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Development of Defence Capability from an Innovation Perspective: The Case of Turkey

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In this study, the case of Turkey from a defence capability perspective has been assessed with respect to the European Union Countries by using innovation indicators. Fourteen innovation indicators from year 2008 of the European Innovation Scorecard 2008 Report constituted a base for the current study. Based on these data, the situation of Turkey regarding the innovation indicators was posited by employing multi-dimensional scaling analysis (MDSA) and K-means cluster analysis. Based on the k-means cluster analysis, Turkey is in the same cluster as in Poland, Portugal, Romania, Slovakia and Croatia. The MDSA showed that the innovation performance of Turkey is in the category of "Catching-up Countries". Several policy recommendations have been given at the end of the study to increase the defence capability of Turkey from innovation indicators perspective.

1. Introduction

The economic and political developments whose impacts are not only felt on a regional scale but also on a global scale enforce organisations and firms, most of which are found under competitive environment, to be open to change. The firms of varying sizes in the defence sector which are one of the stakeholders in the development of a country's defence capabilities have to take the effects of this change into account from the aspects of competitive capacity, profitability and sustainability. In that respect, the Vision 2023 Defence, Aviation and Space Panel Report prepared by the Scientific and Technological Research Council of Turkey (TUBITAK) states that the only way for a country's defence

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industry in general and firms in the defence sector in particular to survive is to produce information and technology intensive goods in information based fields, especially in the information and communication technology industries (TUBITAK, 2003).

The current paradigm shift from traditional production to information and technology intensive production has also been reflected in the contemporary warfare. Under the current circumstances, the theatre of military operations, traditionally dominated by land, naval and air forces, has been carried-out through the electronic environment, especially the Internet. Concordantly, the North Atlantic Treaty Organization (NATO) calls a form of Internet-based warfare as “iWar”. According to the definition of NATO, “iWar” is distinct from what the United States (US) calls ‘cyber war’ or what China calls ‘informationalized war’. These refer to sensitive military and critical infrastructure assets, and to battlefield communications and satellite intelligence. In contrast, “iWar” refers to attacks carried-out over the Internet that target the low security consumer Internet infrastructure, such as the websites providing access to online services (NATO, 2007). The massive interruption of a country’s public and private sector services by attacking the Internet infrastructure was first seen in Estonia in 2007 and then in Georgia in 2008 (NATO, 2007; The Economist, 2008). The expansion of the theatre of military operations into the Internet requires countries to develop their defence capabilities even to overcome an iWar. This fact, once more proves that knowledge and technology are important components of the defence technologies.

In line with these developments, activities for enhancing the defence capabilities gained importance in Turkey, particularly in the last decade. The Turkish defence sector is one of the good examples from the experience of the developing countries regarding the defence capability development. The evolving character of the Turkish defence capability development can be summarized in three phases. Up to 1990, the Turkish defence sector mainly focused on direct procurements from abroad. However, direct procurements posed great risk in times of instability, such as the embargo the Turkish Government faced during the Cyprus Peace Operation in 1974. In the period between 1990 and 2000, while still maintaining direct procurement, the Turkish defence sector started joint production programmes with foreign partners including the manufacturing of Meltem (Breeze) Maritime Patrol and

Surveillance Aircrafts, Cougar Helicopters, Armoured Combat Vehicles, and Mine Hunting Vessels. From 2000 onwards, the Turkish defence sector has been actively carrying out design and export of defence goods and services including Hürkuş (Free Bird) Training Aircraft, Milgem (National Ship) Corvette, unmanned aerial vehicles, and Altay Tank projects (Turkish Undersecretary of Defence Industry, 2011).

As to the Western countries, after the end of the Cold War, the governments in the US and Europe started seeking new models to develop their defence capabilities (James, 2009-I). Although an attitude towards decreasing the defence expenditures that constitute a significant portion of the government expenditures is adopted, it is obvious that a country's capability of protecting its citizens from external threats is dependent on the high technology that its defence equipments have. Furthermore, the production of high-technology defence equipments directly depends on innovation and research and development (R&D) capabilities. For instance, by the end of the Cold War, while the defence R&D budgets recorded sharp falls in some countries, the defence R&D budget of the US reached US$79 billion in 2009, accounting for 12% of the national defence expenditures, recording a growth of 210% compared to the level in 2000 (The White House Office of Management and Budget, 2010). As matter of fact, the magnitude of defence R&D expenditure of the US reached the expenditure levels of the Cold War in 2005 (James, 2009-II). Indeed, high defence R&D expenditure by investments of the US in the defence industry is an indicator not only of expecting a benefit in a military sense but also of an intention to transform the gains from the defence industry R&D activities into commercial gains in civilian applications with a spill-over effect. A study carried out in 2005 by Fabrizio and Mowery documents the substantial role played by the US Department of Defence in the development of the electronic computer, computer software, and semiconductor components industries, resulting in the development of the Internet. Federal R&D investment, procurement policies, and spillovers of technologies from military to civilian applications contributed to the industrial and technological development of these sectors (Fabrizio and Mowery, 2005). A similar pattern of defence R&D expenditures is also seen in the Europe. In 2009, the defence R&D expenditures of the UK constituted 10% of the total national R&D expenditures (Chantrill, 2010). As for Turkey, the gross domestic R&D expenditure (GDRDE) of Turkey amounted to US$ 5.4 billion based on the survey results of public institutions, private universities and private sector firms, and budget and staff data of state universities. However, the share of GDRDE to GDP was still below 1% (exact figure is 0.73%) in 2008 (TUİK, 2009).

All these findings indicate that the role of innovation is becoming increasingly important, particularly in the development of defence capabilities. The term "innovation" is derived from the Latin verb *innovare* (Wordnik, 2010-I). In the Century Dictionary, innovation is defined as "*a novel change in practice or method; something new introduced into established arrangements of any kind; an unwonted or experimental variation*", "*the introduction of new things or methods*" (Wordnik, 2010-II). According to Noah Webster's 1828 American Dictionary, innovation is "*expedient when it remedies an evil and safe when men are prepared to receive it. Innovation is often used in an ill sense for a change that disturbs settled opinions and practices without an equivalent advantage*" (Noah Webster's 1828 American Dictionary, 1828). As to the modern usage of the term, an innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. The minimum requirement for an innovation is that the product, process, marketing method or organisational method must be new (or significantly improved) to the firm. This includes products, processes and methods that firms are the first to develop and those that have been adopted from other firms or organisations (OECD, 2005).

Although they do not express the same thing, invention and innovation are related terms. According to Tidd et al. (Tidd, Bessant, Pavitt, 2005), innovation is the sum of theoretical conception, technical invention and commercial exploitation (as cited in Arpaci, 2009).

The establishment of and progress in theoretical conception, stated as a sub-component of innovation in Tidd's formulation, depends on the education attainment level among the youth, the ratio of the population graduated from higher-education institutes, and the number of people participating in life-long learning programs. However, the quantitative increase in the number of trained people is not enough for innovation capability per se. According to a report published by the Association of American Universities (AAU) in January 2006, serious problems in the

American educational system and a weakening federal commitment to research in the physical sciences and engineering are eroding the innovative edge of the US, with increasingly evident and alarming results. The report also states that following the launch of Sputnik by the Soviet Union in 1957, the US responded those similar challenges by enacting the National Defence Education Act and by multiplying the investment of the US in university-based research. The AAU expects to see a comparable response from the national stakeholders to meet the current challenges the US are facing now (Association of American Universities, 2006).

Beside the factors affecting the theoretical conception, the public/private sector R&D expenditures and innovative SMEs collaborating with other SMEs are indispensable factors for technical invention, the second component of Tidd’s innovation formula. Meanwhile, to measure commercial exploitation – the last component in Tidd’s innovation formula – private sector financing, trademark and design ownership ratios, employment ratios in high-tech manufacturing and knowledge-intensive services, high-tech goods/services trade and exports are needed.

As a response to the challenges of globalisation, the European Council approved the Lisbon Strategy in March 2000 which aspires to make the EU into the most dynamic, most competitive economy in the world by 2010. Despite an ambitious research and innovation agenda, the Lisbon Strategy unfortunately seems to have failed. According to the European Innovation Scoreboard Report 2008 published by the European Commission (EC), the European Union (EU) fell behind the US and Japan regarding innovation. In parallel to the finding of the European Innovation Scoreboard (EIS), the data disclosed by the EC show that the European defence market faces similar problems. The European defence equipment market, worth €41 billion in 2007, is mostly concentrated in six member states, namely France, Germany, Italy, Spain, Sweden and the UK. However, the high regulation at the national level with divergent policies and fragmentation of the European defence market creates bureaucratic drawbacks, slows down innovation and leads to duplication of defence programmes and research. Eventually, this weakens competitiveness of the European defence industry and the effectiveness of the European Security and Defence Policy (ESDP). To improve the competitiveness of the European defence sector, the EC launched a Defence Package on 5 December 2007 designed to set out a new European policy and legislative framework (European Commission, 2010).

Technology generation is a result of R&D and innovation efforts. Starting with the second half of the 20th century, the commercialisation of technologic knowledge and launch of technology based industrial products necessitated a connection to be made between science institutions and industrial organisations. One of the ways to establish this connection was through the technology park (technopark) models. In 2001, Law No. 4691 of "Technology Development Regions" was enacted in Turkey and formed a legal foundation for the technoparks. The breakdown of the projects carried out in these regions in 2008 is as follows: 61.44% in information technology and software, 12.12% in defence industry, 7.71% in electric, electronics and electromechanics, 5.65% in telecommunication, 2.16% in advanced materials, 2.10% in medicine and biotechnology, and 8.01% in miscellaneous fields (State Auditing Board of the Presidency of the Republic of Turkey, 2009).

The European Innovation Scoreboard (EIS), which is the main data source of this study, is one of the international indices covering the performance of the European countries in technologic innovation. According to the EIS 2008 Report, Turkey was placed in the "Catching-up Countries" together with Bulgaria, Croatia, Hungary, Latvia, Lithuania, Malta, Poland, Romania and Slovakia. In the report, it was stated that although the innovation performance of Turkey was well below the EU average, there was an expectation of Turkey's catching the EU average over time with the current performance pace. Nevertheless, it was also stated in the report that data obtained from Turkey were incomplete, majority of the data were not reflected in the European statistics. For these reasons, Turkey got the lowest rankings in relevant innovation indicators of the EIS despite its fastest growth rates (Maastricht Economic and Social Research and Training Centre on Innovation and Technology (UNU-MERIT), 2009).

2. Methodology

In this study, the data for the innovation indicators were obtained from the EIS 2008 Report. Based on these data, the place of Turkey regarding the innovation indicators was posited. For the analysis, multivariate statistical methods; i.e. multi-dimensional scaling (MDS) analysis and K-means cluster analysis were applied.

The users of the MDS method lay emphasis on information visualisation rather than a result. What the statistical methods need for explaining the application is an explanatory graphical technique. In this sense, the MDS method is one of the best techniques available (Young and Hamer, 1987). K-means clustering method clusters the units and gives the cluster parameter estimates of the formed clusters (Anderberg, 1973; Jobson, 1991; SPSS, 1999).

The EIS Report, which was prepared for the EU and in which the innovation capability of Turkey was analysed, is an official indicator comprising of various criteria and calculated under the control of the EC. The EIS Report has been published annually since 2001. A total of 29 indicators are used to form the innovation scoreboard. The indicators include innovation performance data from Turkey, Croatia, Iceland, Norway and Switzerland, beside the EU countries. The data used in this study were obtained from the EIS 2008 Database (Pro Inno Europe, 2009). The report prepared by using the Summary Innovation Index (SII) figures stated that the data obtained from Turkey were incomplete. The analysis report is on innovation and technology, and is prepared by Maastricht Economic and Social Research and Training Centre on Innovation and Technology (UNU-MERIT) with the support of Joint Research Centre (Institute for the Protection and Security of the Citizen) of the European Commission. The innovation indicators reported in the EIS 2008 are grouped in 3 main blocks (enablers, firm activities and outputs) and 7 sub-blocks.

A total number of 32 countries including the member countries of the European Union, Croatia, Switzerland, Iceland, Norway, the EU Average and Turkey have been included in this study. The main data source for the study has been the European Innovation Scoreboard. The following 14 indicators from the 2008 European Innovation Scoreboard Report in which data are available for Turkey have been used for the analysis:

1. Population with tertiary education per 100 population aged 25-64: This is a general indicator of the supply of advanced skills. It is not limited to science and technical fields because the adoption of

innovations in many areas, in particular in the service sectors, depends on a wide range of skills. Furthermore, it includes the entire working age population, because future economic growth could require drawing on the non-active fraction of the population. International comparisons of educational levels however are difficult due to large discrepancies in the educational systems, access, and level of attainment that is required to receive a tertiary degree. Differences among countries should be interpreted with caution.

2. Participation in life-long learning per 100 population aged 25-64: A central characteristic of a knowledge economy is on-going technical development and innovation. Individuals need to continually learn new ideas and skills or to participate in life-long learning. All types of learning are valuable, since it prepares people for "learning to learn". The ability to learn can then be applied to new tasks with social and economic benefits.

3. Youth education attainment level: The indicator measures the qualification level of the population aged 20-24 years in terms of formal educational degrees. It provides a measure for the "supply" of human capital of that age group and for the output of education systems in terms of graduates. Completed upper secondary education is generally considered to be the minimum level required for successful participation in a knowledge-based society and is positively linked with economic growth.

4. Public R&D expenditures (% of GDP): R&D expenditure represents one of the major drivers of economic growth in a knowledge-based economy. As such, trends in the R&D expenditure indicator provide key indications of the future competitiveness and wealth of the EU. R&D spending is essential for making the transition to a knowledge-based economy as well as for improving production technologies and stimulating growth.

5. Private credit (relative to GDP): Following the Innovation Monitor of FORA (The Danish Enterprise and Construction Authority, Division for Research and Analysis) (2007), the availability of private credit is used as an indicator for the supply of start-up capital. This indicator is the most reliable available indicator for

finance for innovation other than venture capital and given the importance of finance as an enabler for innovation it is included as an innovation indicator.

6. Business R&D expenditures (% of GDP): The indicator captures the formal creation of new knowledge within firms. It is particularly important in the science-based sector (pharmaceuticals, chemicals and some areas of electronics) where most new knowledge is created in or near R&D laboratories.

7. Innovative SMEs collaborating with others (% of SMEs): This indicator measures the degree to which SMEs are involved in innovation co-operation. Complex innovations, in particular in ICT, often depend on the ability to draw on diverse sources of information and knowledge, or to collaborate on the development of an innovation. This indicator measures the flow of knowledge between public research institutions and firms and between firms and other firms. The indicator is limited to SMEs because almost all large firms are involved in innovation co-operation.

8. Community trademarks per million population: The Community trademark gives its proprietor a uniform right applicable in all member states of the European Union on the strength of a single procedure which simplifies trademark policies at European level. It fulfils the three essential functions of a trademark at European level: it identifies the origin of goods and services, guarantees consistent quality through evidence of the company’s commitment vis-à-vis the consumer, and is a form of communication, a basis for publicity and advertising. The Community trademark may be used as a manufacturer's mark, a mark for goods of a trading company, or service mark. It may also take the form of a collective trademark: properly applied, the regulation governing the use of the collective trademark guarantees the origin, the nature and the quality of goods and services by making them distinguishable, which is beneficial to members of the association or body owning the trademark.

9. Community designs per million population: A design is the outward appearance of a product or part of it resulting from the lines, contours, colours, shape, texture, materials and/or its

ornamentation. A product can be any industrial or handicraft item including packaging, graphic symbols and typographic typefaces but excluding computer programs. It also includes products that are composed of multiple components, which may be disassembled and reassembled. Community design protection is directly enforceable in each EU Member State and it provides both the option of an unregistered and a registered Community design right for one area encompassing all EU Member States.

10. Employment in medium-high & high-tech manufacturing (% of workforce): The share of employment in high technology manufacturing sectors is an indicator of the manufacturing economy that is based on continual innovation through creative, inventive activity. The use of total employment gives a better indicator than using the share of manufacturing employment alone, since the latter will be affected by the hollowing out of manufacturing in some countries.

11. Employment in knowledge-intensive services (% of total workforce): Knowledge-intensive services provide services directly to consumers, such as telecommunications, and provide inputs to the innovative activities of other firms in all sectors of the economy. The latter can increase productivity throughout the economy and support the diffusion of a range of innovations, in particular those based on ICT.

12. Medium-tech and high-tech exports (% of total exports): The indicator measures the technological competitiveness of the EU i.e. the ability to commercialise the results of R&D and innovation in the international markets. It also reflects product specialisation by country. Creating, exploiting and commercialising new technologies are vital for the competitiveness of a country in the modern economy. This is because high technology sectors are key drivers for economic growth, productivity and welfare, and are generally a source of high value added and well-paid employment. The Brussels European Council (2003) stressed the role of public-private partnerships in the research area as a key factor in developing new technologies and enabling the European high-tech industry to compete at the global level.

13. New-to-market sales (% of turnover): This indicator measures the turnover of new or significantly improved products, which are also new to the market, as a percentage of total turnover. The product must be new to the firm, which in many cases will also include innovations that are world-firsts. The main disadvantage is that there is some ambiguity in what constitutes a 'new to market' innovation. Smaller firms or firms from less developed countries could be more likely to include innovations that have already been introduced into the market elsewhere.

14. New-to-firm sales (% of turnover): This indicator measures the turnover of new or significantly improved products to the firm as a percentage of total turnover. These products are not new to the market. Sales of new to the firm but not new to the market products are a proxy of the use or implementation of elsewhere already introduced products (or technologies). This indicator is thus a proxy for the degree of diffusion of state-of-the-art technologies.

Multivariate statistical methods have been employed in this study to analyse the similarities and differences among the countries by using the European Innovation Scoreboard indicators. SPSS (PASW) 17.0 has been used for analysing the dataset.

3. Findings and Discussion

3.1 Multi-Dimensional Scaling Analysis (MDSA)

The efficiency of the multi-dimensional scaling analysis is measured with the Kruskal stress measure (Kruskal, 1964). The measure is calculated by taking square root of the rate of the differences between the actual configuration dimension and the estimated ones to the estimated configuration distances, and represents the compatibility between data distances and configuration distances (Kalaycı, 2006). It is desirable for MDSA to determine the stress statistics to a level near zero. In the analysis, Kruskal stress value has been found as 0.19 for k=2 and the compatibility level has been determined as low compatibility (0.10 – 0.20). The stress value has been calculated according to the Kruskal's formulation and found as 0.85. In this context, dimension the stress value explains the data in the rate of 0.85 for k=2. The Euclidean

Distance Model that is computed according to distances of countries to one another is presented below in a two-dimensional chart (Figure 1).

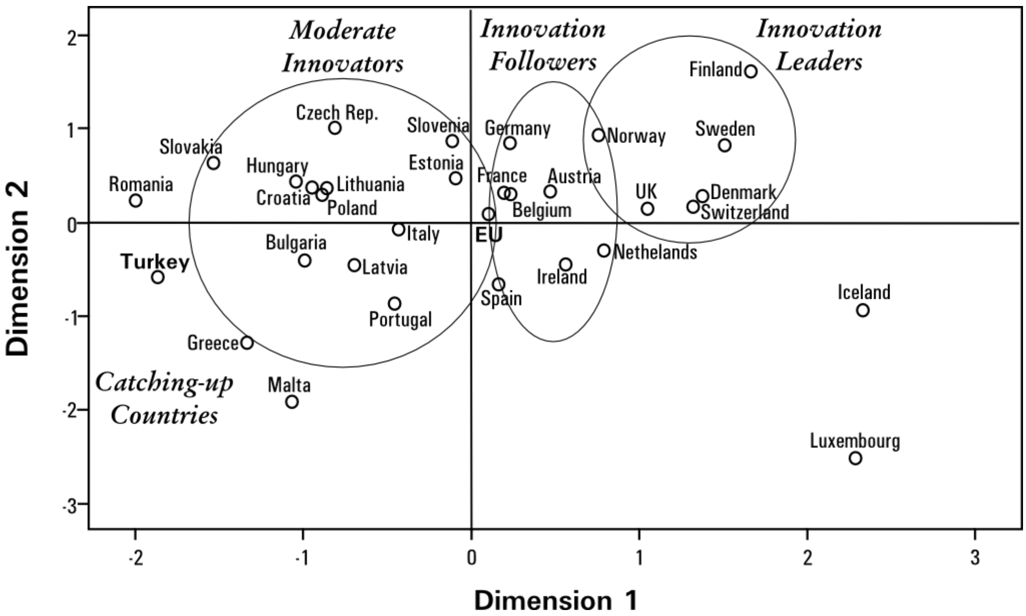

Figure 1. Similar and different countries in innovation based on the Euclidean Distance Model

In Figure 1, the countries which have been perceived as most similar to each other are grouped together based on the EIS data. As a result of the analysis, the countries regarding the 14 chosen innovation indicators formed four different groups in the two-dimensional space. According to the MDSA, the "Innovation Leaders" group includes Finland, Sweden, Denmark, Switzerland, Norway, and the UK. France, Germany, the Netherlands, Austria, Spain and Belgium are included in the "Innovation Followers" group. The group of "Moderate Innovators" includes mostly newly accessed EU countries; i.e., Portugal, Czech Republic, Slovenia, Estonia, Lithuania, Poland, Hungary, Croatia, Greece, Italy, Bulgaria, and Latvia. The last group, "Catching-up Countries", includes Turkey, Malta and Romania.

3.2. K - Means Clustering Analysis

As a result of the k-means clustering analysis, Table 1 gives the clusters and cluster members for K=7. Turkey together with Poland, Portugal, Romania, Slovakia, and Croatia are observed to be in the 4th cluster.

Table 1. Cluster Membership

Cluster No	Cluster Members
1	Czech Republic, Hungary, Malta
2	Luxembourg
3	Iceland
4	Turkey, Poland, Portugal, Romania, Slovakia, Croatia
5	EU Average, Belgium, Bulgaria, Estonia, Ireland, Spain, France, Italy, Latvia, Lithuania, Netherlands, Slovenia, Norway
6	Denmark, Germany, Austria, Finland, Switzerland, England, Sweden
7	Greece

The ANOVA table has been calculated in order to reveal the differences of the innovation indicators in the cluster analysis. The ANOVA output is used for descriptive purposes in here. Table 2 gives the variance analysis showing the clustering effectiveness of the variables in k-means solutions.

Based on the analysis, among the 14 innovation indicators chosen for clustering N=31 countries, all the indicators are significant, except for “Youth education attainment level” and “Innovative SMEs collaborating with others (% of SMEs)”, which have p-values greater than 5% level.

4. Conclusion and Recommendations

A country can develop by increasing its social capital, technology and competitive capacity. To increase the competitive power, the country needs to improve its productivity. In this respect, innovation plays an important role in increasing the productivity levels. In order for Turkey to raise its defence capabilities to those of the developed countries, the levels to be reached regarding innovation should be analysed in an objective and accurate manner. In this way, up-to-date, appropriate and effective national roadmaps and strategies can be established.

Table 2. ANOVA Output of the Cluster Analysis

Innovation Indicators	Cluster Mean Square	Error Mean Square	Sd	F	Sig. (p)
Population with tertiary education per 100 population aged 25-64	3.231	0.464	6	6.95	0.000
Participation in life-long learning per 100 population aged 25-64	3.618	0.372	6	9.73	0.000
Youth education attainment level	1.191	0.954	6	1.24	0.316
Public R&D expenditures (% of GDP)	3.765	0.336	6	11.1	0.000
Private credit (relative to GDP)	2.687	0.595	6	4.51	0.003
Business R&D expenditures (% of GDP)	3.786	0.331	6	11.4	0.000
Innovative SMEs collaborating with others (% of SMEs)	1.342	0.918	6	1.46	0.231
Community trademarks per million population	4.482	0.164	6	27.2	0.000
Community designs per million population	4.936	0.553	6	89.2	0.000
Employment in medium-high & high-tech manufacturing (% of workforce)	2.229	0.705	6	3.16	0.019
Employment in knowledge-intensive services (% of workforce)	3.227	0.465	6	6.93	0.000
Medium-tech and high-tech exports (% of total exports)	2.858	0.554	6	5.15	0.001
New-to-market sales (% of turnover)	3.516	0.396	6	8.87	0.000
New-to-firm sales (% of turnover)	2.271	0.695	6	3.26	0.016

In this study, the significance of innovation and innovation indicators in the development of defence capabilities has been highlighted. Moreover, the position/location of Turkey based on the 14 innovation indicators from the 2008 European Innovation Scoreboard has been put forward.

The study shows that Turkey is in the same cluster as in Poland, Portugal, Romania, Slovakia and Croatia according to the k-means cluster analysis of the innovation indicators. The result of the multi-dimensional scaling analysis (MDSA) reveals that the innovation performance of Turkey is less than the EU average and in the category of "Catching-up Countries" when compared to that of the EU countries together with Norway and Switzerland. Comparing the results obtained in this study with the results of the EIS 2008 Report, similar findings have been reached. However, in the EIS 2008 Report, it has been stated that the data obtained from Turkey were incomplete. In this sense, it is an urgent issue for Turkey to complete the missing data in the innovation indicators, establish innovation policies and apply them efficiently in order to reach the level of innovation performance of the developed countries.

In order for the Turkish defence industry to better integrate innovation, science and technology infrastructure, the following are suggested:

1. The relationship between industry and universities/research institutions should be strengthened.
2. The technology transfer between the higher education institutions and enterprises should be developed.
3. The private sector should allocate more funds to research and development investments.
4. Innovation should not only be restricted to research and development activities, but also a thriving science and innovation community should be brought about by taking part in international cooperation and collaboration initiatives.
5. Sources allocated to research and development should be increased.
6. The number of technology parks providing the technology transfer channel for the industry should be increased.

7. Beside the armed forces constituting the defence capability of a country, the other factors providing the survival and development of this capability are high-technology oriented defence industry, stable economy, well-trained human resources, sound policies and science/technology infrastructure, universities, research and application centres supported with financial sources. If innovation efforts in a country are not supported by theoretical conception, technical invention and commercial exploitation, they cannot be expected to cause any effect in the country.

In order for the three components to create a synergetic impact regarding the development of defence capability, the following are required:

1. The education attainment level among the youth should be fostered.
2. Tertiary education should be encouraged and the ratio of the population graduated from higher-education institutes should be enhanced.
3. The life-long learning programs should be incorporated as a component into the national education strategy. The citizens should be encouraged to participate in such programs no matter what their ages are.
4. The public and private sector research and development expenditures should be allocated to the fields that are effective, commercially profitable and can develop the defence capabilities strategically.
5. The number of innovative small and medium sized enterprises open to national and international collaboration should be increased.
6. The financial instruments available for private sector should be diversified. The access to these instruments should also be facilitated.
7. The rates of ownership in commercial trademarks and industrial designs should be improved.
8. The labour force should be oriented towards technology and knowledge-intensive manufacturing and service sectors.
9. Efficient policies should be carried out for increasing the high-technology exports.

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