

## **Journal of Economics, Management and Trade**

**18(4): 1-10, 2017; Article no.JEMT.35764**

*Previously known as British Journal of Economics, Management & Trade*

**ISSN: 2278-098X**

# **Innovation Activities in Turkey: Comparative Analysis of 2010-2012 and 2012-2014 Periods**

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### **Authors' contributions**

*This work was carried out in collaboration between both authors. Author MK designed the study and managed the analyses of the study. Author HD performed the statistical analysis, wrote the protocol, managed the literature searches and wrote the first draft of the manuscript. Both authors read and approved the final manuscript.*

### **Article Information**

DOI: 10.9734/JEMT/2017/35764

#### Editor(s):

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Complete Peer review History: <http://www.sciencedomain.org/review-history/20721>

**Short Research Article**

**Received 28<sup>th</sup> July 2017**  
**Accepted 24<sup>th</sup> August 2017**  
**Published 29<sup>th</sup> August 2017**

## **ABSTRACT**

The dynamics of globalization have lead to many changes in the environments in which organizations carry out their activities. The modern world has become more interested in competition, speed, risk, productivity and dynamism. Of course, the organizations, which are main elements of the modern world have been affected by these changes. As a result, these organizations have been enforced to renovate their products, systems, processes and strategies. The way of this doing is being creative & innovative. It is evident that the organizations which give priority to creativity and innovation, gain new costumers, obtain a sustainable competitive advantage by producing new values to its customers are naturally advantageous over their competitors.

The goal of this research is to determine the industry's ability for, technological innovation, new product and process development, using new technology, spreading new technology. The results of this research are based on the data obtained from 2010 - 2012 and 2012 - 2014 seasonal

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statistic database (which is prepared by Turkish Statistical Institute). According to the results achieved from this research, the percentage of innovative enterprises grow up from 48,5% to 51,3%. Ones who work on product innovation increased from 77,1% to 77,7% and who works on process innovation increased from 61,3% to 63,3%. Initiatives that carry out innovation activities, the rate of receiving financial support during the period 2012 - 2014 has increased, and the highest growth was 72% in financial support from central public institutions.

*Keywords: Obstacles for innovations; product innovation; National innovative system; product innovation.*

## 1. INTRODUCTION

Improvements in technology and globalization have significant effects as economic structures evolved and social relations re-shaped globally in the latest century. Developments in information and communication technologies as a result of the globalization, have significant effects on economic structures and even the legal systems of nations. Briefly, people's lifestyles have started to look more similar and come closer to each other [1]. With the advantage of science and technology especially rapid changes in communication and transportation, globalization has created a situation which stems from international conjunction and socio-economic reasons. Thus, world markets have entered into the process of becoming a single market. This process depends on the efforts to make innovations and R&D works.

Innovation is defined as the process of converting knowledge into economic and social benefits. Therefore, it's a combination, of technical, economic and social processes. The desire of individuals and society for change requires a culture, which identifies with the tendency to innovation and entrepreneurial spirit. The expectation from innovation is that it transforms a scientific and technological idea into a benefit which can be expressed as a theory or an action or a result. Innovation is an event, which has both local and national characteristics [2]. Countries have to set their innovation strategies according to their national priorities. Companies have to continuously revise and change their production management methods to survive in today's rapidly changing competitive environment. Companies also need to learn through their unfortunate experience for gaining experience [3]. This concept is defined as "innovativeness".

"Innovativeness" is the basic method of creating opportunities; gaining a sustainable competitive

advantage, being a leader in the market and improving performance. Companies usually try to gain an advantage over their competitors by creating better customer value and developing their services and products in the competitive market. To achieve this, they focus on differentiation and cost orientation. At this point, innovation brings the profitability at the competitive market and it provides the superiority to non-innovatory companies by reducing cost.

In today's competitive environment, companies have to execute competitive business practices more successfully than their rivals to compete with them and to be outstanding. Being innovative has great importance for enterprises who want to be a dynamic organization against their competitive opponents. Innovativeness, especially in the product, process and organizational structure, is inevitable for companies while it is also essential for every aspect of economic life in general [4,5]. Research and development efforts for achieving innovation can be local, regional and global at the same time. Mostly innovation itself is a universal phenomenon. Therefore, both research-development efforts and the factors affecting innovation should be analyzed from an international perspective for better evaluation of innovation.

## 2. CONCEPT OF INNOVATION AND THE SORTS

The word of Innovation, with Latin roots of its, signifies not only the process of renewal but also the knowledge, the technology and the product, all of which are the outcome of its process. Briefly, this word itself contains the meanings of the words 'innovate' and 'innovation' together. Consequently, innovation in the definition of novelty requires comparative superiority according to the previous situation either in science or technological advancements and production [6].

Derived from the Latin word “innovationem”, the word “innovation”, which is translated as “yenilik” into Turkish, has several meanings like “renovation”, “change”, “pioneer” and “first” [7,8]. The term “renovation” is defined as “a productive/creative destruction” by [9] according to whom, innovation is not only to develop a new product but also to grant it a commercial value [10]. Building up a new system, developing existing products and services for business purposes; utilizing the existing products, services and processes in new fields of work or new markets.

Innovation is the process which includes transformation, adaptation, application and integration of new ideas, new markets and new practices in business management which turn into new products and services [11]. Different from discovery and invention, innovation signifies the management that surrounds the process of an idea from the conceptual existence of an idea to the arrival at the market and implies the economic and social system which is due to the differentiation and change of the outcome rather than the renovation itself. Creativeness is unlike the innovation; in addition to including the act of boosting the creative ideas in a company, creativeness is considered as the start point of innovation [12,13].

[14] states in his researches that most of the companies in food sector, prefer cost leadership as their competitive strategy, however the number of the enterprises that use differentiation strategy is quite a lot. The companies that could differentiate themselves from the others are more successful in current market conditions, so this implementation is interpreted as that traditional competition concept which depends on low-cost and low-price has started changing in Turkish food sector.

In their recent study, [12] announced that there is a relationship between the types of innovation, size of the companies, sale incomes, current global markets conditions, innovation expenditures, financial support provided to companies for innovation, utilization of various sources of knowledge for improving innovation and cooperation with the other institutions innovation. They also proposed that those dimensions have an impact on the types of innovation.

According to the [15], types of innovation are classified under four main titles, which are;

*Product Innovation, Process Innovation, Marketing Innovation, Organizational Innovation.*

*Product innovation* is any form of development of the products and services of an organization. While *Product Innovation* is closely related with technological product and process innovation, the terms of *Marketing and Organizational Innovations* have been added to the Oslo Guide afterward.

In the Oslo Guide, *Product Innovation* is defined as “creating a new or significantly improved product or service regarding the current features or predicted usage of it”. On the other hand, Innovation is defined in the studies of some other researchers [16,17], as “renovations or changes on a product which is produced by a companies or institution.” For instance, every new model of an automobile brand can be defined as a *Product Innovation*.

*Process innovation* is defined as “the implementation of a new or significantly improved process in production or delivery of goods. This type of innovation includes the production method, techniques in the production of goods and services, equipment and software.

*Marketing innovation* is defined as “a new marketing method which includes the significant changes in the methods of design, packaging, positioning, advertising and/or pricing of a product”. With Marketing Innovation, it is aimed that companies can access to new markets and increase their profits by new marketing and advertising methods.

*Organizational innovation* is defined as “implementation of new methods in commercial practices, an organization of workplace and foreign affairs of the company” [15]. The objective of organizational innovation is to reduce administrative and process costs, increase satisfaction in the workplace and, consequently increase the productivity of the staff; granting access to non-profit items or increasing the performance of the companies by decreasing the costs of equipment and goods.

### **3. MATERIALS, METHODS AND THE FINDINGS OF THE RESEARCH**

#### **3.1 Objective and Scope**

The goal of this study is to identify the industries' abilities for conducting technological innovation,

new product and process development, efforts for utilizing new technology and spread it. Our expectation from the results of this study is to enable the enterprises existing in our country; to increase innovation ability, to identify and remove the causes preventing innovation. Besides, it will help establish a better understanding of the impact of the innovation on the economic development and competition. Lastly, this study will provide a comparative survey the innovation performance of Turkey's national economy according to other economies.

The data used in this research was collected from the production sector (*mining, quarry, manufacturing, electrics, gases, steam and air conditioning, water supply, sewer system*) and service sector (*commerce, transportation and storage, finance and insurance, data and communication, scientific research and development, architecture, engineering*) by using sample survey method by the Department of Statistics (TurkStat). The geographic scope of the study is identified as Turkey.

### 3.2 Methods

Technological Innovation Statistics data issued periodically on the website of the Department of Statistics in Turkey is taken as a basis to identify the sector's efforts and innovation abilities for creating technological innovation, developing new product and process. Using and spreading the new technology by utilizing the OECD methodology by adapting the Model Questioning Sheet of Group Innovation Questionnaire derived from OSLO Guide once in two year-period. In

this research, we analyzed two TurkStat Bulletins. One is dated 2015 which covered the 2012 - 2014 period and the other bulletin dated 2013 which covered 2010 - 2012 [18,19].

The data source of the innovation statistics in Turkey is the enterprises which are selected by the sampling method. The Statistics of Innovation data is gathered by TurkStat Regional Departments by face-to-face interview method. The data collecting activity is conducted by using a web-based questionnaire and processed by the Regional Departments of TurkStat as well.

### 3.3 Evaluation of the Research Findings

#### 3.3.1 Innovative enterprises conducting innovation

Fig. 1 shows the percentage comparison of 2010 - 2012 and 2012 - 2014 data for four different categories of businesses which conducted innovation activities which are; product, process, organization and marketing innovations.

As seen in Fig. 1, 48,5% of enterprises conducted innovative actions between 2010 - 2012 has increased by 3,8% between the years 2012 - 2014 up to 51%.

While there is an increase of companies engaged in product innovation (5%) and processes innovation (6,4%) between 2012 - 2014 years we see a decline in organizational innovation (3,2%) and marketing innovation (1,1%).

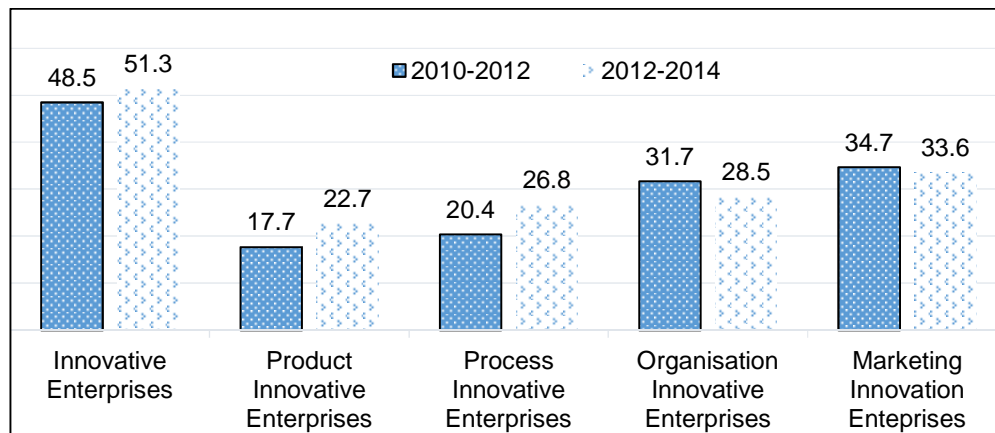


Fig. 1. Innovative enterprises and innovation types, 2010-2012 and 2012-2014 comparison

According to the obtained data, when the periods of 2010-2012 and 2012-2014 compared to in Turkey, the biggest increase is seen in the group of initiatives with Process Innovation with 6,4% while the greatest decline is in the group of initiatives with Organizational Innovation with 3,2%.

### **3.3.2 Product innovation enterprises in Turkey**

In this section, innovative activities of product innovation companies are examined closely as to what has been made and which fields of processes are innovated. As can be seen in Fig. 2, the area of innovations in the 2012-2014 period, in the goods sector is relatively high.

The ratio of goods innovation enterprises increased from 77,1% up to 77,7% in the period of 2012 – 2014. The growth of enterprises in goods innovation was by 0,6%. Wherever the enterprises in service innovation activity reached up from 61,3% to 63,3% by a 2% increase.

According to these results, the biggest increase rate in Product innovative enterprises in the periods mentioned above took place in service innovation activities by 2%.

### **3.3.3 Process innovative enterprises in Turkey**

As seen in Fig. 3, the enterprises which applied process innovation in Turkey between 2012 - 2014 like they did in 2010 - 2012 either developed or improved their manufacturing processes of goods or services. When we

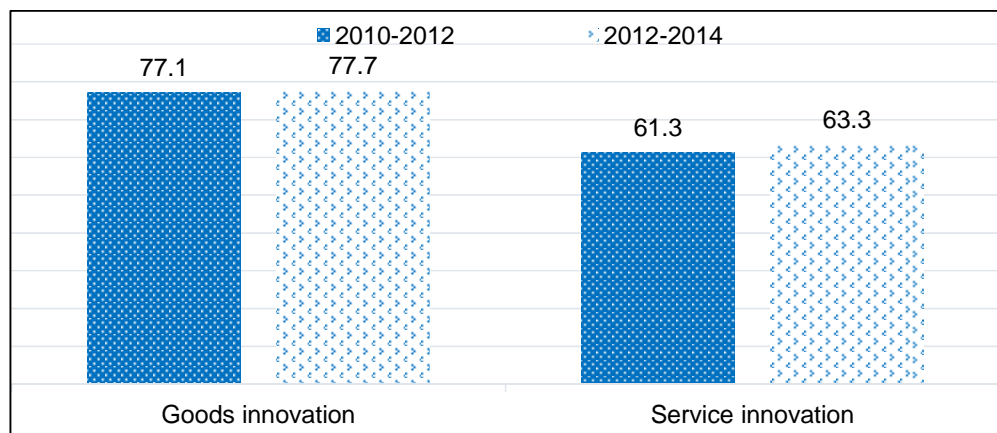
compare 2010 - 2012 and 2012 - 2014 periods; enterprises that utilized process innovation by applying new or significantly improved logistics, delivery or distribution methods for inputs, goods or services displays an increase. On the other hand, a decrease can be observed in manufacturing processes of products as well as in the processes of supporting activities.

While there is a decline in New or significantly improved methods of manufacturing for producing goods or services innovation (5,1%) and New or significantly improved supporting activities for processes innovation (11,1%) between 2012 – 2014 years we see an increase in New or significantly improved logistics, delivery or distribution methods for inputs, goods or services (1,7%).

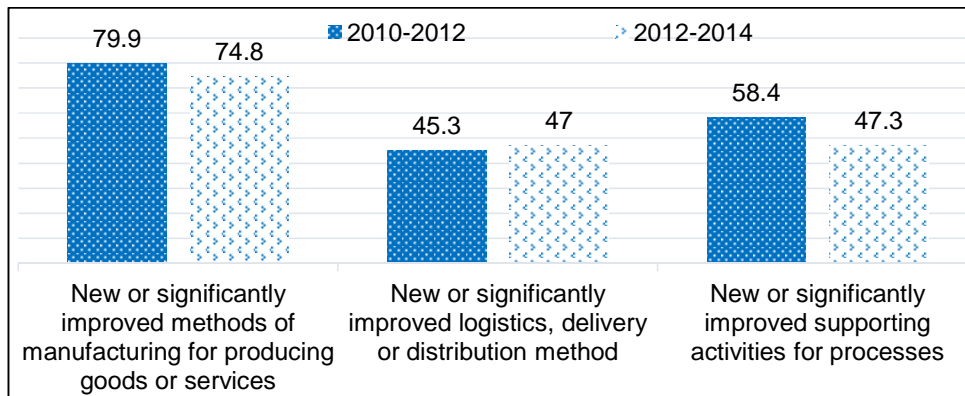
According to the data obtained, only increase in the period of 2010 - 2012 and 2012 - 2014 is in the enterprises in New or significantly improved logistics, delivery or distribution methods for inputs, goods or services with 1,7%. The most decline was in New or significantly improved supporting activities for processes with 11,1%.

### **3.3.4 Organizational innovation initiatives in Turkey**

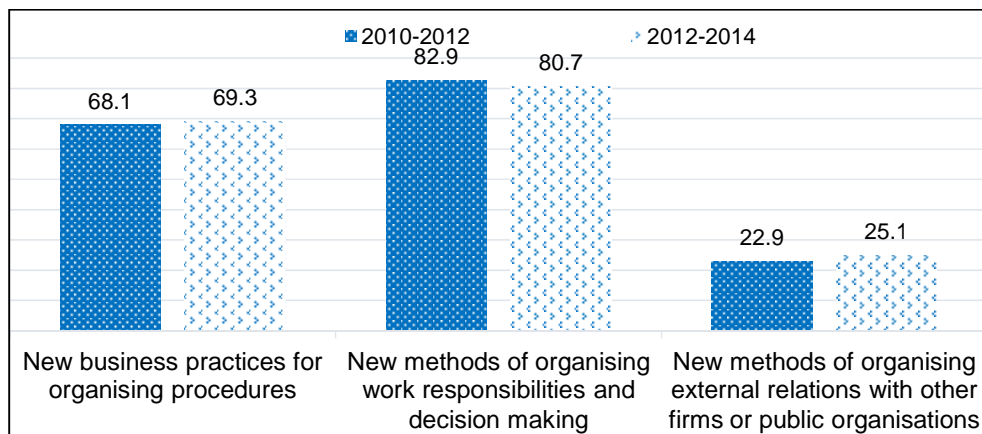
Organizational innovation activities implemented by initiatives are shown in Fig. 4. When Fig. 4 is examined, the organizational innovation activities implemented by the enterprises are in the period of 2010 - 2012 as well as the new methods of organizing work responsibilities and decision making in the period of 2012-2014.



**Fig. 2. Innovation levels of enterprises, 2010–2012 and 2012-2014 comparison**



**Fig. 3. Innovative process enterprises, 2010-2012 and 2012-2014 comparison**



**Fig. 4. Implementation of organizational innovation types, 2010-2012 and 2012-2014 comparison**

While there is an increase in New business practices for organizing procedures (1,2%) and New methods of organizing external relations with other companies or public organizations (2,3%) between 2012 – 2014 years we see a decline in New methods of organizing work responsibilities and decision making (2,2%).

According to the obtained data, the greatest increase is in the period of 2012 - 2014 was in New methods of organizing external relations with other companies or public organizations. The increase was up from 22,9% to 25,1% and the increase rate was 2,3%.

**3.3.5 Marketing innovation activities in Turkey**

Initiatives in marketing innovation activities in Turkey include; Significant changes to the aesthetic design or packaging of a good or service, New media or techniques for product promotion, New methods for product placement

or sales channels and new methods of pricing goods or services made in four areas. The most increase was with 4,7% New methods for product placement or sales channels.

In Implementation of Marketing Innovation Types, while there is an increase in Significant changes to the aesthetic design or packaging of a good or service (3,9%), New media or techniques for product promotion (2,6%) and New methods for product placement or sales channels (4,7%) between 2012 – 2014 years we see only a decline in New methods of pricing goods or services (4,3%).

According to the obtained data, there is only a decrease of 4,3% in the application of new methods of pricing goods or services and the maximum increase was 4,7% in new methods for product placement or sales channels. In order to decrease expenditures companies started to focus on new sale channels like network marketing or online sales.

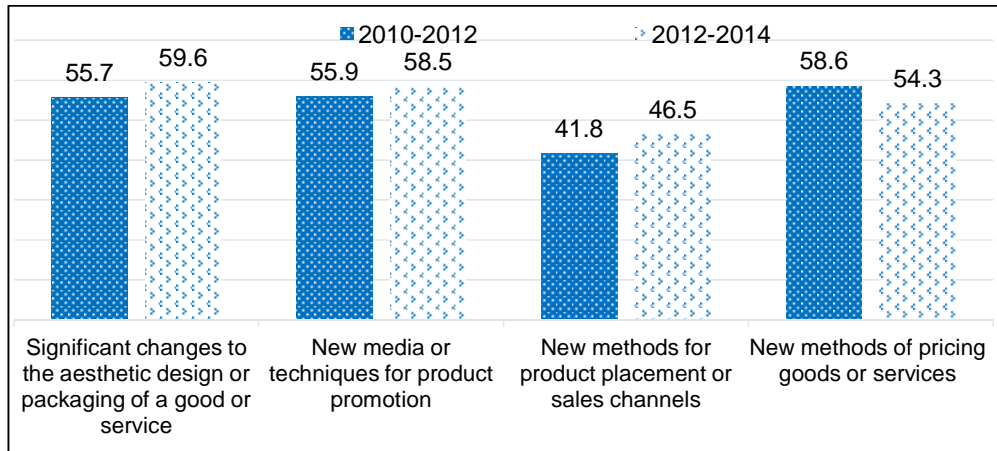


Fig. 5. Implementation of marketing innovation types, 2010-2012 and 2012-2014 comparison

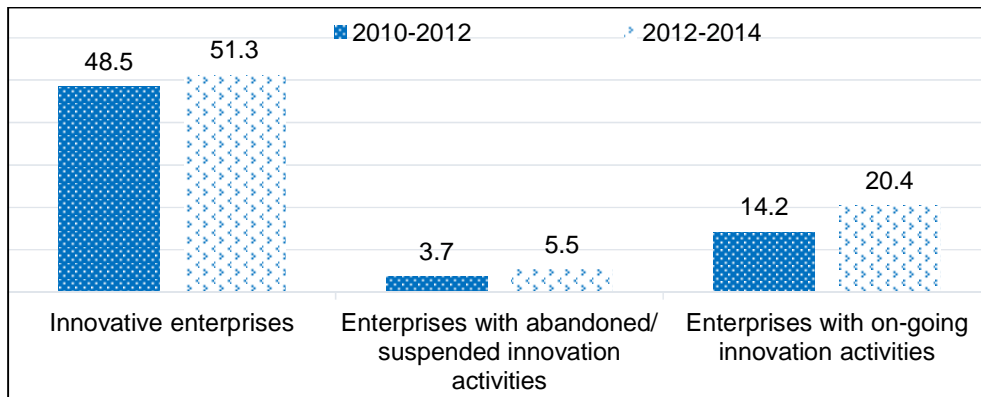


Fig. 6. Innovative enterprise and sustainability, 2010-2012 and 2012-2014 comparison

**3.3.6 Sustainability of enterprises in innovation activities**

In this section, when the sustainability of Initiatives in innovation activities between 2010 - 2012 and 2012 - 2014 is analyzed; it can be seen in Fig. 6, in general, the number of enterprises in Turkey, which was 48,5% in 2010-2012, rose by 2,8% to 51,3% in 2012-2014.

As can be seen in Fig. 6, the rate of innovation activity sustainability is 14,2% between 2010 - 2012, compared 2012 - 2014 period with an increase of 6,2% to 20,4%. Unfortunately, the rate of initiatives that abandoned/suspended innovation activities increased 1,8% to 5,5%.

**3.3.7 Status of enterprises in innovation activities receiving financial support**

Initiatives in innovation activities in Turkey between 2010 - 2012 and 2012 - 214 received

financial support. As shown in Fig. 7, the proportion of enterprises receiving financial support increased by 5,1% to 29,2%.

Governments, which wants to have powerful position in the global era, know that they have to support innovative companies. Because lead to technology needs innovation.

As can be seen in Fig. 7, in all of the initiatives that carry out innovation activities, the rate of receiving financial support during the period 2012 - 2014 has increased. However, the highest increase was 72% in financial support from central public institutions. The second largest increase was in financial support from local or regional public organizations with an increase of 8%. Last but not least, there was financial support from European Union sources with a 3% increase.

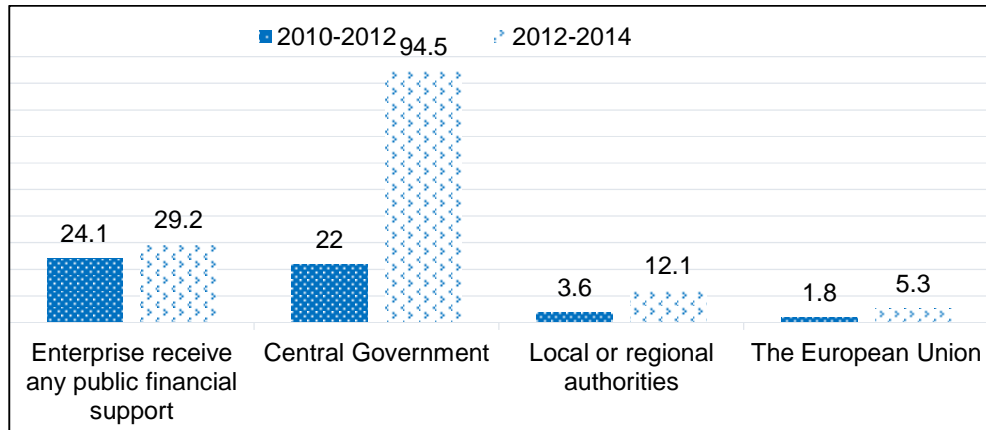


Fig. 7. Financial support ratios of enterprises, 2010-2012 and 2012-2014 comparison

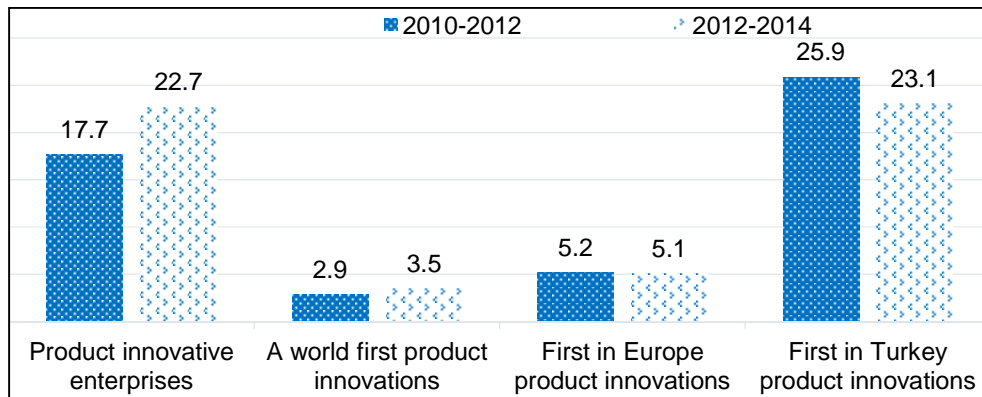


Fig. 8. Radical innovations by region, 2010 - 2012 and 2012 – 2014 comparison

According to these results, initiatives that undertake innovation activities during the period 2012 - 2014 are mostly receiving financial support from central public institutions (94%). The proportion of enterprises receiving financial support from local or regional (12%) and European Union sources (5%) is very low.

### 3.3.8 Radical product innovations of product innovative enterprises

Enterprises that made product innovation in Turkey and the regions they are doing is shown in Fig. 8. In the 2012 - 2014 period, the rate of 17,7% increased by 5% to 22,7%.

While there is an increase in product innovations in the world (0,6%) between 2012 – 2014 years we see a decline in the first product innovations in Turkey (2,8%) and a slight decline in product innovations that were the first in Europe (0,1%).

## 4. CONCLUSION

Innovative activities have advantages such as improvement of the product's quality, expanding new markets and reduction of the costs. The actors, such as government, sector, institutions of research, which affect innovation have contributions like providing the exact conditions for innovation, easing the technical information flow and exchange, inventing the best way of technological transfer, focusing on the competition, perceiving the opportunities, strengthening communication and facilitating the productive abilities of the companies [20]. It is essential in the present competitive environment that the enterprises compete with their rivals and surpass them and conduct the competitive priorities better. On the other hand, it is crucial that the organizations which are more dynamic than the others must be innovative in order not to be an easy target for its rivals. While innovation is one of the essential components of all means



of economics, the innovation of products, processes and constant innovation of the organizational structures have become the basic necessities for survival.

In this research, the companies which conduct innovative activities, the types of innovation, the expenditures for innovation, the financial support for enterprises regarding innovation, the areas where process innovations have been investigated. According to the obtained data, in general in the period of 2012 - 2014 it is determined that there is an increase in the number of companies in innovative enterprises as per 2010 - 2012. Despite significant increases in initiatives especially for product and process innovations in the period of 2012 - 2014, this has shown a slight decrease in organizations and marketing innovation initiatives. The highest increase in this period was observed in process innovation (6,4%). According to red queen hypothesis companies must improve themselves not to fall behind in global competition. Therefore, the companies will be forced to innovate in the future as well as today.

According to the research results published periodically by TurkStat, the majority of Innovative Enterprises, which made product innovations between 2012 and 2014 are similar to those in 2010 - 2012, with innovations as goods innovations. Between 2012 and 2014, there has been an increase in the number enterprises that are innovating both goods and services. The highest increase was in the number of service innovations (2%). The customer satisfaction perception has a profound impact to lifecycle of the companies. Satisfied customers are always an important benefit to companies. According to the data obtained, the majority of the enterprises that made process innovation between 2012 and 2014 made this innovation in the process of production of goods and services as it was between 2010 and 2012. During the period between 2012 and 2014, there have been only increasing in logistics, delivery and distribution processes. Decreases in the processes related to the production processes and supporting activities of goods or services have occurred.

According to the results of the research, the enterprises have made significant increases in the period of 2012-2014 in terms of organizational innovation activities, cooperation with other enterprises or public institutions, partnership, subcontracting and new business

methods for the organizational process. In this period, it seems that some of the most applied job responsibilities and the use of new methods in the decision-making process are somewhat reduced. Again, according to these results, within the scope of the marketing innovation activities that enterprises implement; During the period 2012 - 2014, the most recent increase in the implementation of a new sales or distribution method (5%) has occurred and is followed by a 4% increase in product design or changes in packaging aesthetics. At the beginning of innovation process, changes and efforts to improve the system and their effects become bigger, then the efforts, changes and their effects will be smaller. At the end, there will be only little jobs to improve continually that we may call it just fine tunings. During the 2012-2014 period, the number of innovative initiatives and innovation activities has been growing, and the vast majority of these initiatives have also been successful.

According to the results of the research, the rate of receiving financial support from the industrial enterprises carrying out the innovation activities also increased in the period of 2012 - 2014, and the support received from the Central Government with the increase of the ratio of 72%. It is also observed that there has been a significant increase in the number of enterprises receiving financial support from local or regional institutions and the European Union in the same period. According to the statistics provided by TurkStat, the radical innovations of enterprises in Turkey between 2012 and 2014 have increased in our country. It will not be possible to survive in a competitive environment without sustainable innovation. Therefore, companies need to make sustainable innovativeness to survive. In general, there have been significant increases in the number of product innovation initiatives in the same period. According to these results, it is possible to say that Turkey is working not only within its borders but also worldwide to have a say in innovation activities.

## **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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