



LUND UNIVERSITY

School of Economics and Management

**Master program in Economic Growth,
Innovation and Spatial Dynamics**

Analysis of ICT in Turkey and EU-27 Countries: Why Turkey Lagged Behind?

Veli Gökhan Ekinci
veli.ekinci.148@student.lu.se

Abstract: This study analyses the situation of information and communication technologies in Turkey with making a comparison by applying social capability and catch up theory between Turkey and EU-27 countries ICT production, export, diffusion, and usage among individuals and households, between 2007 and 2013. However, development of ICT industry has started after the industrialization; production and technology development have rapidly increased after the 1980s. Some countries increased their technology production and export, and they became technology and manufacturing giants, while the others were still struggling with completing their industrialization period, like Turkey. Even though, Turkey seems like very close to catch up with the most of European Countries, still it has some lack of the expanding its technology productivity and its international market share in ICT industry. Within this frame, the study search on the reasons of why Turkey is lagged behind of the developed countries even though, it has a potential to develop and increase the technology production.

Key words: Turkey, ICT, EU-27, social capability, catch up

EKHM51

Master thesis (15 credits, ECTS)

June, 2014

Supervisor: Jonas Ljungberg

Examiner: Håkan Lobell

Contents

1. Introduction	4
2. Previous Research	6
3. Theoretical Framework	8
3.1 The Catch-up and Social Capability	9
4. Contribution	13
5. Scope and Limitations	14
6. Methodology	14
7. ICT Sector and Its Use in Turkey and EU-27 Countries	15
7.1 ICT in Turkey	17
7.1.1 Production	21
7.1.2 Exports	25
7.1.3 ICT Usage on Households and Individuals in Turkey	26
7.2 Computer, Electronic and Optical Products Manufacturing in EU-27	29
7.2.1 ICT Usage on Households and Individuals in EU-27	30
8. Information Technologies Sector and Its Potential in Turkey	37
8.1 Analysis of Current Situation in Turkish IT Sector	38
8.1.1 Strengths of Turkish IT Sector	40
8.1.2 Weaknesses of Turkish IT Sector	41
8.2 Applied Government Policies in the New Economy in Turkey	42
8.2.1 Applied Science and Technology Policies and Export Performance	43
8.2.2 Adaptation Efforts and Competitiveness	44
9. Conclusion	45
10. References	49

List of figures

Figure 1: GDP per capita; USD current PPPs, Turkey and Poland, (between 2007 and 2012).....	17
Figure 2: Real GDP annual growth (%), Turkey and Poland, (Between 2007 and 2012) <i>Source: OECD, (2014)</i>	18
Figure 3: Main Indicators of ICT use in Turkey, 2007 and 2013 (% of all Individuals and Households). <i>Source: Eurostat (online data code: (isoc_ci_in_h), (isoc_ci_ifp_iu), and (isoc_ci_cfp_cu))</i>	28
Figure 4: Internet access and broadband internet connections by households, EU-27, 2007 and 2013 (% of all households). <i>Source: Eurostat (online data code: (isoc_ci_in_h) and (isoc_ci_it_h))</i>	30
Figure 5: Internet access of households, 2007 and 2013 (% of all households) <i>Source: Eurostat (online data code: (isoc_ci_in_h))</i>	31
Figure 6: Frequency of internet use, 2013 (% of individuals aged 16 to 74).....	34
Figure 7: Individuals who ordered goods or services over the internet for private use in the 12 months 2007-2013 (% of individuals aged 16 to 74).....	35
Figure 8: Use of internet for social networking, learning, civic and political participation, by age group, 2011 and 2013 (% of individuals).....	36

List of tables

Table 1: Production and Exports of Turkish Electronics Industry by Subsectors (US \$1 000).....	22
Table 2: Production of Turkish and Polish Electronics Industry (US \$1 000)	22
Table 3: Production and Exports of TV sets in Turkey in 2012 (1 000 Units)	22
Table 4: Use of ICTs and use of online services, 2011-2013 (% of individuals aged 16 to 74)	32
Table 5: Place of internet use, 2011 (% of individuals aged 16 to 74)	33

1. Introduction

After the industrial revolution, there have been significant transformations in each economy of the world. However, some countries carried out rapid industrial development, while others are still struggling with economic problems and trying to catch up with developed countries. Turkey is a country which faces numerous economic and social problems as it tries to catch up with the developed countries to reach the level of a welfare society. In 1950s, the invention of the computer in the wake of the transistor has caused to changeovers in the world economy (Dogan, 2010). These developments have involved a rising up for a new sector in the world economy. Knowledge has been the primary resource of Information and Communication Technology which is called as the new economy, information economy, digital economy, and so on. The effect of rapid improvement and intensive ICT use has been felt in the Turkish economy as well as in the world economy. The ICT sector has emerged by rapid changes and innovations of the new technology forms. The utility and ability of ICT caused to usage of ICT in all of the sectors intensely and, it led to change the name of current society as the information society. The innovations in ICT ensued to each other, day by day, and the technological knowledge quickly increased by virtue of these improvements. The other sectors are also developed by the use of ICT. The ICT sector, which has a wide dynamic range in parallel with an increment of its share in the economy as well has contributed as creating new employment areas into sector-specific fields, besides increased productivity and brought a new perspective into the business circles. At the macroeconomic level, ICT has increased production input/output efficiency as a characteristic attribute, from the economic growth point of view; meanwhile, it has reflected positive impacts on the firm performances at the micro level as well. The inflation is also brought down by the price declines of the ICT products (Dogan, 2010). Schreyer (2000) also states that the longest sustained growth has been conducted by the expansion and diffusion of ICT products along with high employment and low unemployment rates, since 1990s. Moreover, rapid productivity growth also led to have a low inflation in the US economy.

My research question would be that: What would be the reason of Turkey's backwardness in comparison with EU-27 countries regarding development of ICT use, and will Turkey be able to catch up with the EU-27 countries?

Mainly, I apply Turkish and European IT usage, production, and export data from Eurostat, OECD, and Turkstat, between 2007 and 2013. While examining the figures, I divide the main data sections as Turkey and EU-27, and then I study the subsections on the Turkish side, electronics, production, exports, and lastly the ICT usage on households and individuals. On EU-27 side, I make sectorial and country based analyses. I discuss ICT usage on households and individuals also. Furthermore, I compare and discuss the situation of Turkey and EU-27 with the figures of these subsections.

After the first section, I make a literature review in the second part of the study. The third section is "Theoretical Framework" that focuses on Abramovitz's (1986) "social capability" and the catch-up theory along with the Turkish situation against the leader countries in the IT sector. "Contribution" is the fourth one, and the fifth one is "Scope and Limitations" that describes the study areas, boundaries and how the topic is examined. Following "Methodology", the seventh one is "Data" which includes the figures about Turkish and EU-27 countries' ICT usage on households and individuals. IT industry production, exports, and information about electronics sector in Turkey. IT manufacturing based on Sectorial and Country analyses. "IT Sector and Its Potential in Turkey" is the last section before the "Conclusion." That section has detailed analyses within its subsections for the Turkish IT sector. While the first subsection analyzes strengths and weaknesses of the Turkish IT sector, the second one handles the topic, mostly around implementing government policies regarding the new economy in Turkey, and historical adaptation process of them. Finally, as the ninth part is the conclusion, that makes an overview of the study, and tries to answer the research question.

Either to be able to see which factors inhibit and trigger the progress of Turkish IT sector, or to show and compare Turkey and EU-27 in different aspects, I focus merely on Turkey's and European Union's most important and current producing goods like computers, electronic and optical products, consumer electronics, telecommunications equipment, professional and

industrial equipment, and components, those subsectors are important evidence of an information society. On the other hand, I examine the figures of ICT diffusion and usage in the society in both of Turkey and EU-27 with the internet and computer use in households among determined age groups and years, and then, their abilities on using computer through programs.

2. Previous Research

There are many investigations about technology production, innovation, information technologies (IT), and science and technology policies on a general basis or based on a specific country like Turkey. For instance, some institutes or NGOs, such as SDE (Institute of Strategic Thinking), YASAD (Turkish Software Industry Association), ISPAT (Investment Support and Promotion Agency of Turkey), TUBITAK (The Scientific and Technological Research Council of Turkey), TTGV (Technology Development Foundation of Turkey), DPT (State Planning Organization), and US Commercial Service study or analyze ICT sector, Software Industry or specific trends of ICT markets in Turkey. Tonta (1999) reviews the concepts of “information technology” and “information society” in his study, and he looks at the universities’ role in information society. He also provides some figures related to amount of information technology investment that is necessary to construct the national information infrastructure in Turkey. Özcivelek and Zontul (2004) make an overview of Turkey’s general situation towards ICT industry and then, they investigate the consumer electronics and the telecommunications equipment production on case studies within the company based insight into the sector. They choose these sub-sectors because of their importance in the Turkish ICT industry. Kirlidog (1996), researches information technology transfer to a developing country and he focuses on executive information technologies in Turkey. Barisik and Yirmibescik (2006) research Turkish economic situation on new economy process by analyzing implemented government policies, and science and technology policies with the reflections of new economy and e-commerce in Turkey. They conclude that there is an expectation to profit by implementing national science and technology policies in foreign trade, even though, shifting to the information society process in the emerging countries is too expensive, and it takes longer time than that emerged countries had.

On the other hand, Kocak and Zeytinli (2009) research welfare of Turkey within a comparison between Finland in relation to the usage of high-tech goods and the effect of technological production. According to authors, as the results of industrialization, Finland is the one of most competitive economies along with high-tech productivity and environmental sustainability realized by well-educated individuals of the equal society. This rapid improvement requires continuous technical development and being an information society. On the contrary, Turkey still struggles with lack of appropriate technology, innovation, and economic problems.

The researchers assume that these issues put Turkey in a different level than Finland, and scholars study and try to understand what can be learned from its unique experience by improvements and the fast changes in Finland. The aim is to understand the change, significance and effect of welfare - particularly social welfare of using high technological services and goods both of two kinds of countries, such as Turkey and Finland. The focus is on some particular goods like computers, mobile phones, and internet which are evidences of the information society to be able to compare and show two countries in different respects. The authors choose Finland as a model to Turkey, in order to show the difference of technology level, production, and adaptation of high technology between these two countries. Kocak and Zeytinli (2009) also assume that, if Finland is one of the best functioning welfare states of the world, there should be things to learn for Turkey, and they would like to introduce it academically to Turkey. Thus, they compare these two countries based on education, educational background and developing primary and higher education, and training as it is the main motive of technological developments. Secondly, the other subjects are that, technological innovations and developments, usage and level of technology, adaptation and transfer of technology. According to Kocak and Zeytinli (2009), the main intention of their study is the effect and importance of education for the welfare society, setting an efficient system of education specifically for the higher education in consideration of Finland sample. In this frame, they discuss model of national innovation system, policies of technical improvements, the improvement of information society and the success of the country economic, technical and social context. The researchers handle the study within two parts. In the first part, review the literature and in the second part the main subject is examined. They use data from OECD, World Trade Organization, European

Commission, and as well as Turkstat and Statistics Finland. The researchers implement qualitative research design by comparing the countries by annotating the data of different variables and paying attention the numerical changes. Kocak and Zeytinli (2009) aim to introduce the differences and the level of welfare state in both countries by analyzing and comparing the data of these two countries. Finally, they conclude that education level of the society is linked with the welfare level. The education level is also linked with productivity and performance of the labor force with respect to contribute to the new economy through technological change that only can be achieved by education. Hence, well-educated society is a prerequisite to achieve welfare state (Kocak and Zeytinli, 2009).

Aydin (2012) studies the IT sector and its potential for Turkey. He determines Turkey's strong and weak points in terms of information sector. As a conclusion, he asserts that a new ministry should be established by the government as soon as possible to ensure the coordination.

3. Theoretical Framework

During the last decades, the world economy is seen undergoing two major structural changes. Firstly, a strongly increased role of (technological) knowledge, mostly in the form of ICTs and secondly, increased globalization of the world economy. Since 1950, the significance of these trends is increasing in developed European countries. However, US industry progressed in another area that of science-based industry, partly due to massive public investments in R&D, while Japan, Europe and other countries started to catch up in many typical "American way of life" products. Hence, another technological and institutional change was set in motion in the US economy, while Europe was trying to fulfill its catching-up phase (European Commission, 1999).

Abramovitz (1986) also separates industrialized Western countries and United States as "followers" and the "leader." According to his hypothesis, followers have a potential of "catch up" with the leader. Economic underdevelopment of that group of followers which suffered since 1973 is usually triggered by a gradually decreasing catch-up potential in accordance with this perspective. According to Abramovitz and David (1996), social capability is an involving factor

of people and organizations' characteristics and dimensions which impact the reactions of people towards economic possibilities. Erkan (1997) emphasizes that Turkey's cultural lack on technological issues was the reason of why Turkey is remained backward against Western countries. Within this context, I make an overview for "the catch-up and social capability" in order to comprehend the situation of Turkish IT industry readily.

3.1 The Catch-up and Social Capability

Since the end of Second World War, the most remarkable description among the other countries, about the size of production growth potential between the countries was the hypothesis that the Western industrialized countries were the closest ones to catch up with United States, due to their accrued inactive technology potentials. A more general hypothesis is also anticipated, that countries will also converge because of their productivity levels, as a result of following and catching up after World War II. In some aspects, the convergence hypothesis could be slightly adjusted with changes in current issues and leadership which are the component parts of rising new leaders and the theoretical and historical puzzles.

The hypothesis indicates that the less-developed economies contain a potential of rapid growth in productivity level. Hence, the countries' trend of productivity growth rates should be always oppositely related to their productivity levels in the beginning.

The basic point is clear. To implement the hypothesis, labor productivity level has to be conducted by the country's technology production level of capital stock. Outdated technology of the leader country is always before the other follower countries' time, and it is too advanced at each investment periods. Thus, chronological age of stocks proceeds together with its technological age (Abramovitz, 1986).

Likewise, when the follower's productivity is lower, if the technological level of stock is higher, the stock will automatically be superannuated. While the new stock replaces the old one by a leader country, the time difference between installation of the old goods and their substitution with the new ones, which is called the advance of knowledge, limits and governs the productivity increases. And from the followers' side, there is a big chance and potential to have a huge

progress. The latest technology within new capital can exhibit the edge of knowledge, but the old stock was technologically obsolete. Due to the large technological gap among follower and leader, follower gets the bigger and stronger chance to reach the leader's productivity growth level. So, the follower's potential rapidly increases to catch up with the leader, in parallel with the size of productivity gap. At this point, the catch-up occurs, when the follower has no or small old capital stocks. Moreover, if the follower is more lagged behind since the very beginning, the catch up will be quicker. The opportunity of replacing obsolete stocks or adjust the latest technology products gradually decreases, and correspondingly follower's chance to make a huge progress also becomes smaller. In other words, as long as follower's productivity rate approaches to the leader's level, the potential of productivity growth becomes weaker (Abramovitz, 1986).

We need to have a qualification on the basic hypothesis. First of all, technological underdevelopment does not emerge coincidentally. Unchangeable characteristics of a society are the significant part of failures in country's history that as a result of trying to catch up with the emerged countries. Technological surge of a less developed country which is anticipated by the basic hypothesis, always in a reduced form, and the same shortcomings never allow having a technological surge in less developed countries, even though the leap is anticipated by the same basic hypothesis (Abramovitz, 1986).

Abramovitz (1986) named and summarized these characteristics as "social capability." If we take technological underdevelopment alone, it leads to the basic hypothesis in terms of catch-up and convergence, which are already enhanced. Accordingly, European countries were the closest ones to catch up with the leader United States, due to their considerable sociocultural heritage, and the development potential of their undeveloped technologies compare to US.

Even though, Turkey did not take part in the Second World War, Turkish society had to confront with three junta regimes due to sociopolitical issues such as political pressure, student upheavals, and both of domestic and international political uncertainty. Consequently, Turkey has struggled with sociopolitical issues instead of being more developed regarding social capability along with technological production. On one hand, even if we go back to Turkey's recent history about two or three centuries back, we can also see Ottoman Empire's failure in technology policies because

of country's government type which was "Sharia." In this government system, supreme leader can allow or reject the new regulations according to Islamic rules. However, the decisions were mostly given personally in favor of monarch, instead of applying the Sharia. On the other hand, society introduced to the Ataturk's contemporary Turkey, which could achieve the adoption of secularism and carried forward into a much more modernized society and developed country with reformist policies. Therefore, country was renamed as "Republic of Turkey." However, Turkey is still lagged behind of the Western countries because of its inferior social capability against the leader countries. Nonetheless, the gap between social capability of Turkey and the leader countries is gradually narrowed by the results of the recent sociocultural developments established on trade liberalization policies in Turkey. During last two decades Turkish society is getting more familiar with the daily use of information and communication technologies, and ICT is getting increasingly more diffused through the all society, and the level of ICT use among individuals is increasing in line with the globalization (Şenses, 1989). Even though, Turkey is still following the Western countries in terms of economic growth, social welfare, and technology production, I suggest that, as long as applying the appropriate science and technology policies, Turkey will achieve to catch up with the leaders soon because of its steady economic growth which is parallel with the social capability and the potential of technology production in the industrial areas.

Regarding to social capability, developments through hypothesis will be clearly seen in the international comparisons as long as social capabilities are close to each other. Hence, we can say that, the rapid growth potential of a country becomes weak, if it has no qualification within its backwardness. However, potential for a rapid growth in technological backward, country should be socially developed.

According to Abramovitz (1986), there is no precise measurement or description for social capability in the catch-up hypothesis. In one of his previous qualitative studies, he takes into consideration Western countries and tries to identify their social capability with technical qualification through years of education, and their financial, industrial, commercial and political institutions (Abramovitz, 1979). By doing this, he wants to examine the relations between

financial institutions and large-scaled enterprises regarding the aspects of management and organization patterns, and also, the large-scaled individual firms in the markets those can stimulate the capital. In some circumstances, country selections can be pretty convenient. For instance, European countries and Japan are the most appropriate ones in respect to explain postwar growth. That is why, they were the most adequate countries to implement and adapt the best available technology that was produced in US. Nevertheless, the results of working on social capability were still disputable, and some considerations can be suggested as a judgment of the topic as below:

First one is about adaptability and specialization. Even though, a country's patterns of financial, commercial and industrial organizations, and its education system structure can be formed without any problems to utilize the latest technology, but it may not be fitted into the country's present technology, therefore country can have an adaptation problem and cannot meet the requirements of change. Apparently, each country more or less has an adaptation capacity. However, it can be differed from one to another one, and the capacities can also be changed in time.

Another one which is the adaptability concept, points out that there is a mutual interaction among technological opportunity and social capability. A country's situation of educational background average and the present institutional arrangements restrict the national technology choices. Nevertheless, the current technology level is compelled to have a change by technological opportunity. Thus, the country can gain experience through adjusting and also enhancing its own institutional arrangements. After a successful adaptation process, advanced technology gradually weakens the restrictions by the social capability and allows having all of its facilities (Abramovitz, 1986).

Lastly, there are also some other forms those are the components of social capability within economic systems, rather than only management of companies and education system. Their openness to the buy and sale new goods and services, to start up and management of the new companies, and of course, competitiveness can be some samples for the other aspects of economic systems. Within another perspective, this is also questionable, whether there is a

restriction by traditional commercial relations, vested interests and established positions or not (Abramovitz, 1986). Mancur Olson (1982) also identifies defeat in war along with the political traumas like a radical experience that clears the way for new patterns of operation and commercial, new organizations, and new men, in order to provide the harmony with technological potential. I reconsider the technological catch-up idea briefly once again as below:

A rapid technological development potential is always reserved within social capabilities of technologically less-developed countries, and they affect the implementation success of technologies that already started to use by technologically developed leader countries. Increasing demand, capital accumulation, level of structural change, and the knowledge transition are the limited factors, when the potential for catch up realized. So, the potential appears as a result of these limited factors of society. Even though the tendency of catching up can be so strength or weakened, the process is always self-limiting for limited periods, by an endogenous growth of social capabilities or within an advantageous convergence of production forms of followers towards leaders (Abramovitz, 1986).

4. Contribution

In Turkey, studies regarding to technological development and innovation are increasingly gaining importance. However, it could be said that there are few studies and works which examine the roots of technological development and its potential economic effects. Some studies focus on the role of information technology, some of them focus on the role and development of science in technology and economy, and some other just analyze the role of innovation systems in various country cases. In this study, I analyze the developments of IT industry in Turkey. I also try to find out what kind of factors prevents, and what kind of driving forces are behind of the Turkish IT industry progress. Accordingly, the study likely contributes to the literature by providing better understanding in the issues of what kind of weaknesses Turkish IT industry has, and which science and technology policies applied in order to facilitate the catch-up process with leading countries in the world.

5. Scope and Limitations

The study focuses to reveal the reasons of why Turkey lagged behind of EU-27 countries in terms of IT production, use and diffusion in the societies by making a comparison between Turkey and EU-27 countries. I choose the period as in the beginning of 1980s when the openness trade policies of new programme started in Turkey. Hence, since liberalized trade structure in 1984, Turkish economy is taken off due to changed controls on imports, foreign trade quotas and revised tariffs.

While preparing the tables and graphs, I use some basic statistical data between 2007 and 2013 to see the differences between Turkey and EU-27. I compare Turkey and Poland in terms of GDP per capita, and Real GDP annual growth, to analyze whether there is a “catching-up” process in favor of Turkey against Poland or not. According to figures and graphs, although Turkey has lower ratios compare with Poland; it seems like that Turkey has a big chance to catch-up with Poland because of its steady growth. I compare Turkey and EU-27, regarding internet and computer usage of individuals, and internet use on households, in order to analyze the level of Turkish social capability against EU-27. In other words, I try to see how far Turkey lagged behind of the European countries with respect to the information society process, which is a necessity of today’s social capability to realize the catching up with the other leader countries, in accordance with Abramovitz’s (1986) “social capability” theory.

6. Methodology

The literature review is the initial method, and I try to get some insights from the studies which were done in the literature. Therefore, I highlight the issues of new economy, IT sector, development of ICT industry in general manner and, IT industry in specific manner in Turkey. Secondly, I make a comparison between Turkey and EU-27 in relation to contribution of ICT market on GDP, and finally, I discuss the results based on implementation of appropriate policies towards Turkey’s failure or requirements on IT industry progress.

Furthermore, the study is a quantitative research in an exploratory and comparative manner. Thus, I deepen the understanding of the issues those were mentioned above, and I seek some new insight on the reasons behind the phenomenon that Turkey has experienced weak technological progress during the last several decades. Beginning point of the methodology is based on analysis of some statistical secondary data of Turkish and EU-27 ICT industry. Accordingly, I provide some arguments regarding technological development of IT industry in Turkey.

7. ICT Sector and Its Use in Turkey and EU-27 Countries

This section aims to make a comparison between the position of ICT market, and its diffusion and adaptation levels in the Turkish and European society in parallel with Abramovitz's (1986) "catching up" and "social capability" theories. To be able to understand how big the gap between Turkey and EU-27 countries is, I choose Poland as sample or average country of the European Union. Before starting to discuss the figures for ICT production and usage, I would like to show and discuss the GDP per capita, and GDP annual growth differences between Turkey and Poland. I choose the period between 2007 and 2012, hence, it would be easier to see if there is a narrowing gap, and these two countries are converging, in other words, whether Turkey is realizing the "catching up" or not.

As we can see the **Figure 1** below, Although Turkey is not a European Union member country, it follows a very similar trend with Poland regarding GDP per capita \$ US current purchasing power parity (PPP) between 2007 and 2012. It shows that Turkey has significant links regarding international trade and has a strong productivity to be able to compete with some European countries those are the followers of earlier industrialized leader countries. Also, in **Figure 2**, in the end of 2012, Turkey has already the same level of real GDP annual growth within only 0.3% of difference than Poland. Even though, Turkey has witnessed a sharp fall before and after the 2008 crisis and was impacted much more than Poland. Between 2008 and 2009, while Poland's real GDP annual growth has decreased from 5.1% to 1.6 within a 3.5% difference, meanwhile Turkey was having 5.5% difference in the beginning of 2009 compare with 2008. The situation is also nearly same with the period of 2007-2008 that is why Turkey had a difference of 4% of

real GDP annual growth, while Poland was having only 1.7 per cent. Hence, it seems like Poland was not influenced by crisis as much as Turkey. However Turkey fixed a rapid increase with a proportion of 9.2% in 2010, and Poland stayed behind of Turkey with a proportion of 3.9% real GDP annual growth. Nonetheless, it does not mean that Turkey caught up and overtook Poland in GDP per capita. Therefore, when we glance once again at **Figure 1**, still, Turkey follows Poland with small annual differences between 2007 and 2012.

Finally, on Real GDP annual growth, **Figure 2**, Turkey was in a trend to follow Poland since 2009, and overtook Poland between 2010 and 2011. Moreover, Turkey kept the leading position until the 2011 crisis led them to converge, which shows that these two countries are the parts of same markets or business environments.

Consequently, this similarity also indicates that both of them have nearly same patterns of industrial productivity and social capability in total contribution to welfare level of the society. However, measuring the gap between Turkey and EU-27 with only the economic variables gives us just a blurred picture. Thus, considering social aspects of the economic growth in a country, such as the behaviors of the individuals towards use and diffusion of new technologies draws the picture more clearly. However, I mainly focus on ICT sector based on industrial production and ICT use on households and individuals, both in Turkey and EU-27 countries based on data between 2007 and 2013 by Eurostat and Turkstat. Firstly, the situation of the Turkish ICT manufacturing and exports is described. In accordance with the Turkstat's ICT use survey (2013) on households and individuals, I discuss the differences and changes of figures on computer, internet use and capability of the basis of individuals and households. In order to explain the variances, and the individuals are classified into three age groups like aged 16-24, 25-54, 55-74, and of course, the general group aged 16-74 which consists of these three groups. Almost the same conditions applied to the EU-27 countries as well.

7.1 ICT in Turkey

Last decades, Information technologies have shown a significant development all over the world. In the 21st century, the emerged countries have witnessed so-called “information age” relies on the rising of communication and electronic industries. Turkey has been influenced economically and socially by the developments of information and communication technologies as much as the other countries. ICT triggered the changes in traditional patterns, and developed the approaches of trade mechanisms; those are brought with the new global perspectives in Turkish economy (Turkoglu, 2010). In this section, I discuss electronics sector in Turkey and Poland, because of its rapidly emerging position in ICT markets.

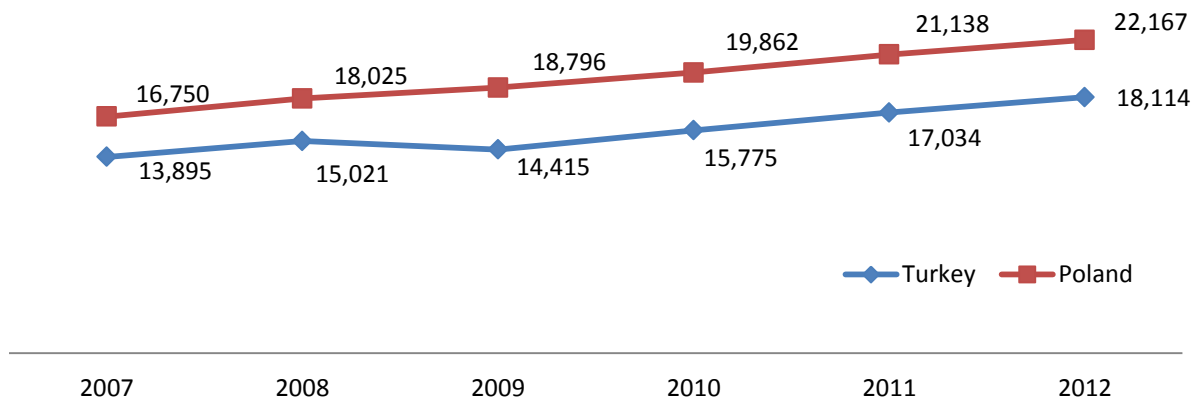


Figure 1: GDP per capita; USD current PPPs, Turkey and Poland, (between 2007 and 2012)

Source: OECD, (2014).

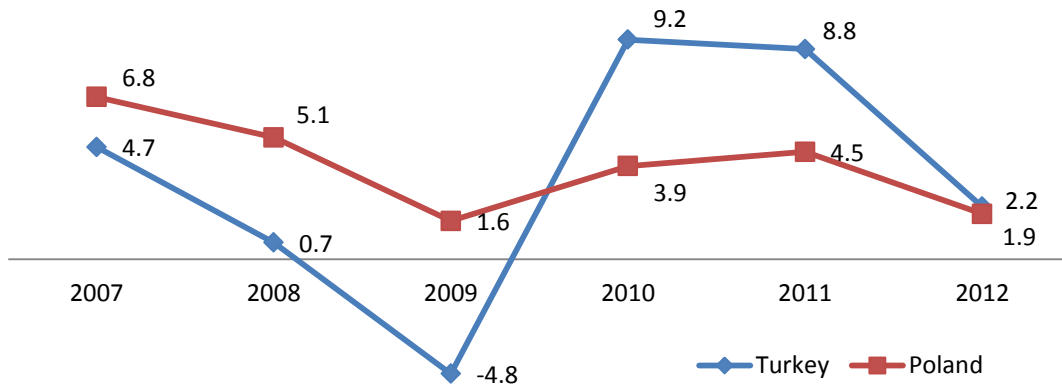


Figure 2: Real GDP annual growth (%), Turkey and Poland, (Between 2007 and 2012)

Source: OECD, (2014)

Since the last half of 1980s, electronics sector performed a rapid development in Turkey, mainly based on the beginning of color TV broadcasting and telecommunication investments. Moreover, developments in telecommunication technologies also led to have a growth in the sector. Foreign license agreements which are signed with Japan, the USA, Canada, France, The UK, Denmark, Italy, the Netherlands and Germany, led to the majority of Turkish firms to start their operations. Recently, electronics industry has gained an important technical knowledge. Electronic sector is consisted of six subsectors as below:

1. Computers,
2. Consumer electronics,
3. Telecommunications equipment,
4. Defense industry electronics,
5. Professional and industrial equipment,
6. Components.

The computer subsector production includes software, hardware, services and supplies. Knowledge and technical capabilities of Turkish computer firms in the subsector are enhancing gradually by increasing IT use in Turkey. Video players, audio video cassettes, electronic

calculators and scales, cash registers, television satellite antennas and receivers, audio appliances, color TVs constitute the consumer electronic subsector. Telecommunication subsector contains transmission equipment, telecommunication cables and wires, end user equipment, telegraph and telephone automatic exchanges, transmitter/receiver antennas for wireless telephone equipment, and receivers and transmitters for wireless telegraph/telephone equipment. Turkish products are used for communication infrastructures by many countries. The professional and industrial equipment subsector has a key role in many various industries. It includes rectifiers, induction ovens, uninterrupted power supplies, automotive electronics, medical electronics, automation systems, test and measuring equipment, signalization and alarm systems, fire alarm and security systems, audiovisual systems, and industrial electronic equipment. Component subsector investments have an increasing trend along with the other subsectors' activities in electronics industry. Connection elements, circuit elements, picture tubes, electronic relays, printed circuit boards, coils and transformers and acoustic elements constitute the components subsector (Ministry of Economy, 2014).

Similarly, following the economic and political transition in 1989, Poland has started the third period of its economic progress. Crucial market reforms such as currency stabilization, economic freedom, remove the borders for being a member of global trade in the 1990s; accession to European Union in 2004, and subsidies by EU had triggered rapid Polish economic growth in these two decades. Today, Polish dynamism of new technologies and its competitiveness in the global arena have occurred due to these fundamental market reforms, and of course, being a member of EU. However, there is also a non-negligible effort of entrepreneurs which led to realize the innovation and improvement in the ICT sector in Poland. The firms of ICT sector in Poland especially have specialized in the mobile solutions, consumer electronics, electronic games, and production of custom software. Moreover, Poland is the fifth largest labor supplier of ICT production segment in Europe by 5.1%, and Polish ICT export has grown by 28% per annum, between 1996 and 2008 (M Promotion Agency, 2013).

In all economies in the world, significance of cooperation between business circles and the institutions for finding new solutions in the sectors is undisputable. The countries such as Turkey

and Poland mostly have small businesses which are inadequate companies to apply the innovations on their businesses successfully. Therefore, they always need to be in interaction with the business environment institutions, which are able to supply the required new technology implementation to the firms by virtue of their sufficient technical infrastructure and knowledge. Besides, initial capital and consulting services are supplying by the institutions for new manufacturers when they need development and formation based on innovation.

At this point, techno-cities play an important role with respect to transition of information and technological knowledge from scientific labs and businesses to the small businesses which need change and development by technological innovation (M Promotion Agency, 2013). Companies and scientific labs and businesses constitute the techno-cities and sometimes they diffuse a region and it calls as an innovation cluster such as Medicon Valley life science cluster of Oresund between Denmark and Sweden.

Likewise, electronics sector in Turkey also produces innovative and globally competitive products with high quality in the main factories those are located in techno-cities and techno-parks collaborated with the universities and the other institutions such as TUBITAK and TTGV. Briefly, there are 129 R&D centers are currently active mostly located around the Marmara region within 32 out of total 50 Technology Development Zones (TDZs) in Turkey. Research centers aggregate mostly around Istanbul, Ankara, Izmir and Kocaeli because of their facilities about transportation, labor supply and high population rates. ICT sector provides employment opportunity for 1.784 people out of total 14.837 people in R&D centers.

As much important as TDZs, R&D centers are also make significant contributions to ICT development in Turkey. In total 163 applications for establishing R&D centers and 134 of them have already been accepted and they have taken their R&D certificates. 13 of these R&D centers are active in the ICT sector and they constitute approximately 10% of the total R&D activities in Turkey (ISPAT, 2014).

“Vestel City” is the one of well-known largest industrial production area in the world, and it operates as the “Vestel Manisa Facilities” which is located on approximately 1.000.000 square

meter in total, and only “Vestel City” is established onto 685.000 square meters in-door area in Manisa-Turkey. Besides, within a daily 76.000 total production capacity, Vestel produces daily 18.000 white goods and 45.000 televisions, and respectively, 29% and 85% of them are exporting to 140 different countries mostly in Europe and Japan (Vestel, 2014).

In Poland, techno-parks had developed intensively by subsidies and operational programs of European Union in 2004-2010. After the investments Poland had 18 scientific research units and 523 institutions in 33 techno-parks. However, in 2010, F5 Consulting and the Polish Business Chamber for Advanced Technology have carried out a benchmarking of techno parks in Poland. As a result of the researches, Wroclaw Technology Park has selected as most popular with one specific research institution and 85 business entities. Even though Cracow Technology Park was having only 58 companies and 3 research institutions, it was providing employment opportunity for 7.700 people out of in total 16.500 supplied by 17 most active Polish techno-parks (M Promotion Agency, 2013).

7.1.1 Production

In 2012, Turkish total electronic industry production was \$12.5 billion according to data from TESID (Turkish Electronic Industrialists’ Association). Telecommunication equipment and consumer electronics subsectors represent respectively, share of 18.5%, and 34.8% of the total production in electronics sector (Ministry of Economy, 2014).

To determine Turkey’s situation in the ICT market, I make a comparison between Turkey and Poland in years of 2007 and 2010 in terms of ICT production. On Turkish side, Total ICT sector production is generated by subsectors of components, consumer electronics, other professional and industrial equipment, telecommunication equipment, defense electronics, and computers. Polish ICT subsectors are electronic games, production of custom software, consumer electronics, and the mobile solutions as mentioned before. In 2007, Turkey’s ICT industry produced \$9.5 billion, and Poland’s production was \$9.8 billion. Poland has approached to level of \$13.5 billion which was \$11.2 for Turkey in 2010.

Table 1: Production and Exports of Turkish Electronics Industry by Subsectors (US \$1 000)

Subsectors	Production			Export		
	2007	2010	2012	2007	2010	2012
Components	494,920	640,141	686,742	687,118	920,185	988,798
Consumer Electronics	4,285,117	3,665,753	4,383,607	2,150,157	1,843,062	2,356,572
Telecommunication Equipment	1,506,912	2,112,534	2,319,971	1,723,598	1,932,553	2,624,910
Other Professional and Industrial Equipment	1,595,022	2,374,201	2,096,213	282,774	769,862	744,483
Defence Electronics	667,373	950,000	1,190,175			
Computers	963,689	1,554,223	1,882,318	93,989	120,142	124,040
Total	9,513,033	11,296,852	12,559,026	4,937,636	5,585,804	6,838,803

Source: Turkish Electronics Industrialists Association (TESID)

Table 2: Production of Turkish and Polish Electronics Industry (US \$1 000)

Country	2007	2010
Turkey	9.5	11.2
Poland	9.8	13.5

Source: Turkish Electronics Industrialists Association (TESID), M Promotion Agency

Table 3: Production and Exports of TV sets in Turkey in 2012 (1 000 Units)

	Production	Export
TV sets	11,570	10,700

Source: Turkish Electronics Industrialists Association (TESID)

Regarding Polish ICT sector, service sector fills 84% of the whole customer demand in 2010. Approximately 72% of service sector were specialized in IT services, 14% of these companies were working with wholesale, and 15% were professionalized telecommunication services. Even though the telecommunication services and operations are having a crucial position in Turkish ICT sector, the Polish telecommunication services has growth slowly between 2007 and 2010 by 4% in terms of the number of companies in the field. In general, 995 companies in the Polish ICT sector in 2007 accrued by 404, and they reached the level of 1399 in 2010 (M Promotion Agency, 2013).

Turkish telecommunication equipment and consumer electronics subsectors are the most developed ones in terms of capacity. But in the consumer electronics subsector, especially television sets are the primary product group (Ministry of Economy, 2014). Vestel, Arcelik, and Beko are the sub-companies of “Koc Holding” which has also several both national and multinational companies in a wide range of sectors such as automotive, food, finance, energy, tourism in domestic and international sectors, besides consumer sector in Turkey. For instance, Arcelik purchased Blomberg in 2002, which is located in Germany. The acquisitions continued with Elektra Bregenz and its brand Tirolia from Austria, Flavel and Leisure cooker brands from UK, and finally Arctic which was the biggest white goods producer of Romania. Consequently, Arcelik became the owner of all of these companies’ plants and sold more than 80 countries all over the world. Moreover, in 2004, Beko purchased the German electronics company Grundig AG’s “Home Intermedia System Division” (Özcivelek and Zontul, 2004). Similarly, in 2012, Asseco Poland Capital Group is the largest Polish holding with PLN4.96 billion which equals with \$1.52 (\$100= PLN325.70, Source: Data of the National Bank of Poland (NBP)) billion. Asseco Poland sales IT products and services, and it is a corporate alliance of ABG, Prokom Software, Softbank and Asseco Poland (M Promotion Agency, 2013).

In 2012, units of 11.6 million televisions produced in Turkey, and more than 10 million of them mostly exported to the European consumers. Due to technological developments of Plasma and LCD TVs in the sector, producers were forced by consumer expectations to implement the new technologies through new investments. Within this framework, Turkish TV sets have a

remarkable reputation in European countries, as a result of the price and quality. There are about 300 firms in audiovisual equipment and TV-radio receivers sectors, and Istanbul and Manisa are cities which are the main locations for the main factories those are collaborated with the universities and the other institutions such as TUBITAK and TTGV (Ministry of Economy, 2014).

Telecommunication is also another significant subsector of Turkish ICT industry, which is reached \$2.3 billion of equipment production in 2012. Having a substantial experience and knowledge through establishing a fruitful and efficient communication infrastructure is the aim of Turkey in this subsector. Besides, R&D activities were also having a significant role in this telecommunication subsector's achievement. In total more than 140, and dominated by large and medium sized companies constitute the Turkish telecommunication industry. Specifically, the largest share of total production in the telecommunication equipment subsector belongs to the telecommunication cables. A wide range of telecommunication and electric cable and wire types, such as, telecommunication optic cables, large energy transmitting cables, and electrical shaver coils are produced in the Turkish cables and wires sector. Fiber optic cables, electric conductors, coaxial cables and insulated enameled winding wires are the major items in the sector. Turkey has a huge potential in cable sector along with over 370 cable manufactories belonging either national or multinational cable companies, and mostly they are located in Istanbul and Kayseri. Moreover, the sector is dominated by some of these larger companies, and fiber optic cable production is gradually getting more importance in the industry. International and European norms and standards are applying by Turkish electronics industry. For instance, through affixing "CE Mark" (which is a compulsory conformity mark in order to indicate the compliance of the product for European Economic Area since 1985) onto the products in the Turkish market has been compulsory since 2002; Turkish producers rapidly increase their potentials towards international area (Ministry of Economy, 2014).

7.1.2 Exports

Since 1990, the electronics industry has shown a steady increase in export markets based on R&D efforts and productions. Turkish market is getting the latest technology by Turkish electronics industry together with the European markets. Export products of electronics industry, initially canalizing in Europe, and Turkish electronics industry exports reached about 200 countries within a total value of \$6.5 billion in 2013 which was \$5.5 billion electronics export compare with \$13.1 for Poland in 2010 (M Promotion Agency, 2013). Telecommunication equipment and consumer electronics subsectors were the fundamental goods in exports, as in production (Ministry of Economy, 2014). In 2010, consumer electronics subsector achieved at the export value of \$1.8 billion and \$7.4 billion (about 57%) in Turkey and Poland, respectively.

TV sets exports, as the most substantial consumer electronics item, has reached \$1.7 billion in 2013. In the consumer electronics subsector exports share of TVs was 94.1%, and they were exported by more than worldwide 145 countries in 2013, again. Turkish television sets have share of about 50% in the European Union TV market, and the European Union is the major market for Turkish Television sets exports with the share of 90.3 per cent. It means, that share of 90.3% produced TV sets in Turkey are imported by European Union (Ministry of Economy, 2014).

The export of Turkish telecommunication subsector was impacted by the international sector developments like infrastructure investments as well. The Turkish telecommunication subsector export value arrived \$2.8 billion in 2013. In total exports of telecommunication subsector, cables and wires hold the largest share, and 90% of the Turkish telecommunication equipment subsector export is contained by exports of telecommunication cables and wires. As an addition, in 2013, cables and wires exports arrived at the level of \$2.5 billion. Germany, the UK, Belgium, France, Russian Federation, Turkmenistan and Israel are the mostly exporting destinations for the Turkish telecommunications cables and wires. Even though Turkish export value is not high in the international area, Turkish export performance of electronics industry gradually increases by fair prices with excellent quality, and it seems Turkey has continuously increasing foreign

market shares due to effective after sales services and engineering quality along with enduring R&D activities (Ministry of Economy, 2014).

7.1.3 ICT Usage on Households and Individuals in Turkey

There has been a steady growth in internet and computer use among Turkish individuals between 16-74 ages in recent years. The rates of Internet and computer use in this group were respectively, 29% and 31% in 2007, and these rates were 46% and 47% in 2013 (Figure 3). In Turkey, internet use on Households has increased from share of 20% to 49%, in Poland, from 41% to 72%, and it has increased from 55% to 79% in the EU-27 countries between 2007 and 2013 (Eurostat, 2014). Individuals increasingly pay attention to keep up with the new technology era by learning how to implement a formula in statistics through a program sheet or prepare their own graphs, tables, and charts. By getting cheaper internet subscription for home or office, cheaper IT devices, and diffusion of the ICT devices and their significant role on new communication and socialization patterns among the individuals, led the people more tend to this kind of devices and technologies, and that is why on households or individually internet use boomed in Turkish society in the last decade. In 2013, and 16-74 age groups, shares of female internet and computer users within last 12 months were 36% and 37%, while these proportions of males were 57% and 57%.

When we look at situation in Poland and EU-27 countries compare with Turkish internet use in the last 12 months for all individuals between 2007 and 2013, the internet use has increased 17% in EU27, 16% for Poland, and lastly, Turkish internet use has increased also 17%. Even though, the increase of these proportions are very close, there is still 19% and 31% gap between respectively, Poland-Turkey, and EU27-Turkey regarding to the share of internet use of all individuals. In 2013, the percentage of all individuals' internet use in the last 12 months in EU27, Poland and Turkey were respectively, 77%, 65% and 46% (Eurostat, 2014).

In rural areas, share of internet and computer usage were respectively 28.6% and 29.5%, and in urban areas, they were 58% and 59 per cent. In TR1 Istanbul region was having the highest ratios

with 61.4% and 62.1% respectively, and TR5 West Anatolia region follows the leader with 58.5% and 59.8 per cent (Turkstat, 2013).

Individuals aged between 16 and 24 constitute the highest proportion of internet and computer users group. The ratio of internet and computer usage in male groups was higher than females in all age groups. Moreover, the share of regular internet were 39.5% by users who use internet at least once a week or almost every day, and it was 91.6% for the individuals using internet in the last three months among all individuals aged 16-74 in the first quarter of 2013. Regular internet users in rural area 86.7% of total amount of individuals using internet in last three months, and it was 92.6% in urban area. It was 96.1% in TR1 Istanbul by SR Level1.

With the new technological facilities of smart and mobile phones, individuals can connect to the internet while they are away from home or office. In the first three months of 2013, 17.1% of individuals aged 16-74 accessed to internet with portable computers away from home or office. However, smart or mobile phones usage was quite high like 41.1% of internet users compare with the proportion of portable computer users (Turkstat, 2013).

According to Turkstat's (2013) ICT usage survey on households and individuals, almost a quarter of total internet users aged 16-74 purchased the services or goods through internet. In figures, it was 24.1%, and the share of internet shopping customers was 21.8% in 2012. Between April 2012 and March 2013, 15.7% of internet shoppers purchased their groceries and foods, 15.9% of them, magazines, newspapers, books (including e-books), 20% of them bought their travel arrangements such as car hire, transport tickets, 25.6% of them household goods, and 25.8% of them ordered electronic equipment. Finally, 48.6% of internet users ordered their sports equipment and casual clothes over internet.

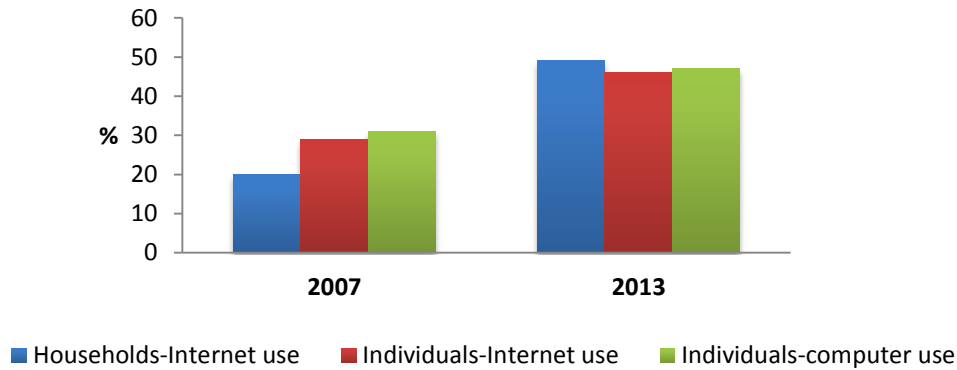


Figure 3: Main Indicators of ICT use in Turkey, 2007 and 2013 (% of all Individuals and Households).

Source: Eurostat (online data code: (isoc_ci_in_h), (isoc_ci_ifp_iu), and (isoc_ci_cfp_cu))

According to 2013 ICT usage survey, the share of having internet in households has increased from 47.2% to 49.1% in a year. “Have no need” is the main reason of why not having access to the internet at home for households, with the share of 35.7% in total.

Proportion of internet access in households was 29.1% in rural areas, and 57.4% in urban areas. In accordance with SR Level1, four regions of Turkey were above the average of the internet access percentage of households. In figures, TR1 Istanbul is with 63.3%, TR2 West Marmara has the share of 58.8%, and TR4 East Marmara by 56.8%, and as the last, TR5 West Anatolia follows with the share of 52.4 per cent. Regarding broadband internet connection in Turkey, 46.5% of all households had broadband connection in their houses, according to ICT usage survey, 2013. While the proportion of 65.6% of households having internet access, 32.2% of all households was using ADSL for internet access. As a type of connection to the internet, 3G is used by 20.1% of all households, and by 41% of households have internet connection at their houses.

There is also an important point stands out that 75.6% of the individuals using internet for downloading or reading online news, newspaper, and news magazines in the first quarter of 2013. Social networks follow the reading online activities by the proportion of 73.2 per cent. Besides, 41.3% of internet users accessed to the internet pages of public authorities, between

April 2012 and March 2013, which shows a falling tendency compare with a proportion of 45.1 per cent between April 2011 and March 2012 (Turkstat, 2013).

7.2 Computer, Electronic and Optical Products Manufacturing in EU-27

The computer, electronic and optical products manufacturing sector had two key subsectors in accordance with the number of enterprises in EU-27, those were the electronic boards and components manufacturing, and manufacture of devices and equipment for testing, navigating and measuring, and clocks and watches. In 2010, the EU-27's computer, electronic and optical products manufacturing sector's 56.6% of value added, and 58.3% of workforce was constituted by these two subsectors. Communication equipment sector follows these two large subsectors with the share of 18.1%, consumer electronics and the computers and peripheral equipment subsectors also follow by 6.7% and 8.2% proportions of the sectorial workforce, respectively. Optical instruments and photographic equipment, magnetic and optical media, and the irradiation manufacturing are the three smallest subsectors providing the share of 8.7% in total workforce in sector (Eurostat, 2013).

In this part, I derive data from Eurostat to make a comparison between Turkey, Poland and EU-27. There is data only from 2009 for Turkish ICT industry according to Eurostat. Therefore the year of 2009 is chosen for the comparison. However, to understand the situation of Turkish ICT use and diffusion through the society, the years of 2007 and 2013 are taken for the comparison of ICT use between EU-27, Poland, and Turkey.

In generally, 44.2 thousand Companies contributed to the computer, electronic and optical products manufacturing sector along with 1.15 million employees, in the EU-27. However, when we make a country based comparison, Poland was having 2.678 enterprises in the manufacture of computer, electronic and optical products manufacturing, while Turkey had only 613 enterprises in 2009. The case of persons employed in the sector is also quite similar with the number of enterprises in Poland and Turkey, which was respectively, 62.416 and 24.382. The gross operating surplus for the EU-27's computer, electronic and optical products manufacturing sector

was 5.6% of turnover, which was 8.7% for Poland and 16.0% for Turkey in 2009 (Eurostat, 2014).

7.2.1 ICT Usage on Households and Individuals in EU-27

ICT had diffused and gained importance in the society due to its decreasing costs and increasing accessibility in the last decade. 55% of households in the EU 27 had internet access in 2007, and it reached at the level of 79% in 2013. Broadband had a great effect to formation of information society based on knowledge by the reason of its affordable and widespread access. Moreover, broadband usage of EU-27 households compare with 2007, increased almost twofold, and it reached proportion of 76% in 2013 (Figure 4) (Eurostat, 2014).

Netherlands had the highest proportion of household internet access in 2013 that was recorded as 95%, and Luxembourg, Denmark, and Sweden followed above 90% as well (Figure 5). However, with the rate of 49%, Turkey followed Bulgaria recorded the lowest percentage (of 54%) internet access between EU-27 countries. Besides, between 2007 and 2013, Turkey had a rapid increase like more than twofold regarding internet access in households, which was almost threefold in Bulgaria (Eurostat, 2014).

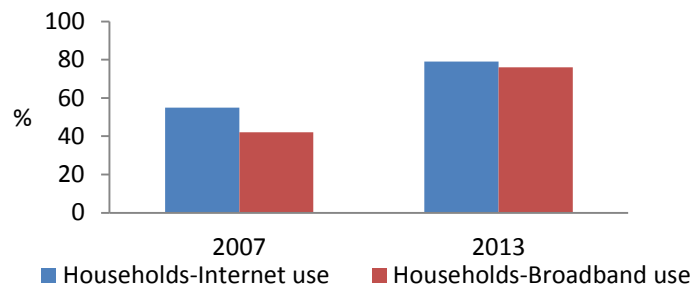


Figure 4: Internet access and broadband internet connections by households, EU-27, 2007 and 2013 (% of all households).

Source: Eurostat (online data code: (isoc_ci_in_h) and (isoc_ci_it_h))

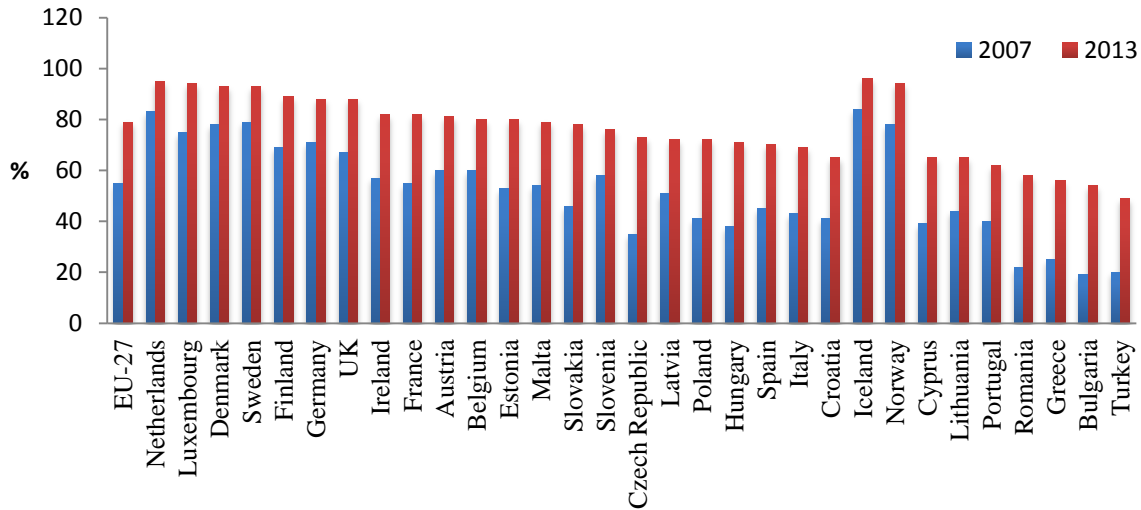


Figure 5: Internet access of households, 2007 and 2013 (% of all households)

Source: Eurostat (online data code: (isoc_ci_in_h))

Since 2011, over 70% of between 16 and 74 aged users in EU-27 had almost the same usage level of computer and internet. Even though, only less than half of the Romanian and Bulgarian individuals aged between 16 and 74 years used internet and computer in 2011, Bulgaria and Romania had achieved the level of 50% of their computer and internet used by individuals aged 16 to 74, which was still less than the level of 50% for Turkey in 2013. Besides, since 2011, the share of individuals’ internet and computer use has been 90% as the minimum level in Denmark, Sweden, Luxembourg and the Netherlands. In 2013, 59% of the users exploited the internet for searching information about services and goods, while Turkey was having 26% (Table 4).

The individuals who used internet three months before the ICT survey 2011 in EU-27, 93% of them used the internet when they were at home, as shown in Table 5. The proportion of 42% of internet users, accessed to the internet through at their work places, and 24% of them used their friends, relationships or neighbor’s house. Nevertheless, the main group of users also connected to the internet “daily,” more than “at least once a week (but not every day)” in 2013, as we see Figure 6 (Eurostat, 2014).

Table 4: Use of ICTs and use of online services, 2011-2013 (% of individuals aged 16 to 74)

Countries	Computer use			Internet use			Used Internet for finding information about goods and services		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
EU-27	73	74	76	71	74	75	57	62	59
Belgium	82	82	83	82	81	82	:	65	67
Bulgaria	49	53	53	48	52	53	28	36	35
Czech Rep.	72	73	74	70	73	74	56	62	63
Denmark	90	93	95	90	92	95	72	82	82
Germany	84	84	85	81	82	84	70	75	77
Estonia	77	79	81	77	78	80	54	70	60
Ireland	76	77	78	75	77	78	53	63	61
Greece	54	55	60	52	55	60	39	45	50
Spain	69	72	72	67	70	72	47	61	48
France	78	80	81	78	81	82	67	69	68
Croatia	59	63	67	58	62	67	43	52	46
Italy	55	56	58	54	56	58	41	41	37
Cyprus	59	63	67	57	61	65	48	55	56
Latvia	70	73	75	70	73	75	52	63	52
Lithuania	63	67	69	63	66	68	54	57	56
Luxembourg	91	93	94	90	92	94	66	84	70
Hungary	69	72	73	68	71	73	54	59	58
Malta	69	69	70	68	69	69	53	57	50
Netherlands	92	93	94	91	93	94	82	83	83
Austria	81	82	82	79	80	81	62	71	67
Poland	64	64	64	62	62	63	44	48	45
Portugal	58	62	64	55	60	62	41	51	46
Romania	43	48	50	40	46	50	27	31	26
Slovenia	70	70	73	67	68	73	54	59	55
Slovakia	76	78	79	74	77	78	54	58	56
Finland	89	91	92	89	90	92	76	81	79
Sweden	93	93	95	93	93	95	75	83	81
UK	87	88	90	85	87	90	66	72	70
Iceland	96	97	97	95	96	97	81	88	86
Norway	94	95	95	93	95	95	78	88	79
Macedonia	:	60	:	:	57	:	:	37	:
Serbia	:	:	:	:	:	:	:	:	:
Turkey	:	:	44	:	:	43	:	:	26

Source: Eurostat (online data codes: (isoc_ci_cfp_cu), (isoc_ci_ifp_iu), and (tin00095))

Table 5: Place of internet use, 2011 (% of individuals aged 16 to 74)

	Home	Place of work	Place of education	Other people's houses	Other places
EU-27	93	42	12	24	14
Belgium	95	44	13	25	18
Bulgaria	91	36	11	8	7
Czech Rep.	94	36	15	16	9
Denmark	98	51	17	21	16
Germany	95	45	9	22	16
Estonia	93	39	16	19	11
Ireland	93	31	11	5	3
Greece	88	35	8	13	12
Spain	88	41	13	26	24
France	94	39	8	33	12
Croatia	92	34	12	14	11
Italy	88	40	12	24	20
Cyprus	87	44	16	29	21
Latvia	89	36	15	30	21
Lithuania	92	35	19	20	12
Luxembourg	97	47	12	15	20
Hungary	92	35	17	22	10
Malta	96	39	9	14	12
Netherlands	99	53	15	24	10
Austria	95	47	13	15	13
Poland	93	30	14	16	8
Portugal	90	40	16	27	17
Romania	89	30	18	9	7
Slovenia	94	50	12	31	22
Slovakia	91	47	16	21	13
Finland	97	55	20	45	34
Sweden	97	54	17	34	29
UK	95	44	13	25	8
Iceland	98	54	21	31	11
Norway	98	60	15	30	23
Macedonia(1)	86	23	17	17	20
Serbia(2)	81	28	14	16	7
Turkey(1)	63	32	7	16	21

Source: Eurostat (online data code: (isoc_pibi_pai))

(1) 2010.

(2) 2009.

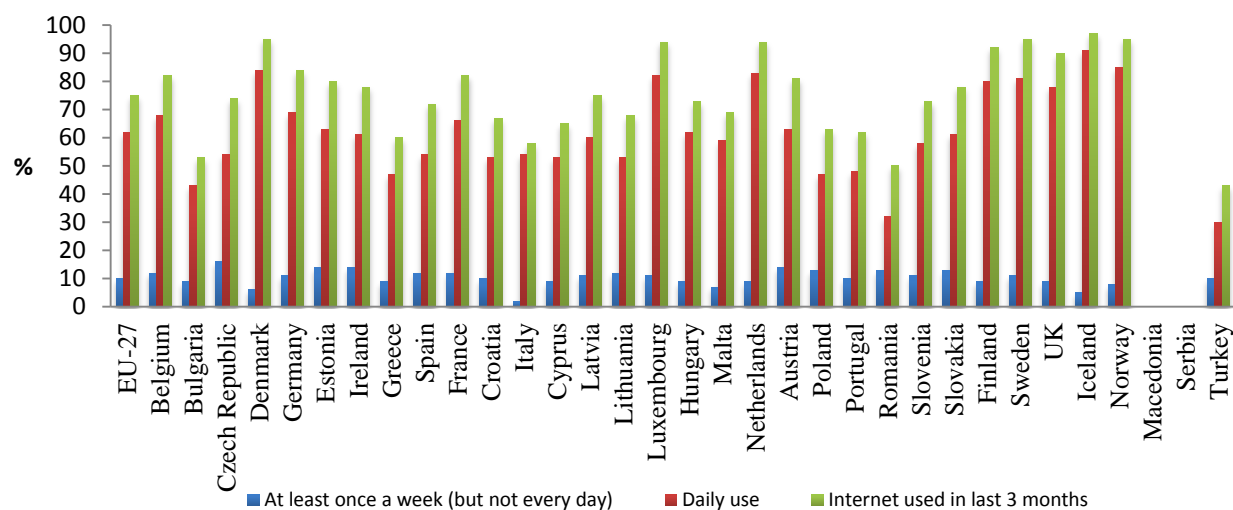


Figure 6: Frequency of internet use, 2013 (%of individuals aged 16 to 74).

Source: Eurostat (online data code: (isoc_ci_ifp_fu) and (isoc_ci_ifp_iu))

In 2013, as we can see in Figure 7, there was an increase of 17% compare with 2007, and the share of 16 to 74 aged internet users who ordered services and goods at least once through internet, reached to 47 per cent. In 2013, services and goods were ordered by over 65% of users in Finland, the Netherlands, Germany, Luxembourg, Norway, Sweden, and The United Kingdom, while Italy, Estonia, Portugal, Cyprus, Greece, Lithuania, Croatia, and Hungary were having proportions between only 20% and 28% of individuals who ordered services and goods through internet. While the share of individuals who ordered goods and services through internet was 10% in Turkey, the lowest rates among the EU-27 countries were in Romania and Bulgaria, respectively 8% and 12%, in 2013 (Eurostat, 2014).

Aged between 16 and 74 individuals used internet in 2011 and 2013 for participating in social networks, taking role in online voting or consultations, posting and reading opinions about political and social issues, and social networking for other new activities like consulting wikis, as seen in Figure 8. In both 2011 and 2013, there was a high disparity between age groups 55 to 74, and 16 to 24. While the proportion of 85% of youngest age group in the EU-27 participated in social networks in 2013, the oldest one participated only by 13 per cent. The average of

participating social networks of individuals aged 16 to 74 has increased by 43% in 2013, which was on the level of 38% in 2011.

On one hand, this distinction between younger and older age groups means that the members of older age group tend to maintain their social contacts with the old and/or traditional forms. On the other hand, the members of younger age group tend to use social networks to keep their social contacts. Moreover, all of these four activities in Figure 8 were mostly used by the youngest age group (Eurostat, 2014).

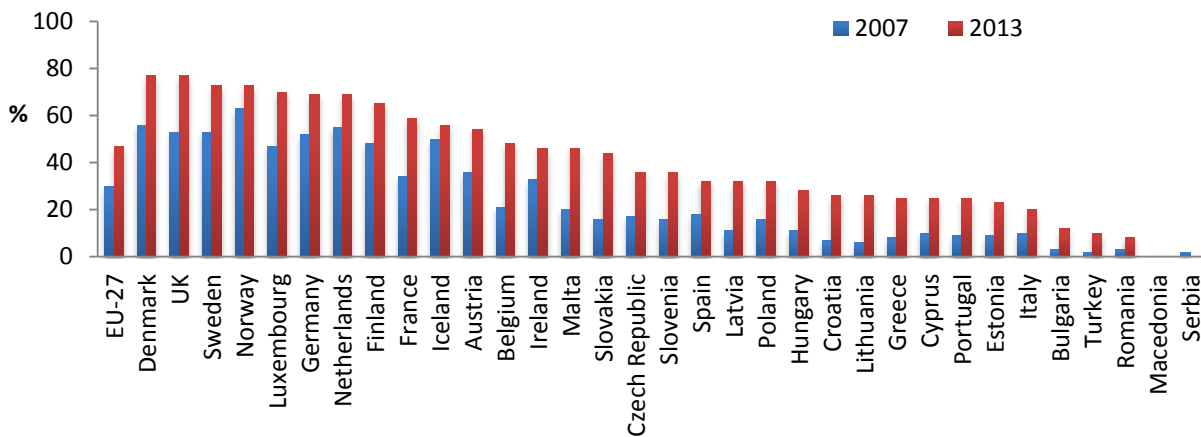


Figure 7: Individuals who ordered goods or services over the internet for private use in the 12 months 2007-2013 (% of individuals aged 16 to 74).

Source: Eurostat (online data code: isoc_ec_ibu)

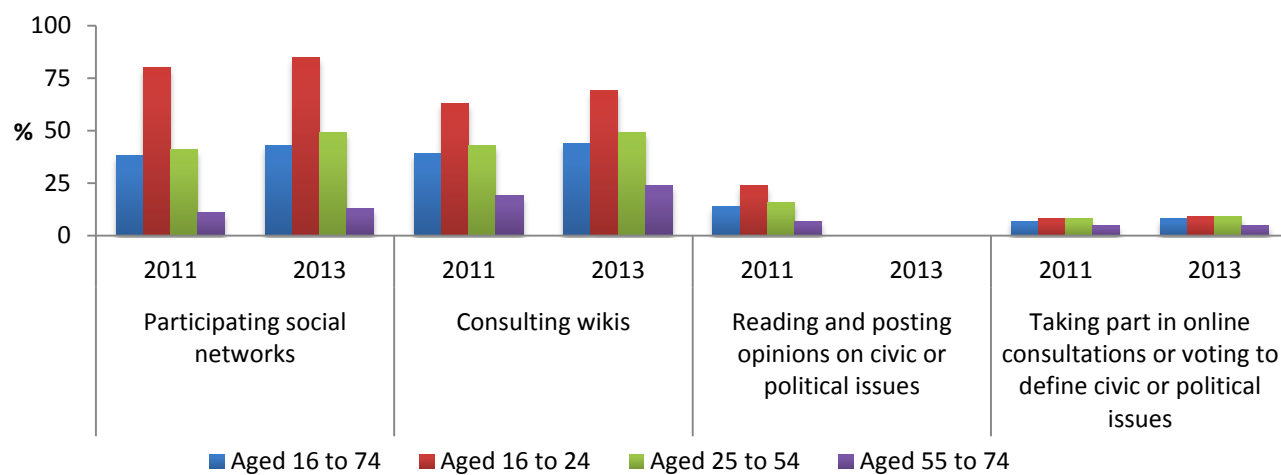


Figure 8: Use of internet for social networking, learning, civic and political participation, by age group, 2011 and 2013 (% of individuals).

Source: Eurostat (online data code: isoc_bde_15cua)

In the main group that aged between 16 and 74 had some skills on computer usage like copy and paste or move the folders to another place in the system within a proportion of 63%, the ability of using basic arithmetic formulas in programs' share was 43%, making presentations was 31%, and 10% of the main group had capability to write computer programs, in 2011. However, the youngest group that aged 16 to 24 had higher proportions of computer skills than the main group, such as the proportion of 89% of these members of the youngest age group had ability to copy or replace the folders in the computer, 66% of them had good skills to implement basic appropriate formulas in programs, 60% of youngest individuals presented their works through an electronic slide show, and lastly, the proportion of 20% of the younger individuals had enough knowledge to write computer programs (Eurostat, 2014).

8. Information Technologies Sector and Its Potential in Turkey

Information technologies have been the most significant factor of the global economy development. Undoubtedly, IT has a key role to emergence of information society and structure of necessary economy policy in Turkey, with respect to take place in an important scale in the science and technology competition against the other developed countries in the future. In order to catch up with the leader countries and find new IT markets in the international area, reducing the costs by applying the transition from labor intensive production to high-tech intensive production would be the appropriate policy.

IT is the key determinant and trigger of the global economy, competitiveness along with the globalization in the economy, and lastly the EU membership process. Military, economic and cultural links are directly impacted by the “IT sector” which gains importance day by day, as a major and strong determinant of national economic growth of countries. Hence, achievements of economic efficiency in all sectors are the most necessary condition to establish the information society in Turkey. In addition, the strategic significance of IT is quite high against to catch up with developed countries by value-added, which is provided by IT sector (Aydin, 2012).

In respect to the manufacturing sector, Turkey is lagged behind of the world’s economies in many sectors due to its manufacturing industry is consisted by rather labor intensive and outdated technology use. In agriculture, the sector can stand only by subventions, and most of the time it is used as a political argument by politicians, besides the country is too late for Industrialization. Particularly tourism in service sector seems an important segment in Turkish economy, even though the whole service sector is not grown enough yet. However, breakthroughs came along with developed and modernized designs into the textile and automotive industry, and country could not get enough shares from the world trade. The fact is that, IT sector substantially affects the development process of economic growth and social progress in today’s world. That is why; Turkey cannot keep away from the information technologies of increasingly globalized world. Yet, Turkey needs to make difference to catch up, and more importantly, to forge ahead the world and to establish rules on IT sector. According to

Aydin (2012), in the future, Turkey will have a national stability on dimension of strategic planning and implementation to cope with the other world economies in IT industry, as long as Turkey sets a course for strengthen and configure its own economic future within a framework of realizing the country's goals in the aspects of mission and vision through applying science and technology policies and strategies (Aydin, 2012).

8.1 Analysis of Current Situation in Turkish IT Sector

Neither all over the world nor in Turkey, is it possible to go far with only one sector alone. While the developments are progressing correspondingly in the sectors between each other, as long as the government subsidizes and attaches particular importance to some of these significant sectors, those will become a locomotive of the economy. Just like, textile was a state-subsidized industry which was getting an important attention before. But today, priority and privilege of IT sector should be provided by government policies regarding country benefits getting by surplus value of the sector.

As a matter of fact, competition is not only in domestic market, global platforms witness technological and commercial achievements by competitiveness as well. Due to this reason, IT sector will be the most important determinative factor of Turkey's future for the decision support mechanisms. Information technologies in present condition, Turkey has achieved to enter a substantial period in terms of establishing the information society. In particular, Turkish policy makers' vision and stability on the social I transformation towards becoming information society, has been the most hopeful feature of Turkey, recently (Aydin, 2012).

If the policy makers could be arrived earlier on this level, the solutions would be easily found by them in the sectorial and infrastructural issues. Moreover, expecting a social transformation into the information society in Turkey would not be a realistic approach according to recent indicators. Each technological facility and device is developed due to the individuals who can afford these devices and facilities presented by technology.

Even though, Turkish information technology sector has rapidly increased in the last decade, but, sectorial output does not commonly take place in schools, households and SMEs. Nevertheless,

currently established system in metropolitans is more intensive than in other provinces, and it never spreads to the rural areas. Obviously, to promote high-tech is a necessity especially in SMEs, and to provide training for well-educated and qualified next generations are also important determinants of information society constitution. Likewise, use of information technologies is also necessary to spread over rural areas by the policy makers. Even the maximum efficiency on usage of the computer systems of public sector is realized, public sector can also exploit the information technology services provided by private sector in a necessity (Aydin, 2012).

Since the last decade, software became a prerequisite for information society formation, has overemphasized as a part of IT sector, and because of its human resource potential, but Turkey could not take a decisive, conscious and concrete step about national software sector development. Although, a considerable amount of software programs are developed by the public sector along with the private sector, but this potential never can provide a competitive advantage. Turkey has a young population, and it is clear that, qualified and well-educated brain power will be a significant source of output and employment opportunity, especially in software production. In order to make software sector more attractive for the Turkish youth; necessary tax regulations of software sector need to be resettled and enhanced in favor of software employees and companies by implementing betterments in the conditions for both of workers and companies, and applying tax-free zones in techno-parks. Thus, the number of companies in the Turkish Software sector, and international market competitiveness will be rapidly increased by applying tax-free zone and creating attractive techno-park conditions (Aydin, 2012).

Science and technology policies have a significant role in the transformation of information society. In this sense, imported technology is used and applied in information technologies and industrialization by Turkey. Within this context, the reason of why Turkey does not completely produce its own technology is Turkish society's cultural incapability against the other societies of technologically developed countries (Erkan, 1997).

Today, Turkish ICT sector has reached a noticeable development due to several incentive programs and projects by public authorities such as "The Ministry of Transport, Maritime Affairs

and Communication,” “The Ministry of Science, Industry and Technology,” “The Scientific and Technological Research Council,” and “The Information & Communication Technologies Authority.”

Furthermore, these projects and programs have been a trigger for information technology revolution and the milestones of Turkish information society as well. In order to update technology policies in Turkey, examining the subject in more detailed policies by composing reformist culture policies within a new perspective is much better. Particularly, universities and the other research institutes constitute scientific and cultural policies through a competitive and innovative education system, which rewards success within a new understanding and approach. For instance, “FATİH Project” is pioneering the public sector investments those are closely linked with the ICT sector in Turkey, also, in the same project, equipment and software substructure are provided for the movement of The Ministry of National Education within the framework of “Smart Class” project, which aims to equip 42.000 schools and 570.000 classes with the latest IT systems and devices and consequently the education system will be turned into computerized education system with these Smart Classes (ISPAT, 2014). Thus, Turkish education system will be harmonized with these global contemporary scientific and cultural developments, and consequently, Turkey will be much better position in terms of social capability in the near future.

8.1.1 Strengths of Turkish IT Sector

I compile the strong and advantageous aspects of Turkish information sector in order of priorities. Firstly, position advantage of the country, which is based on its geographical location on the world. Secondly, Turkey’s dynamism and potential, that is based on its demographic structure which provides the youngest population of the Europe. Thirdly, the synergy effect of a deep rooted history and cultural background is also one of significant advantages. Lastly, especially infrastructure support is also an important advantage that is brought along by use of advanced technology on banking system and e-government projects. In addition, contribution and returns of present potential in Turkish economy, newly constituted techno-cities and techno-parks, world-wide manufacturing and installation facilities potential of leader companies in

private sector, realized export contribution in the national economy, easier selection of appropriate technology among tested ones, due to newly started technology investments along with prioritized importance of technology in terms of development and export progress by policy makers are also great opportunities for the country (Aydin, 2012).

Specifically, the most important industrial developments and enlargements were seen in consumer electronics and software sectors. In consumer electronics sector, as I mentioned before, Vestel, Arcelik, and Beko are the biggest national companies in domestic market, but Beko is also the most known company in European markets (Özcivelek and Zontul, 2004). Furthermore, within an export share of Turkish TV sets by 87% in 2012 is also a strong producing aspect of the sector (Ministry of Economy, 2014). Software has become one of the most important key factors and, the most important share holder in the information and communication technologies progress of the 21st century's world. Software is the complementary tool for government, economy, trade and social life to provide interactive, efficient and productive operations among them. Today, all world economies consider software industry as the most significant economic and strategic factor for the improvement (Interpromedya, 2011). Turkish economy experiences a rising significant role of software industry among world economies, and creates opportunities for employment and increases market share of the software sector. In figures, the size of software market was \$0.7 billion in 2010, and expected to reach level of \$1.2 billion in 2017 (ISPAT, 2014).

8.1.2 Weaknesses of Turkish IT Sector

Regarding Turkey's weak points on IT sector, absence of national coordination unit takes first place. Next, in terms of infrastructural capacity insufficiency, resource shortage of finance based on diseconomy, Turkey's small market size, bad image of Turkish goods, difficulties based on insufficient numbers of national brand creation, and lack of qualified and/or well-educated employee with under-qualified system issues can be count as negative side of Turkish IT sector. Also, lower R&D investments and correspondingly inadequate technology production, low efficiency of newly constituted techno-cities and techno-parks, insufficient institutionalization of

companies in private sector, law, education and technology can be counted as weaknesses of IT sector in Turkey (Aydin, 2012).

8.2 Applied Government Policies in the New Economy in Turkey

Until 1980s, there have been some troubles about completing the process of industrial society transition along with information society transition, due to Turkey's protectionist and closed economy policies (Yücel, 1997:5). In spite of there have been crucial developments in the 1980s, efforts of national economy on technological change were not quite enough. Although, positive developments have been observed on scientific and technological indicators of Turkey in the 1980s and 1990s, these developments have made only limited contributions to the Turkish productivity structure, competitiveness and export performance. One of the most important reasons behind of that limited development was the poor performance of science and technology policies (Barisik and Yirmibescik, 2006).

In 1993, 653 specialty technologies out of 739 in 32 main technology groups has been used in investment and production, according to the Turkey Technology inventory which is published by Ministry of Science, Industry and Technology. Turkey's important manufacturing and technology areas are consisting of Textile, leather, glass, pure chemistry and petro chemistry, construction technologies, hardware, machine manufacturing, metallurgical technology, automotive technologies, information and communication technologies, and partly electronic and food technology (Demir, 1996:43).

In 1983, Turkish Science and Technology Policy 1983-2003, and then documents of 1993-2003 have been prepared by constituting of the Scientific and Technological Research Council of Turkey (BTYK). Council's functions has been extended and activated, in 1995, Patent Law has renovated, and lastly in 1996, Presidency of the Turkish Competition Authority and also Legislation of Intellectual Property Rights has been established. Between 2003 and 2005, utilization and awareness of information and communication technologies in Turkey have increasingly diffused along with developments in the world. In 2001, Turkey has become a part of an extended initiative for candidate countries which called as "e-Europe +" in accordance with

Lisbon Strategy which aims to provide that European Union will become the most competitive, dynamic and knowledge-based economy all over the world in the future, and moreover, e-Europe Initiative and e-Europe Action Plan which are surfaced on the purpose of realizing this strategy. E-Europe 2002 Action Plan which is successfully implemented by EU and brought to 2005 with the new goals. Turkey has become a party to e-Europe 2005 as well (Barisik and Yirmibescik, 2006).

In order to acceleration and coordination of the transition process of information society, e-Turkey Project has taken part in Action Plan. Information Society Agency has been established by the Secretariat of the State Planning Organization. Within 2003/12 numbered Prime Ministry Circular, project's the codes of practice and its purposes have been determined. E-Turkey Project's main purpose is, realizing a participative, transparent, effective state structure with simple business processes, in order to acceleration of information society transition process, and provide faster and more quality public services (Resmi Gazete, 28.10.2003:202).

8.2.1 Applied Science and Technology Policies and Export Performance

Until 2000s, Turkish total productivity and export performance have lagged behind of expectations due to insufficient implementations of science and technology policies, such as Turkish Science and Technology Policy 1983-2003, and documents of 1993-2003. Turkey's export in 2004 was performed by share of 4% in agriculture, 1% in mining, and 94.3% in manufacturing. Turkey's productivity activities are aggregated mainly in textile and ready wear, ceramic, food and drink, tobacco, iron and steel, forestry products and furniture sectors which are technologically less developed, but gained depth technological capability on labor force. Also, more than half of import and export is supported by these industries. Therefore, Turkish production and export has aggregated in partly traditional (labor intensive) low-tech sectors and partly also in capital intensive sectors. Gradually decreasing export rates in the late 1990s, and the increases trend in the early 2000s could be explained by the effects of the national technology policies. With the exception of capital intensive technology product groups, export rates are pretty lower in the others. In recent years, Turkey has struggled with many troubles such as inflation, war in the contiguous countries, and negotiation on EU full membership process. In

spite of all these bothers, export has realized as \$73.1 billion by annual growth rate of 15% in 2005 (Barisik and Yirmibescik, 2006).

Although the effect of IT sector cannot measure in the period of 2002-2004, we could say that there was an impact of internet and the other information and communication equipment regarding increase of information flow among institutions, and the exploration of new export markets. In the period of 2002-2005, while significant investments were establishing through incentive law, companies have renovated their present systems and capacities. Despite the slowdown in ready wear sector, non-ferrous metals, automotive, machinery and electric-electronic sectors have seriously increased their shares in exports. Agriculture and mining sector has experienced a decrease in their share in exports. There has been also an important increase in exports of Electronic products within the scope of IT goods. Electric-electronic sector has increased 39.4% within 9.5% of market share, and machinery and equipment sector has increased 41.9% and had 3.3% of market share in the end of 2004 (Barisik and Yirmibescik, 2006).

8.2.2 Adaptation Efforts and Competitiveness

Countries that want to provide competitive advantage against the other countries, they could be accomplished their competitive advantages by virtue of either implementation of active science and technology policies or improve their national economic structure and give an outstanding performance in exporting markets. In developing countries, science and technology infrastructure emerges quite slowly, because, completing the information society transition takes long time and it is too expensive. Even though, there have been serious investments in this field, Turkey's technological structure is mostly progressing on licensed-production and patent agreements with the other countries. In turkey, technology requirements of the industry are substantially provided by abroad through direct transfers instead of using own productions. From 1980 to middle of 1990s, indicators provided by Under-secretariat of Treasury show that Turkish manufacturing industry had supplied the technology requirements through licensing in an attempt to renewal of product and production process or facility renovating (Göker, 1995:156). Developments especially in tourism and banking sub-sectors could be explained by the impacts of license

agreements in service sector. Approximately 44% of these license agreements signed up with Germany and US, and 30% of them were with United Kingdom, France, Italy and Switzerland (Barisik and Yirmibescik, 2006).

While technological capacity in Turkey is determined by license and the other similar factors; developing new technologies, producing and adaptation initiatives of present ones to the local conditions were unfortunately neglected by policy makers. Until 2002, implemented science and technology policies in Turkey were not sufficiently promotional and directive in respect to both national structure of productivity and export performance. In 2000s, technological intensive productivity in some private sector companies and their successes on export performance were important but exceptional structures with regards to national economy, and they were mostly observed at a level of medium and large-scaled firms in the Turkish economy. Turkey is expecting to profit by science and technology in foreign trade through these breakthroughs (Barisik and Yirmibescik, 2006).

9. Conclusion

In this study, the situation of Turkish IT industry which is also a part of ICT sector examined by making a literature review and using Turkish and international based secondary data within social capability approach. Further on, I implement an international comparison between Turkey and EU-27 countries. However, I compare Turkey with Poland, when I need to make a country based comparison. These comparisons reveal that to what extent Turkey is lagged behind of European Union regarding ICT production, diffusion over the country, and access level of individuals in the society. As we can see at the figures of EU-27 countries and Turkey regarding internet access of household, and frequency of internet use; Turkey follows the new EU members closely. Moreover, in terms of ordering goods and service via internet individual based, Turkey stands between Romania and Bulgaria, which indicates that Turkey is a developing rapidly with respect to private internet use among the individuals.

I study on situation of IT sector in Turkey, its implemented policies, and I also analyze the ICT production, and ICT usage on Households in Turkey, and EU-27 with figures. I have chosen time

period 1980-2012; because Turkish industrial clusters, those are the outcome of spatial and economic transformation, which had started to take part in the beginning of 1980s in Turkish economy by virtue of foreign trade and exchange those were supported by openness trade policies of the new programme. Revised tariffs, changed foreign trade quotas and controls on imports led to have a further liberalized trade structure in 1984 (Şenses, 1989).

In the 1990s, developments of information and communication technologies led the diffusion of electronic based information technologies. Technological developments and innovations had caused to lower costs of technology-intensive products and the lower costs enabled to get the knowledge faster and broadly. Easily getting knowledge triggered the global trade liberalization policies among countries. International business sense had changed, and economic activities had geographically expanded. In the transition period of the information societies, qualified workforce and knowledge had become the key factors of the economic development of the countries due to diffusion of the new economy.

Spread of internet is the one of significant dynamics of the new economy process. Within the accessibility of the knowledge, decision-making process of consumers, entrepreneurs and labors became easier, and the consumers effectively became conscious about costs and range of products that allowed them to have more options in the market, and they had no need to have resellers any more. Administrative and inventory costs decreased for manufacturers and suppliers. Equally sharing the knowledge, easily getting the links with the international markets and lower costs of information exchanges between the companies contributed to resolution of the imperfect information problems in the global market. Adaptation to the new economy's intense competition environment that came along with internet was a must for the companies regarding to stay in the market. That is why; the companies had to change their selves and their products consistently (Barisik and Yirmibescik, 2006).

Turkey's infrastructure potential of e-commerce and new economy is nearly same with the average of European countries, and Turkey's infrastructure potential is more advantageous than the other developing countries. However, that potential could not be used eligibly because of the major obstacles such as getting late for the regulations concerning legal and technical

infrastructures, and applying these potentials in a long period of time. The new economy in Turkey is also identified with the Turkish economic history, likewise, on one hand, the heritage of industrialization failure of Ottoman Empire still impacts Turkey's industrialization process, and on the other hand, Mustafa Kemal Atatürk's principles and reforms, especially in the industrialization and establishing the new factories (within only 15 years, 46 factories in several cities) along with the reforms in the society to fulfill the social capability and to realize the competitiveness against the Western countries. In this sense, I suggest that, Turkey will catch up with the European countries' new technologies in a very short time, and close the historical gap regarding social capability, as long as following Atatürk's reforms and principles.

Turkey draws a country profile that has a harmony with the new economy, as long as Turkey generates the solutions for the current economic issues. There has been some progress regarding the new economy, although Turkey has been struggling with the major problems, such as; high inflation, unemployment, heavy going bureaucracy in public sector, and low productivity of private sector in the current economy. Therefore, there are some long and short term measures, and especially public sector has a key role of taking measures. The institutions such as TTGV, TUBITAK, and DPT develop projects about information economy and its infrastructure. E-government and e-Turkey projects are started to produce under the influence of external dynamics especially inspiring by e-Europe phenomenon (Barisik and Yirmibescik, 2006).

Turkey still has limited capability to bring innovations and apply them in manufacturing. That is why, necessary technologies for these sectors are provided by licenses instead of producing. Technological innovations are realized by a big majority of medium-sized enterprises. In the long term, producing national information technologies is the solution for the Turkish economy, and intensively usage of information technologies by the SMEs is the prerequisite for development of the country.

Intense R&D and information technology production provide the country's competitiveness against the other strong economies. Therefore, it is possible to start with producing all of these information technologies, and especially software industry and the other critical technologies in Turkey by having projects and subsidies in the fields of R&D and production. For this purpose,

accomplishing the sufficient resource and infrastructural studies in terms of information technologies is a crucial factor for the transition of Turkish information society. Moreover, establishing the information society mostly depends on the education of information technologies. For this reason, the development of social capability starts with organizing the environments those are easily accessible to the internet via computers for the primary school students. However, the applications that make lower cost of the knowledge are the solution for the internet access in whole society (Barisik and Yirmibescik, 2006).

10. References

- Abramovitz, M. (1979). *Rapid Growth Potential and Its Realization: The Experience of The Capitalist Economies in The Postwar Period*, in Malinvaud, E. (ed.) *Economic Growth and Resources*, London: The International Economic Association.
- Abramovitz, M. (1986). Catching up, forging ahead, and falling behind. *The Journal of Economic History*, 46(02), 385-406.
- Aydın, İ. (2012). Bilişim Sektörü ve Türkiye'nin Sektördeki Potansiyeli. *International Journal of New Trends in Arts, Sports & Science Education (IJTASE)*, 1(1), 180-200.
- Barisik, S., & Yirmibeşçik, O. (2006). Türkiye'de Yeni Ekonominin Oluşum Sürecini Hızlandırmaya Yönelik Uyum Çabaları. *Uluslararası Yönetim İktisat ve İşletme Dergisi*, 2(4), 39-62.
- Demir, H. (1996). Dış Ticaretimizde Kobi'lerin Yeri ve Önemi. *Dış Ticaret Dergisi, KOBİ Özel Sayısı, Aralık, Ankara*, 40-52.
- Dogan, S. (2010). "Türkiye'de bilgi ve iletişim teknolojilerinin ekonomik büyüme üzerindeki katkıları", İstanbul: Yıldız Teknik Üniversitesi Sosyal Bilimler Enstitüsü.
- Erkan, H. (1997). *Bilgi toplumu ve ekonomik gelişme*, Ankara: Türkiye iş bankası Kültür Yayınları.
- European Commission, (1999) *Technology, economic integration and social cohesion*, Maastricht: Targeted Socio-Economic Research (TSER).
- Eurostat, (2013).
<http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do;jsessionid=9ea7d07e30d9a3bd27b108cd41d4a3a9811ae196282f.e34MbxSahmMa40LbNiMbxMchuMe0>
(accessed May 27, 2014).

Eurostat, (2014).

http://epp.eurostat.ec.europa.eu/portal/page/portal/information_society/data/main_tables
(accessed May 28, 2014).

Göker, A. (1995). *Bilim, Teknoloji, Sanayi Üçlemesi*, İstanbul: Sarmal Yayınları.

Interpromedya, (2011). <http://ictnewseurasia.com/100-general-overview-of-the-turkish-software-industry.html> (accessed March 13, 2014).

ISPAT, (2014). <http://www.invest.gov.tr/en-US/infocenter/publications/Documents/ICT.INDUSTRY.pdf> (accessed Sep 2, 2014)

Kirlidog, M. (1996), Information technology transfers to a developing country: Executive information systems in Turkey. *Information Technology & People*,9(3), 55-84.

Kocak, O., & Zeytinli, E. E. (2009). The Effect of Technological Production and Usage og High-Tech Goods to Welfare of A Country: Comparison of Finland and Turkey. *Economics & Management*, (14): 882-851.

Ministry of Economy, (2014). <http://www.tcp.gov.tr/english/sectors/sectoringpdf/electronics.pdf>
(accessed May 5, 2014).

M Promotion Agency, (2013). http://poland-it.pl/tfile/Polish_IT_ICT_services_information_booklet.pdf (accessed Aug 12, 2014).

M Promotion Agency, (2013). <http://poland-it.pl/Download/60> (accessed Aug 12, 2014).

OECD, (2014), http://www.oecd-ilibrary.org/economics/country-statistical-profile-turkey_20752288-table-tur (accessed May 24, 2014).

OECD, (2014). http://www.oecd-ilibrary.org/economics/country-statistical-profile-poland_20752288-table-pol (accessed May 24, 2014).

Olson, M. (1982). The rise and fall of nations: Economic growth, stagflation and social rigidities.

- Ozcivelek, R., & Zontul, H. (2004). Insights into the ICT Industry in Turkey. *Turkey: TUBITAK-BILTEN Research Institute.*
- Resmi Gazete (2003). *VII- Bilgi ve İletişim Teknolojileri*, S.25273, 28.10.2003:202-207
- Schreyer, P. (2000). *The Contribution of Information and Communication Technology to Output Growth: A Study of the G7 Countries* (No. 2000/2). OECD Publishing.
- Şenses, F. (1989). *1980 Sonrası Ekonomi Politikaları Işığında Türkiye’de Sanayilesme* Ankara: V Yayınları.
- TESİD, (2011). http://www.tesid.org.tr/tsd/belge/tesid_eng2011.pdf (accessed May 10, 2014).
- TESİD, (2013). http://www.tesid.org.tr/tsd/belge/TESiD_2013_almanak_ingilizce.pdf (accessed May 10, 2014).
- Tonta, Y. (1999). Bilgi toplumu ve bilgi teknolojisi. *Türk Kütüphaneciliği.*
- Turkoglu, Y. (2010). ICT Sector in Turkey. *Export Promotion Center of Turkey.*
- Turkstat, (2013). *Information and communication technology (ict) usage survey on households and individuals*, Ankara: Turkish Statistical Institute
- Vestel, (2014). <http://www.vestel.com.tr/vestel-sirketler-grubu> (accessed May 28, 2014).
- Vestel, (2014). <http://www.vestel.com/en-en/corporate/vestelgroup.aspx> (accessed May 28, 2014).
- Yücel, İ. Hakkı, (1997). *Bilim ve Teknoloji Politikaları: Ülke Örnekleri*, Ankara: DPT.