ISTANBUL TECHNICAL UNIVERSITY ★ INSTITUTE OF SCIENCE AND TECHNOLOGY

INNOVATION IN MANUFACTURING INDUSTRY, OBSTACLES, SOURCES AND INCENTIVES REGARDING INNOVATION IN TURKEY

Master Thesis by

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By the increase of increased innovation, companies are forced to have continuous improvement to gain competitive advantage in the marketplace. Innovation plays crucial role to sustain competitive advantage in the future.

This master thesis focuses on status of innovation in manufacturing industry in Turkey, innovation types, obstacles, incentives, sources and aims for innovation. I tried to summarize literature studies and survey results regarding innovation.

I would like to thank Prof. Dr. Sıtkı Gözlü who gave all support and assistance to me during all my graduate education life and this thesis study and I would like to express my appreciation to all my teachers for their contribution to my academic career. I am grateful to research assistant Gül T. Temur who always helped me throughout the stages of my thesis, gave me morale support and close friendship.

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SUMMARY

Internal and external changes are one of the most important characteristics of the organizations. Organizations survive if they manage these changes successfully. For this aim, innovation plays an important role in success of companies. In this study, innovation status of Turkish manufacturing sector is examined and obstacles, incentives and sources regarding innovation are obtained. At first, innovation and innovation types in literature are studied and regarding these studies, surveys that are implemented to Turkish Manufacturing Sector are considered. Parameters regarding obstacles for innovation that is examining in today's world mostly, the sources and incentives that companies use for innovation and their importance levels are determined.

According to those aims mentioned above, with the help of literature studies, surveys are mailed to 364 companies that are in ISO500 companies and 58 surveys are collected. Surveys are analyzed with statistical tests.

The obstacles and sources are found as compatible with literature studies. The studies of companies regarding innovation types as product, process, marketing and organizational are examined.

In product innovation types, companies give more importance to launch a product that is not produced before with current methods and technology

The process type that companies give most importance is innovation in manufacturing techniques. In marketing innovation types, companies give more importance to change in design or appearance of products. Companies give most importance to usage of new organizational methods in external relations as an organizational innovation.

R&D, manufacturing (sources in the company), external market and customers are the most used sources for innovation by companies.

The companies give more importance to gain new markets, to preserve current markets as aims for implementation of innovations.

Most of the companies consider innovations as a risky process. As expected, deficiency of financial resources is the most important obstacle for innovation.

Companies are tried to be clustered according to different criteria (types of innovation, obstacles, sources, incentives and aims) regarding sectors. Automotive, paper, electrics-electronics and forestry sectors are classified as different from other sectors.

At the same time, product, process, marketing and organizational innovations in the last three years are questioned and expectations regarding innovations that will be actualizing are obtained. There is no important difference between the innovations that are implemented in the past and expectations regarding future. In conclusion, it is found that there is no enough studies in Turkish Manufacturing Sector as expected.

İMALAT SEKTÖRÜNDE İNOVASYON, TÜRKİYE'DE İMALAT SEKTÖRÜNE YÖNELİK ENGELLER, KAYNAKLAR ve TEŞVİKLER

ÖZET

İç ve dış değişimler, örgütlerin sahip olduğu en önemli özelliklerdendir. Örgütler bu değişimleri iyi yönetebildikleri müddetçe rekabet ortamında ayakta kalabilmektedir. Bu amaçla inovasyon, firmaların başarılarında anahtar faktör olara rol oynamaktadır. Bu çalışmada, Türkiye'de imalat sektöründe inovasyonun mevcut durumu incelenmiş ve inovasyona yönelik engeller, teşvikler ve kaynaklar ortaya koyulmuştur. Öncelikle, inovasyon ve inovasyon türleri ile ilgili literatürdeki çalışmalar incelenmiş ve bu çalışmalar doğrultusunda Türk İmalat Sektörü'ndeki firmalara uygulanan anketler incelenmiştir. Günümüzde güncel olarak çok fazla incelenen bir konu olan inovasyona engel olabilecek parametreler, firmaların inovasyon için kullandıkları kaynaklar, teşvikler ve amaçları önem dereceleri ile araştırılmıştır.

Bu amaçlar doğrultusunda, literatürden elde edilen bilgiler ışığında Türkiye ISO500 içerisinde yer alan 364 adet firmaya hazırlanan anketler gönderilmiş ve 58 adet anket toplanmıştır. Anketler çeşitli istatistikî testler ile analiz edilmiştir.

Firmaların yöneldiği kaynaklar ve kendilerine engel olabilecek parametreler literatür araştırmalarında belirtilen parametreler ile uyumlu bulunmuştur. Aynı zamanda ürün, proses pazarlama ve organizasyonel inovasyon olarak firmaların ne tür çalışmalar yapmış oldukları ortaya koyulmaya çalışılmıştır.

İnovasyon yenilik türlerinden ilki olan ürün yenilikleri içerisinde firmalar en çok mevcut teknolojiye bilgi sahibi olarak yeni bir ürün geliştirmeye önem vermektedirler. Üretim metodunda değişiklik ise firmaların en fazla önem verdikleri proses yeniliği türlerindendir.

Firmalar pazarlama yeniliği türlerinden ürünlerin tasarımı ve görünümünde değişiklik, organizasyonel yenilik türlerinden ise dış ilişkilerde yeni bir organizasyonel yeniliğe sahip olmaya önem vermektedirler.

Firmalar için Ar&Ge, dış piyasa ve müşteriler ise en çok kullanılan inovasyon kaynakları arasındadır. Firmalar inovasyon uygularken en fazla yeni piyasalara sahip olmayı ve mevcut piyasalarını korumayı amaçlamaktadırlar.

Firmaların büyük çoğunluğu ise hala inovasyonu riskli bir proses olarak algılamaktadır. Yine beklendiği üzere firmalar için inovasyona engel oluşturan en önemli parametre finansal kaynakların yetersizliğidir.

Firmalar farklı kriterler için(inovasyon çeşitleri, engeller, kaynaklar, teşvikler ve amaçlar) içinde bulundukları sektörlere göre kümelendirilmeye çalışılmıştır. Bu amaç doğrultusunda otomotiv, orman ürünleri, elektrik-elektronik ve kağıt sektörleri diğer sektörlerden farklılık göstermiştir.

Aynı zamanda çalışmada firmaların geçmiş başarı ile gerçekleştirdikleri ürün, proses, pazarlama ve organizasyonel yenilikleri sorgulanırken, geleceğe yönelik olarak firmalarında inovasyona yönelik olarak beklentileri ortaya koyulmaya çalışılmıştır. Firmaların geleceğe yönelik beklentileri ya da yaptıkları çalışmalar, geçmişte gerçekleştirdikleri başarılardan önemli derecede bir farklılık göstermemektedir. Sonuç olarak ise Türk İmalat Sektörü'nde geçmişte ve gelecekte beklendiği ve literatürde incelendiği oranda çalışma yapılmadığı gözlemlenmiştir.

1. INTRODUCTION

It is known that, science; technology and innovation are the basic elements for the developments of companies, industries and countries (Sartori and Pecheco, 2006). The rapid increase of competition and developing technologies cause increase of the need for developing innovation for the companies in the world. The evidence from literature shows that innovation has a huge effect on industrial and national development. Determinants of innovation are one of the main areas in literature that is searched and affects the rate of companies' innovation. They are derived from the internal and/or external relations of the company, size, sectors, personnel, R&D and technical capabilities (Souitaris, 2003).

The way of innovation measurement is depend on the aim and intention of the researchers (Goldsmith and Foxall, 2003). The researches, scientists and students have studied innovation intensely in the last decade (Silva and others, 2006).

Innovation has many meanings that are named by authorities and researchers. This research is depending on the meaning of innovation that is in OSLO manual. An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations (Oslo Manual, 2006).

With the introduction of cheap labor force from far-east countries, centre of manufacturing has been shifted to those countries as China, India and South East countries. So, developed countries started to manufacture their products in those countries to catch the competition. But, the important point is; they do not give up manufacturing area completely. Manufacturing industry started to focus on high technology and tried to form a manufacturing industry including R&D and innovation intensive.

Turkey is in the corner of this transition from focusing on productivity to focusing on innovation since Turkey is also at the end of the cheap labor based competition

(Ulusoy, 2006). So innovation is also an important weapon for competition in internal and also external markets.

The aim of this project is researching and gathering information about some aspects of innovation as obstacles, aims/ effects, sources/incentives and the relation between details of innovation types and also company characteristics. With the information gathered from literature, the status of innovation searches in Turkey is especially having been done for big companies.

2. INNOVATION AND CHANGING ENVIRONMENT

By the increase of intensive competition from abroad and domestic companies, companies start to operate in highly competitive sectors. With identifying environmental trends and adopting them, developing human source to develop the intelligence, knowledge and creative potential, increasing the technology use conscious, learning and innovation help companies to gain advantage in competitive areas (Roffe, 1998). In those environments, innovation is the key factor for success and sustainability for the companies (Roffe, 1999).

Change is one of the environmental characteristics of the organizations that when the management presumes accurate, they take the advantages of these changes. The capacity of an organization to improve their skills and learning new areas help companies to gain advantage in competitive areas (James and Roffe, 2000). This big change in the rules of competition is described as hypercompetition by D'Aveni that requires continuous innovation (Thomas and D'Aveni, 2004), (Chanal, 2004).

The use and acquire of information is significant for manufacturing companies to gain competitive advantage in today's free markets. It is not enough just to operate daily works well and also realizing need for changes in operational frameworks is essential. In order to achieve this perception in companies each function should operate in a way that is supportive of its effort to compete in the marketplace through innovation (Mason and Jablokow, 2003).

3. INNOVATION

3.1 Innovation

There are many innovation meanings in the literature. According to academic and business literature, innovation means to make an idea technically and commercially marketable and accessible to larger production in order to continue with sales (Casper and Waarden, 2003).

Roffe explains; Innovation is a crucial process for the wellbeing of an organization. Innovation is the process by which businesses improve their competitiveness and profitability through the continuing adoption of relevant new products and ideas (Roffe, 1999).

Innovation is defined as: an ongoing process of leaving, searching and exploring which results in: (1) new products, (2) new techniques, (3) new forms of organization and (4) new markets (Avermate and others, 2003).

Innovation as a term has many meanings (Goldsmith and Foxall, 2003). It had been derived from Latin 'innovatus'. Its meaning is 'starting to use new methods in cultural, administrative and social platforms' (İnovasyon: Nedir, Ne Değildir?, 2007).

Innovation is a pervasive attitude, a feeling, an emotional state, an ongoing commitment to newness. It is a set of values that represents a belief in seeing beyond the present making that vision a reality (Kuczmarzki, 2003).

Innovation is not only the conversion of an idea to a product, but also the incremental changes. They also provide profitability. In general, success is caught by simplified business models (Tamer, 2006).

The meaning according to Oslo Manual is, 'An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations'(Oslo Manual, 2006).

Within all those definitions there are terms that are related to innovation but are different from innovation. To start with, first concept is research& development that means process of improving existing products, developing new products, processes, materials and services to transfer them to a plant and/or market (Açan, 2004). It is one of the fundamental activities of the innovation, but if it is not converted to commercial activities it does not create value and results of R&D can not be converted to innovation (İnovasyon: Nedir, Ne Değildir?, 2007).

Another important term to be coming out is invention. Invention is a new idea or concept generated by R&D. It becomes an innovation if it can be converted to a product that is socially used (Martin and Martin, 2004). At that point, implementing innovation as a necessity come into the picture, because that means 'introducing it on the market' (Oslo Manual, 2006).

3.2 Research & Development

Before examining R&D as an indicator for performance measurement, basic research, applied research and also experimental development should be defined. Basic research is defined as 'experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundations of phenomena and observable acts, without any particular application or use in view'. Applied research is defined as 'original investigation undertaken in order to acquire new knowledge'.

Research and experimental development (R&D) comprises creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to derive new applications (as defined in the Frascati Manual) (Oslo Manual, 2006).

3.3 The Innovative Company

Successful companies in the sectors create new knowledge and provide the wide usage of it to have new products. Those companies are named as knowledge creating companies. They create intellectual capital that is finalized with new products. Everybody in those companies helps to change the vision of companies into innovative technologies (Roffe, 1999).

A company that has implemented at least one innovation is an innovative company basically. Innovation activities may be implemented, developing or planned for the future (Knight, 1996). There are three kinds of innovation activities during a given period. They can be successful, ongoing or abandoned in that period (Oslo Manual, 2006).

4. TYPES OF INNOVATION

To start with, at first types of change should be defined that companies face with them in daily life. This helps management to use the company's sources effectively. At that point there are two types of changes such as: sustaining technological innovation and disruptive technological innovation. Sustaining technological change is the improvement of an existing system whereas disruptive technological innovation is related to major modifications in systems (Mason and Jablokow, 2003).

There are four types of innovation: product innovations, process innovations, marketing innovations and organizational innovations. In that classification, product and process innovations enclose technological process and product innovations (Oslo Manual, 2006).

4.1 Product Innovation

With the increase of global competition, as a result of intense international competition, demanding markets and rapidly changing technologies, product innovation is becoming more significant for the companies (Denton, 1999).

Product innovation is the introduction of a product that is new or significantly improved with respect to its characteristics or intended uses. This product can include both a new technology and knowledge and also, existing knowledge and technologies. The important point, to call a product as an innovation is it should differ from current products with either its characteristics or usage areas. Addition to that, with minor changes in a product characteristics and/or specifications such as components and materials to gain a new use is also a product innovation. This situation does not include design changes if does not involve a change in characteristics of the product and intending uses (Oslo Manual, 2006).

Product innovations may be the result of organizational changes or exploitation of new markets in companies (Avermaete and others, 2003).

Product innovation is one of the most obvious ways of generating revenues for the companies. Products should be renewed or completely new for the companies to not taking the risk of staying behind of competitors. At that point core product features may be developed with radical changes and also incremental changes may be done as to develop supporting activities. This provides to sell the product to the different customers with different offerings (Johne, 1999).

4.2 Process Innovation

Process Innovation is the implementation of a new or significantly improved production or delivery method that includes significant changes in techniques, equipment and/or software. To decrease unit costs of production or delivery, to increase quality or to produce or to deliver new or improved products can be achieved by process innovations. New automation equipment on a production line can be an example of implementation of new production methods (Oslo Manual, 2006).

Process innovations do not include only production and delivery improvements and also support activities such as purchasing, accounting, computing and maintenance (Oslo Manual, 2006). In general, process innovations allow the production of new products that means those two innovations sometimes may not be separated (Avermaete and others, 2003).

An efficient process of process innovation may also provide the manufacturer to produce same product at lower cost. At that time, the aim is to reduce prices to gain more customer or not (Johne, 1999).

4.3 Marketing innovation

Marketing innovation includes significant improvements in product design or packaging, product placement, product promotion or pricing. This type of innovation is closely related to understanding customer needs, discovering new markets, positioning the current markets newly in order to increase sales. The important point is to use the marketing method firstly in the company and can be applied to both existing and new products. The new method can be developed by the company itself or can be adopted by other companies (Oslo Manual, 2006).

Product design changes including product form and appearance changes and does not including functional changes are also marketing innovations. If packaging is one of the main elements of the product it is also included in this type of innovation. .Product placement changes in marketing involve the introduction of new sales channels. Logistic changes as transportation, storage are not product placement changes since it s directly related to efficiency. Introduction of franchising system, direct selling can be given as examples of product placement changes (Oslo Manual, 2006), (Denton, 1999).

Product promotion changes as the use of new concepts for promoting products are one of the main innovation areas of marketing innovation. Another example can be given as branding. Innovations in pricing include new pricing strategies such as ranging price according to demand. The important point is to differentiate prices according to customer segmentation is not considered as innovation (Oslo Manual, 2006).

A change can be an innovation if and only if it is used by the company for the first time. If a marketing concept is used before for a product in the company and if this method is started to be used for another product, this can be not an innovation. Marketing innovation involves the ability to mix target markets and also the best service to those markets (Johne, 1999).

4.4 Organizational Innovation

In most academic researches focus on technical innovations and less focus on organizational innovations that are equally significant to the effective operation of an organization (Mol and Birkinshaw, 2006). An organizational innovation is the implementation of a new organizational method in the company's business practices, workplace organization or external relations (Oslo Manual, 2006). This type of innovation includes both invention and implementation and it has to be perceived as new by the organization concerning changes to internal practices, processes and/or structures (Mol and Birkinshaw, 2006). Innovations should aim to increase the performance of the company by reducing costs, improving working conditions etc and also should be used for the first time. These changes include new practices such as increasing the knowledge flow within company, new training and education systems or new management systems (supply chain, reengineering…)Changes in

distribution of responsibilities and decision making with a new method in the company are the innovation of workplace organization. Contribution of workers in decision making process with teamwork activities can be an example of organizational innovation for the companies (Oslo Manual, 2006).

A company can make organizational change with using external relations. Outsourcing one of the functions fort he first time, new collaborations with research institutes, suppliers and/or customers can be examples of this type of innovation (Avermaete and others, 2003).

The important point is that if changes in business practices, workplace organizations or external relations are considered as innovation if and only if they are first implementation of a new organizational method. In addition to that, mergers and acquisitions can include organizational changes but can not be considered as an organizational innovation itself (Avermaete and others, 2003). As a whole, the relation between innovation types can be seen in Figure 4.1.

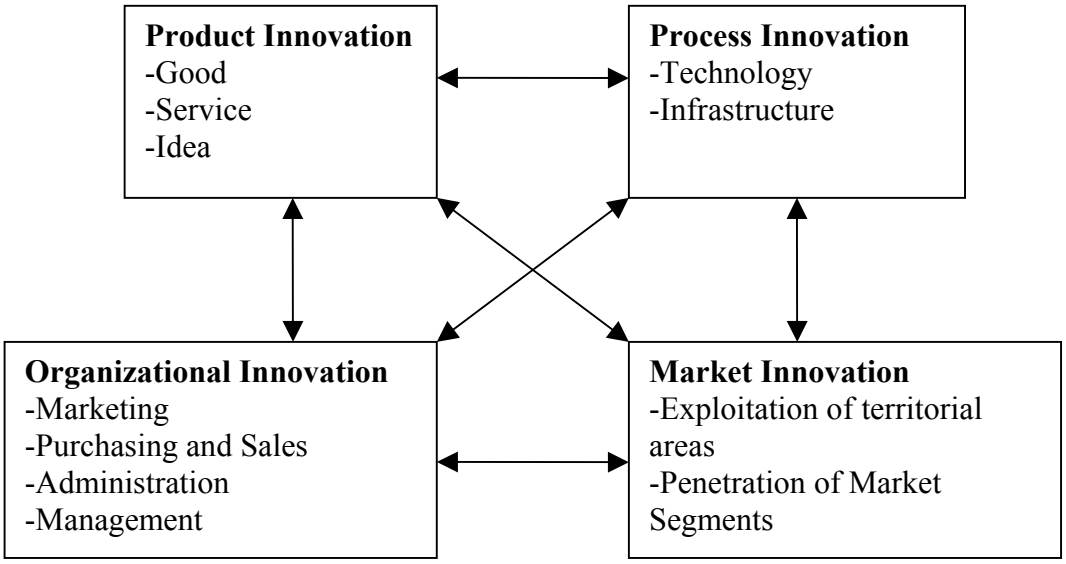


Figure 4.1: Domains of Innovations (Avermaete and others, 2003)

4.5 Distinguishing Between Types of Innovations

In general, most innovations are built up from more than one innovation types so, it is important for the companies to distinguish these types of innovation to evaluate their performance. As an instance, a company can make process innovations in order to produce a new product or a company can use a new marketing method to launch a new product. The factor that is needed for distinguishing product innovations and marketing innovations is to evaluate if the change is in product's functions or in usage areas. If products include changes of functional or user characteristics (compared to existing products), these are product innovations. In addition to that, if the change is a new marketing concept including significant change in design, this is a marketing innovation. Innovations can be considered as both, marketing and also product innovations in case changes that are implemented include both functions of the product and also form, appearance or packaging of the product (Oslo Manual, 2006).

At first, marketing and process innovations aims different points, marketing innovations aim increasing sales or market share where process innovations aim decreasing unit cost or product quality. An example can be given as a new way of selling products can also include new logistics method as transport, storage and handling of products. In these cases, innovations can be considered as both process and also marketing innovations (Oslo Manual, 2006).

In fact, there are no rigid borders to give only one name to an innovation in the companies. In general, a new process introduction may involve a new organizational method as teamwork. For instance, starting to use a total quality management system can be concluded as an improvement in production methods. The significant factor to distinguish process and organizational changes is the type of activity. Process innovations are related to production methods, equipments and specific techniques where organizational changes are related to people and also organization of work. The aim is another significant factor for differentiating these innovations as organizational changes aim new organizational methods in the company's business practices and to improve workplace organization or external relations where as process innovations aim to decrease unit costs or increase product quality (Oslo Manual, 2006).

4.6 Changes that are not Considered Innovations

4.6.1 To Give up

If a company stops to produce a product, to sell a product or gives up one of the existing marketing or organizational methods, it is not called innovation for the company even if this situation helps to improve the performance of the company (Oslo Manual, 2006).

4.6.2 Simple Capital Replacement or Extension

Minor changes or improvements as updating software on equipments are not innovations if those are new to the company now. For example, the purchase of equipment that is identical to the existing ones is not an innovation for the company (Oslo Manual, 2006).

4.6.3 Changes Resulting Purely from Changes in Factor Prices

Changes or adjusting of prices according to the changes in factor prices are not innovations (mostly price innovations in marketing) because this situation is completely based on the external factors (Oslo Manual, 2006).

4.6.4 Regular Seasonal and Other Cyclical Changes

In mostly clothing, footwear and fashion sectors, there are seasonal changes that appear as the appearance of the products. These changes are routine in design and are not innovations (Oslo Manual, 2006).

5. MEASUREMENT OF INNOVATION

5.1 Innovation Performance

Innovation performance of companies is an intermediate variable between companies' general performance and certain business performance that should be measured. Within the previous researches, there is a positive relation between innovation performance and companies' performance (Denton, 1999).

In the literature, mostly researched factors are size of the companies, sector of the companies, degree of competition, technological developments and capacity of budget that is denoted to innovation (Galia and Legros, 2004).

Innovation includes in many areas but still there is no generally accepted way of measuring innovation. There are some searches including basically patent data and R&D expenditures, and also there are some researches with sending surveys to companies (Avermaete and others, 2003).

Innovation can be measured in five ways:

- Through case study
- Through trade journals and publications(literature based indicators)
- Through surveys
- Through input indicators such as R&D expenditures
- Through output variables such as patents and sales of the product (Casper and Waarden, 2003).

5.2 Innovation Capability

There are four keys for systematic innovation capability that is shown in Figure 5.1. Integration of leadership, culture, skills and processes lead and increases the increase of innovation (Casper and Waarden, 2003).

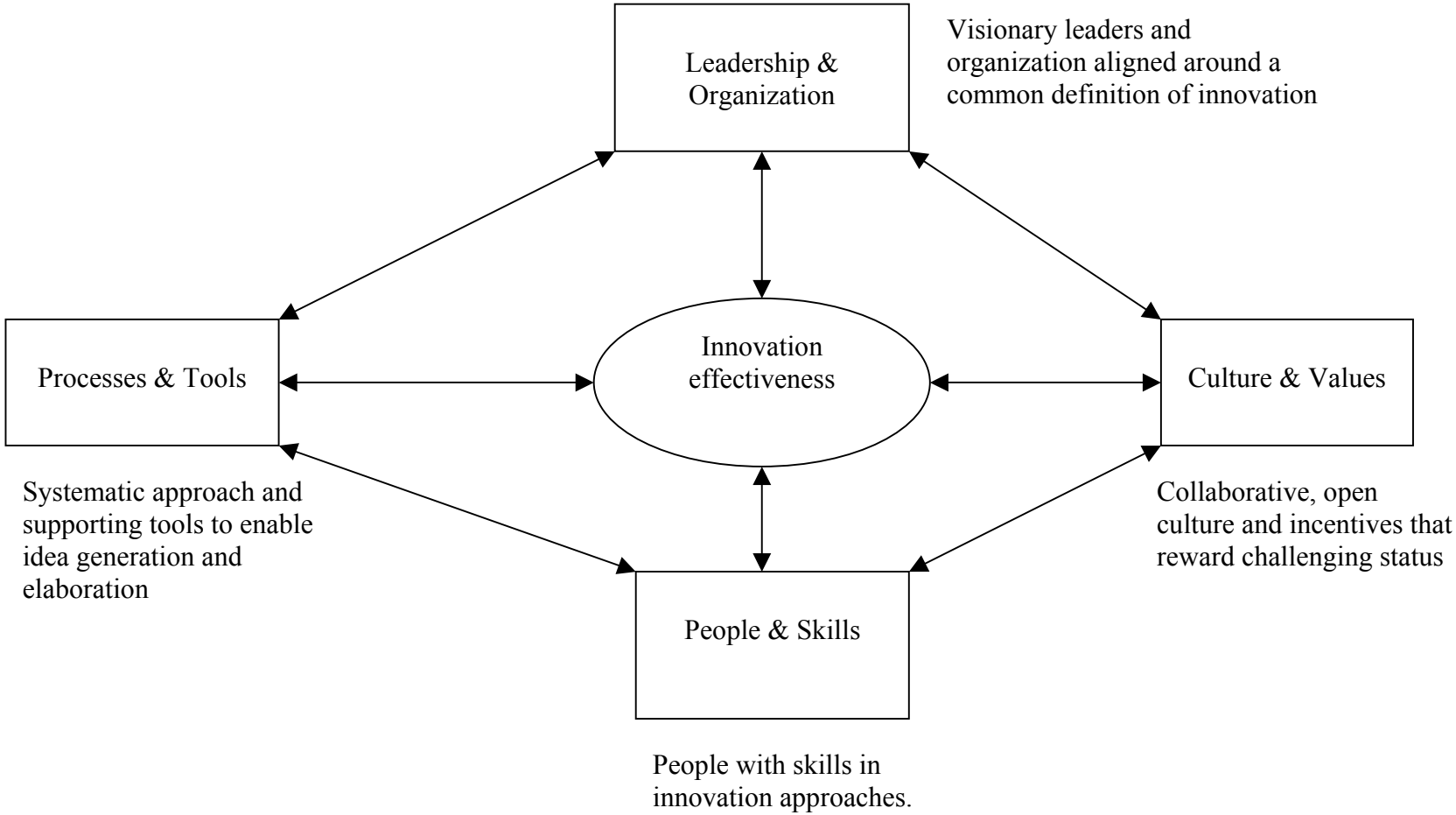


Figure 5.1: Keys for innovation capability

5.3 Problems in Measuring Innovative Performance

5.3.1 Innovation versus Diffusion

After idea generation stage of innovation, at final, innovation should be diffused domestically and/or externally. At that stage, diffusion creates by order of economic development and money. The important point is that, to be innovative does not mean effective marketing of innovative products. So, diffusion and innovation are two separate forward and backward looping processes. However, because of tight connections between these two processes, economic performance indicators should be included in performance measurement, But there is a conflict between these indicators that if they are related to innovation or diffusion (Casper and Waarden, 2005).

5.3.2 Innovation versus Imitation

The important question to explain the conflict between innovation and imitation 'Is the product, process, organizational and marketing change new for the company, the sector, country or the world?'. Some studies say that if this change is no longer new for the sector it is not an innovation but it is an imitation (Casper and Waarden, 2005). According to Oslo Manual, if the product, process, organizational and marketing change is new (or significantly improved) for the company, it is an innovation (Oslo Manual, 2006). In this research, this approach will be used in implementation section.

5.3.3 Ex Post Identification of Innovation

In researches, after searching methodology the problems arise regarding what has been measured and if it is an innovation. Because characterizing innovation appears only much later. That means the proof of innovation is hidden in its adoption within time (Casper and Waarden, 2005). In general the near past is always in memory and also the most successful innovations are remembered by the companies.

5.4 Success Factors of Innovation

In general success factors of innovation are promoting a company culture, creating structure reflecting in the effective use of systems and technology and investors in people, analyzing competitors, developing co-operations and partnerships similar to the networking concept (Laforet and Tann, 2006).

The core idea of the success factors of innovation is, to do right projects and also to do project right. Doing the right projects is related to external factors mostly as characteristics of new markets, technologies, competitive areas. Doing the projects right are based on mostly internal factors which are generally invisible (Cooper, 1999).

In a research that includes 500 innovations, the elements mentioned below are considered as common to successful innovations:

- Small, incremental innovations contribute significantly to economic success.
- Recognition of demand is more common factor that recognition of technical potential.
- The experience and knowledge of the employees have in the company is the main source of innovations (Cooper, 1999).

5.5 Determinants of Innovation

There are different meanings to classify determinants of innovation in literature.
Determinants of innovation in economic literature can be considered in four ways:

1. Demand conditions: It generally affects product innovations because of customer demand changes
2. Appropriate conditions: Conditions to gather the benefits of the innovation to take the advantage of the response time of the competitor.
3. Capability of absorbing external knowledge to increase technological knowledge
4. Innovation is affected by the market structure, characteristics and strategy of the companies (Casper and Waarden, 2005).

There are some hypotheses in the literature that give a view for types and determinants of innovation;

- Demand should influence product innovation more than process innovation
- Large companies invest more in process innovation than small companies.
- If the companies are more diversified, more product and process innovations occur. This case is mostly important for product innovation.
- External knowledge sources are important inputs for increasing ability of technology use and inside absorptive ability are important for using those sources (Casper and Waarden, 2005).

External resources should be taken into account by management in decision-making process in manufacturing sector. In that area, connectivity that means to tie people and also machines in manufacturing plants to increase network relations that enables information flow rapidly. Another vital external factor is availability of information that means to collect any kind of information, anytime and anywhere (Mason and Jablokow, 2003). Lastly, flexibility is one of the significant external factors. An example can be given as product innovations since they are not only physical products more, they are set of services and complementary goods that are packaged together in the minds of customers. In order to achieve this, companies should be in association with customers and also should be flexible enough to respond them easily and rapidly (Mason and Jablokow, 2003).

5.6 The Choice of Indicators

Input and output literature of economics includes factors that appear in a production function as, input of R&D, labor, sum of investments and product output. There are some factors that is used for the measurement of various aspects of technical change as patents, R&D expenditures, personnel, innovations, diffusion rates and so on (Souitaris, 2006).

According to Freeman there are three important points. At first, there is no measure for knowledge intensity so that R&D based factors can not deal with the activities of the company that are directed towards knowledge accumulation. The other actor is related to service sector. The last one is the importance of increasing macro-micro models of network and inter-company relations. There are three most widely used innovation indicators as R&D, patents and sales and exports (Oslo Manual, 2006).

5.7 Incentives and Outcomes of Innovation

The factors that drive innovation are important to determine understanding the innovation process. The effects of innovation on performance of the companies include market share, productivity and efficiency changes (Oslo Manual, 2006).

In general, mostly companies aim of improving product quality, opening up new markets and reducing unit labor cost. Extending product ranges, opening up new markets, complying with the standards and regulations, improving product flexibility can be counted as some of the objectives for innovation (Uzun, 2001). In general, objectives and barriers may vary by type of innovation. For example the objectives of product and marketing innovations are related to demand where process and organizational changes are related to supply. But generally barriers are included by all type of innovations.

There are three basic requirements for success:

- Creating and sustaining supportive corporate culture,
- Generating a flow of ideas
- To give importance to creative people in the companies and lead breakthrough efforts (Perel, 2002).

Further, management should create an internal environment that motivates employees that thy will search for continues improvements. It is a way of creating demand of searching new ways and what is happening in the company and in the sector (Mason and Jablokow, 2003).

Lack of qualified personnel and organizational rigidities are also known obstacles for the success of innovation. Further lack of information regarding customers markets and technologies can be counted as obstacle since lack of these may prevent matching technical opportunities with customer needs. Therefore those obstacles may be dependent to and affect each other easily. At the finance side, innovation costs and lack of source of finance are common obstacles for innovation and in general small sized companies are affected from them mostly (Galia and Legros, 2003).

In a research made by Strategos containing 550 innovative companies, obstacles for innovation are:

- Short term focus
- Lack of time, resources or staff
- Leadership expects payoff sooner than is realistic
- Management incentives are not structured to reward innovation
- Lack of a systematic innovation process
- Belief that innovation is inherently risky (Loewe and Dominiquini, 2006).

The incentives of innovation may be also four types as obstacles such as: government, social, economic and organizational. Tax relief for R&D expenditures, change depreciation rates to increase investment in high technology plant and equipment, increase government funding for product and process R&D are some of governmental incentives. Greatly increased incentives for savings and investing are an example for social incentive and increasing emphasis on evaluation of long term performance of executives is an example for organizational incentives (Knight, 1996).

5.8 Objectives and Effects of Innovations

Companies may start using innovation activities for a number of reasons. The objectives may be related to products, markets, productivity, efficiency and quality.
The objectives may or may not be achieved by the companies while they are related to the motives for innovating; effects are related to the outcomes of innovation. In general, three important concepts that are related to the incentives of innovation are competition, demand and markets. The concepts that may be built on these concepts determine the importance of motives for innovations. For example, changes in product lives as becoming short day-by-day force the companies to develop new products and arise as need to increase product portfolios. Changes in workplace organizations are concerned with customer relations and increasing the share of knowledge (Oslo Manual, 2006).

5.9 Measures of Impacts on Enterprise Performance

The successes of innovation are related variety of factors and those factors also affects the quality of innovation. Another important point is the impacts of innovation vary between different sectors. The degrees of success of one-type innovations are also related to success of innovations in another type of innovation.

For instance, the success of product innovation can be higher if it is supported with a successful marketing innovation. Also, the impact of process innovations may be related to organizational changes. It is generally difficult to determine quantitative outcome measures that their estimate is difficult (Oslo Manual, 2006).

It is important to measure the costs of innovation during change process. It may be not measured directly but increasing, decreasing or not changing of the costs may be measured and they may be sources to changes of the types of the costs such as material, energy or labor costs. The same technique may be used to measure for employment increase, decrease and/or how much (Goldsmith and Foxall, 2003).

5.10 Obstacle for Innovation

In general, obstacles to innovation are four types as: social, organizational, economic and government (Knight, 1996).

Less support by top management, excessive bureaucracy, cost factors, short-time horizons can be counted as some of obstacles to innovation and creation (Roffe, 1998). During innovation process, the case of the not balancing risk and accountability can be occurred as barrier when the decisions of the people includes risk and they are not included in the process and not aware of the information what the risks are (More, 1985).

The top management is one of the obstacles in the companies to sustaining innovation since in general they lack the courage to implement changes (Perel, 2002). Since innovation process is perceived as risky and costly (Galia and Legros, 2004).

There may be some different factors that hamper innovation activities. Those may slow activities or becomes a reason for not starting. High costs, lack of demand, lack of skilled personnel or knowledge and legal factors may be examples of obstacles. In general small or medium sized companies may be lack financial factors as a barrier for their innovation activities. The companies may meet lack of demand in prices that they should launch the product. Sometimes companies are unable to find the skilled personnel that will give them support. Those skilled people may no be found in the company or in the market itself. Another important barrier may be lack of knowledge relating to the market and technologies that are two main key factors for innovation.

Those barriers can be related only one type of innovation or/and all of them. In general cost factors are related to process and market factors are related to marketing innovations but in fact to separate those factors definitely is not possible for the companies since those factors affect each other (Oslo Manual, 2006).

5.11 Innovation and Company Size

There are studies in literature that are related to relationship company size and innovation. This researches shoe that generally there is a positive relation between innovation capability and companies' size. Since financial possibilities for R&D projects are more, large companies have the chance of supporting these activities with their internal funds. Another point is that, R&D is more efficient in larger companies since trade-offs between R&D and other functional areas are usually more efficient. And also large companies reach scope economics in a faster way that helps to reduce innovation risks. In literature, opposite opinions have also been discussed. The reason for this, large companies may have less efficient R&D control because of loss of management control and also increased bureaucracy control. However, even with those arguments, there is consensus in most industries; R&D activities increase proportionally to company size. With all these information two conclusions come to ahead:

- R&D activity increases usually in a proportional way with company size.
- Innovations tend to increase less than proportionally with company size (Arias and others, 2003).

5.12 The Scope for Innovation

There are two important factors to develop innovation in companies. Those concepts are stock of resources and the other one is capability. The company's external relations, physical resources as machinery and labor force are stock of the company. The other one is the ability of creativity, interaction and entrepreneurship of the company. This is may be named as competence also.

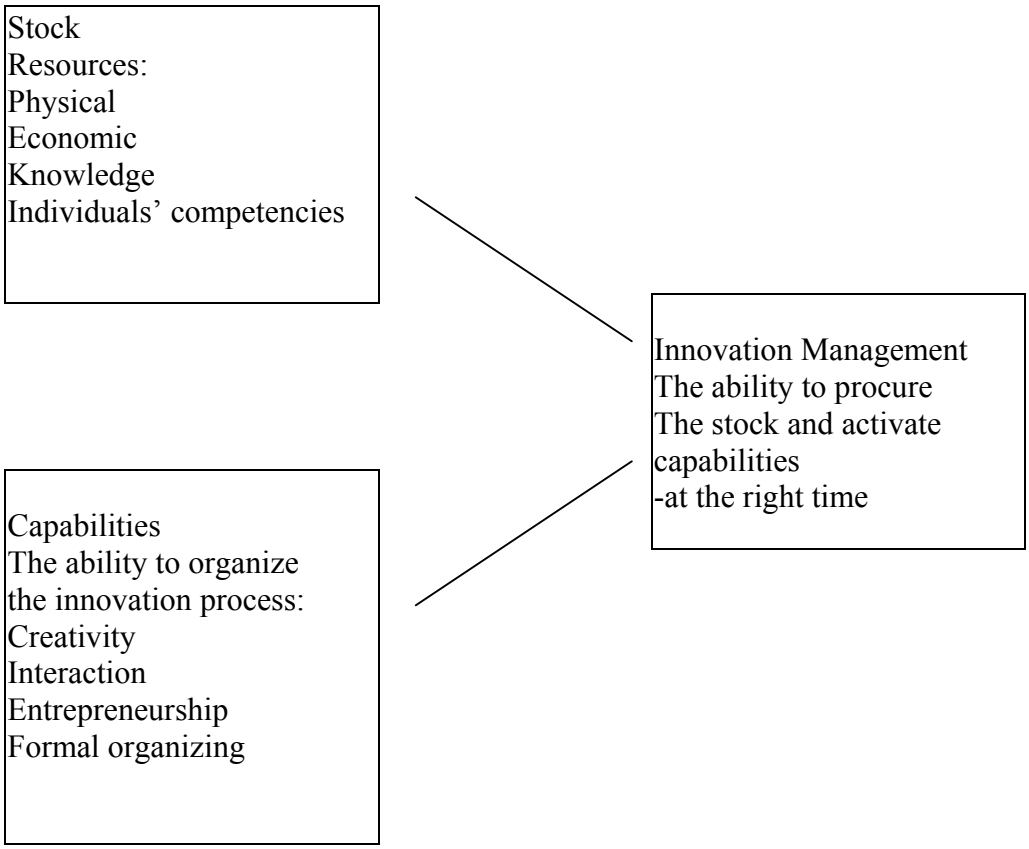


Figure 5.2: Management's scope for innovation (Casper and Waarden, 2005)

5.12.1 The Stock

The resources and assets of the companies may be included in or outside of the companies. The resources may be different types, for example the image of the company in the Markey is one type of resource. It is generally impossible to define which of the resources are important and which are not. Since companies may not know sometimes which resources they will need in the future and also which resources they have. Some of them may be embedded in employees as experience. For example they may act as different to different innovation projects. Other resources as financial and also technological are important. Main innovation resources are three types:

- Knowledge (Knowledge of the market, technology or customers, society, etc.)
- Competencies the ability to have different behaviors in different innovation roles and for managers to create innovation process.
- Financial resources

Those are the general terms, and in fact specific areas of those main terms vary between companies. The company may not have the resources but may have the ability to get them. An efficient training system and the relationship between financial sources in the market and the company may be examples of it. Some of the important sources are:

- Technology
- Physical facilities
- Sales system
- Position and image in the market as a company
- Customer relations
- Relation to external sources as suppliers, customers, competitors and political actors (Casper and Waarden, 2005).

5.12.2 Capabilities

Capabilities of the companies regarding innovation enable companies to mobilize the innovation stock where necessary. There are four general capabilities:

- The ability to define problems
- Creativity
- The ability to procure knowledge
- The ability to organize the innovation process and encourage intrapreneurship (Casper and Waarden, 2005).

5.12.3 Strategy

The strategy normally does not include any ideas for specific innovations but provides a framework for the innovation process. That means it include guidelines on how innovative the companies should be and how develop (Casper and Waarden, 2005).

5.12.4 Corporate Culture

The need for innovation-oriented culture is a capability for the companies that want to put innovation in their center. In some of the studies there has not been found any relationship between initiative elements and the degree of intrapreneurship. So the corporate culture is complex but shows also innovative capability (Sundbo, 2001).

5.13 Studying Feedback or the Consequences of Innovation

5.13.1 The Complexity of the Division of Labor

In 1970-1980 years, the companies were hiring their employees from occupations new to the sector. After that, researches showed the composition change of the labor force. Although size of employee remained same, the proportion of technical and professional employees increased. This may be summarized as the decrease of the unskilled personnel but increase of the skilled personnel (Casper and Waarden, 2005).

5.13.2 On the Nature of Competition

The effect of innovation to the sector may vary as positive and also negative because technologies may enhance capacities and also may help to decrease the number of companies in the sector. New organizations generally introduce new processes and technologies that eliminate the number of companies (Casper and Waarden, 2005), (Oslo Manual, 2006).

5.14 Innovation, Uncertainty and Risk

Innovation is defined as risky process and involves uncertainty, probing, re-probing, experimenting and testing. In fact innovation is more often uncertain than risky. The difference is uncertainty can not be calculated but risks can. Outcomes of innovation are often uncertain. This uncertainty is not only for new products and also for efficient processes. The estimate of how much investment and labor force will be needed is also not certain for innovation processes. Another point is the unintended and accidental inventions are also possible. Their future benefits and demand has also big uncertainty.

Innovations after succeeded may be uncertain for other companies or for the organization itself since it may destroy the old tradition of markets, products, and supplier chains. Those uncertainties and risks may be direct and also indirect. For example, in some cases cooperation with users and suppliers, competitors may be needed since competences of individual companies do not suffice for developing new product and process.

The question of why the companies innovate if it is risky and uncertain is logical at that point. But not to innovate and stay behind of technological developments is more risky. There are positive incentives like to have the chance of making big profits and also negative ones as fear and competition. Incentives are only not sufficient to move companies to innovate, and also there should be meaningful reasons for this (Casper and Waarden, 2005).

5.15 Regulation and Innovation

Laws and regulations in many ways and in different phases of the innovation process affect innovation. There are some examples of regulations that affect innovation in different phases of the innovation cycle. Example of some regulations for manufacturing sector is shown in Table 1.

Table 5.1: Innovation and Regulation

	Basic Research	**Applied research and invention**	**Development**	**Manufacturing**	**Marketing**
Innovation-specific regulation	Animal testing, lab certification, patent law, copyright law	Animal testing, lab certification, patent law, copyright law	Technical Standards	Regulation of use of instruments	Brands and trade marks regulation
Sectoral-specific regulation	Biotech regulation nuclear energy	Biotech regulation nuclear energy, pre-clinical drug trials regulation	Sectoral safety norms: construction, airplanes	Pesticides, chemical regulation	Pricing regulation
General Regulation	Environmental standards, freedom of information, privacy regulation	Environmental standards, privacy regulation	General health and safety regulation	Labor law, environmental law, general competition law	Advertising regulation, tax law, incomes policy

(Casper and Waarden, 2005).

5.16 Innovation and Training

In recent times, training in agile strategies, total quality management, benchmarking and reengineering has increased as management tools. By this way, companies aim to reduce costs, improve quality and increase productivity, or effect innovation. In general companies less aims the last one (Roffe, 1999). With the increase of innovation, need for training in innovation activities and mostly in creativity has increased (Roffe and James, 2000). Training is one of the innovation activities if it is required for implementing innovation. It may be required for managers or production workers in the company. If this training is not related to innovation activities such as training in existing production methods for new employees ongoing computer training, this training does not related to improve innovation activities in the companies. Training for the first-time introduction of new marketing methods or new organizational methods is part of activities for marketing and organizational innovations (Oslo Manual, 2006). Training the teams in the companies regarding the related business models and also systematic innovation process is one of the most important innovation activities (Loewe and Chen, 2007).

5.17 Levels and Degrees of Innovation

There are three basic levels for innovation: new to the company, new to the market, and new to the world. The resource of the innovation may be the companies themselves or co-operation with other enterprises public research institutions, or whether they are mainly developed outside the enterprise. As mentioned above, an innovation should be at least new to the company to be an innovation. A product, process, marketing and organizational method may have already been developed and implemented by other companies or research institutes, but if it is also not implemented before in the company, that is an innovation for the company. If an innovation first developed by the company, it is a driver of the process of innovation (Oslo Manual, 2006).

Innovation may be new to the market, if the company introduces the product into the market that can include a geographic region or product line. Geographic region may be domestic or international that is based on the company's operating view. If the innovation is new to the all markets in the world, this innovation is new to the world.

As a whole;

At that point, it is important to determine if;

- In the observation period (that is in general three years), new or significantly improved products, process, organization and/or marketing method has been implemented that were new to the company.
- In the observation period (that is in general three years), new or significantly improved products, process, organization and/or marketing method has been implemented that were new to the market.
- In the observation period (that is in general three years), new or significantly improved products, process, organization and/or marketing method has been implemented that were new to the world.

For product innovations, it is important to take the product lifecycle into the account that if the cycles are short, innovation impact will be higher for those companies (Oslo Manual, 2006).

6. MEASURING INNOVATION ACTIVITIES

6.1 Aims/ Effects

Measurement of innovation to gather information about activities provides companies information regarding whether activities have contribution to the improvement of the performance of the company. Innovation activities such as R&D and other expenditures related to innovations are investments that the results may be in the future (Love and Roper, 1999).

Return to innovation activities may be calculated with quantitative measures of expenditures. The important point is that R&D is only one step of innovation activities. Development of reproduction, production, distribution and training activities are some of support activities of innovation (Love and Roper, 1999).

In addition to innovation activities that directly affect innovation, there are some other factors such as knowledge bases, workers' capabilities, and academic backgrounds (Oslo Manual, 2006).

Identifying those factors is the most important point of measuring innovation activities of the companies (Oslo Manual, 2006), (Love and Roper, 1999).

6.2 The Components and Coverage of Innovation Activities

Innovation activities are technological, organizational, financial and commercial steps that lead to investment in new knowledge. These activities may be innovative themselves or required for the implementation of innovations. While most R&D is related to product and process innovations, some may be related to marketing or organizational innovations. Basic research is by definition not related to any specific innovation. All R&D is included as innovation activity. Furthermore, R&D is defined as a separate category that includes relevant activities for product, process, marketing and organizational innovations, along with basic research. All innovation activities other than R&D that are specifically related to marketing and organizational innovations and not related to a product or process innovation are

included under the categories preparation for marketing innovations and preparation for organizational innovations, respectively. This includes acquisition of other external knowledge or capital goods and training that is specifically related to marketing or organizational innovations. (Oslo Manual, 2006), (Love and Roper, 1999).

6.3 Activities for Innovation

There are three possible routes for innovation for the companies as; R&D, technology transfer and networking. Technology transfer is mostly depending on intra-company organization whereas networking contains inter-company relationships (Love and Roper, 1999).

6.3.1 Activities for Product and Process Innovations

6.3.1.1 Acquisition of Other External Knowledge and Sources

In addition to R&D, companies may gain technological improvements and know-how from different resources. Those resources may be non-patented inventions, licenses, and disclosures of know-how, trademarks, designs and patterns, competitors, research institutes (Love and Roper, 1999).

Innovation activities also involve acquisition of machinery, equipment and other capital goods. They may be required for the innovation activities including major improvements modifications and repairs. Especially equipments and machinery includes instruments and equipments that are used in product and process innovations of the companies (Oslo Manual, 2006).

6.3.1.2 Other Preparations for Innovations

Development of innovations in the companies does not include only R&D. They include both the later phases of development activities and also pre-provision of product and process innovations.

There are some activities that are considered as preparations for product and process innovations. Those can be partially excluded in R&D such as industrial design or trial production or fully excluded such as patents, production start-up and testing.
For example some elements of industrial design should be included as R&D, if they are required for R&D. Market research; market tests and launch advertising for new

or improved goods can be included in Market preparation for product innovations (Oslo Manual, 2006).

6.3.2 Activities for Marketing Innovations

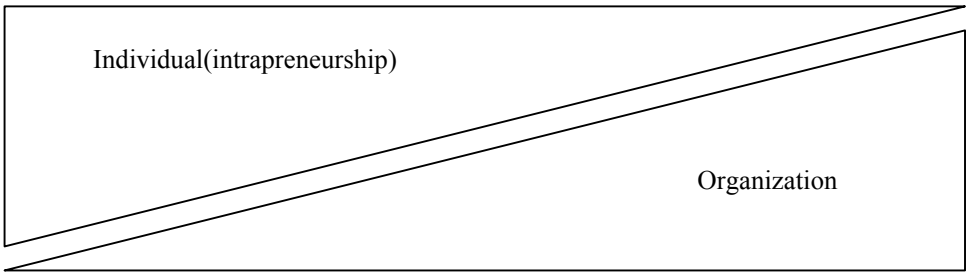
Preparations for marketing activities include development and planning of new marketing methods and works that are involved in their implementation. This category includes four types of marketing instruments typically as: preparation for the introduction of new marketing methods in product design or packaging, in pricing methods, in product placement and in product promotion (Kuzmarzki, 2003).

Design which is included in the definition of marketing innovation is the change in the form and appearance of products and not their technical specifications or other user / functional characteristics. Those activities may be included in R&D or in other preparations for product and process innovations. So, if the changes designs do not include changes in functional characteristics (product innovations), they should be included in preparations for marketing innovations (Oslo Manual, 2006).

7. GENERAL MODEL FOR THE INNOVATION PROCESS

Innovation process is organized both by individuals and organizational structure; it is shown graphically in Figure 7.1.

Idea or problem
Identification Implementation



Intrapreneurs Managerial structure

Figure 7.1: Organization of innovation process by individuals and organizations

This model describes innovation from the first idea generation phase to the implementation phase. The start becomes mostly by individual effort and then it becomes more organized. Lastly, managerial structure goes on (Sundbo, 2001).

7.1 The Phases of the Innovation Process

There are three main phases of the innovation process. The innovation process may be different in different types of the companies; this model just identifies fundamental social processes in innovation (Sundbo, 2001).

7.1.1 Initialization Phase

Initialization phase of the general process is significant since having the original idea is mostly difficult and acceptance of this idea by management is also more difficult. This new idea can be initiated by three different ways in the companies:

1. It may be initiated from below which is needed interactive structure
2. It may be initiated by the management

3. It may be initiated by an innovation or R & D department (Sundbo, 2001).

7.1.1.1 Initiative from Below

This is an approach for companies that use ordinary employees mostly and those employees meet problems and this problem may be solved by an individual, by an group or by someone else in the organization. Although the idea comes from below, top management may play a role in the process by creating a climate or an environment that provides to improve intrapreneurship (Isaksen and Tidd, 2006).

In many of the innovation processes, individuals take the role of initiating the process and after that collective organization takes the role. Those individuals may be employees at the lowest level, but it may change depend on companies' structures. At that point, sources of inspiration may be tools from social life as articles, newspapers and may be suppliers, interaction with professional colleagues or innovation by other companies. However, innovation may be come to ahead with a problem as manufacturing or sales problem. After the idea is created, knowledge-pull process starts as selecting the kind of knowledge that is needed. This knowledge may be tacit and codified. Tacit knowledge is important since creativity run counter to tacit knowledge (Isaksen and Tidd, 2006).

In this type of initiating phase, the role of management is to develop the organizational culture since they may create or destroy it. They need to create the conditions that make individuals to develop, to create and also to innovate. Since their behavior is a major force to increase creativity and also to adopt changes easily (Isaksen and Tidd, 2006). So management must accept the conditions for innovation processes that come from below.

7.1.1.2 Management Initiation

In This type of initiation, top management has the idea of top manager or external actors. Top management has to decide whether resources are adequate or not. Those sources may be labor force, capital or equipment itself. When this idea comes from the top entrepreneur, he/she has the opportunity of inspiring other people and to cerate the environment of carrying the idea through. At that point, an innovation department may be established for the development of his/her ideas apart from R&D

department. Another option may be to establish project teams that is build up from the people from different departments (Isaksen and Tidd, 2006).

7.1.1.3 The Formal Knowledge or R&D Approach

Generally, this type of initiation of innovation occurs in technological companies. R&D department manages innovation and top management also joins this process only in significant steps if needed. These departments are disciplined innovators that follow the going and tendency in the sector as their profession. It is important mostly in manufacturing companies (Isaksen and Tidd, 2006).

7.1.2 The Development Phase

In this phase, the idea is developed into a prototype or completed plan. Different types of innovation have different types development processes however those types are integrated since for example, a new product required a new marketing tool. The resources for development can be of many kinds depending on the innovation itself. The most significant factors can be listed as below:

- Knowledge
- Capital
- Organizing ability
- Formal organization
- Motivation of employee
- Relation with external factors
- Technology

The important point is to acquire right resources at the right time and also to use them at optimal level. The capabilities for development phase can be counted as:

- Involving the right resources in the right proportions
- Making the right decisions in relation to future market possibilities
- Creating an efficient managerial structure (Isaksen and Tidd, 2006).

7.1.3 The Implementation Phase

In this last phase of the innovation process, innovation must be implemented. Functional problems that are mostly related to users' need are solved at this stage. The concept is to sell the innovation to the users. So the important relationship is

between the company and users. Those users may be the customers or the employees. This stage also differs for different types of innovation. This difference can be seen in Figure 7.2 as including different level of processes for different types of innovation.

Innovation Process		**Implementation Process**
Organizational Process	↕	Internal social process
Product		Rational expert process
Market process		External social and political

Figure 7.2: Innovation and Implementation Process

In this phase, top management decides whether to start the final implementation or not. After start decision, the role of management is to continue with the process and support it. This innovation may meet some problems on the market or the in the organization itself that may require to remove the innovation completely or just to make corrections on it (Isaksen and Tidd, 2006).

Another problem may occur with the implementation phase as other competitors may imitate the innovation. At that point for manufacturing companies patent system may protect the companies. Process innovations may be patented but it is done rarely, organizational and market innovations are not patented. So the protection is thus a problem and the best protection method is constant innovation and staying always in front of the competition (Sundbo, 2001).

8. TURKEY AND MANUFACTURING SECTOR

After 2000, the production rate increased by 24.5 % by 2004 in manufacturing sector. The most added value created sector is chemical petrol sector in average (Saraçoğlu and Suiçmez, 2006).

The engine sector for Turkey in that industrialization is continuing is manufacturing sector. As a result, the percentage of the manufacturing sector in gross national product is increasing (Ulusoy, 2003).

As innovation is strictly related to macroeconomic conditions, inflation is an important disincentive in this respect. After 2001 crises, as the increase of inflation and interest rates, industrial sector met serious problems. Innovation performance is highly related to development and productivity levels. In Turkish industry, more than 80% of the production is private sector and 99.5% of the sector is dominated by SMEs (Innovation Policy Profile: Turkey, 2003).

Research and Development investment in Turkey is 0.64% while in EU is 1.9%. Therefore, R&D activities conducted in Turkey are low compared to other developed countries. Total number of R&D personnel is increased from 20.1% in 1996 to 22.3% in 2000. The reason for this is the force of globalization on companies (Innovation Policy Profile: Turkey, 2003).

In Turkey, small companies have patents 13 times more than big companies have. But since they do not achieve simplified business models, big companies produce those products that are licensed (Tamer, 2006).

9. RESEARCH METHODOLOGY AND FINDINGS

In this section, the information regarding status of innovation in Turkey and aims of this research are given in detail with the combination of literature of innovation. At first, aims and importance of research, after that, survey results are discussed.

9.1 Aim of the Research

The main aim of this research is to give an idea regarding status of innovation in Turkey. In this way of main aim, targets of research in detail are;

- To state the relation between innovation types and company characteristics
- To state the relation between sources that companies use for innovation and company characteristics
- To state the relation between aims and effects of innovation and company characteristics
- To state the relation between obstacles for innovation activities and company characteristics
- To cluster sectors regarding innovation characteristics
- To state importance level of each expression regarding obstacles, aims, effects of innovation and innovation types.

9.2 Importance of the Research

In today's world, innovation is discussed and researched in the world and seen as the most important competitive weapon. At first, this research gives an idea regarding where Turkey is in innovation. Apart from this view, in this research;

- The factors related to innovation are discussed in literature part as collecting and summarizing from literature researches.
- The effects, aims and obstacles of innovation that firms give importance are expressed.

- The status of innovation and its types are stated expressly.

By this way, this study gives an idea to companies and researches regarding status and future aspects of innovation.

9.3 The Method of the Research

In this research, at first, information regarding some aspects of innovation is collected from literature. With the information that is gathered form literature to evaluate the firms in Turkey, a survey is developed. For establishment date, sector and personal information, blanks are required to fill and for employee number, sale revenue, target market or foreign capital, it s required to select appropriate option. For other expressions likert scale and yes/no options are used. In likert scale (1) Not important (2) Little important (3) Middle degree important (4) Important (5) Very important phrases are used. The questions are related to training in firms, degree of innovation types, innovations, sources, aims and effects, obstacles for innovations. Surveys are mailed to 364 companies. Those companies are selected from ISO500 companies, basically manufacturing ones. 58 companies responded to surveys. The feedback ratio is approximately 16%. In analyzing surveys, SPSS12 computer software is used for statistical analysis.

9.4 Profile of Respondents

9.4.1 Sectors

There are a lot of kinds of sectors in Turkey since survey responses are from different sectors as glass, food and FMCG etc. that frequencies and percentages of sectors are shown in Table 9.1. 11 of total companies are from metal sector with 18,97 %, 9 companies from food sector with 15,52% and 6 from textiles with 10,34%. It is natural to have most of sectors from metal, food and textile since three of developed sectors in manufacturing areas are textile, food and metal in Turkey.

Table 9.1: Sectors

Sectors	Frequency	Percent
Paint	1	1,72
Glass	2	3,45
Cement	3	5,17
Electrical	1	1,72
Electronics	2	3,45
Craft machinery	1	1,72
Food	9	15,52
Fertilizer	1	1,72
FMCG	2	3,45
Pharmaceuticals	4	6,90
Paper	1	1,72
Machine	1	1,72
Metal	11	18,97
Forestry	2	3,45
Automotive	4	6,90
Petrol	1	1,72
Plastics	3	5,17
Military	1	1,72
Textiles	6	10,34
Structural	2	3,45
Total	58	100

9.4.2 Date of Foundation

In survey, the dates of foundation are asked to companies and are shown in Table 9.2. The oldest company is founded in 1944 and the newest one is founded in 2002. There are 37 companies are founded before 1980 and 21 after 1980.

Table 9.2: Date of Foundation

Date of Foundation	Frequencies	Percent
Before 1980	37	63,79
After 1980	21	36,2
Total-1	58	100

9.4.3 Employee Numbers

Since the companies are selected from ISO500 companies, most of the companies have employees greater than 250 as expected. Employee numbers are shown in Table 9.3. Approximately 91% of the companies have greater than 250 employees.

Table 9.3: Employee Numbers

Employee Number	Frequency	Percent
50-250	5	8,62
≥ 250	53	91,38
Total	58	100,00

9.4.4 Sales Revenue

91% of the companies have sales revenue greater than 50 million TL. Those sales revenues are shown in Table 9.4.

Table 9.4: Sales Revenue

Sales revenue(TL)	Frequency	Percent
10-50 million	3	5,17
≥ 50 million	53	91,38
Missing	2	3,45
	58	100

9.4.5 Target Markets

As the companies are selected from the biggest companies in Turkey, it is expected that their target markets are both internal and foreign markets. They have a percentage of 70% of all companies. Target markets are shown in Table 9.5

Table 9.5: Target Markets

Target Market	Frequency	Percent
Internal market	16	27,59
External Market	1	1,72
Both of them	41	70,69
Total	58	100

9.4.6 Foreign Capital Ownership

In Table 9.6, the status of the foreign capital ownership is shown. 24 companies have foreign capital partnership whereas 34 companies do not have.

Table 9.6: Foreign Capital Ownership

Foreign Capital Ownership	Frequency	Percent
Yes	24	41,38
No	34	58,62
Total	58	100

9.5 Degree of Innovation

As mentioned in literature section, innovations may be new in the world, in the county or in the company. In Table 9.7, frequency and percentages of the firms that had actualized and will actualize a product innovation are shown.

Table 9.7: Degree of Product Innovation

Product Innovation-will be actualized			Product Innovation-had been actualized		
Degree of innovation	**Frequency**	**%**	**Degree of innovation**	**Frequency**	**%**
New in the world	1	1,72	New in the world	4	6,90
New in the country	17	29,31	New in the country	23	39,66
New in the company	8	13,79	New in the company	22	37,93
None of them	32	55,17	None of them	9	15,52
Total	58	100	Total	58	100

For the last three years, 38% of the firms had an innovation in the company and 40% of the companies had an innovation in the country. The companies that had an innovation in the world means also those innovations are new for the county and new for the company itself. For the last three years, 29% of the companies have started to new researches for product innovations that are assumed to be new in the country, probably with new patents. But 55% of the companies have not started to new working areas for product innovation that may give some clues for sometimes it may be not possible to forecast and plan innovation, since only 15% of the companies did not have any innovations for the last three years. Other important point is product innovations that are new in the world. Only one company will be actualizing innovation that will be new in the world but 4 companies had innovations new in the world for the last three years.

In Table 9.8, marketing innovation status of the companies is shown. As expected, most of the companies have innovations that are new in the company. 67% of the companies did not achieve any innovation in marketing and 36% of the companies have not started to study any innovation that may reflect the despairing status. Half of the companies are waiting to launch a new marketing innovation in the few years that will be new for the company.

Table 9.8: Degree of Marketing Innovation

Marketing Innovation-will be actualized			**Marketing Innovation-had been actualized**		
Degree of innovation	**Frequency**	**%**	**Degree of innovation**	**Frequency**	**%**
New in the world	2	3,45	New in the world	1	1,72
New in the country	6	10,34	New in the country	3	5,17
New in the company	29	50,00	New in the company	15	25,86
None of them	21	36,21	None of them	39	67,24
Total	58	100	Total	58	100

For marketing innovations, one of the companies implement a marketing innovation and 2 of the companies will be implementing marketing innovations.

For process innovations, frequencies and percentages for the last three years are shown in Table 9.9. Only one company is expecting to implement an organizational innovation and 2 companies had been actualized an innovation for the last three years. As in the other types of innovation, most of the companies have been implemented and will be implementing organizational innovations that are new in the company that had been adopted or benchmarked from other companies.

In Table 9.9, process innovation status is shown in summary. In all four types of innovations, process innovation has the lowest percentage in 'none of them' level. It may be the result of high financial source necessity and mostly big investment for process innovations. As most of the equipments and machines are imported to Turkey, the companies may face difficulties to implement process innovations. Furthermore, nearly half of the companies had been implement a process innovation in the company that are new for the company and 19% of the companies had process innovations which are new in the country.

Table 9.9: Degree of Process Innovation

Process Innovation-will be actualized			Process innovation-had been actualized		
Degree of innovation	**Frequency**	**%**	**Degree of innovation**	**Frequency**	**%**
New in the world	1	1,72	New in the world	2	3,45
New in the country	3	5,17	New in the country	11	18,97
New in the company	10	17,24	New in the company	28	48,28
None of them	44	75,86	None of them	17	29,31
Total	58	100	Total	58	100

In Table 9.10, organizational innovation status has been shown. As expected, companies give the least importance to organizational innovation or have the biggest difficulty in defining organizational changes as innovation. 71% of the companies do not think to implement any innovation in organizational area. 57% of the companies had been adapted at least one organizational innovation which are new in the companies. 33% of the companies also did not develop any organizational innovation.

Table 9.10: Degree of Organizational Innovation

Organizational Innovation Will be actualized			Organizational Innovation Had been actualized		
Degree of innovation	**Frequency**	**%**	**Degree of innovation**	**Frequency**	**%**
New in the world	-	-	New in the world	1	1,72
New in the country	6	10,34	New in the country	5	8,62
New in the company	11	18,97	New in the company	33	56,90
None of them	41	70,69	None of them	19	32,76
Total	58	100	Total	58	100

9.6 Sectoral Clusters

Cluster analyses are used to classify the data regarding the similarities (Albayrak and others, 2005). This analysis classifies the objects that resembles to each other. That means elements of one clusters will not resemble to the elements of another cluster. Before studying cluster analysis, sectors are decreased to 16 and any sector that has only one element has been eliminated to get more confidential and meaningful results.

9.6.1 Product Innovation and Sectoral Clusters

In the first analysis, clusters are composed regarding the importance that companies give to product innovation types that are:

- To launch a new product that is not manufactured before with current technology and information
- To manufacture a new product with new information and technology
- Develop a new product with new usage area that is different from current ones.
- Develop a new usage area with incremental technical changes in product features
- Develop an important change in design of functional features of the product

Three types of clusters are shown in Table 9.11.

There are three types of clusters for product innovation. In most of the sectors are classified in the first clusters. In the third cluster, the companies that produce forestry products and automotive have been clustered as both of the sectors manufacturing process are lead to high technology and big investments.

Table 9.11: Product Innovation and Clusters

Product Innovation		
1. Cluster	**2. Cluster**	**3. Cluster**
Paper	Glass	Forestry
Cement	Petrol	Automotive
Pharmaceuticals	Metal	
FMCG	Food	
Plastics	Textile	
Electrical		
Structural		
Machine		
Electronics		

9.6.2 Process Innovation and Sectoral Clusters

Sectors are classified regarding to the importance level of detailed process innovations that are:

- Innovation in techniques for manufacturing
- Innovation in equipments and machines
- To develop a new software
- To develop an equipment, technique and software in support activities and is shown in Table 9.12.

In this type of clustering, fertilizer and paper sectors are classified in the same cluster. This may be the result of similarities process flow of these sectors Most of

the sectors are classified in the first cluster and forestry machine and electronics are in the third cluster as process of this type of manufacturing includes high technology.

Table 9.12: Process Innovation and Clusters

Process Innovation		
1. Cluster	**2. Cluster**	**3. Cluster**
Food	Fertilizer	Forestry
Textile	Paper	Machine
Metal		Electronics
Cement		
Pharmaceuticals		
FMCG		
Plastics		
Petrol		
Glass		
Automotive		
Electrical		
Structural		

9.6.3 Marketing Innovation and Sectoral Clusters

In the third part of clusters, sectors are classified regarding detailed marketing innovation:

- To make design changes in form and appearance of the product
- Implementation of new marketing methods in product promotion
- Implementation of new pricing strategy
- Launch of new sales channels

In marketing innovations, most of sectors are classified in first clusters as shown in Table 9.13, in electrical and structural sectors which marketing activities are limited as comparison to FMCG and automotive sectors are classified in the same sector.

Table 9.13: Marketing Innovation and Clusters

Marketing Innovation		
1. Cluster	**2. Cluster**	**3. Cluster**
Food	Automotive	Electrical
Textile	Paper	Structural
Metal	Forestry	
Cement		
Pharmaceuticals		
FMCG		
Machine		
Plastics		
Petrol		
Glass		
Fertilizer		

9.6.4 Organizational Innovation and Sectoral Clusters

In Table 9.14, clusters are shown regarding the similarities in detailed organizational innovation types as:

- Usage of new method in working area
- New methods for distribution of responsibility and decision making between workers
- Usage of new organizational methods in external relations

As in marketing innovations, structural and electrical sectors are classified in the same cluster with paper sector. Paint, fertilizer, forestry, petrol, automotive and glass sectors are classified in the same group.

Table 9.14: Organizational Innovation and Clusters

Organizational Innovation		
1. Cluster	**2. Cluster**	**3. Cluster**
Paint	Food	Paper
Fertilizer	Textile	Structural
Forestry	Metal	Electrical
Petrol	Cement	
Automotive	Pharmaceuticals	
Glass	FMCG	
	Machine	
	Plastics	

9.6.5 Sources for Information and Technology and Sectoral Clusters

The sources for information and technology may be classified as:

- The sources in the company

- The sources out of the company
- Public sector sources
- General information sources

Clusters of sectors regarding the importance level that companies give to these sources for information and technology to implement and search for innovation are shown in Table 9.15.

Table 9.15: Sources and Clusters

Sources		
1. Cluster	**2. Cluster**	**3. Cluster**
Paper	Glass	Forestry
Fertilizer	Petrol	Automotive
	Metal	Cement
	Food	Electrical
	Textile	Pharmaceuticals
	FMCG	Structural
	Plastics	
	Machine	
	Electronics	

As similar to clusters regarding process innovations, paper and fertilizer sectors are similar to each other and forestry, automotive, cement, electrical, pharmaceuticals and structural sectors are similar with giving similar importance levels to sources for information and technology.

9.6.6 Effects and aims for innovation and Sectoral Clusters

The effects and aims for innovation are classified as:

- Competition, demand and markets
- Manufacturing and delivery
- Organizational Structure
- Others

Clusters regarding effects/ aims are shown in Table 9.16.

Table 9.16: Effects/ Aims and Clusters

Effects / Aims		
1. Cluster	**2. Cluster**	**3. Cluster**
Fertilizer	Forestry	Paper
Glass	Automotive	
Petrol	Paint	
Metal		
Food		
Textile		
FMCG		
Plastics		
Machine		
Electronics		
Cement		
Electrical		
Pharmaceuticals		
Structural		

Paper industry is classified separate from other sectors as in other types of clustering studies. Forestry, automotive and paint are classified in the same clusters. Apart form other studies; paint sector is also classified in another cluster at first time in aims/ effects for information.

9.6.7 Obstacles for Innovation and Sectoral Clusters

Clusters regarding the obstacles for innovations (shown in Table 9.17) are developed in four main headings as:

- Cost
- Information Factors
- Organizational Factors
- Market and competitors

In the last type of clustering study, sectors are classified regarding the obstacles for innovation. Paper sector is again defined in one cluster separately. Electronics, machine, metal, fertilizer, FMCG sectors are classified in the same group.

Table 9.17: Obstacles and Clusters

Obstacles		
1. Cluster	**2. Cluster**	**3. Cluster**
Glass	Machine	Paper
Petrol	Electronics	
Food	FMCG	
Textile	Metal	
Plastics	Fertilizer	
Cement		
Electrical		
Pharmaceuticals		
Structural		
Forestry		
Automotive		
Paint		

9.7 Sectoral Assessment and Innovation Types

In this section of the research, the difference between importance level that companies give to the innovation types are examined. For this reason, anova tests are implemented with 95% confidence interval.

Before defining this difference, test of homogeneity of variances are implemented to show if the variances are assumed to be homogeneous. If not, these types of statistical analysis do not give confidential results.

9.7.1 Importance Level of Product Innovation and Sectors

In Table 9.18, product innovations and sectors are examined.

Null Hypothesis: There is no difference between sectors regarding the importance level for product innovation types.

Alternate Hypothesis: There is difference between sectors regarding the importance level for product innovation types.

The importance level means, standard error, deviations are shown according to 95% confidence level. FMCG sector gives the most important to launch a product that is not produced before with current methods and technology. Food sector give the most importance to 'produce a new product with new information technology that are not in the company'. For automotive sector, to produce a product that has a new usage area has the highest level of importance. FMCG sector gives the highest importance

to develop a new usage area with incremental technical changes in product features and lastly the highest level of importance for metal sector is to change design of functional features of the product

Table 9.18: Product Innovation and Sectors

Product Innovation	Sectors	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Launch a product that is not produced before with current methods and technology	Food	11,00	4,45	0,69	0,21	3,99	4,92
	Cement	4,00	4,00	0,82	0,41	2,70	5,30
	Metal	8,00	4,38	0,74	0,26	3,75	5,00
	Textiles	6,00	4,67	0,52	0,21	4,12	5,21
	Plastics	3,00	4,67	0,58	0,33	3,23	6,10
	Automotive	4,00	4,00	1,15	0,58	2,16	5,84
	pharmaceuticals	3,00	4,33	0,58	0,33	2,90	5,77
	FMCG	5,00	4,80	0,45	0,20	4,24	5,36
	Total	44,00	4,43	0,70	0,10	4,22	4,64
Produce a new product with new information technology that is not in the company	Food	11,00	4,55	0,52	0,16	4,19	4,90
	Cement	4,00	3,00	1,83	0,91	0,09	5,91
	Metal	8,00	4,25	0,46	0,16	3,86	4,64
	Textiles	6,00	4,50	0,55	0,22	3,93	5,07
	Plastics	3,00	4,67	0,58	0,33	3,23	6,10
	Automotive	4,00	4,25	0,50	0,25	3,45	5,05
	pharmaceuticals	3,00	4,33	0,58	0,33	2,90	5,77
	FMCG	5,00	4,40	0,55	0,24	3,72	5,08
	Total	44,00	4,30	0,79	0,12	4,05	4,54

Table 9.18: Product Innovation and Sectors (continued)

Product Innovation	Sectors	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Produce a product that has a new usage area	Food	11,00	3,82	0,87	0,26	3,23	4,41
	Cement	4,00	2,50	1,00	0,50	0,91	4,09
	Metal	8,00	3,50	0,93	0,33	2,73	4,27
	Textiles	6,00	3,00	0,63	0,26	2,34	3,66
	Plastics	3,00	3,33	1,53	0,88	-0,46	7,13
	Automotive	4,00	4,25	0,96	0,48	2,73	5,77
	pharmaceuticals	3,00	3,33	0,58	0,33	1,90	4,77
	FMCG	5,00	3,80	1,10	0,49	2,44	5,16
	Total	44,00	3,50	0,98	0,15	3,20	3,80
Develop a new usage area with incremental technical changes in product features	Food	11,00	3,55	1,13	0,34	2,79	4,30
	Cement	4,00	2,25	0,96	0,48	0,73	3,77
	Metal	8,00	3,63	1,69	0,60	2,22	5,03
	Textiles	6,00	3,50	1,05	0,43	2,40	4,60
	Plastics	3,00	4,00	1,00	0,58	1,52	6,48
	Automotive	4,00	2,75	1,71	0,85	0,03	5,47
	pharmaceuticals	3,00	3,67	1,53	0,88	-0,13	7,46
	FMCG	5,00	4,40	0,55	0,24	3,72	5,08
	Total	44,00	3,50	1,28	0,19	3,11	3,89

Table 9.18: Product Innovation and Sectors (continued)

Product Innovation	Sectors	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Changing design of functional features of the product	Food	10,00	4,00	0,94	0,30	3,33	4,67
	Cement	3,00	2,00	1,00	0,58	-0,48	4,48
	Metal	8,00	4,38	0,74	0,26	3,75	5,00
	Textiles	6,00	3,83	0,75	0,31	3,04	4,62
	Plastics	3,00	4,33	0,58	0,33	2,90	5,77
	Automotive	4,00	4,00	0,82	0,41	2,70	5,30
	pharmaceuticals	3,00	4,33	0,58	0,33	2,90	5,77
	FMCG	5,00	3,80	1,64	0,73	1,76	5,84
	Total	42,00	3,93	1,05	0,16	3,60	4,25

In Table 9.19, test of homogeneity of variances are shown. Significant score of Levene test shows that the acceptance of One-Way Anova test with testing homogeneity of variances for importance level of each product innovation type in countries.

Table 9.19: Selected Statistics for Importance Levels of Each Sector for Product Innovation Types

Sector Comparison for Importance Level of Product Innovation(1)		
Product Innovation	**Levene Statistic**	**Sig.**
Launch a product that is not produced before with current methods and technology	2,08	0,07
Produce a new product with new information technology that is not in the company	11,88	0,00
Produce a product that has a new usage area	1,42	0,23
Develop a new usage area with incremental technical changes in product features	1,66	0,15
Changing design of functional features of the product	0,85	0,56

Except 'Produce a new product with new information technology that is in the company' product innovation type, for all others Sig. Value is greater that 0,05 which means variances are homogenous. With this premise study, anova test is expressed in Table 9.20.

Table 9.20: Comparison of Sectors regarding Product Innovation

Sector Comparison for Importance Level of Product Innovation(2)		
Product Innovation	**F**	**Sig.**
Launch a product that is nor produced before with current methods and technology	0,78	0,61
Produce a product that has a new usage area	1,55	0,18
Develop a new usage area with incremental technical changes in product features	1,21	0,32
Changing design of functional features of the product	2,2	0,06

In this table, it is shown that all Sig. values are greater that 0,05 and null hypothesis is accepted that means there is no difference between sectors regarding the importance that they give to ways of product innovation. As shown in Table 9.20, means of importance levels for sectors are similar to each other and approximately 4.

9.7.2 Importance Level of Process Innovations and Sectors

In this section, sectors are examined regarding the importance level that they give to the types of process innovation.

Null Hypothesis: There is no difference between sectors regarding the importance level for process innovation types.

Alternate Hypothesis: There is difference between sectors regarding the importance level for process innovation types.

Before these hypotheses are tested, homogeneity of variances is tested in Table 9.22. In Table 9.21, the highest level of importance for different sectors:

- for FMCG sector, innovation in manufacture of new products
- for pharmaceuticals sector, Innovation in currently used equipments
- for food sector, acquire of new software,
- for pharmaceuticals sector, innovation in delivery methods
- for food sector, to have new technique, software and equipment in support activities

Table 9.21: Process Innovation and Sectors

Process innovation	Sectors	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Innovation in manufacture of new products	Food	11	4,09	0,94	0,28	3,46	4,73
	Cement	4	4,25	0,96	0,48	2,73	5,77
	Metal	8	3,75	1,28	0,45	2,68	4,82
	Textiles	6	4,33	0,52	0,21	3,79	4,88
	Plastics	3	4,00	0,00	0,00	4,00	4,00
	Automotive	4	4,25	0,96	0,48	2,73	5,77
	Pharmaceuticals	3	4,33	0,58	0,33	2,90	5,77
	FMCG	5	4,40	0,55	0,24	3,72	5,08
	Total	44	4,14	0,85	0,13	3,88	4,40
Innovation in currently used equipments	Food	10	4,00	0,82	0,26	3,42	4,58
	Cement	3	3,33	2,08	1,20	-1,84	8,50
	Metal	8	3,13	0,99	0,35	2,30	3,95
	Textiles	6	3,83	0,75	0,31	3,04	4,62
	Plastics	3	4,00	0,00	0,00	4,00	4,00
	Automotive	4	3,25	0,50	0,25	2,45	4,05
	Pharmaceuticals	3	4,33	1,15	0,67	1,46	7,20
	FMCG	5	3,80	1,10	0,49	2,44	5,16
	Total	42	3,69	0,98	0,15	3,39	3,99

Table 9.21: Process Innovation and Sectors (continued)

Process innovation	Sectors	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Acquire of new software	Food	11	4,36	0,92	0,28	3,74	4,98
	Cement	4	3,50	1,29	0,65	1,45	5,55
	Metal	8	3,38	1,19	0,42	2,38	4,37
	Textiles	6	4,00	0,89	0,37	3,06	4,94
	Plastics	3	3,33	0,58	0,33	1,90	4,77
	Automotive	4	3,75	0,50	0,25	2,95	4,55
	Pharmaceuticals	3	4,00	0,00	0,00	4,00	4,00
	FMCG	5	3,60	0,89	0,40	2,49	4,71
	Total	44	3,82	0,95	0,14	3,53	4,11
Innovation in delivery methods	Food	11	4,09	0,94	0,28	3,46	4,73
	Cement	4	3,25	1,71	0,85	0,53	5,97
	Metal	8	3,88	1,36	0,48	2,74	5,01
	Textiles	6	4,00	0,89	0,37	3,06	4,94
	Plastics	3	3,67	0,58	0,33	2,23	5,10
	Automotive	4	4,25	0,96	0,48	2,73	5,77
	Pharmaceuticals	3	4,67	0,58	0,33	3,23	6,10
	FMCG	5	3,60	1,52	0,68	1,72	5,48
	Total	44	3,93	1,11	0,17	3,59	4,27

Table 9.21: Process Innovation and Sectors (continued)

Process innovation	Sectors	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
To have new technique, software and equipment in support activities	Food	11	4,36	0,50	0,15	4,02	4,70
	Cement	4	4,25	0,96	0,48	2,73	5,77
	Metal	8	3,25	1,58	0,56	1,93	4,57
	Textiles	6	4,00	0,89	0,37	3,06	4,94
	Plastics	3	4,00	1,00	0,58	1,52	6,48
	Automotive	4	3,25	1,71	0,85	0,53	5,97
	Pharmaceuticals	3	3,00	2,00	1,15	-1,97	7,97
	FMCG	5	3,80	0,84	0,37	2,76	4,84
	Total	44	3,82	1,17	0,18	3,46	4,17

In the test of homogeneity, except innovation in currently used equipments, other types of process innovations have homogenous variances (shown in Table 9.22).

Table 9.22: Selected Statistics for Importance Levels of Each Sector for Process Innovation Types

Sector Comparison for Importance Level of Process Innovation(1)		
Process Innovation	**Levene Statistic**	**Sig.**
Innovation in manufacture of new products	1,68	0,15
Innovation in currently used equipments	2,59	0,03
Acquire of new software	1,33	0,27
Innovation in delivery methods	0,66	0,71
To have new technique, software and equipment in support activities	1,82	0,11

In one way anova test(shown in Table 9.23), all types have sig. value greater than 0,05 that means for these types of process innovation there is no difference between importance levels of sectors.

Table 9.23: Comparison of Sectors regarding Process Innovation

Sector Comparison for Importance Level of Process Innovation(2)		
Process Innovation	**F**	**Sig.**
Innovation in manufacture of new products	0,37	0,92
Acquire of new software	1,04	0,42
Innovation in delivery methods	0,54	0,8
To have new technique, software and equipment in support activities	1,09	0,39

9.7.3 Importance Level of Marketing Innovation and Sectors

For marketing innovation types, the differences between importance levels are examined (shown in Table 9.24).

Null hypothesis: There is no difference between sectors regarding the importance level for marketing innovation types.

Alternate Hypothesis: There is difference between sectors regarding the importance level for marketing innovation types.

- For plastics, change in design or appearance of products
- For metal, launch of new sales channels

- For pharmaceuticals, implementation of new marketing methods for product promotions
- For pharmaceuticals, implementation of new marketing methods for product promotions

have the highest level of importance.

Table 9.24: Marketing Innovation and Sectors

Marketing innovation	Sectors	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Change in design or appearance of products	Food	11,00	3,82	0,98	0,30	3,16	4,48
	Cement	4,00	3,50	1,91	0,96	0,45	6,55
	Metal	8,00	4,13	0,83	0,30	3,43	4,82
	Textiles	6,00	4,17	0,75	0,31	3,38	4,96
	Plastics	3,00	4,33	0,58	0,33	2,90	5,77
	Automotive	4,00	3,75	0,96	0,48	2,23	5,27
	pharmaceuticals	3,00	4,00	1,00	0,58	1,52	6,48
	FMCG	5,00	3,20	1,30	0,58	1,58	4,82
	Total	44,00	3,86	1,03	0,15	3,55	4,18
Launch of new sales channels	Food	11,00	4,00	0,89	0,27	3,40	4,60
	Cement	4,00	3,50	1,91	0,96	0,45	6,55
	Metal	8,00	4,25	0,71	0,25	3,66	4,84
	Textiles	6,00	4,17	0,98	0,40	3,13	5,20
	Plastics	3,00	4,00	0,00	0,00	4,00	4,00
	Automotive	4,00	4,00	0,82	0,41	2,70	5,30
	pharmaceuticals	3,00	4,00	0,00	0,00	4,00	4,00
	FMCG	5,00	3,60	1,67	0,75	1,52	5,68
	Total	44,00	3,98	1,00	0,15	3,67	4,28

Table 9.24: Marketing Innovation and Sectors (continued)

Marketing innovation	Sectors	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Implementation of new marketing methods for product promotions	Food	11,00	3,82	1,25	0,38	2,98	4,66
	Cement	4,00	3,75	1,89	0,95	0,74	6,76
	Metal	8,00	3,63	1,19	0,42	2,63	4,62
	Textiles	6,00	3,67	0,82	0,33	2,81	4,52
	Plastics	3,00	3,67	0,58	0,33	2,23	5,10
	Automotive	4,00	3,75	1,89	0,95	0,74	6,76
	pharmaceuticals	3,00	4,67	0,58	0,33	3,23	6,10
	FMCG	5,00	3,40	1,34	0,60	1,73	5,07
	Total	44,00	3,75	1,20	0,18	3,38	4,12
Implementation of new pricing strategies	Food	11,00	3,36	1,29	0,39	2,50	4,23
	Cement	4,00	3,50	1,29	0,65	1,45	5,55
	Metal	8,00	3,88	1,36	0,48	2,74	5,01
	Textiles	6,00	3,83	0,98	0,40	2,80	4,87
	Plastics	3,00	4,00	0,00	0,00	4,00	4,00
	Automotive	4,00	3,75	1,89	0,95	0,74	6,76
	pharmaceuticals	3,00	4,33	0,58	0,33	2,90	5,77
	FMCG	5,00	3,60	1,67	0,75	1,52	5,68
	Total	44,00	3,70	1,23	0,19	3,33	4,08

Test of homogeneity o variances (shown in Table 9.25) shows that except launch of new sales channels, data for all other types of marketing innovations are homogeneous.

Table 9.25: Selected Statistics for Importance Levels of Each Sector for Marketing Innovation Types

Sector Comparison for Importance Level of Marketing Innovation(1)		
Marketing Innovation	**Levene Statistic**	**Sig.**
Change in design or appearance of products	1,44	0,22
Launch of new sales channels	3,97	0,00
Implementation of new marketing methods for product promotions	0,80	0,59
Implementation of new pricing strategies	1,30	0,28

In Table 9.26, all sig values are greater than 0,05 that means there is no difference between importance levels of marketing innovation types between sectors.

Table 9.26: Comparison of Sectors regarding Marketing Innovation

Sector Comparison for Importance Level of Marketing Innovation(2)		
Marketing Innovation	**F**	**Sig.**
Change in design or appearance of products	0,59	0,76
Implementation of new marketing methods for product promotions	0,29	0,95
Implementation of new pricing strategies	0,27	0,96

9.7.4 Importance Level of Organizational Innovation and Sectors

For organizational innovation types, the differences between importance levels are examined (shown in Table 9.27).

Null hypothesis: There is no difference between sectors regarding the importance level for organizational innovation types.

Alternate Hypothesis: There is difference between sectors regarding the importance level for organizational innovation types.

- For textiles, Usage of new methods for working execution
- For FMCG, New methods for distribution of responsibility and decision making between workers

- For FMCG, Usage of new organizational methods in external relations have the highest level of importance. And also usage of new organizational methods in external relations have the highest level of importance

Table 9.27: Organizational Innovation and Sectors

Organizational Innovation	Sectors	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Usage of new methods for working execution	Food	11	3,55	1,04	0,31	2,85	4,24
	Cement	4	4,00	0,82	0,41	2,70	5,30
	Metal	8	4,00	1,41	0,50	2,82	5,18
	Textiles	6	4,33	1,03	0,42	3,25	5,42
	Plastics	3	3,33	1,15	0,67	0,46	6,20
	Automotive	4	3,50	1,73	0,87	0,74	6,26
	pharmaceuticals	3	3,33	0,58	0,33	1,90	4,77
	FMCG	5	4,00	1,00	0,45	2,76	5,24
	Total	44	3,80	1,11	0,17	3,46	4,13
New methods for distribution of responsibility and decision making between workers	Food	11	3,55	0,69	0,21	3,08	4,01
	Cement	4	3,50	1,29	0,65	1,45	5,55
	Metal	8	4,00	0,76	0,27	3,37	4,63
	Textiles	6	4,00	0,89	0,37	3,06	4,94
	Plastics	3	3,67	0,58	0,33	2,23	5,10
	Automotive	4	3,75	0,96	0,48	2,23	5,27
	pharmaceuticals	3	4,00	1,00	0,58	1,52	6,48
	FMCG	5	4,20	0,84	0,37	3,16	5,24
	Total	44	3,82	0,81	0,12	3,57	4,07

Table 9.27: Organizational Innovation and Sectors (continued)

Organizational Innovation	Sectors	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Usage of new organizational methods in external relations	Food	11	4,00	0,77	0,23	3,48	4,52
	Cement	4	3,75	0,50	0,25	2,95	4,55
	Metal	8	4,25	1,04	0,37	3,38	5,12
	Textiles	6	4,33	0,52	0,21	3,79	4,88
	Plastics	3	4,00	0,00	0,00	4,00	4,00
	Automotive	4	3,75	1,26	0,63	1,75	5,75
	pharmaceuticals	3	4,00	0,00	0,00	4,00	4,00
	FMCG	5	4,60	0,55	0,24	3,92	5,28
	Total	44	4,11	0,75	0,11	3,88	4,34

Table 9.28: Selected Statistics for Importance Levels of Each Sector for Organizational Innovation Types

Sector Comparison for Importance Level of Organizational Innovation(1)		
Organizational Innovation	**Levene Statistic**	**Sig.**
Usage of new methods for working execution	0,62	0,74
New methods for distribution of responsibility and decision making between workers	0,62	0,74
Usage of new organizational methods in external relations	1,48	0,21

Since Sig. values in Table 9.28 are greater than 0.05 (for 95% confidence interval), variances are homogenous that means the results from variance analysis will be confidential.

Table 9.29: Comparison of Sectors regarding Organizational Innovation

Sector Comparison for Importance Level of Organizational Innovation(2)		
Organizational Innovation	**F**	**Sig.**
Usage of new methods for working execution	0,51	0,82
New methods for distribution of responsibility and decision making between workers	0,52	0,82
Usage of new organizational methods in external relations	0,69	0,68

In Table 9.29, it is shown that all Sig. values are greater that 0,05 that means there is no difference between sectors regarding the importance that they give to ways of organizational innovation.

9.7.5 Sources for Information and Technology for Innovation and Sectors

In this section the hypotheses are:

Null Hypothesis: There is no difference between sectors regarding the importance level for sources for information and technology.

Alternate Hypothesis: There is difference between sectors regarding the importance level for sources for information and technology.

Table 9.30 shows test of homogeneity of variances. For all of the factors, sig value is greater than 0,05 that means variances are homogenous.

Table 9.30: Selected Statistics for Importance Levels of Each Sector for Sources for Innovation

Sector Comparison for Importance Level of Sources(1)		
Sources	**Levene Statistic**	**Sig.**
R&D	2,29	0,05
Manufacturing	0,57	0,77
Marketing	2,04	0,08
Delivery	0,22	0,98
External markets and customers	1,14	0,37
Competitors	1,07	0,40
Other firms in the sector	0,81	0,58
Consultants/ Consulting firms	0,85	0,56
Private Research Institutes	1,22	0,32
Suppliers of service, equipments and software	0,62	0,74
Universities	0,33	0,94
Public Research Institutes	2,12	0,07
Expertise public/semi public innovation support services	1,59	0,17
Patents	0,92	0,50
Professional congresses, meetings, literature	1,16	0,35
Fairs and exhibitions	1,18	0,34
Professional and commercial unions	0,97	0,46
Illegal networks	0,48	0,84
Public organizing	1,15	0,35

F and sig values to express difference between importance levels are shown in Table 9.31.

Table 9.31: Comparison of Sectors regarding Sources for Innovation

Sector Comparison for Importance Level of Sources(2)		
Sources	**F**	**Sig.**
R&D	2,3	0,05
Manufacturing	0,73	0,65
Marketing	0,17	0,99
Delivery	0,09	1
Foreign markets and customers	0,54	0,8
Competitors	0,53	0,8
Other firms in the sector	0,28	0,96
Consultants/ Consulting firms	0,66	0,7
Private Research Institutes	0,57	0,78
Suppliers of service, equipments and software	1,32	0,27
Universities	0,52	0,81
Public Research Institutes	0,32	0,94
Expertise public/semi public innovation support services	1,63	0,16
Patents	1,49	0,2
Professional congresses, meetings, literature	0,79	0,6
Fairs and exhibitions	0,44	0,87
Professional and commercial unions	0,59	0,76
Illegal networks	0,31	0,95
Public organizing	0,5	0,83

For all of the sources, the difference between sectors for importance levels can not be found since all sig values are greater than 0,05 for 95% confidence level.

9.7.6 Obstacles for Innovation Activities and Sectors

In this section the hypotheses are:

Null Hypothesis: There is no difference between sectors regarding the importance level for obstacles for innovation activities.

Alternate Hypothesis: There is difference between sectors regarding the importance level for sources for obstacles for innovation activities.

Table 9.32 shows test of homogeneity of variances. Risk perception regarding innovation, Deficiency of information to reach to incentives as support projects and financial sources and Market structure dominated by big companies have sig values smaller than 0,05 that means, variances are not homogenous and anova tests do not give confidential results.

Table 9.32: Selected Statistics for Importance Levels of Each Sector for Obstacles for Innovation

Sector Comparison for Importance Level of Obstacles for Innovation(1)		
Obstacles	**Levene Statistic**	**Sig.**
Risk perception regarding innovation	4,95	0,00
Very high cost	1,67	0,15
Deficiency of financial sources	0,95	0,48
High inflation and interest rates	1,01	0,44
Deficiency in reaching risk capital	0,78	0,61
Deficiency in technological knowledge	1,83	0,11
Deficiency in market knowledge	1,15	0,36
Resistance to internal changes	0,77	0,62
Deficiency of technical personnel in company	0,78	0,61
Deficiency in technical personnel in sector	0,84	0,56
Deficiency of information to reach to incentives as support projects and financial sources	2,94	0,02
Managerial incentives not including reward for innovation	0,60	0,75
Disinclination for training employees	0,34	0,93
Central decision making and responsibility mechanism	2,29	0,05
Focusing on short term results	0,94	0,49
Imitation risk by competitors	0,18	0,99
Market structure dominated by big companies	2,93	0,02

For all other obstacles, anova test results are shown in Table 9.33.

Table 9.33: Comparison of Sectors regarding Obstacles for Innovation

Sector Comparison for Importance Level of Obstacles for Innovation(2)		
Obstacles	**F**	**Sig.**
Very high cost	2,76	0,06
Deficiency of financial sources	0,38	0,91
High inflation and interest rates	0,68	0,69
Deficiency in reaching risk capital	0,62	0,74
Deficiency in technological knowledge	1,2	0,33
Deficiency in market knowledge	2,47	0,07
Resistance to internal changes	2,79	**0,02**
Deficiency of technical personnel in company	2,15	0,06
Deficiency in technical personnel in sector	0,65	0,71
Managerial incentives not including reward for innovation	1,61	0,17
Disinclination for training employees	1,05	0,42
Central decision making and responsibility mechanism	0,66	0,7
Focusing on short term results	2,35	0,04
Imitation risk by competitors	1,03	0,43

For obstacle 'Resistance to internal changes', sig value is smaller than 0,05 that means there are differences between sectors. At this point Post Hoc Tests is used to between which sectors there are differences. Tukey test results are shown in Table 9.34.

Table 9.34: Difference between Sectors for Obstacles for Innovation

Multiple Comparisons				
Tukey HSD				
Dependent Variable	Sector	Sector	Mean Difference	Sig.
Resistance to internal changes	Food	Cement	1,20	0,49
		Metal	-1,18	0,25
		Textiles	-0,97	0,59
		Plastic	-0,30	1,00
		automotive	-0,55	0,98
		pharmaceutical	0,03	1,00
		FMCG	0,10	1,00
	Cement	Food	-1,20	0,49
		Metal	-2,38	**0,01**
		Textiles	-2,17	**0,04**
		Plastic	-1,50	0,54
		automotive	-1,75	0,25
		pharmaceuticals	-1,17	0,80
		FMCG	-1,10	0,74

Table 9.34: Difference between Sectors for Obstacles for Innovation (continued)

Multiple Comparisons - Tukey HSD				
Dependent Variable	Sector	Sector	Mean Difference	Sig.
Resistance to internal changes	Metal	Food	1,18	0,25
		Cement	2,38	**0,01**
		Textiles	0,21	1
		Plastic	0,88	0,9
		Automotive	0,63	0,97
		pharmaceutical	1,21	0,65
		FMCG	1,28	0,37
	Textile	Food	0,97	0,59
		Cement	2,17	**0,04**
		Metal	-0,21	1
		Plastic	0,67	0,98
		Automotive	0,42	1
		pharmaceutical	1	0,85
		FMCG	1,07	0,66
	Plastic	Food	0,3	1
		Cement	1,5	0,54
		Metal	-0,88	0,9
		Textiles	-0,67	0,98
		Automotive	-0,25	1
		pharmaceutical	0,33	1
		FMCG	0,4	1
	Automotive	Food	0,55	0,98
		Cement	1,75	0,25
		Metal	-0,63	0,97
		Textiles	-0,42	1
		Plastic	0,25	1
		pharmaceutical	0,58	0,99
		FMCG	0,65	0,98
	Pharmaceuticals	Food	-0,03	1
		Cement	1,17	0,8
		Metal	-1,21	0,65
		Textiles	-1	0,85
		Plastic	-0,33	1
		Automotive	-0,58	0,99
		FMCG	0,07	1

Table 9.34: Difference between Sectors for Obstacles for Innovation (continued)

Multiple Comparisons				
Tukey HSD				
Dependent Variable	Sector	Sector	Mean Difference	Sig.
Resistance to internal changes	FMCG	Food	-0,1	1
		Cement	1,1	0,74
		Metal	-1,28	0,37
		Textiles	-1,07	0,66
		Plastic	-0,4	1
		Automotive	-0,65	0,98
		pharmaceutical	-0,07	1

For the sig. values that are smaller that 0,05(for 95% confidence interval), there are difference between sectors.

- Metal sector give more importance to resistance to internal changes than cement sector. The mean difference level is 2,38.
- Textile sector gives more importance to resistance to internal changes that cement sector. The mean difference level is 2,17.

9.8 Foreign Capital Ownership and Innovation

In this search, the hypotheses mentioned below are tested.

Null hypothesis: There is no relation between degree of innovation and foreign capital ownership between organization for product innovations that has been started in the company but not actualized yet.

Alternate thesis: There is relation between degree of innovation and foreign capital ownership between organization for product innovations that has been started in the company but not actualized yet. That means variables are not independent.

Table 9.35 shows the relation between status of foreign capital ownership and degree of product innovations that will be actualized.

Table 9.35: Status of Foreign capital Ownership and Product Innovation (will be actualized)

Product innovation - will be actualized					
Foreign capital ownership	**New in the world**	**New in the country**	**New in the firm**	**None of them**	**Total**
Yes	1	8	4	11	24
No	0	9	4	21	34
Total	1	17	8	32	58

Pearson Chi-Square Value: 2,535

Asymp sig (2 sided): 0,469

Since sig value is greater than 0,05, there is no relation between status of foreign capital and degree of innovation that companies started to work on.

In Table 9.36, the relation between status of foreign capital and degree of innovation that companies had been implemented for the last three years are shown.

Table 9.36: Status of Foreign capital Ownership and Product Innovation (had been actualized)

Product innovation – had been actualized					
Foreign capital ownership	**New in the world**	**New in the country**	**New in the firm**	**None of them**	**Total**
Yes	1	9	13	1	24
No	3	14	9	8	34
Total	4	23	22	9	58

Pearson Chi-Square Value: 6,735

Asymp sig (2 sided): 0,081

The sig value is greater than 0,05 that means there is no relation between status of foreign capital and degree of innovation that companies had been implemented for the last three years are shown.

In Table 9.37, the relation between status of foreign capital and degree of process innovation that companies will be implemented are shown. There are three firms that at least one innovation will be actualized by the companies that have foreign capital ownership.

Table 9.37: Status of Foreign capital Ownership and Process Innovation (will be actualized)

Process innovation - will be actualized					
Foreign capital ownership	**New in the world**	**New in the country**	**New in the firm**	**None of them**	**Total**
Yes	0	0	3	21	24
No	1	3	7	23	34
Total	1	3	10	44	58

Pearson Chi-Square Value: 4,088

Asymp sig (2 sided): 0,252

Since sig value is greater than 0,05, there is no relation between status of foreign capital and degree of process innovation that companies will be implemented.

The relation between process innovations that had been implemented in the last three years and status of foreign capital ownership are examined in Table 9.38. The percentages of the firms that have foreign capital ownership and do not have, regarding process innovation implementing in the last three years are nearly equal.

Table 9.38: Status Foreign capital Ownership and Process Innovation (had been actualized)

Process innovation - had been actualized					
Foreign capital ownership	**New in the world**	**New in the country**	**New in the firm**	**None of them**	**Total**
Yes	1	4	16	3	24
No	1	7	12	14	34
Total	2	11	28	17	58

Pearson Chi- Square Value: 6,991

Asymp sig (2 sided): 0,071

Since sig value is greater than 0,05 there is no relation between to have foreign capital ownership and to have process innovation in the last three years.

In Table 9.39, the relation between marketing innovations that companies will be actualizing in near future and also foreign capital ownership status is expressed.

Table 9.39: Status of Foreign capital Ownership and Marketing Innovation (will be actualized)

Marketing innovation - will be actualized					
Foreign capital ownership	**New in the world**	**New in the country**	**New in the firm**	**None of them**	**Total**
Yes	0	1	5	18	24
No	1	2	10	20	33
Total	1	3	15	38	57

Pearson Chi-Square Value: 1,727

Asymp sig (2 sided): 0,631

Since sig value is greater than 0,05 there is no relation between to have foreign capital ownership and degree of marketing innovation that will be actualizing for the companies.

The relation between having foreign capital ownership and having at least one marketing innovation in the past three years are shown in Table 9.40. 24 companies have foreign capital investment and 18 of them had been implemented at least one marketing innovation in the past three years.

Table 9.40: Status of Foreign capital Ownership and Marketing Innovation (had been actualized)

Marketing innovation - had been actualized					
Foreign capital ownership	**New in the world**	**New in the country**	**New in the firm**	**None of them**	**Total**
Yes	1	3	14	6	24
No	1	3	15	14	33
Total	2	6	29	20	57

Pearson Chi-Square Value: 1,860

Asymp sig (2 sided): 0,602

Since sig value is greater than 0,05 there is no relation between status of foreign capital ownership and level of marketing innovation that had been actualized n the last three years.

In Table 9.41, the cross table expresses the relation between if the companies have foreign capital ownership and level of organizational innovation.

Table 9.41: Status of Foreign capital Ownership and Organizational Innovation (will be actualized)

Organizational innovation -will be actualized				
Foreign capital ownership	**New in the country**	**New in the firm**	**None of them**	**Total**
Yes	3	4	17	24
No	3	7	24	34
Total	6	11	41	58

Pearson Chi-Square Value: 0,298

Asymp sig (2 sided): 0,862

Since sig value is greater than 0,05 there is no relation between foreign capital ownership and the ability that companies will be actualizing an innovation.

In Table 9.42, frequencies of foreign capital ownership and the companies that had been implemented an organizational innovation is shown.

Table 9.42: Status of Foreign capital Ownership and Organizational Innovation (had been actualized)

Organizational innovation - had been actualized					
Foreign capital ownership	**New in the world**	**New in the country**	**New in the firm**	**None of them**	**Total**
Yes	1	1	18	4	24
No	0	4	15	15	34
Total	1	5	33	19	58

Pearson Chi-Square Value: 7,953

Asymp sig (2 sided): 0,047

Since sig value is smaller than 0,05, there is a relation between foreign capital ownership and also organizational innovation frequencies that the companies had been implemented. Since the frequencies for the companies that have foreign capital ownership are higher than the companies that do not have foreign capital ownership, it can be expressed that, when the companies have foreign capital ownership their potential to implement organizational innovation is also higher.

9.9 Innovation Ownership

9.9.1 Product Innovation Ownership

In this part, the relations between the differences in means between two different groups are examined. To have/or not to have an innovation is the first group and the second group is obstacles, aims/ effects, sources for innovation.

Null Hypothesis: There is no difference in importance mean level between two groups that has product innovation and not product innovation

Alternate Hypothesis: There is a difference in importance mean level between two groups that has product innovation and not product innovation

Only the expressions that have difference are given in Tables.

In Table 9.43, the difference between importance levels for to have a product innovation and not to have a product innovation is shown.

For aims for innovation; Increase of product and service supply capacity, there is a difference between importance levels for two groups. The companies that have an innovation give more importance to the increase of product and service supply capacity.

For organizational innovation;

- The companies that do not have a product innovation give more importance to the usage of new method in working area
- The companies that do not have a product innovation give more importance to the usage of new organizational methods in foreign relations

For sources for innovation;

- The companies that have a product innovation give more importance to the foreign markets and customers

For obstacles;

- The companies that do not have a product innovation give more importance to the Focusing on short term results
- The companies that do not have a product innovation give more importance to the central decision making and responsibility

For process innovation;

- The companies that have a product innovation give more importance to the Innovation in techniques for manufacturing

Table 9.43: Differences regarding Product Innovation Ownership

Independent Samples Test(Product Innovation)		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Aims/Effects							
Increase of product and service supply capacity	Equal variances assumed	0,93	0,34	-2,51	0,01	-1,00	-0,11
	Equal variances not assumed			-2,33	0,04	-1,08	-0,04
Organizational Innovation							
Usage of new method in working area	Equal variances assumed	11,21	0,00	-2,75	0,01	-0,63	-0,10
	Equal variances not assumed			-2,10	0,06	-0,75	0,02
Usage of new organizational methods in foreign relations	Equal variances assumed	0,05	0,83	-2,26	0,03	-1,05	-0,06
	Equal variances not assumed			-2,86	0,01	-0,97	-0,15
Sources for Innovation							
Foreign markets and customers	Equal variances assumed	10,68	0,00	-3,64	0,00	-0,74	-0,21
	Equal variances not assumed			-2,79	0,02	-0,86	-0,10

Table 9.43: Differences regarding Product Innovation Ownership (continued)

Independent Samples Test(Product Innovation)		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Obstacles							
Focusing on short term results	Equal variances assumed	27,79	0,00	3,28	0,00	0,21	0,85
	Equal variances not assumed			4,31	0,00	0,27	0,79
Central decision making and responsibility	Equal variances assumed	0,11	0,74	2,25	0,03	0,04	0,71
	Equal variances not assumed			2,23	0,04	0,01	0,74
Process Innovation							
Innovation in techniques for manufacturing	Equal variances assumed	40,23	0,00	-5,57	0,00	-0,76	-0,36
	Equal variances not assumed			-3,34	0,01	-0,93	-0,18

9.9.2 Marketing Innovation Ownership

In this section, the importance level differences are examined between the companies that have a marketing innovation and the companies that do not have a marketing innovation.

Null Hypothesis: There is no difference in importance mean level between two groups that has marketing innovation and not marketing innovation

Alternate Hypothesis: There is a difference in importance mean level between two groups that has marketing innovation and not marketing innovation

For product innovation;

- The companies that do not have a marketing innovation give more importance to develop a new usage area with incremental technical changes in product features
- The companies that do not have a marketing innovation give more importance to changing design of functional features of the product
- For organizational innovation
- The companies that do not have a marketing innovation give more importance to the usage of new method in working area
- The companies that do not have a marketing innovation give more importance to the usage of new organizational methods in foreign relations

For sources;

- The companies that have a marketing innovation give more importance to the public research institutes
- The companies that have a marketing innovation give more importance to the competitors

For aims/ effects;

- The companies that do not have a marketing innovation give more importance to decrease of customer response time

For obstacles;

- The companies that have a marketing innovation give more importance to the deficiency in technological knowledge

For marketing innovation;

- The companies that do not have a marketing innovation give more importance to launch of new sales channels. All values regarding marketing innovation ownership and other factors are shown in Table 9.44.

Table 9.44: Differences regarding Marketing Innovation Ownership

Independent Samples Test(Marketing Innovation)		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Product Innovation							
Develop a new usage area with incremental technical changes in product features	Equal variances assumed	5,07	0,03	-3,67	0,00	-0,70	-0,20
	Equal variances not assumed			-3,48	0,00	-0,71	-0,19
Changing design of functional features of the product	Equal variances assumed	3,86	0,05	5,02	0,00	0,72	1,68
	Equal variances not assumed			4,38	0,00	0,64	1,76
Organizational Innovation							
Usage of new method in working area	Equal variances assumed	66,16	0,00	-3,90	0,00	-0,59	-0,19
	Equal variances not assumed			-3,25	0,00	-0,64	-0,14
Usage of new organizational methods in foreign relations	Equal variances assumed	3,03	0,09	2,70	0,01	0,13	0,90
	Equal variances not assumed			2,33	0,03	0,06	0,97

Table 9.44: Differences regarding Marketing Innovation Ownership (continued)

Independent Samples Test(Marketing Innovation)		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Sources							
Public research institutes	Equal variances assumed	0,15	0,70	2,22	0,03	0,08	1,67
	Equal variances not assumed			2,19	0,03	0,07	1,69
Competitors	Equal variances assumed	13,87	0,00	-2,63	0,01	-0,57	-0,08
	Equal variances not assumed			-2,44	0,02	-0,59	-0,05
Aims/ Effects							
Decrease of customer response time	Equal variances assumed	29,07	0,00	-2,73	0,01	-0,49	-0,08
	Equal variances not assumed			-2,32	0,03	-0,54	-0,03

Table 9.44: Differences regarding Marketing Innovation Ownership (continued)

Independent Samples Test(Marketing Innovation)		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Obstacles							
Deficiency in technological knowledge	Equal variances assumed	6,38	0,01	2,17	0,03	0,02	0,54
	Equal variances not assumed			2,06	0,05	0,00	0,56
Marketing Innovation							
Launch of new sales channels	Equal variances assumed	2,51	0,12	2,47	0,02	0,13	1,28
	Equal variances not assumed			2,27	0,03	0,07	1,34

9.9.3 Process Innovation Ownership

In this section all factors examined regarding the companies have a process innovation and not have process innovation. All values are shown in Table 9.45.

Null Hypothesis: There is no difference in importance mean level between two groups that has process innovation and not process innovation

Alternate Hypothesis: There is a difference in importance mean level between two groups that has process innovation and not process innovation

For aims/ effects;

- The companies that do not have a process innovation give more importance to decrease of unit labor costs
- The companies that do not have a process innovation give more importance to the development of confidence and decrease of environmental risks
- The companies that do not have a process innovation give more importance to the development of strong relations with customers
- The companies that do not have a process innovation give more importance to the development of communication and interaction between different commercial activities

For organizational innovation;

- Usage of new method in working area

For sources;

- Fairs and exhibitions

For obstacles;

- The companies that do not have a process innovation give more importance to focus on short term results

For training;

- The companies that have a process innovation give more importance to the capability of problem solving

For process innovation;

- The companies that have a process innovation give more importance to the innovation in techniques for manufacturing

For marketing innovation;

- The companies that do not have a process innovation give more importance to the implementation of new marketing methods in product promotion
- The companies that do not have a process innovation give more importance to the implementation of new pricing strategy
- The companies that do not have a process innovation give more importance to launch of new sales channels

For obstacles;

- The companies that do not have a process innovation give more importance to the risk perception regarding innovation

Table 9.45: Differences regarding Process Innovation Ownership

Independent Samples Test(Process innovation)		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Aims/ Effects							
Decrease of unit labor costs	Equal variances assumed	53,26	0,00	2,35	0,02	0,04	0,49
	Equal variances not assumed			3,64	0,00	0,12	0,41
Development of confidence and decrease of environmental risks	Equal variances assumed	37,76	0,00	2,15	0,04	0,02	0,45
	Equal variances not assumed			3,38	0,00	0,09	0,37

Table 9.44: Differences regarding Process Innovation Ownership

Independent Samples Test(Process innovation)		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Development of strong relations between customers	Equal variances assumed	88,81	0,00	2,62	0,01	0,07	0,54
	Equal variances not assumed			4,11	0,00	0,16	0,46
Development of communication and interaction between different commercial activities	Equal variances assumed	0,03	0,87	0,08	0,93	-0,27	0,30
	Equal variances not assumed			0,08	0,93	-0,28	0,30

Table 9.45: Differences regarding Process Innovation Ownership (continued)

Independent Samples Test(Process innovation)		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Organizational Innovation							
Usage of new method in working area	Equal variances assumed	24,50	0,00	-2,99	0,00	-0,56	-0,11
	Equal variances not assumed			-2,44	0,02	-0,62	-0,05
Sources							
Fairs and exhibitions	Equal variances assumed	21,14	0,00	-2,24	0,03	-0,38	-0,02
	Equal variances not assumed			-1,71	0,10	-0,45	0,05
Obstacles							
Focusing on short term results	Equal variances assumed	0,88	0,35	2,17	0,03	0,02	0,60
	Equal variances not assumed			2,19	0,04	0,02	0,60

Table 9.45: Differences regarding Process Innovation Ownership (continued)

Independent Samples Test(Process innovation)		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Process innovation							
Innovation in techniques for manufacturing	Equal variances assumed	125,30	0,00	-4,56	0,00	-0,59	-0,23
	Equal variances not assumed			-3,15	0,01	-0,69	-0,14
Marketing Innovation							
Implementation of new marketing methods in product promotion	Equal variances assumed	14,51	0,00	-2,34	0,02	-1,55	-0,12
	Equal variances not assumed			-3,11	0,00	-1,37	-0,30

Table 9.45: Differences regarding Process Innovation Ownership (continued)

Independent Samples Test(Process innovation)		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Implementation of new pricing strategy	Equal variances assumed	6,17	0,02	-2,99	0,00	-1,75	-0,35
	Equal variances not assumed			-3,72	0,00	-1,62	-0,48
Launch of new sales channels	Equal variances assumed	4,88	0,03	-2,49	0,02	-1,36	-0,15
	Equal variances not assumed			-3,18	0,00	-1,23	-0,28

Table 9.45: Differences regarding Process Innovation Ownership(continued)

Independent Samples Test(Process innovation)		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Obstacles							
Risk perception regarding innovation	Equal variances assumed	4,86	0,03	-2,09	0,04	-1,69	-0,03
	Equal variances not assumed			-2,19	0,04	-1,67	-0,06
Training							
Capability of problem solving	Equal variances assumed	1,27	0,26	2,27	0,03	0,06	0,97
	Equal variances not assumed			2,16	0,04	0,03	1,00

9.9.4 Organizational Innovation Ownership

In this section all factors examined regarding the companies have an organizational innovation and not have organizational innovation. All values are shown in Table 9.46.

Null Hypothesis: There is no difference in importance mean level between two groups that has organizational innovation and not organizational innovation

Alternate Hypothesis: There is a difference in importance mean level between two groups that has organizational innovation and not organizational innovation

For product innovation;

- The companies that have an organizational innovation give more importance to develop a new usage area with incremental technical changes in product features

For sources;

- The companies that have an organizational innovation give more importance to the disinclination for training employees
- The companies that have an organizational innovation give more importance to the other firms in sector

For obstacles;

- The companies that do not have an organizational innovation give more importance to the deficiency of technical personnel in company
- The companies that have an organizational innovation give more importance to the deficiency in market knowledge
- The companies that do not have an organizational innovation give more importance to the information deficiency in finance sources and projects that prompt innovation

For aims/effects;

- The companies that have an organizational innovation give more importance to the development of strong relations with customers
- The companies that do not have an organizational innovation give more importance to increase of product and service supply capacity

- The companies that do not have an organizational innovation give more importance to reproduce of products that were not manufactured more including changes

For process innovation;

- The companies that have an organizational innovation give more importance to the Innovation in techniques for manufacturing

Table 9.46: Differences regarding Organizational Innovation Ownership

Independent Samples Test(Organizational Innovation)		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Product Innovation							
Develop a new usage area with incremental technical changes in product features	Equal variances assumed	1,81	0,18	3,25	0,00	0,42	1,75
	Equal variances not assumed			3,64	0,00	0,48	1,68
Sources							
Disinclination for training employees	Equal variances assumed	0,04	0,84	2,93	0,01	0,13	0,67
	Equal variances not assumed			2,92	0,01	0,12	0,68
Other firms in sector	Equal variances assumed	9,74	0,00	-2,32	0,02	-0,56	-0,04
	Equal variances not assumed			-2,15	0,04	-0,59	-0,01

Table 9.46: Differences regarding Organizational Innovation Ownership (continued)

Independent Samples Test(Organizational Innovation)		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Aims/Effects							
Development of strong relations between customers	Equal variances assumed	26,63	0,00	-3,26	0,00	-0,59	-0,14
	Equal variances not assumed			-2,71	0,01	-0,64	-0,09
Increase of product and service supply capacity	Equal variances assumed	1,70	0,20	-2,95	0,00	-0,88	-0,17
	Equal variances not assumed			-2,97	0,01	-0,89	-0,17
Reproduce of products that were not manufactured more including changes	Equal variances assumed	1,65	0,20	-3,34	0,00	-0,72	-0,18
	Equal variances not assumed			-3,43	0,00	-0,71	-0,18
Process innovation							
Innovation in techniques for manufacturing	Equal variances assumed	38,55	0,00	-2,91	0,01	-0,47	-0,09
	Equal variances not assumed			-2,32	0,03	-0,53	-0,03

Table 9.46: Differences regarding Organizational Innovation Ownership (continued)

Independent Samples Test(Organizational Innovation)		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	Sig. (2-tailed)	95% Confidence Interval of the Difference	
						Lower	Upper
Obstacles							
Information deficiency in finance sources and projects that prompt innovation	Equal variances assumed	1,02	0,32	-2,72	0,01	-1,25	-0,19
	Equal variances not assumed			-2,63	0,01	-1,27	-0,16
Obstacles							
Deficiency of technical personnel in company	Equal variances assumed	26,83	0,00	2,25	0,03	0,03	0,59
	Equal variances not assumed			2,48	0,02	0,06	0,56
Deficiency in market knowledge	Equal variances assumed	1,98	0,16	2,27	0,03	0,04	0,60
	Equal variances not assumed			2,32	0,03	0,04	0,60

10. CONCLUSION AND DISCUSSION

In increasing competitive environment, companies have started to give more importance to innovation to meet customer requirements in the best way that enables to be alive. Innovation is not only R&D but also implementation of new and/or significantly developed products. The important issue is the successfully implementation of the innovations.

There are abundance in product and service supply in the world that it is getting hard to sell products and services to markets with profit. In the world and also in Turkey, there are studies that encourage companies to innovations and also there are some obstacles that are forces companies to develop and also to launch new products.

In this study, success factors/incentives, aims/effects, obstacles and sources for innovation are examined. The relation between these factors and companies' characteristics are stated.

In product innovation types, companies give more importance to launch a product that is not produced before with current methods and technology, Produce a new product with new information technology that are not in the company, Produce a product that has a new usage area. The process type that companies give most importance is innovation in manufacturing techniques. In marketing innovation types, companies give more importance to change in design or appearance of products. Companies give most importance to usage of new organizational methods in external relations as an organizational innovation.

R&D, manufacturing (sources in the company), external market and customers, suppliers of service, equipments and software, professional congresses, meetings, literature, fairs and exhibitions are the most important sources to get information and technology for innovation for companies.

The companies give more importance to develop product line, to gain new markets, to preserve current markets, to improve product quality, to improve capacity of

product supply, to increase efficiency in product delivery and supplier based and lastly to decrease environmental effects as aims for innovation.

For 56% of the companies, risk perception regarding innovation seems to be as obstacle. For 59% of the companies, deficiency of financial sources is a major obstacle for innovation activities. Risk perception regarding innovation, deficiency of financial sources, very high cost and deficiency of technical personnel in company are the most four important obstacle for companies for innovation activities.

For product innovation only one company is expecting to have an innovation in the world in future and 4 of the companies have implemented an innovation which is new in the world. For process innovation, only one company is expecting to implement an innovation in the world and also 2 companies have implemented innovations new in the world. For marketing innovation, there area two companies will have an innovation new in the world and only one company has implemented marketing innovation new in the world in the last three years. For organizational innovation, there is not any company which is now studying on one organizational innovation which will be new in the world and in the last three years, only company has achieved an innovation which is new in the world are examined for the innovations new in the world, country and company, it is seen that those levels are really low for Turkey. Apart from innovations that are implemented in the last three years, future aspects are also not different that the past. It seems to be not more innovations are expected to be achieved in companies although there are studies, researched regarding innovation in media, in universities and in congress.

In sectoral clusters analysis, the sectors that have resemblance to each other is tried to be detected. Paper, forestry, automotive and electrical sectors seem to be different that other sectors in all types of innovations regarding the importance level that companies in those sector give to these innovation types. Since there are not efficient company numbers in each of sector, detailed analysis may be not possible in that area.

As a continuing analysis of sectoral cluster analysis, difference between sectors regarding the importance level that they give the innovation types are studied. According to conclusions;

- Difference is not found between sectors for the importance level that they give to product innovation types.
- Difference is not found between sectors for the importance level that they give to process innovation types.
- Difference is not found between sectors for the importance level that they give to marketing innovation types.
- Difference is not found between sectors for the importance level that they give to organizational innovation types.

Relation between company characteristics and innovation degrees are examined. At first, the relation between foreign capital ownership and degree of innovation for each type are studied. But it is not found any relation between degree of innovation and foreign capital ownership between organizations for product innovations, process innovations and also marketing innovations.

There is only one relation has been found for organizational innovation degrees and foreign capital ownership. The companies that have foreign capital ownership seem to have more potential to implement an organizational innovation in the last three years than the companies that do not have foreign capital ownership. This conclusion is found as expected since Turkey is following the world in most types of innovations the companies that have foreign capital are implementing those strategies and innovations to the company that they have in Turkey.

Another analysis has been studied to detect the importance level differences between the companies that have an innovation and do not have an innovation. The companies that do not implement an product innovation give more importance to; the usage of a new method in working area, focusing on short term results (as an obstacle), central decision making and responsibility (as an obstacle) than the companies that have implemented an product innovation. The companies that have implemented a product innovation give more importance to foreign markets and customers (as a source) and innovation in techniques in manufacturing (process innovation) than the companies that have not achieved an innovation in the last three years.

The companies that have a marketing innovation give more importance to public research institutes (as a source), competitors (as a source), deficiency in

technological knowledge (as an obstacle) than the companies that do not have a marketing innovation. To develop a new usage area with incremental technical changes in product features (as a product innovation), to change design of functional features of the products (as a product innovation), decrease of customer response time (as an aim) and launch of new sales channels (as a marketing innovation) are important factors for the companies that have not implemented a marketing innovation.

The companies that have not implemented a process innovation in the last three years give more importance to decrease of unit labor costs, development of confidence and decrease of environmental risks, development of strong relations with customers (as aims for innovation), focus on short term results (as an obstacle), implementation of new marketing methods for product promotion (as a marketing innovation). Companies that have a process innovation give more importance to fairs and exhibitions (as a source), innovation in techniques in manufacturing (as a process innovation) than the companies that have not implemented an innovation.

As a last type innovation, companies that do not have an organizational innovation give more importance to deficiency of technical personnel in the company (as an obstacle), deficiency to reach to financial resources for innovation (as an obstacle), increase of product supply capacity (as an aim) than the companies that have achieved an organization change at least in the company. The companies that have implemented an innovation give more importance to develop a new usage area with incremental technical changes in product features (as a product innovation), other firms in the sector (as a source), disinclination for training employees (as a source), development of strong relation with customers (as an aim), innovation in techniques in manufacturing (as a process innovation) than the companies that have not achieved an organizational innovation in the last three years.

As it is expected the companies that have an innovation give more importance to the all factors for innovation, the results are different that companies that have not implemented an innovation give more importance to some of the factors.

In conclusion, this study has shown that companies give importance to innovation mostly to reach new markets and to increase profitability. Companies use suppliers of service, equipments and software, professional congresses, meetings, literature,

fairs and exhibitions to get information and technology for innovation mostly. Risk perception regarding innovation, deficiency of financial sources, very high cost and deficiency of technical personnel in company are the obstacles for companies to research and implement innovations.

As companies start to give more importance to innovation and conscious is increasing, the companies do not have yet enough studies on innovation for the future. The companies should work on to win the obstacles and give more importance to the sources to implement new innovation activities to continue competition in global markets especially with far-east countries.

It is shown that, in fact, there are not many innovations that have been implemented in companies in the last three years and most of them are innovation in the company that has been adapted by other companies. Innovations those are new in the country and new in the world are less than the innovations that are new in the companies as expected.

For future, there are also not many innovations are expecting to be implemented. But, the companies should work on more innovations especially the innovations that will bring added value to companies to fight against countries like China, India etc that has cheap labor force.

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APPENDIX: The Survey Questionnaire

2 January 2008

To responsible Manager,

We need your help for master thesis of Management Engineering program in Istanbul Technical University. The survey that we have sent us aims to research innovation, obstacles for innovation, incentives and sources of innovation in Turkish Manufacture Sector.

The responses will be kept confidential and information will be evaluated in general. If you require, results will be sent to you in summary. Please inform us regarding this request.

It is really important to send us back this survey in two weeks to keep survey update.

This research will reach to its aim with filling by managers in manufacturing or engineering departments including your thoughts and opinions. We would like you to fill the survey and send back to us and thanking you in advance for your contribution and understanding.

Best regards,

Prof. Dr. Sıtkı GÖZLÜ Chem. Eng. Bahar Emeksizoğlu

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INNOVATION ACTIVITIES SURVEY

1. Date of Foundation of the Company……

2. The sector that the company is in .....

3. How many employees are working in the company?

( ) 10-49

( ) 50-249

( ) more than 250

4. How much sales revenue does the company have in 2007?

( ) less than 250,000 YTL

( ) 250,000 YTL – 1 million YTL

( ) 1 million YTL – 5 million YTL

( ) 5 million TL – 10 million YTL

( ) 10 million YTL – 50 million YTL

( ) more than 50 million YTL

5.Which one is your target market?

( ) Only internal market

( ) Only external market

( ) Both of them

6.Is there any foreign capital ownership in the company?

( ) Yes

( ) No

In below questions, 1-5 shows the impotance levels. Please select the one that is suitable for you.

(5) Very important

(4) Important

(3) Averagely important

(2) Less important

(1) Not important

7. About which subjects have been done training or about which subjects do you need training, please specify the importance level

.

Training Subject	**Actualized**		**Importance Level**				
	Yes	**No**	**1**	**2**	**3**	**4**	**5**
Capability of problem solving			(1)	(2)	(3)	(4)	(5)
Models regarding the increase of capability of employees			(1)	(2)	(3)	(4)	(5)
Teamwork			(1)	(2)	(3)	(4)	(5)
Organizational Learning			(1)	(2)	(3)	(4)	(5)
Innovativeness			(1)	(2)	(3)	(4)	(5)

'An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations'

8. In which types innovations have been actualized in the last three years or in the stage of actualizing? What is the level of innovation (new in the world, new in the country, new n the company)?

Innovation Level / **Innovation Type**	**Innovation will be actualized**			**Innovation had been actualized**		
	New in the world	**New in the country**	**New in the company**	**New in the world**	**New in the country**	**New in the company**
Product Innovation						
Process Innovation						
Marketing Innovation						
Organizational Innovation						

9. Please specify the importance levels of innovation types.

Innovation	Actualized		Importance Level				
	Yes	No	1	2	3	4	5
Product Innovation							
Launch a product that is not produced before with current methods and technology			(1)	(2)	(3)	(4)	(5)
Produce a new product with new information technology that is not in the company			(1)	(2)	(3)	(4)	(5)
Produce a product that has a new usage area			(1)	(2)	(3)	(4)	(5)
Develop a new usage area with incremental technical changes in product features			(1)	(2)	(3)	(4)	(5)
Changing design of functional features of the product			(1)	(2)	(3)	(4)	(5)
Process Innovation							
Innovation in manufacture of new products			(1)	(2)	(3)	(4)	(5)
Innovation in currently used equipments			(1)	(2)	(3)	(4)	(5)
Acquire of new software			(1)	(2)	(3)	(4)	(5)
Innovation in delivery methods			(1)	(2)	(3)	(4)	(5)
To have new technique, software and equipment in support activities			(1)	(2)	(3)	(4)	(5)
Marketing Innovation							
Change in design or appearance of products			(1)	(2)	(3)	(4)	(5)
Launch of new sales channels			(1)	(2)	(3)	(4)	(5)
Implementation of new marketing methods for product promotions			(1)	(2)	(3)	(4)	(5)
Implementation of new pricing strategies			(1)	(2)	(3)	(4)	(5)
Organizational Innovation							
Usage of new methods for working execution			(1)	(2)	(3)	(4)	(5)
New methods for distribution of responsibility and decision making between workers			(1)	(2)	(3)	(4)	(5)
Usage of new organizational methods in external relations			(1)	(2)	(3)	(4)	(5)

10. Which sources are used for information and technology transfers in the company, please specify the importance level?

Sources for Technology	Usage		Importance Level				
	Yes	No	1	2	3	4	5
Sources in the company			(1)	(2)	(3)	(4)	(5)
R&D			(1)	(2)	(3)	(4)	(5)
Manufacture			(1)	(2)	(3)	(4)	(5)
Marketing			(1)	(2)	(3)	(4)	(5)
Delivery			(1)	(2)	(3)	(4)	(5)
Sources out of the company							
External market and customers			(1)	(2)	(3)	(4)	(5)
Competitors			(1)	(2)	(3)	(4)	(5)
Other companies in the sector			(1)	(2)	(3)	(4)	(5)
Consultants / Consulting companies			(1)	(2)	(3)	(4)	(5)
Private Research Institutes			(1)	(2)	(3)	(4)	(5)
Suppliers of service, equipments and software			(1)	(2)	(3)	(4)	(5)
Public Sector Sources							
Universities			(1)	(2)	(3)	(4)	(5)
Public Research Institutes			(1)	(2)	(3)	(4)	(5)
Expertise public/semi public innovation support services			(1)	(2)	(3)	(4)	(5)
General Information Sources							
Patents			(1)	(2)	(3)	(4)	(5)
Professional congresses, meetings, literature			(1)	(2)	(3)	(4)	(5)
Fairs and exhibitions			(1)	(2)	(3)	(4)	(5)
Professional and commercial unions			(1)	(2)	(3)	(4)	(5)
Illegal networks			(1)	(2)	(3)	(4)	(5)
Public Organizing			(1)	(2)	(3)	(4)	(5)

11. Which aims do you have in the company regarding innovation, please specify the importance level?

Aims / Effects	Aims		Importance Level				
	Yes	**No**	**1**	**2**	**3**	**4**	**5**
Competition, Demand and Markets							
reproduce of products that were not manufactured more including changes			(1)	(2)	(3)	(4)	(5)
Increase of product and service supply line			(1)	(2)	(3)	(4)	(5)
Increase or preserve current market ratio			(1)	(2)	(3)	(4)	(5)
Entering new markets			(1)	(2)	(3)	(4)	(5)
Increase of appearance of products			(1)	(2)	(3)	(4)	(5)
Decrease of customer response time			(1)	(2)	(3)	(4)	(5)
Manufacture and Delivery							
Increase of product and service quality			(1)	(2)	(3)	(4)	(5)
Increase of flexibility of product and service supply			(1)	(2)	(3)	(4)	(5)
Increase of product and service supply capacity			(1)	(2)	(3)	(4)	(5)
Decrease of unit labor costs			(1)	(2)	(3)	(4)	(5)
Decrease of product design costs			(1)	(2)	(3)	(4)	(5)
Decrease of manufacturing delays			(1)	(2)	(3)	(4)	(5)
Decrease of service activities supply costs			(1)	(2)	(3)	(4)	(5)
Increase of efficiency of product and service supply and/or delivery time			(1)	(2)	(3)	(4)	(5)
Increase of information technology capacity			(1)	(2)	(3)	(4)	(5)
Organization in the Company							
Development of communication and interaction between different commercial activities			(1)	(2)	(3)	(4)	(5)
Increase of information transfer and share with other organizations			(1)	(2)	(3)	(4)	(5)
Development of strong relations with customers			(1)	(2)	(3)	(4)	(5)
Development of working conditions			(1)	(2)	(3)	(4)	(5)
Others							
Development of confidence and decrease of environmental risks			(1)	(2)	(3)	(4)	(5)

12. Which parameters are obstacles for innovation activities, please specify the importance level?

	Obstacle		Importance Level				
	Yes	No	1	2	3	4	5
Cost			(1)	(2)	(3)	(4)	(5)
Risk perception regarding innovation			(1)	(2)	(3)	(4)	(5)
Very high cost			(1)	(2)	(3)	(4)	(5)
Deficiency of financial sources			(1)	(2)	(3)	(4)	(5)
High inflation and interest rates			(1)	(2)	(3)	(4)	(5)
Deficiency in reaching risk capital			(1)	(2)	(3)	(4)	(5)
Knowledge Factors							
Deficiency in technological knowledge			(1)	(2)	(3)	(4)	(5)
Deficiency in market knowledge			(1)	(2)	(3)	(4)	(5)
Deficiency of technical personnel in company			(1)	(2)	(3)	(4)	(5)
Deficiency in technical personnel in sector			(1)	(2)	(3)	(4)	(5)
Deficiency of information to reach to incentives as support projects and financial sources			(1)	(2)	(3)	(4)	(5)
Organizational Factors							
Managerial incentives not including reward for innovation			(1)	(2)	(3)	(4)	(5)
Disinclination for training employees			(1)	(2)	(3)	(4)	(5)
Central decision making and responsibility mechanism			(1)	(2)	(3)	(4)	(5)
Resistance to internal changes			(1)	(2)	(3)	(4)	(5)
Focusing on short term results			(1)	(2)	(3)	(4)	(5)
Market, Competitiors							
Imitation risk by competitors			(1)	(2)	(3)	(4)	(5)
Market structure dominated by big companies			(1)	(2)	(3)	(4)	(5)

Name, Surnamae:

Title :

Company Name :

Company Address :

Telephone Number :

Fax:

E-mail:

Would you like us to send you the research results as summary?

( ) Yes

( ) No

CIRCULUM VITAE

Bahar Emeksizoğlu was born in 1982 in İstanbul. She graduated from chemical engineer program of İstanbul Technical University in 2005. In 2003, she attended to management engineering double major program. She graduated management engineer program in 2006 and in the same year, she attended management engineer master program in Istanbul Technical University. From October/2008, she is working in Eczacıbaşı-Baxter Hast. Urun. San ve Tic. A.Ş.