

12th International Strategic Management Conference, ISMC 2016, 28-30 October 2016, Antalya, Turkey

## Innovation: A comparative case study of Turkey and South Korea

Aysel Erciş<sup>a</sup>, Musa Ünal<sup>b,\*</sup>

<sup>a,b</sup> *Atatürk University, Erzurum, 25030, Turkey*

---

### Abstract

When the world has been experienced the rapid technological developments, innovation have been playing a key role for countries which want to increase their economic growth and prosperity. The innovation potential of an economy influence to macroeconomic and microeconomic factors such as GDP/capita, R&D expenditures, international trade. Therefore, we want to examine the positions of innovation in Turkey and South Korea. There are some similarities in these countries to compare them in each other. In the 1980s, the per capita income in South Korea approximately equal to the per capita income in Turkey. The purpose of this paper was to examine innovation comparing Turkey and South Korea using Innovation Global Index reports between 2007 and 2015. The data source is the Global Innovation Index which is co-published by Cornell University, INSEAD, and The World Intellectual Property Organization (WIPO, an agency of the United Nations), by taking into consideration the time period 2007-2015. The results highlighted that Turkey should focus innovation more than before with regards to pillars.

© 2016 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of the organizing committee of ISMC 2016.

**Keywords:** Innovation, Global Innovation Index, Turkey, South Korea

---

### 1. Introduction

Technology and innovation play an increasingly important role in the economic development of both developed and developing countries. Innovation is so important for competitive and growth. Policy makers around the world promote government investments and policies to expand their nations' innovative capacities in order to maintain their positions in the global market competition (Shi and Pray 2012).

Gurbiel (2002) emphasizes that the innovation potential of an economy is influenced by both macroeconomic and microeconomic factors: GDP/capita, R&D expenditures, international trade, competitiveness, technological gap, level of profit recorded by foreign companies in a country. Studies in recent years show that there is a link between economic performance and innovation for companies (Carrincazeaux and Gaschet 2015; Likar et al. 2014; Boons et al. 2013; Kumar and Subrahmanya 2010; Cainelli et al. 2006, 2004; Heidenreich 1998) and economic growth and

---

\* Corresponding author. Tel.: +090 553 605 60 46; fax: +090 442 231 19 07.

E-mail address: [musa.unalan@atauni.edu.tr](mailto:musa.unalan@atauni.edu.tr)

innovation (Pece et al. 2015; Westmore 2013). Over the last two decades, both developed and developing nations starts to understand importance of innovation because of that innovation makes better something. So, innovation increases some ratios that can be listed as employment growth, sustainable growth, social developments and social welfare. Because of these reasons, we want to examine the positions of innovation in Turkey and South Korea. There are some similarities in these countries to compare them in each other. South Korea has been progressed but Turkey has been remained same points in comparison with former rank. Also, South Korea is the only country that can rise from middle-income to high-income level. In that case, we started asking ourselves this question: What is to make different South Korea from Turkey? It is surely that there are many answers for this question. However, we think that one of the important answers is innovation. For that matter, in this study we investigate the innovation status for both countries.

The rest of the paper is organized as follows: (1) to provide a brief overview of Turkey and South Korea; (2) to review the extant literature on strategic management of innovation; (3) to describe global innovation index ratings data; (4) to present analyses and results; and (5) to recommend the implications of findings with conclusions.

## 2. An Overview of Turkey and South Korea

In the 1980s, the per capita income in South Korea approximately equal to the per capita income in Turkey (Sak 2015). Before forty years ago, the ratio of per capita income between South Korea and US (South Korea/US) was 25%, but now it is 60%. On the other side, the ratio of between and Turkey and US (Turkey/US) was 25%, but now it is 25%. South Korea has been progressed but Turkey has been remained same points in comparison with former rank. Also, South Korea is the only country that can rise from middle-income to high-income level. Within this time period, you can find some of the criteria to compare Turkey and South Korea in Table 1 (Factbook 2015).

Table 1. An overview of Turkey and South Korea

| Criteria                                        | Turkey                                                                 | South Korea                                                                                                                                                    |
|-------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Area</b>                                     | 783,562 km2 (37th largest in the world)                                | 99,720 km2 (109 <sup>th</sup> largest in the world)                                                                                                            |
| <b>Population</b>                               | 79,414,269 (July 2015 est.; 17th largest in the world)                 | 49,115,196 (July 2015 est.; 28 <sup>th</sup> largest in the world)                                                                                             |
| <b>GDP (purchasing power parity)</b>            | \$1.508 trillion (2014; 18th in the world)                             | \$1.781 trillion (2014; 14th in the world)                                                                                                                     |
| <b>GDP per capita (purchasing power parity)</b> | \$19,600 (2014; 84th in the world)                                     | \$35,300 (2014; 46th in the world)                                                                                                                             |
| <b>GDP real growth rate</b>                     | 2.9% (2014); 4.4% (2013); 2.1% (2012)                                  | 3.3% (2014); 2.9% (2013); 2.3% (2012)                                                                                                                          |
| <b>GDP composition</b>                          | 8.2% agriculture, 26.9% industry, 64.9% services                       | 2.3% agriculture, 38.3% industry, 59.4% services                                                                                                               |
| <b>Budget</b>                                   | \$189.9 billion (revenues); \$209.7 billion (expenditures)             | \$350.7 billion (revenues); \$337.9 billion (expenditures)                                                                                                     |
| <b>Unemployment rate</b>                        | 9.9% (2014)                                                            | 3.5% (2014)                                                                                                                                                    |
| <b>Exports</b>                                  | \$176.6 billion (2014; 30th in the world)                              | \$572.7 billion (2014; 6th in the world)                                                                                                                       |
| <b>Exports commodities</b>                      | apparel, foodstuffs, textiles, metal manufactures, transport equipment | semiconductors, petrochemicals, automobile/auto parts, ships, wireless communication equipment, flat display displays, steel, electronics, plastics, computers |
| <b>Imports</b>                                  | \$240.4 billion (2014; 24th in the world)                              | \$525.5 billion (2014; 24th in the world)                                                                                                                      |
| <b>Imports commodities</b>                      | machinery, chemicals, semi-finished goods, fuels, transport equipment  | crude oil/petroleum products, semiconductors, natural gas, coal, steel, computers, wireless communication equipment, automobiles, fine chemical, textiles      |

Source: CIA World Factbook

### 3. Strategic Management of Innovation

The value of innovative capacity of intellectual assets as a component of total market values has increased exponentially. As a result, the foundations of traditional economic and business thinking, and strategic management, have been shaking. The nature of economic value and wealth creation, not only for enterprises but also for countries, regions and industries, has become fundamentally different. The impact on strategic management, both in strategic thinking, and strategy implementation is very important for countries to grow their economics (Davenport et al. 2006).

The using of innovation strategically can be reason of competitive advantage in globalizing world for countries. The strategic management of innovation has become a central topic within the strategic management field (Hermann 2005). Strategic management of innovation is concerned with using appropriate strategic management techniques and measures to augment of impact the firm's innovation activities on firm growth and performance (Keupp et al. 2012).

Innovation is increasingly recognized as a vitally important social and economic phenomenon. Companies are concerned about their innovation ability and politicians care about innovations because of the growth, welfare, and employment (Fagerberg et al. 2013). There is a good understanding among scholars of what innovation refers to. Mostly, innovation is interpreted as the creation of new knowledge (Storz et al. 2015). Rogers (Rogers 1983) defines innovation as 'an idea, practice, or object that is perceived as new by an individual or another unit of adoption'.

The definition of innovation from Drucker is a unique tool of entrepreneurship and an action through which new resources for a rise in welfare are created and getting new ideas to converse as product and service (Drucker 1985). When Peter Drucker (1985) analyse the practice of innovation, he made clear something about innovation. "Before 1880 or so, invention was mysterious; early nineteenth-century books talk incessantly of the flash genius. The inventor himself was a half-romantic, half-ridiculous figure, tinkering away of in lonely garret. By 1914, the time World War 1 broke out, 'invention' became 'research', a systematic, purposeful activity, which is planned and organized with high predictability both of the results aimed at and likely to be achieved. Something similar now has to be done with respect to innovation. (Drucker 1985) " According to the European Commission, innovation, as a process, expresses "to transform an idea into a marketable product or service, a new or improved method of manufacturing or distribution, or into a new social service method" (Commission 1995). According to Stern et al. (2000), the national innovation capability of a country (as an economic as well as a political entity) can generally be defined as the potential to produce a stream of commercially relevant innovations.

### 4. Research Methodology

The data source is the Global Innovation Index which is co-published by Cornell University, INSEAD, and The World Intellectual Property Organization (WIPO, an agency of the United Nations), by taking into consideration the time period 2007-2015. The core of the GII (Global Innovation Index) consists of a ranking of world economies' innovation capabilities and results.

For instance, The Global Innovation Index (GII) 2015 covers 141 economies around the world and uses 79 indicators across a range of themes. Thus GII 2015 presents us with a rich dataset to identify and analyse global innovation trends.

Over the last eight years, the GII has established itself as a leading reference on innovation (INSEAD 2007, 2009, 2010; Dutta 2011; Dutta 2012; Dutta and Lanvin 2013; Dutta 2014, 2015). The Global Innovation Index relies on two sub-indices, the Innovation Input Sub-Index and the Innovation Output Sub-Index, each built around pillars. Five input pillars capture elements of the national economy that enable innovative inputs: (1) Institutions, (2) Human capital and research, (3) Infrastructure, (4) Market sophistication, and (5) Business sophistication. Two output pillars capture actual evidence of innovation outputs: (6) Knowledge and technology outputs and (7) Creative outputs. The number of countries for each year is show in the below table (Table 2).

Table 2. The number of countries for each year in The Global Innovation Index

| Year              | 2007 | 2008-09 | 2009-10 | 2011 | 2012 | 2013 | 2014 | 2015 |
|-------------------|------|---------|---------|------|------|------|------|------|
| Number of Country | 107  | 130     | 132     | 125  | 141  | 142  | 143  | 141  |

Source: The Global Innovation Index

When these reports have published since 2007, especially first years such as 2007-2008-2009, there are not same criteria like last years. Therefore, we try to put best place for old criteria to adjustment. (In addition, the explanation of 2008-9=2008-2009 and 2009-0=2009-2010). You can see in the below figures.

#### 4.1. Analyses and Results

Our in-depth analyses, based on Global Innovation Index using data to compare Turkey and South Korea's strengths and weaknesses in innovation. These analyses consider two main criteria and seven sub-criteria.

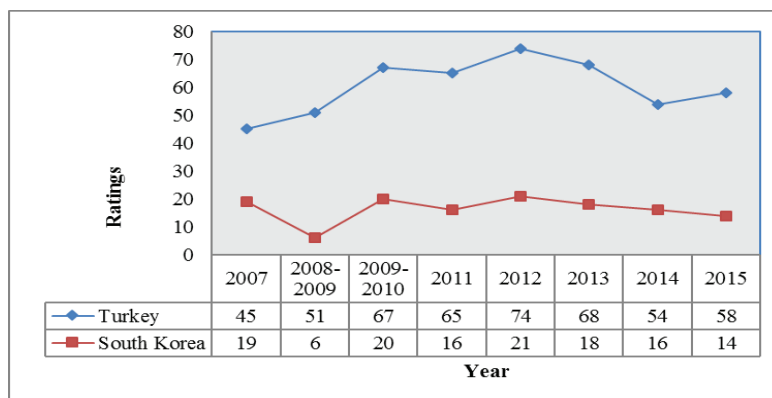


Fig.1. Global innovation index ratings

Fig. 1 shows that except during 2007, when Turkey had a rate of global innovation index (51), both countries had similar trends in these ratings from 2008 to 2014. The best places of global innovation index ratings of Turkey and South Korea in 2007 and 2008-09, at 45 and 6, respectively. However, in 2012, innovation rates for the two countries dropped sharply to 9 for Turkey and 5 for South Korea, according to the previous year. Overall, South Korea innovation index ratings seemed to increase faster than Turkey ones after 2012.

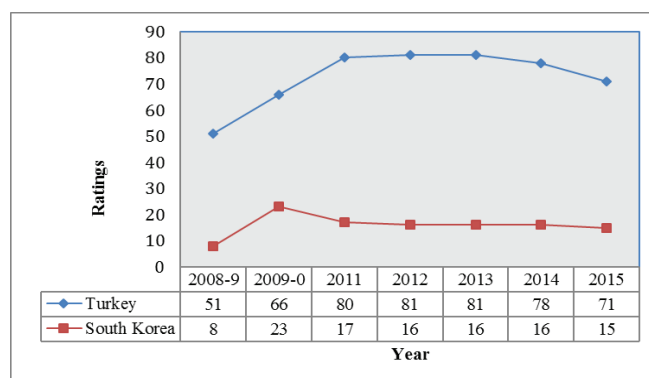


Fig.2. Innovation input sub-index ratings

Fig.2 compares the innovation input sub-index ratings of Turkey and South Korea from 2008 to 2015. In each of these years, the South Korea was well ahead from Turkey. Between 2011 and 2014, the trends for Turkey and South Korea had noticeably same from the above line.

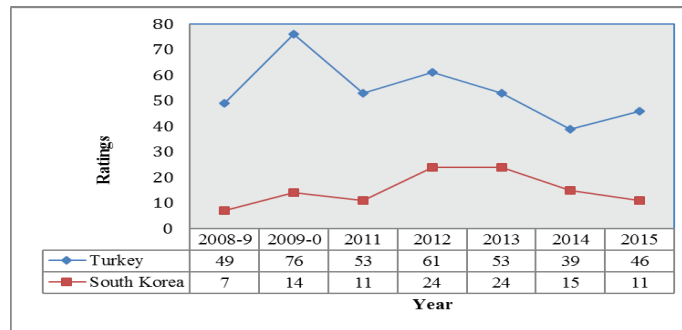


Fig.3. Innovation output sub-index ratings

The worst level of innovation output sub-index ratings for Turkey stood in 2009-0 at 76, whereas the figure for South Korea in 2012-13 at 24. The output ratings for both countries were consistently higher in South Korea than in Turkey.

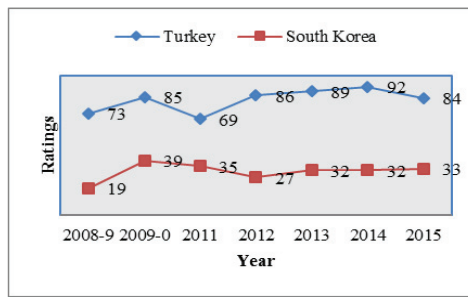


Fig.4. Institutions ratings

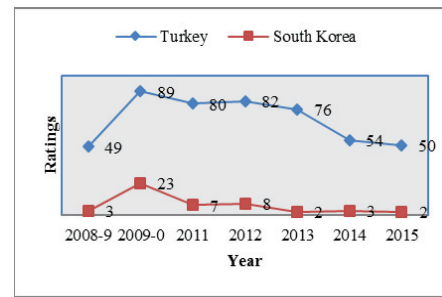


Fig.5. Human capital &amp; research ratings

When analyzed the Figure 4 and Figure 5, we note that South Korea is predominant in order to ranking. Especially, South Korea is very successful at the area of human capital & research. There has been an improvement in the human capital & research area in Turkey between 2009-10 and 2015 from the ranking of 89 to 50. According to institutions ratings, Turkey and South Korea had a similar trend from 2008 to 2015.

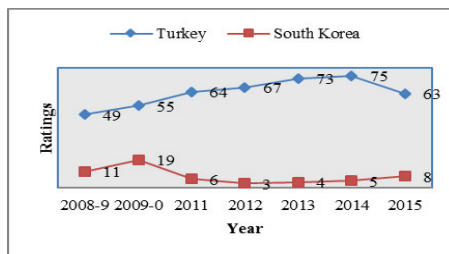


Fig.6. Infrastructure ratings

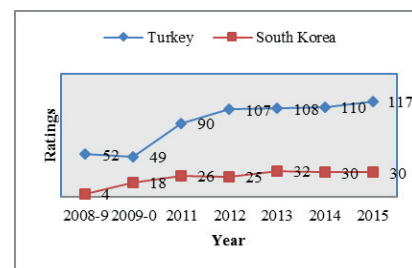


Fig.7 Market sophistication ratings

From the above line (Fig.6) it is found that there has been a failure with regards to Turkey between 2008 and 2014. However, South Korea except some of years, the general positions in Global Innovation Index is good situation such as the criteria of human capital & research. According to Figure 7, both countries had a negative progress from 2008 to 2014.

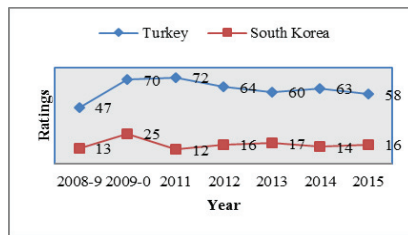


Fig.8. Business sophistication ratings

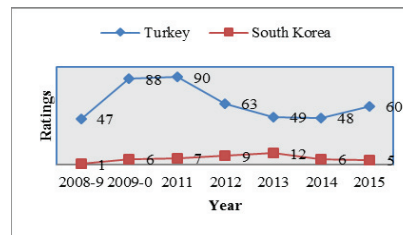


Fig.9. Knowledge &amp; technology outputs ratings

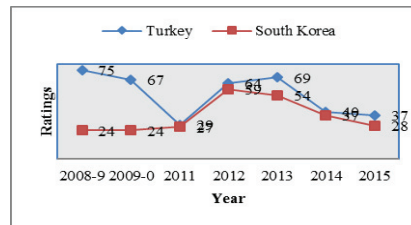


Fig.10. Creative outputs ratings

Fig.8 shows that oppositely there has been progress for both countries. While the ranking of Turkey has been increase, South Korea's has been decrease between 2009 and 2015. There are some of the fluctuations in Fig.9 for Turkey. On the other hand, we can see that one of the best areas of South Korea is knowledge & technology output. The nearest area for both countries is creative outputs especially after 2011 in Fig.10.

If we summary what should get from these graphs, we can organize the reasons of the success of South Korea and position of Turkey at same time:

#### South Korea

- The government of south Korea introduced variety of financial and tax incentives
- Korean governments export oriented policies forced domestic companies to the international markets and exposing them to high global competition.
- Government supported big Korean family holdings enjoyed great financial sources.
- Education policies aimed to raise qualified human resources.
- Korea chose to acquire technology by informal modes of technology transfer, imitation, reverse engineering, turnkey plant construction, foreign licensing and original equipment management.
- Korean government shifted its policy from labour intensive products to technology intensive industries.
- R&D in private sector from %30 (1970) to %75 (2008). (From 1990s, the private industries started to function as an important driver in Korean national innovation system.)
- Innovation actors: universities, government institutes, industry.

#### Turkey

- The lack of integrated innovation systems within institutions, firms and politics.
- Regulations in laws, business factors and cooperation firms and customer ecosystem are inadequate.
- Quality of innovation is poor (top universities, patent, citable documents) (Turkey:43; South Korea: 8).
- R&D in private sector from %20 (1990) to %44 (2008).
- Incentives in industries and universities have started lately.
- Under the leadership of TUBITAK, created national innovation strategy such as science technology and innovation strategy (2011-2016).

The results point out that while Turkey has the 45th place among 107 countries in 2007, South Korea has the 19th place in the general ranking of Global Innovation Index. Out-of 141 countries in 2015, Turkey has the 58th place wherever South Korea has the 14th place in order to GII. When we look to the Innovation Input Sub-Index, the rank of Turkey in 2015 is 71 and the rank of South Korea is 15. And also, from the point of view of Innovation Output Sub-

Index, Turkey has the 46th place while the South Korea has the 11th place in 2015. Turkey's best performance pillar in output and input is Creative Outputs being in numbers of 37 out of 141 in 2015. On the other side, South Korea's best performance pillar in output and input is Human Capital & Research being in numbers of 2 out of 141 in 2015. The purpose of this paper was to examine innovation comparing Turkey and South Korea using Global Innovation Index reports between 2007 and 2015. The results highlighted that Turkey should focus innovation more than before with regards to pillars. Because, Turkey need to do and have to do it for competitive market and growth.

## 5. Conclusion

In this paper, the definition and description of innovation from Turkey and South Korea have been brought together for a comparative analysis with the using of Global Innovation Index. From this state of the art, further discussions about specific institutions and companies from Turkey and South Korea, which varies a lot and has to be reflected upon, can be started. Fundamentally, we try to summary general status about innovation from the point of these two countries.

However, already in this article, it has been shown that the Turkey and South Korea's innovation position are quite different on many pillars (human capital & research, infrastructures, market sophistication, business sophistication, knowledge & technology outputs).

Although the innovation systems of Turkey and South Korea are different, and also the use of a method like innovation is diversified. In both countries, evaluations of the innovation programs in government and private sector and their implementation and impacts are missing. Therefore, researchers fill the gap with examine deeply.

Coming back to the starting point, the basic definitions of innovation and an overview of Turkey and South Korea, we can summarize that they are different from some of the criteria. This means both sides — and other countries — may learn from this comparison and improve their exercises.

What Turkey should do:

- target oriented approaches in R&D and innovation
- shifted its policy from labour intensive industries to technology intensive industries
- stay focused to middle and high-tech products instead of low-tech products
- support mechanism for the establishment of research, development institutes, universities
- increases to variety of financial and tax incentives including technology fund system and research personnel convert research results to commercial products
- spend more for education, improvement of human capital, efficient technology policies, and innovation systems development
- promote high potential or advantageous sectors or companies for sustainable competitive advantage

## References

- Boons, F., C. Montalvo, J. Quist, and M. Wagner. (2013). Sustainable innovation, business models and economic performance: an overview. *Journal of Cleaner Production* 45:1-8.
- Cainelli, G., R. Evangelista, and M. Savona. (2004). The impact of innovation on economic performance in services. *Service Industries Journal* 24 (1):116-130.
- . (2006). Innovation and economic performance in services: a firm-level analysis. *Cambridge Journal of Economics* 30 (3):435-458.
- Carrincazeaux, C., and F. Gaschet. (2015). Regional Innovation Systems and Economic Performance: Between Regions and Nations. *European Planning Studies* 23 (2):262-291.
- Commission, E. (1995). Green Paper on Innovation.
- Davenport, T. H., Leibold, M., & Voelpel, S. C. (2007). *Strategic Management in the Innovation Economy: Strategic Approaches and Tools for Dynamic Innovation Capabilities*. John Wiley & Sons.
- Drucker, P. F. (1985). *Innovative and Entrepreneurship, Practice and Principles*. New York: Harper & Row. Retrieved April 7:2013.
- Dutta, S. (2012). The Global Innovation Index 2012: Stronger innovation linkages for global growth: INSEAD.
- Dutta, S., and B. Lanvin. (2013). The global innovation index 2013: The local dynamics of innovation.
- Dutta, S. I. (2011). The Global Innovation Index 2012: Accelerating growth and development.
- Dutta, S. L., Bruno; Wunsh-Wincet, Sacha. (2014). The Global Innovation Index 2015: Human factor in innovation.
- . 2015. The Global Innovation Index 2015: Effective innovation policies for development.
- Factbook, C. 2015. CIA Factbook. Retrieved November:2015.
- Fagerberg, J., B. R. Martin, and E. S. Andersen. (2013). *Innovation studies: evolution and future challenges*: Oxford University Press.
- Gurbriel, R. (2002). Impact of innovation and technology transfer on economic growth: the central and Eastern Europe experience. *Warsaw School of Economics*.

- Heidenreich, M. (1998). Economic performance and institutional innovation - The German production and political regime in global competition. *Kolner Zeitschrift Fur Soziologie Und Sozialpsychologie* 50 (2):374-375.
- Herrmann, P. (2005). Evolution of strategic management: the need for new dominant designs. *International Journal of Management Reviews*, 7, pp. 111–130.
- INSEAD. 2007. The Global Innovation Index 2007: INSEAD.
- . 2009. The Global Innovation Index 2008-09: INSEAD.
- . 2010. The Global Innovation Index 2009-10: INSEAD.
- Keupp, M. M., Palmié, M. and Gassmann, O. (2012), The Strategic Management of Innovation: A Systematic Review and Paths for Future Research. *International Journal of Management Reviews*, 14: 367–390. doi: 10.1111/j.1468-2370.2011.00321.x
- Kumar, R. S., and M. H. B. Subrahmanya. (2010). Influence of subcontracting on innovation and economic performance of SMEs in Indian automobile industry. *Technovation* 30 (11-12):558-569.
- Likar, B., J. Kopac, and P. Fatur. (2014). Innovation investment and economic performance in transition economies: Evidence from Slovenia. *Innovation-Management Policy & Practice* 16 (1):53-66.
- Pece, A. M., O. E. O. Simona, and F. Salisteanu. (2015). Innovation and Economic Growth: An Empirical Analysis for CEE Countries. *Procedia Economics and Finance* 26:461-467.
- Rogers, E. M. (1983). *Diffusion of innovations*. New York: Free Press 18 (20):271.
- Sak, G. 2015. Ben Kore'de kendimi yine ezik hissettim <http://www.radikal.com.tr/yazarlar/guven-sak/ben-korede-kendimi-yine-ezik-hissettim-1414945/>: Radikal.
- Shi, G. M., and C. Pray. (2012). Modeling agricultural innovation in a rapidly developing country: the case of Chinese pesticide industry. *Agricultural Economics* 43 (4):379-390.
- Stern, S., M. E. Porter, and J. L. Furman. (2000). The determinants of national innovative capacity: National bureau of economic research.
- Storz, C., F. Riboldazzi, and M. John. 2015. Mobility and innovation: A cross-country comparison in the video games industry. *Research Policy* 44 (1):121-137.
- Westmore, B. 2013. R&D, Patenting and Growth.