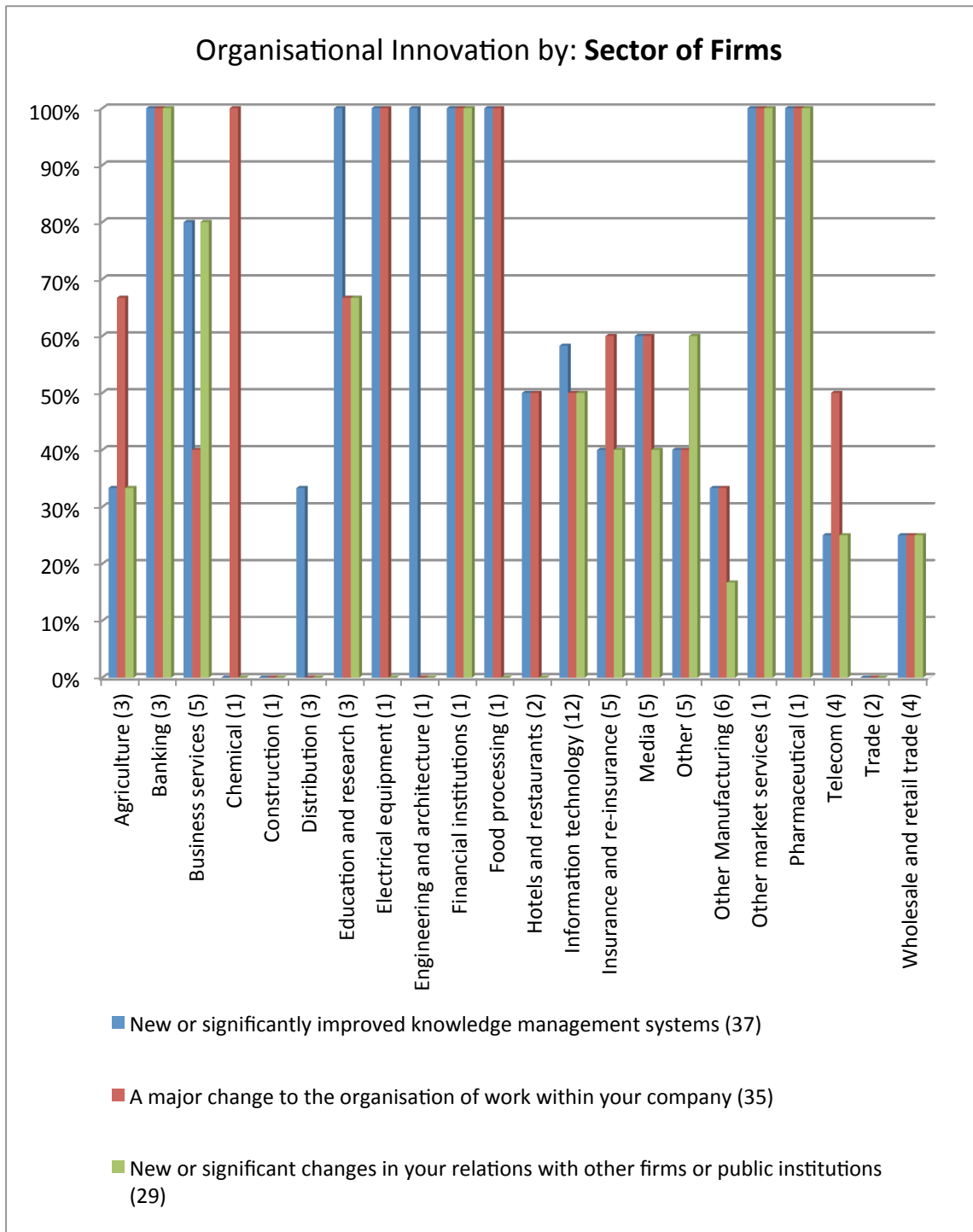


Fig.63. Organisational Innovation by: Sector of Firms (2009 – 2013)



Fig.64. Organisational Innovation by: Size of Firms (2009 – 2013)

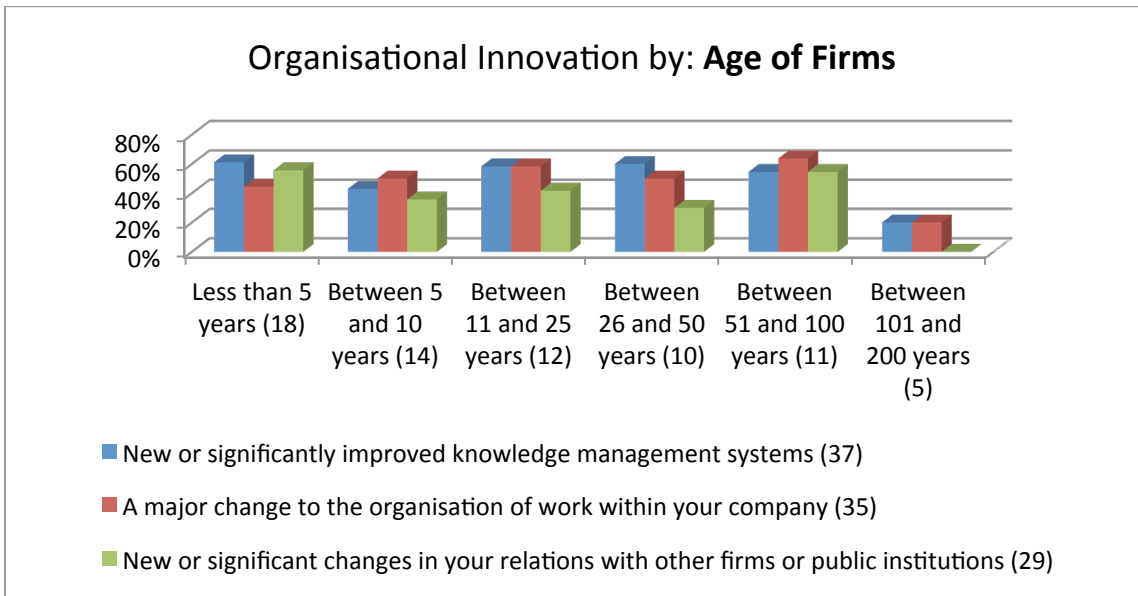


Fig.65. Organisational Innovation by: Age of Firms (2009 – 2013)

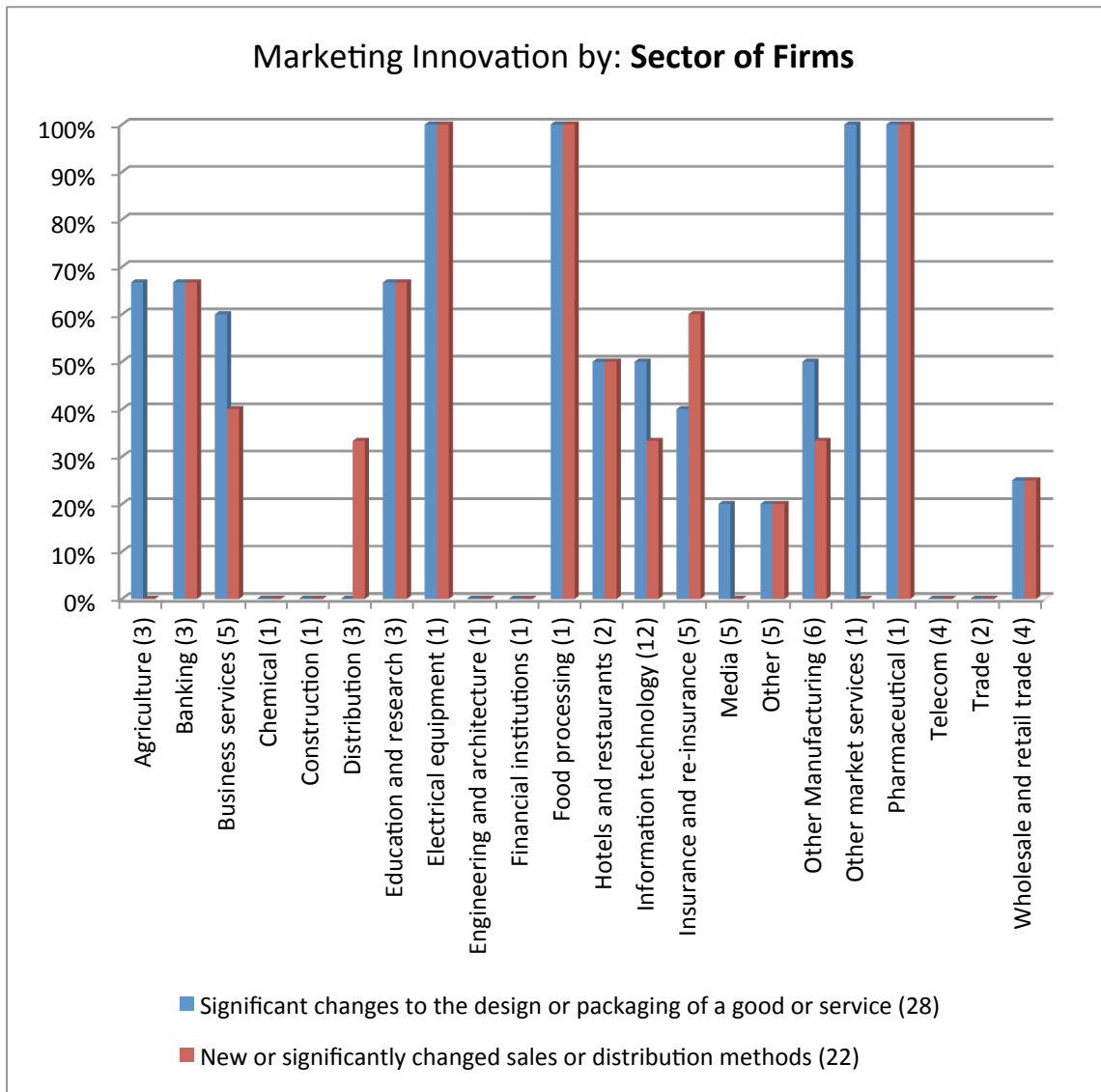


Fig.66. Marketing Innovation by: Sector of Firms (2009 – 2013)

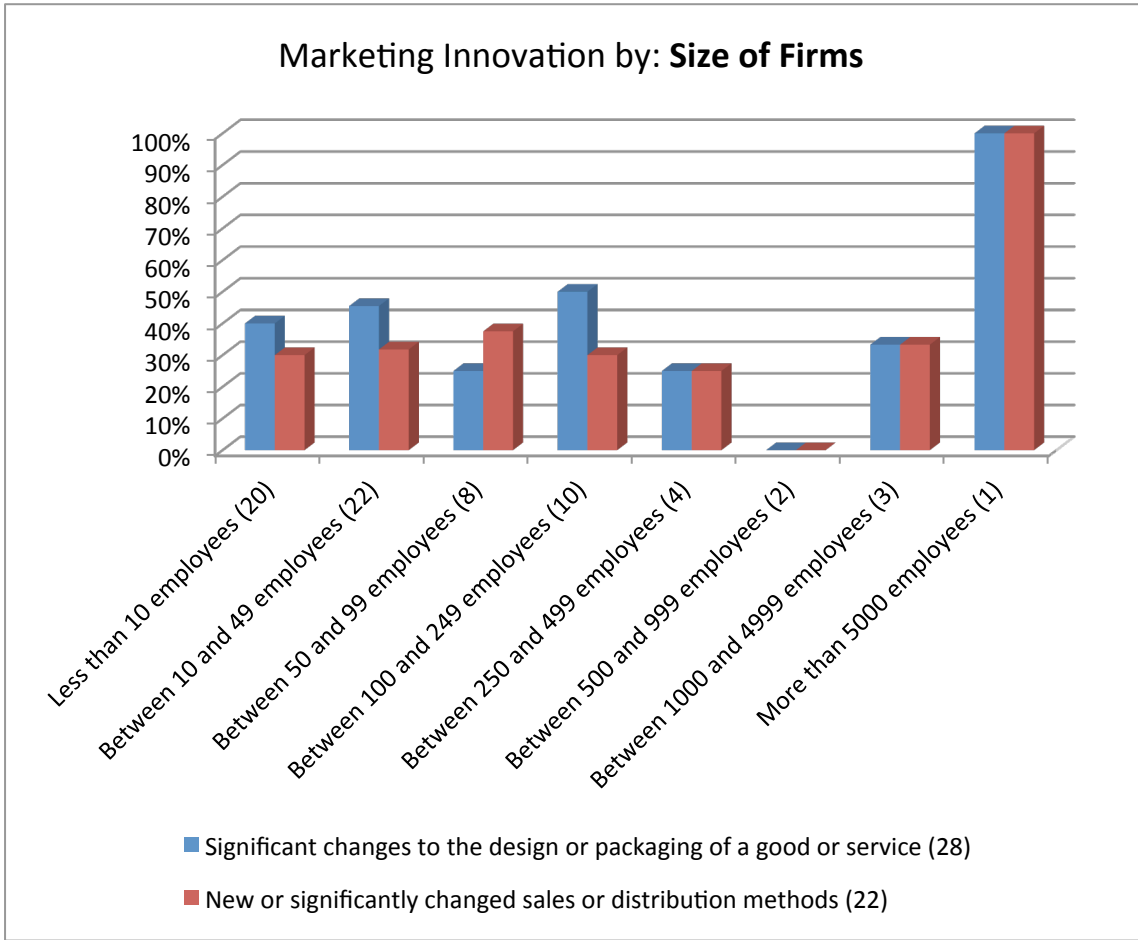


Fig.67. Marketing Innovation by: Size of Firms (2009 – 2013)

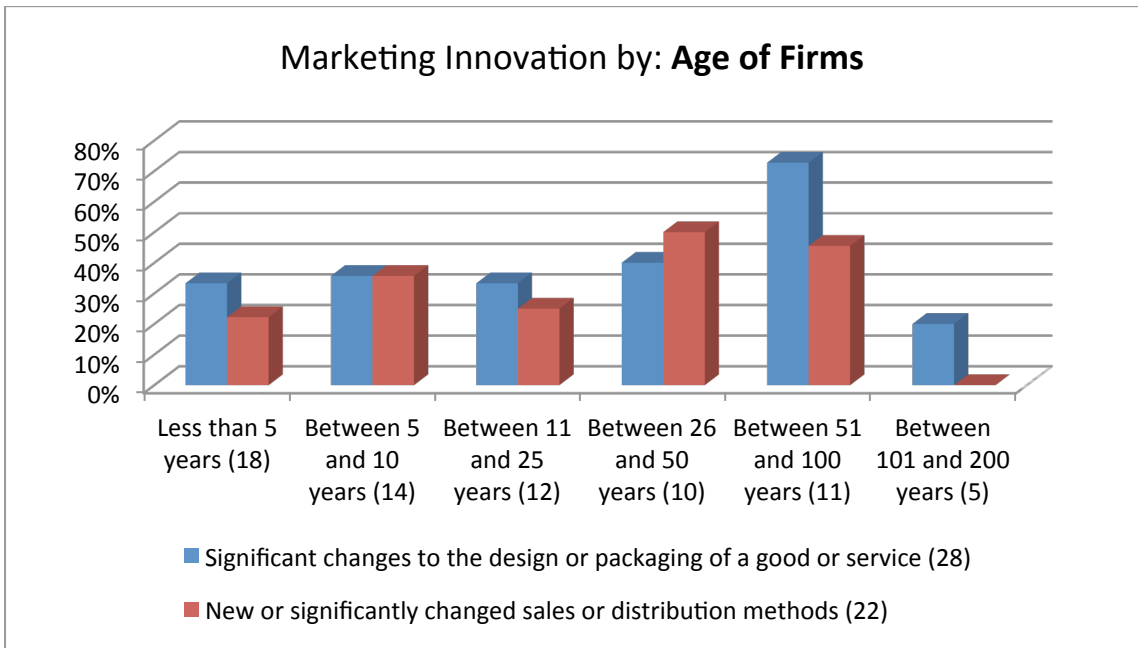


Fig.68. Marketing Innovation by: Age of Firms (2009 – 2013)

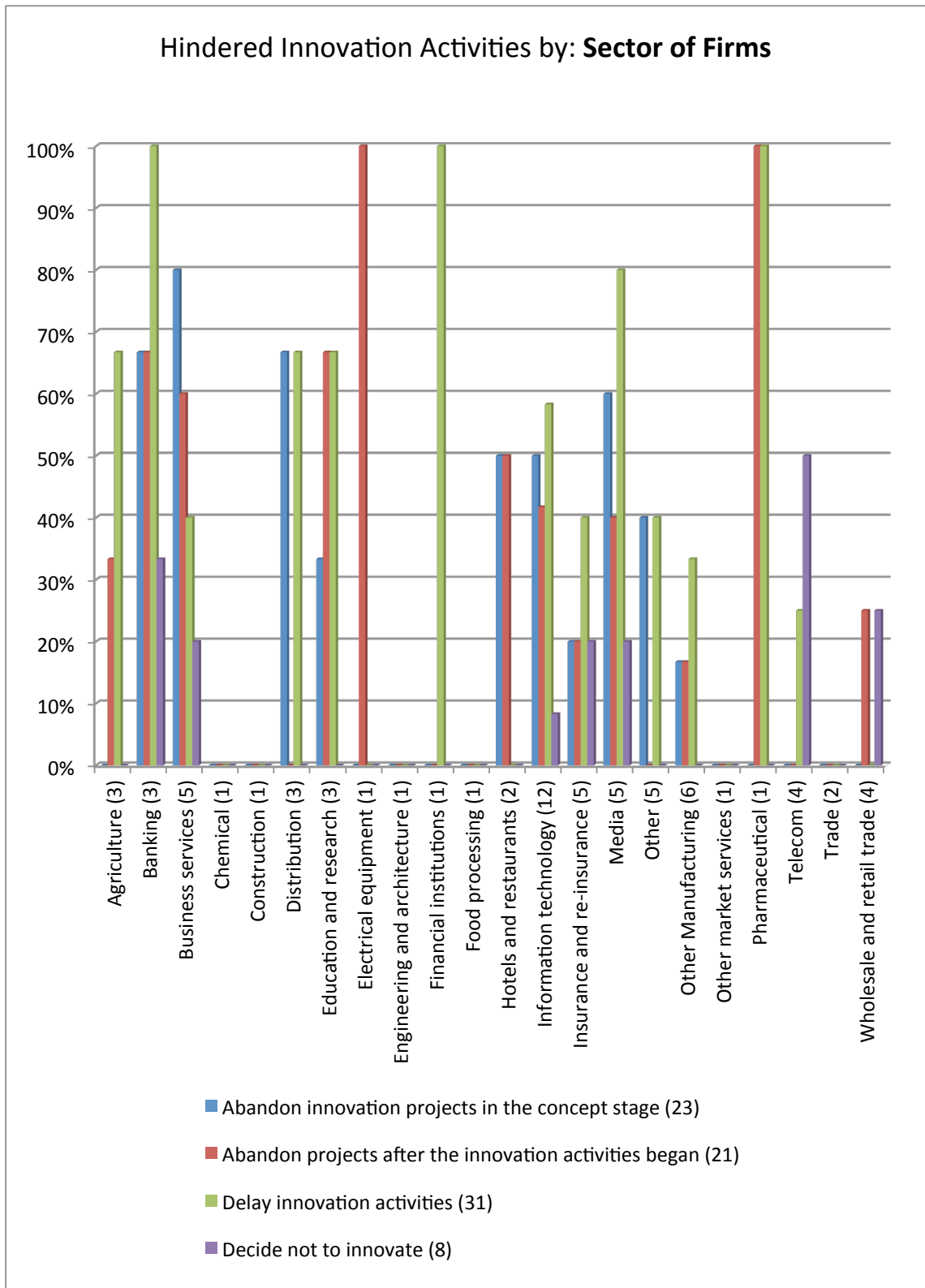


Fig.69. Hindered Innovation Activities by: Sector of Firms (2009 – 2013)

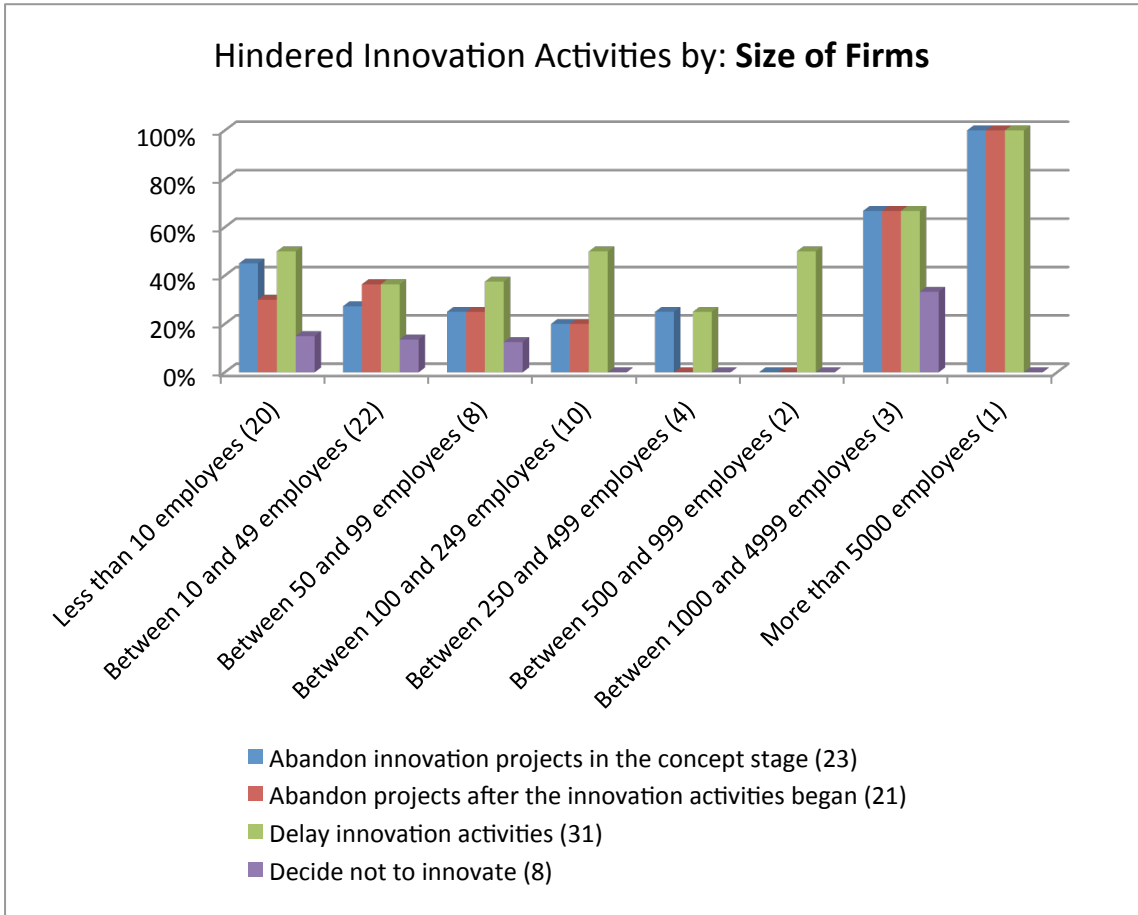


Fig.70. Hindered Innovation Activities by: Size of Firms (2009 – 2013)

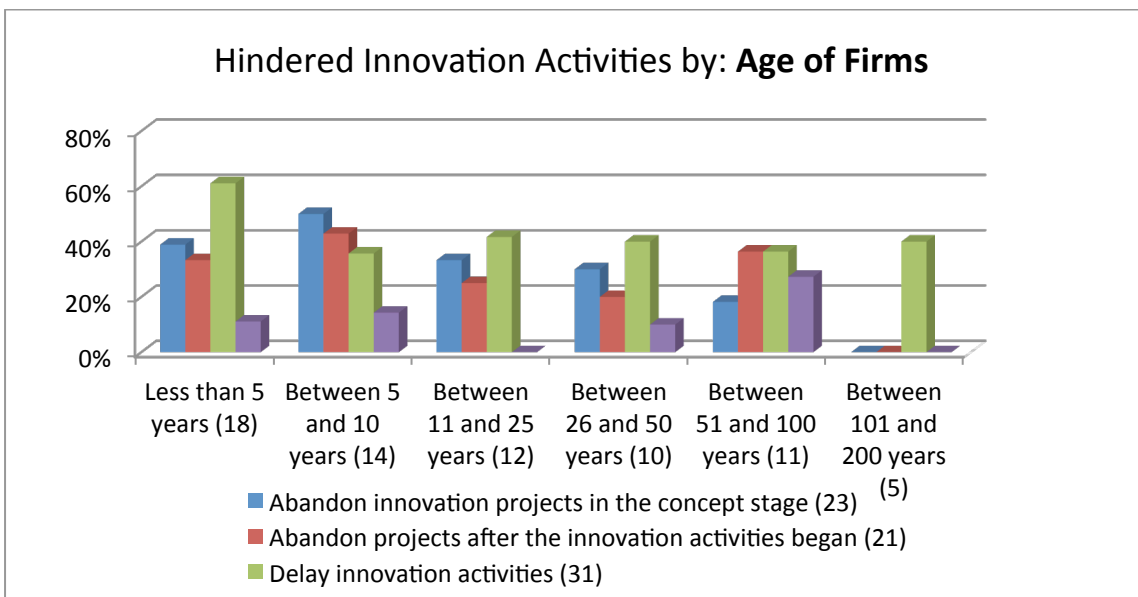


Fig.71. Hindered Innovation Activities by: Age of Firms (2009 – 2013)

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