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Research Oriented and Entrepreneur University as an Element of National Innovation System: Samples of South Korea and Turkey*

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Abstract

It is understood that technological development is very important in the economic development and industrialization processes of the countries. In South Korea, the technological development processes experienced in the past of many other developed countries have been experienced at a much faster rate than the previous examples, the country has completed the industrialization in a shorter time than the previous examples and developed countries. In this rapidly evolving process, the role of the stepping and pathcreating technological development has been generally accepted.

In the 1960s and 1970s, South Korea began to establish a national innovation system based on university-industry cooperation and supported by the state, with an emphasis on research and development.

In recent years, South Korea started to establish the Triple Helix National Innovation System in the 1990s, and the Research-Oriented Entrepreneur created the new triple helix system on which the university is based. In the 2000s, it made the system compatible with the new developments regarding the national innovation system.

Since the foundation of the Ottoman Empire, education has been important, and in time, the scientific organization, with its institutionalized structure, has dealt with the teaching of both mental and transplant sciences. However, it can be said that the teaching of mental sciences has been discredited and the researcher aspect of society towards technology development has been removed.

During the 18th century, with in the framework of the westernization movement, the developments in science and new information were readily available from abroad and taught in the country. Similarly, new Technologies were purchased from abroad and adapted to the country and a dependency to the technology transfer path was established. This situation continued during the Republican years.

The education system remained teaching-oriented, while the research units in the universities developed in a path-dependent manner, while the firms did not give the necessary importance to establish a research unit. Thus, universities could not make enough contributions to universal scientific developments, and firms could only follow technological developments. The efforts to break the path dependency in recent years should lead the companies to research and the emergence of innovative companies in every field.

Keywords: Education system, university, technological development, technology transfer, path dependency.

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1. Introduction

A country that is technologicaly backward must address technology transfer as a priority on its way to economic development, we can say. Because the ability to do business can only be achieved through learning, and this can be achieved through technology transfer (Dolanay, 2017: 9; Dolanay and Oguzturk, 2018) As for every living thing, the most important thing for man is his relationship with his natural environment. These relationships arise from the essential requirements of human biological nature. Today, we can say that the eforts of societies to develop technology, starting from their relations with the natural environment, have led them to build up their knowledge and experience in the fields of science, technology and industrial production. (Göker, 2013: 37-38) We can say that this accumulation has developed continuously in quality and quantity throughout history. For example, the first people meet the water drinking requirements, the palms of the water made it easier to drink, using a single palm by combining the two palms of the water by combining more and easier to discover, then wet clay to give the shape of their palm by drying the water to move from one place to another, we can say that. We can say that the accumulation of knowledge and experience that is called the culture of developing an effort to meet the natural needs of human beings and to create a beter living environment for himself, to make his work easier and beter, to benefit more from his work. We can say that this accumulation has developed continuously in quality and quantity throughout history. For example, the first people to meet the water drinking requirements, the palms of the water made it easier to drink, using a single palm by combining the two palms of the water by combining more and easier to discover, then wet clay to give the shape of their palm by drying the water to move from one place to another, we can say that We can say that the accumulation of knowledge and experience that is called the culture of developing an effort to meet the natural needs of human beings and to create a better living environment for himself, to make his work easier and better, to benefit more from his work. Development culture develops and gains continuity within the framework of human relations with nature and the network of relations established within society. We can say that the belief that it is possible to access better in society plays an important role in the formation of continuity. Technical and technological developments, the direction and methods of use of these technologies have been determined by societies that have all the economic and political power in their hands, and thus technological developments have gained momentum.The culture of development that underlies technological developments has become entrenched in all social strata in Western societies, and beyond that it has gained complete continuity in the transfer from generation to generation.(Göker, 2013, 37-41)

Later, Western societies saw that this culture of technology development could advance more easily and rapidly within the organizational structure they called the national innovation system. At this point, we can say that National Innovation Systems in the world are beginning to evolve towards triple helix systems.

The likes of the rapid economic development that came with technological development in Western societies this time. It has been seen in Japan over a hundred years and South Korea this time in 20 years. Moreover, each new example has completed its industrialization in a shorter time and with greater speed than the previous one. South Korea, on the other hand, began to establish the national

innovation system at the beginning of the industrialization process that it initiated in the 1960s. (Dolanay, 2017; Dolanay and Oguzturk, 2018)

2. Changes in the National Innovation System in the Historical Process and Current Debates

The concept of the national innovation system was first introduced by Lundvall and gave the company a leading role, unlike the model of LundvalSabato (1975) which gave the state a strategic role in the emergence of innovations. Due to the decline in the role of military power during the Cold War, there were also changes in the institutional structures of societies that made academia stand out, while at the same time the network of relations between academia, industry and the state was transformed. With this transformation, the role of the University in the transfer of information and technology has been debated. Traditionally, a new one has been added to the existing duties of the university within the system, and the university has been charged with direct assistance to industry and cooperation with industry. This new mission of the University in the field of economic development initiated the process of transforming universities in many countries around the world. The installation of this new task did not end discussions of the role of the university within the system, but continued to be discussed in Western European countries in the United States. Before the 19. Century, Universities has became institutions for teaching, At the end of the 19. century, in addition to teaching, universities were given research duties. Thus, the academic revolution, together with the third task of the universities created the second academic revolution. As a result of the new network of relations between the university, industry and the state, alternative strategies for alternative economic growth and social transformation will be established. (Etskowitz and Leydesdorff, 2000: 109-110)

In the process of evolution of innovation systems over time, the duties of institutional structures within the system should be discussed, the main topic of discussion in the 2000s, within the framework of different institutional structures that define the relations between the university, industry and the state, which path should be followed in industrial relations of the university is problematic. (Etskowitz and Leydesdorff, 2000: 111)

The first is the model that has traditionally been used in the historical process. In this model, the national state has been institutionally above academia and industry, and has been inclusive of both. A strong version of this model has been applied in the socialist states of the former USSR and Eastern Europe, while a weak version has been applied in many Latin American countries and in some European countries, such as Norway. The second is the model created by industry, academia and the state, which have different institutional structures and whose boundaries are well drawn. In this model, the relationships between all three institutional structures are formed in a time-consuming process that depends on certain rules. This model is called The let them do System. Third, in order to resolve the disconnect between the institutions in the second model, an information environment is created to overcome the institutional disconnect; in this new model, each institution can assume the role of the other and work collaboratively, resulting in hybrid organizations. This model is called triple helix system. (Etskowitz and Leydesdorff, 2000: 111)

However, no matter how the national innovation system is formed within the country, there is a degree of intertwining in university-industry-state relations. University-Industry Cooperation and

interaction based on innovation environment the main purpose of creating knowledge- based firms achieve economic development and with different technological levels, different areas that operate in large and small scale, has been to establish strategic partnerships between public laboratories and academic research groups. Regulations for this purpose have been encouraged, but not controlled, by the state. (Etskowitz and Leydesdorff, 2000: 112)

The main thing that national innovation system models applied after World War II have in common is that they recognize that innovation can emerge at the end of a linear process. According to this model, science leads technology and technology meets the needs of the market. There is a smooth one-way flow from basic scientific research to commercial practice. Innovation in this approach is revealed by the great leap in the level of knowledge achieved by superior individuals or research groups. In this model, there can be no feedback effect at the advanced stages of the innovation process, towards the initial phase of the research, or between different phases. The emergence of linear innovation system, rapid developments and mistakes are part of the learning process that brings about innovations. However, feedback and corrections are of fundamental importance in radical and incremental innovations. What's more, basic scientific butts don't always lead to innovation design. However, the problems that arise during the design and testing of new products or production processes have been able to expand the research and the emergence of new branches of science. Technological innovations can also occur without any interaction with any branch of science. The theories of innovation after the linear model have determined that innovations take place in conjunction with normal, collaborative social and economic activities, and that technological progress and radical leaps occur through social and organizational changes. Thus, multi-element innovation networks are focused on processes that are nonlinear and act in interaction with each other. (Arnkil, Jürvensivu ,Koski, Piirainen, 2010: 9)

The Triple Helix system presents an analytical model in which a variety of different institutional structures and policy models are defined, explaining their own dynamics. Research Systematics are undergoing changes within the types of traditional innovation systems and post-modern research systems are emerging, reorganization is taking place, and the role of knowledge in economy and social life is expanding. In order to explain the reorganized structure in the relations between the university-industry-state, theories of sociology should be established in a way that removes institutional barriers, reveals redefined innovations and provides effective control.(Etskowitz and Leydesdorff, 2000: 112)

Unlike the binary helical system, the triple helical system is not stable. In Triple Helix varieties, the sources of innovation hypothetically do not arise in sync. In other words, they do not form together in their predetermined form. The sources of innovation produce riddles for participants, interpretive experts and policy makers to solve. This network of relationships, sub-dynamics that respond by generating surplus value, incentives, strategies and projects, at least in order to get closer to the goals, the framework needs to be harmonized continuously. If we can control these dynamics, we can say that the situation of innovation research programs is emerging. (Etskowitz and Leydesdorff, 2000: 112-113)

The dynamic national innovation system involves collaboration between research users and research elements in various institutional structures that cross national boundaries and become increasingly complex. The triple helix system is expected to be in continuous change. Observations,

on the other hand, give the possibility of continuous renewal of analytic expectations. (Etskowitz and Leydesdorff, 2000: 113)

The knowledge-intensive economic structure is in constant transformation. In other words, when information is increasingly used as a source in the production and distribution system, we can say that restructuring occurs in the form of 'creative destruction'.(Etskowitz and Leydesdorff, 2000: 113)

The characteristics of the Reconstructionist forces were revealed by the evolutionist economy. (Etskowitz and Leydesdorff, 2000: 113)

In the quadruple helix system, unlike the triple helix system, the society is located within the model. So a quad chart corporate structure, (Etskowitz and Leydesdorff, 2000) innovation process and is expected to contribute single individuals IE users user-oriented features,the HR describes the process of formation. (Arnkil et al., 2010: 7-10)

In the quadruple helix system, stakeholders are given a leading role in the policy-making process, but the current level can be disappointing. Therefore, it was understood that a more open university-technology-commercialization process should be established. It is necessary to establish a more open structure to this cooperation in such a way as to take into account the different commitments of different stakeholders. However, the construction of different commitments and commitments is very complex and has not yet been adequately understood.However, McAdam and McAdam in finding new markets by gaining knowledge, strengthening scientific infrastructure and achieving competitiveness, creating a quadruple helix system involving the collaboration of universities, industry, government and users(Campbell and Carayannis, 2016: 4)

One of the most important elements of the system is the entrepreneurial university. Public research institutions and universities were assigned entrepreneurship duties in the system. Thus, they were asked to be closely associated with both scientific research and innovation formation. The indicators of the increase in entrepreneurship of universities are the number of patents, the number of licensing grants and the number of companies that provide the transitional form of researchers. The entrepreneurship characteristic of universities is most easily understood from the degree of concentration of researchers on information transfer. (D'este, Mahdi, Neely, 2010: 1)

The academic entrepreneur is mainly concerned with finding, unearthing and obtaining profit opportunities. It is mainly aimed to develop entrepreneurship skills in researchers. According to the theory on university-industry technology transfer, scientists at the University are required to engage in commercializing their own research results or opening up a business field of research results. In academic entrepreneurship, the discovery of commercial opportunities and the acquisition of an invention and academic patent realized in the University Technology transfer Office are of equal importance. Alternatively, it is also concerned with the emergence of new areas of work related to academic researcher invention. In this context, the researcher is not only concerned with the commercialization of his own invention, but also with the new areas of activity that may arise in the market related to the new invention. (D'este et al., 2010: 3)

Academic firm is the organization of firms focused on promoting, supporting, advancing and promoting knowledge production. The academic firm also operates on the principle of profitability, but the principle of knowledge production and knowledge production tries to maintain and maintain balance. The sole purpose of the commercial firm is to maximize profits. The academic firm, on the

other hand, focuses on maximizing or optimizing information and innovations. (Campbell and Carayannis, 2016: 1-2)

For the academic firm, innovations and knowledge are of fundamental importance. Academic firm can monitor linear and nonlinear innovation formation processes. In the process of linear innovation, first basic research is carried out in universities, then the information that emerges here spreads to society and the economy, and companies apply this knowledge to the economy and turn it into commercial products and profits. In the process of non-linear innovation formation, there is a parallel process of information generation (the emergence of information) and the application of information. The processes of basic research and the application of knowledge both run in parallel and interact. Non-linear formation process of innovation, organizational designs that encourage creative firms simultaneously in different circuits having different levels of academic and technological maturity of the product, adapt to different technologies, employees with the employees of other institutions in different sectors to work together for a change and so enables an employee to operate in more than one institution simultaneously. A firm academic study, or basic research in universities and other higher education institutes and related organizations linked with universities and institutes can work with by creating a network. The academic firm explores the possibilities of creating a network with other academic and commercial firms and can create a network. (Campbell and Carayannis, 2016: 2)

3. South Korea National Innovation System and Research-Focused (Oriented) Entrepreneurial University

South Korea is a country with a history of 5,000 years. It has a classical school tradition and has internalized a social structure that places importance on human development in the historical process. Thus, we can say that the idea of being able to contribute to individual information development in Korea has been tried as a priority. (http://www.koreaneducentreinuk.org: 3)

We can say that education provided the necessary energy for South Korea to come to the advanced level of countries. South Korea has grown rapidly since its independence in 1945 and has continued its economic development. We can say that the government's investment in education, along with the demand of the people, was behind this great success. While South Korea was one of the most powerful countries in the world when the state was established in 1948, it is now the 15th most powerful in the world. Its economy has become. Therefore, as of 2010, it has moved from being a country that has received assistance in education to a country that has built bridges with developing countries in education and economic development. We can say that South Korea's unique education system is behind this rapid development in education. (http://www.koreaneducentreinuk.org: 4)

After South Korea gained its independence, the state sought to make education at all levels phase by phase open education accessible to all students. Education became open to all at primary school level in 1959, and education became open to all in secondary education from 1985-2005. Higher School Education became open to all in 2017. (http://www.koreaneducentreinuk.org: 5)

Among the total population, the university enrollment rate increased from 27.2% in 1980 to 72% in 2012. In order to increase the opportunities for Education, South Korea switched to a lifetime education system in 1999. Thus, it is aimed to increase social ability to higher levels. Participation in

the lifetime education system among the population increased from 29.4% in 2008 to 35.6% in 2012. In accordance with the principle of providing education to all, the South Korean state actively supports socio-economically disadvantaged students and disabled students. In addition, the state provides educational support to students from multi-cultural families. (http://www.koreaneducentreinuk.org: 5)

It is possible to examine the historical development process of the South Korean education system by dividing it into periods. In the period between 1948-1960, which was the first term, the education system was restructured, primary education was brought into line with universal standards and secondary education was brought into line with universal standards and skill acquisition courses were expanded during the holiday period. Labor force has been provided to labor-intensive industries and heavy and chemical industries that require skills. During the third period, 1981-1997, the economy was restructured for a technology-intensive industrial structure, while on the other hand, the expansion and quality of higher education was increased and the need for high-skill labour force of the industry was met. During the fourth period of 1998, on the one hand, a knowledge-based and high-tech intensive industrial structure was formed, on the other hand, education became oriented towards creating creativity and qualifications, teaching the use of advanced technology, and the principles of lifelong education were adopted. Thus, the information society's workforce for the information intensive industry has been provided (http://www.koreaneducentreinuk.org:12).

South Korean society was based on learning many years ago and focused on its traditional sociocultural structure. Therefore, we can say that the need to learn has become a part of South Kore culture. So the right to education is very important to South Korean society. As social class differences began to emerge over the hundred years, it was seen that education was an effective way to eliminate class differences. Increasing the need for qualified labor force through industrialization has made education the key to social success. Families supported their children's education with such enthusiasm that they were able to sell their land and animals to send their children to school during the Korean War in the 1950s. Then the "cattle Tower" Parent-Teacher Association, which was established for this purpose, started to support those who could not afford school expenses (http://www.koreaneducentreinuk.org: 8).

All responsibility and authority in education has been given to the Ministry of Education since 1948. The name of the ministry has changed continuously during the historical period and as of 2001 it became the Ministry of Education and Human Resource Development (MOEHRD). On 29 February 2008, the ministry was renamed the Ministry of Education, Science and Technology (MEST) by the merger of the Ministry of Education and Human Resource Development with the Ministry of Science and Technology. On 23 March 2013, the two ministries were separated from each other and the Ministry of Education (MOE) and the Ministry of Science and technology became separate institutions. (Levent and Gökkaya, 2014: 3)

Under the ideology of “Hongink Ingan”, the Ministry of education aimed to educate every Korean citizen as self-confident individuals who can contribute to the democratic development of the country and humanity and to the welfare of society. Within the framework of this objective, the ministry has been responsible for education in primary, secondary and higher education institutions and for developing human resources policies within the framework of lifelong education. (Levent and Gökkaya, 2014: 3)

In the 1980s, the concept of lifelong learning was adopted and the education system was renewed in line with this understanding. In the 1990s, local educational autonomy was established. The main objective was to support vocational education within the scope of lifelong education. In South Korea, the curriculum of education, the topics to be addressed at all levels and the time to be allocated, as well as general guidelines for methods of evaluating educational activities have been developed. But there are also units that allow changes to be made by local education authorities and schools. (Levent and Gökkaya, 2014: 4)

The South Korean national curriculum is periodically updated to meet new educational demands and needs of society's changing structure over time, and to incorporate new emerging academic disciplines into the program. Within this framework, seven curriculum changes have been made since 1954. The curriculum change that was made in 2000 started to be implemented at the primary level and started to be valid in the whole school system since 2004. With the new curriculum, the work load of the courses was reduced, allowing more flexibility to meet the individual needs of the students, thus increasing the independent learning activities of the students. We can say that they have been better prepared for the globalization and information age that the century has brought.(Levent and Gökkaya, 2014: 4)

Another characteristic of the 7th curriculum is that it has become an elective curriculum. Again, 30% of teachers were given autonomy in the implementation of the curriculum and a teacher-centered structure was wanted to be created. Another characteristic of the seventh curriculum compared to the past curricula is that it is student-oriented and that the student tries to bring his / her individual ability, predisposition and creativity to the fore. This final curriculum is based on open education and performance evaluation procedures. The aim was to create a school community and to ensure that student abilities are evaluated in and out of school.(Levent and Gökkaya, 2014: 4-5)

While the share allocated by the South Korean state to education from the total budget was 2.5% in 1951, it increased to 15% in the years between 2000 and 2008. In 2008, South Korea was ranked third in the world in terms of the share allocated from the budget to education spending, while Turkey was ranked 17th. (Levent and Gökkaya, 2014: 8)

In this way, with the seventh curriculum change, South Korea introduced new regulations that could have an impact on the higher education system, creating a structure that centered on students and lecturers and directed them to research and learn. With the creation of this structure, it was aimed to contribute to the creation of the research-oriented entrepreneurial university framework.

In 1999, the South Korean Ministry of Education launched a program called ‘Brain Korea 21’ to train scientists worldwide. The main objective of this program is to create research universities around the world by serving as a platform on which original ideas and creative technologies are produced. The number of national universities in two years is 35 out of 50, according to a decision taken in 2005.it was decided to reduce student quotas of these universities. In this context, it was decided to reduce the number of private universities by 25% from 358 to 271. Within the framework of this reduction, it is planned to restructure or merge the universities participating in the program. These regulations aimed at increasing the qualifications of universities have successfully increased the international competitiveness of universities. (Levent and Gökkaya, 2014: 10)

After the 1997 financial crisis in South Korea, economic nationalism was replaced by the idea of economic globalization. Large industrial groups were asked to become international firms, and the basic role of the state was also changed. The state is now focused solely on basic R & D projects and is geared towards promoting technological development. (Cho, 2014: 4)

The relationship and interaction between universities and industry, which had been weak in the national innovation system in the past, has not reached a sufficient level.This is due to the fact that universities have been focused on teaching in the past. However, with the 1990s, research activities in universities began to be given priority. (Cho, 2014: 4)

In the 1980s, the student quota of the departments related to science and engineering was increased in order to direct universities to work more in the field of Science and technology, while the Social Sciences were reduced. With the new regulation in 1995, on the one hand, the increase in the number of universities was encouraged and a new university system was started to be created. This new arrangement initiated the process of establishment of private universities. After the 1997 financial crisis, the change in the higher education system accelerated, and the new government programme envisioned changes in three areas for the R & D system. First, it was decided to encourage the increase of the number of publications in accordance with international criteria, second, to increase the number of universities and enrolled students, third, to ensure that the results of the research can be transformed into technology and innovations with commercial value through the provision of project-based work in public research. (Cho, 2014: 5) With the new regulation, universities have started to work jointly with industrial organizations and the state to realize technological innovations and economic development. (Cho, 2014: 7-8) Although the dependence of universities on large firms continues to some extent in the new system, universities have had the chance to become more independent. (Cho, 2014: 7-8) Universities have been at the center of the new system based on innovation-based economic growth and technological convergence. Because universities not only unearth new knowledge, but also have the task of ensuring that knowledge is used and disseminated in the business world. (Cho, 2014: 7-8) That is, universities have assumed the function of not only unearthing new knowledge and technology, but also enabling the formation and dissemination of innovations. Thus, entrepreneurial and infuse-oriented universities began to emerge.

Pohang Steel Company (POSCO) founded POSTECH in 1986 by taking the example of California Institute of Technology (Caltech). The old-style university building, SKKU, was acquired by Samsung in 1996 through a joint venture procedure. While POSTECH was founded as a research-oriented and entrepreneurial university, SKKU subsequently changed structure. (Cho, 2014: 7-15) So we can say that the South Korean triple helix (triplehelix) national innovation system was created with the support of the POSTECH pioneer as well as the SKKU.

However, there has been a national innovation system in South Korea before, and there has been an atmosphere of close cooperation and cooperation between universities and industrial organizations. Since the mid-1990s, a new structuring has been undertaken and a successful model has been established in order to overcome the blockage in the economy and its capacity to innovate. (Cho, 2014) Thus, in the 1990s, while universities were reorganized to carry out their new duties in accordance with the entrepreneurial university model, on the other hand, the formal education system was expanded and the knowledge level of innovation users was increased. Beginning in the 1990s, a

quadrilateral innovation system was established and an information society emerged that could be cited as an example.

4. Turkish National Innovation System and Research-Oriented Entrepreneurial University

We can say that Turkey has a history of education system whose origins date back to the Ottoman Empire and even to the Seljuk State. (Ulusoy, 2007) The formation and development of Ottoman Science in the pre-Ottoman Seljuk period, ancient Anatolian cities and the established traditions of the old science , can be said to have been realized through scholars from Turkistan, Egypt, Syria and Iran. (Ihsanoğlu, 1999: 17)

The administrative level in the Ottoman Empire was composed of three different groups called ilmiye (science class), seyfiye (army class) and kalemiye (administration class). (Tatlısumak, 2016: 150) The foundations of the Ottoman state organization were laid during Orhan Gazi's time and the final form was taken by the arrangements made during Fatih Sultan Mehmet's (Sultan Mehmet the Conqueror) time. In addition to the Grand Vizier, the Divan-ı Humayun, in which the seyfiye, ilmiye and kalemiye arms are represented, constituted the foundation of the state organization. (Günay, 2003: 32)

Madrasas started to be organized as formal educational institutions just as they were in the Seljuk State. The first Madrasa (Education Institution) in the Ottoman Empire was established in Iznik by Orhan Gazi in 1330/1331. Later, two more madrasas were built in Bursa by Orhan Gazi. Many Madrasas were established in Bursa by Sultan I Murad and madrasas were opened in Bursa and Edirne by Yıldırım Bayezid. After the conquest of Istanbul, Sahn-ı Seman Madrasa was opened by Sultan Mehmet the Conqueror and Suleymaniye madrasa by Sultan Suleyman the Magnificent. (Ulusoy, 2007: 1-89; Uzunçarşılı, 1988)

Islam has encouraged believers to learn, to study the beings around them, to look at everything they see and know in the universe. Therefore, knowledge is prescribed for every Muslim, male and female. In other words, it was obligatory for every Muslim to know the religious judgement of the situations he would encounter in his own life and to learn the Catechism. (Arslan, 1999: 43)

In the Ottoman Empire, it was understood that the madrasas were organized in accordance with the Islamic religion's approach to research and acquisition of knowledge.

The Ottomans benefited from the accumulation of educational institutions developed in other Islamic countries in the establishment of Madrasa. Davud b. Kayseri one of the important scientific people of the time, to teach at the madrasa in Iznik, which was first established. Mahmud b. Muhammad was brought to Kayseri. (Ulusoy, 2007: 33) The same method was followed in the time of Sultan Mehmet The Conqueror and Ali Kuşçu, an important scientist of the time, was brought to the Hagia Sophia madrasa as a principal. The Ottomans transferred their knowledge of the mental Sciences developed in the Baghdad and Samarkand regions and the transfer Sciences developed in the Damascus and Egypt regions. (Ulusoy, 2007: 33) So they took the knowledge before them and added the knowledge they produced and went on the way of increasing the knowledge in the geography of Turkey.

The number of madrasas established during the period of Orhan Gazi, was 20 during the period of

Sultan 1. Murad and Orhan Gazi with himself established 5 madrasas. The number of madrasas established during the reign of Sultan 1. Murad was 20, while The number of those established during the Sultan 1. Bayezid period reached 18. 37 madrasas were established during Sultan 2. Murad's reign. A madrasa continued to be established between 1402-1413 and the Sultaniye Madrasa, which was established in Bursa in 1419 during the reign of Çelebi Mehmet, was considered the highest of the Ottoman madrasas until the conquest of Istanbul. In general, as the Ottoman lands expanded, madrasas were established in line with the needs of the state, and those who grew up there took up important duties in the state and gained effectiveness. From the foundation of the first madrasa in 1331, Sultan 2. Murad's death in 1451. In the 120 years leading up to, a total of 84 madrasahs were established, as a result, an ilmiye class was established and the effectiveness of the ulema in the State Administration increased. (Ihsanoğlu, 2003: 859-863)

In the Ottoman madrasas of the classical period, the courses are taught on a book basis, the course is taught by the headmaster, and the same lesson is repeated by the person named Muid who is chosen from among the students after the course.Both the students ' interest in the subjects was encouraged and the students were directed to research. (Ulusoy, 2007) In this way, we can say that a research-oriented university-style approach was created in the circumstances of that day.

In the Ottoman madrasas of the classical period, the students who were named suhte were given the condition to go to cerr during the holidays. However, this requirement was also made optional, and students with good economic status were given the right to continue their education and graduate earlier in the holidays. In other parts of the Ottoman Empire, the Suhtes had the chance to transfer their knowledge to the public, to integrate with the public (Karademir, 2008: 9; Ulusoy, 2007; Uzunçarşılı, 1988) and to be compatible with the sociocultural structure. In this period, the students were free to teach both mental and transplant sciences, so they were able to transfer their knowledge in mental Sciences in addition to the knowledge of public transplantation in suhtes cerr time. During this transfer, they were able to receive food, and financial aid from the public. (Yıldız, 2010: 128- 130; Karademir, 2008; Ulusoy, 2007; Uzunçarşılı, 1988) Thus, both the spread of knowledge was realized and entrepreneurs were able to obtain the necessary knowledge easily for themselves. This style of operation showed that the entrepreneurial university structure could be created in the circumstances of that day.

In addition, the way the courses are taught in these first semester madrasas was largely left to the initiative of the head teachers. (Yıldız, 2010: 129; Karademir, 2008; Ulusoy, 2007; Uzunçarşılı, 1988)

Another characteristic of the madrasas is that they were established as a complex, and that the places serving many different purposes (library, dining hall, classrooms, student dormitories etc.) is provided to be. Therefore, in today's sense, we can say that a university campus style architecture has been adopted. (Yıldız, 2010: 128)

The main purpose of the madrasas was to educate individuals at various levels and branches in accordance with their success and abilities. After subjecting the students to a general education, the madrasa units trained and gave them to community service by giving them the opportunity to choose according to their success and abilities. (Ulusoy, 2007: 106) determined to have committed to a boarding madrassa system able to exceed even today's experiences-food, shelter, medical and psychological aid, and relations were understood to be dealt one on one with each student given importance. (Ulusoy, 2007: 38)

During the time of Fatih Sultan Mehmet, Sahn-ı Seman madrasas were established by Fatih Sultan Mehmet, and for the first time there were specialized madrasas in the same settlement along with the lower tier (Tetimme) madrasas. While three students shared the same room in Tetimme, one room was given to each student in Sahn-ı Seman madrasas. There were 19 student rooms in each of the eight madrasas located in Sahn-ı Seman. (Ulusoy, 2007: 49-76) as with the previous madrasas in the Suleymaniye madrasas which were later established during the reign of Kanuni Sultan Süleyman (Sultan Süleyman the Magnificient), mental sciences such as riyaziyat (mathematics, geometri and etc.) and natural sciences were taught, but there were no specialized madrasas in these areas. It was understood that the number of students in the Ottoman madrasas ranged from 20 to 40. The students in the initial phase were called suhte, while those who advanced their knowledge were called danişment. In the first Ottoman madrasas, students were also called Faqih. (Ulusoy, 2007: 77-89)

Al Azhar Madrasa in Egypt was founded in 970 and converted to the University in 1961 by transferring all its past accumulation. (Ultanir, 2017: 4) however, all the background knowledge, experience and skill accumulation was lost as the madrasa education system, based on a long-established tradition, was switched to the university education system in Turkey.

As of the middle of the 16th century, the functioning of madrasas, which were educational institutions later in their time, had deteriorated. Several causes of this deterioration have been identified.

The most important reason for the deterioration is that philosophy education has been removed from the madrasa syllabus and therefore mental sciences have started to fall out of sight. (Yıldız, 2010; Şanal, 2003: 151-152) It is necessary not to limit the decline in madrasas only with the neglect of mental sciences such as philosophy, science, mathematics. Later, religious sciences such as kelam (speech about Islamic philosophy science) were neglected, and issues began to be explained on the basis of naslars (old texts about sciences) and authorities (old writers about sciences). (Sanal, 2003: 151-152). Thus, the integrity and sociocultural structure of the madrasas were disrupted and the investigative aspect was shelved.

An event that can be considered a turning point in Ottoman society is the weakening of mental Sciences in madrasas and the emphasis on faqih instead. Although Faqih has provided practical benefits in regulating people's daily religious lives, it has been a useful source of reference for the mediocre. Philosophy has been regarded as objectionable from time to time and has been interpreted as a harmful field of science due to the fact that it can lead to some derogatory debate and criticism. (Bilkan, 2017: 144-146)

The exclusion of mental Sciences from the educational process has reached such a level that At the end of the 16th century, the Observatory of Takiyuddin Efendi, who had established an observatory in Istanbul and had done studies on the science of astronomy, was destroyed by being held to the ball. (Dolanay, 2017; Dolanay and Oguzturk, 2018) He was a student of Sinan Pasha and Ali Kuşçu, who were scientific people of the Sultan 2. Bayezid period. Mullah Lutfi had deep knowledge in both astronomy, mathematics and science, as well as in the fields of logic, the word and philosophy. He was seen as a scholar enough to find solutions to matters without having to look at Ibni Sina's law on medicine. However, Molla Lutfi, who was accused of irreligion, was executed by cutting her neck with a sword on 23 January 1495 in Sultanahmet Horse Square. (Uludogan, 2015: 3-5) Again Sultan 4. Murad's one of advisors and the author of the book Enmüzecü't-TIB of Mirim Çelebi, , was killed for using opium. (http://blog.milliyet.com.tr)

Just like philosophy, when the intellectual sciences began to fall, it was understood that the scientific people engaged in the intellectual Sciences began to fall.

This process, which started at the beginning of the 16th century, lasted almost two centuries. It was thought that the reason why these courses were not included in the curriculum was that there was psychological pressure on society by the Kadizadeans, as these two centuries had not given enough importance to the mental Sciences, and that the demand and fetva (religious rules which head of religious persons indication) in this subject were not found. (Bilkan, 2017: 146-147)

Kadizadeliler against the intellectual sciences and philosophy, as well as those engaged in these sciences, considered as infidels. (Bilkan, 2017: 147)

Katip Çelebi, whose real name is Mustafa Ibn Abdullah, wrote the following about the discrediting of philosophy in Madrasa Education. "From the early ages of the great Ottoman Empire until the time of Sultan Süleyman Khan, the researchers who reconciled wisdom and Shari'ah had established a reputation. Abulfeth Fatih Sultan Mehmet had Medaris-i Semaniye built, according to the law to be studied in order to be studied in his foundation wrote, and Haşiye-i isolation and Şerh-i Mevakif lessons should be taught. Those who came later considered it reasonable to remove these lessons as philosophy and to teach Hidaye and Ekmel (perfectness and knowledge) courses. It is not reasonable to settle with them alone, so what philosophy is left, neither Hidaye nor Ekmel". (Quotod by Bilkan, 2017 :169)

In Islam, the sciences are divided into mental and transplant sciences in general. However, many Islamic scholars have divided the sciences into various classifications. For example, Farabi has classified the sciences under five main headings. These are the sciences and departments of language, the sciences and departments of logic, the sciences and departments of Ta'limi, the civil Sciences and departments, the nature and theology. According to Hocazade Muslihüddin Mustafa, the sciences are divided into three main groups. These are the sciences that can be explained and written, the sciences that can be expressed but are not true to be written and drawn, the sciences that are not true to be expressed and written. Taşköprülüzade stated that Muslihüddin Mustafa described the second group of Sciences as useless Sciences. Taşköprülüzade referred to the sciences in the second group as "ilm-i batın". According to him, those who have knowledge of these sciences do not learn these sciences fromthe books. God has brought the divine secrets close to them. (Unan, 2006.: 14-18)

However, At the end of the 17th century, when defeats began to appear in wars, this time the necessity of mental sciences emerged and the need to make innovations in the Ottoman state system began to be felt in this direction.(Ihsanoğlu, 2003: 23-24) this time, instead of returning to the system of teaching mental Sciences in madrasas, institutions of the west that are not compatible with the sociocultural structure started to be transferred and first started from the establishment of institutions to train officers for the army. (Şen, 2013: 482-485)

This process of renewal was not limited to the establishment of military schools and new educational institutions were established by transfer from the West. For the children who have graduated from sibyan school (primary school), rushdiye (secondary school) is arranged for those who want to go to agriculture, trade, industry, War, medical and engineer schools. (Şen, 2013: 483) During the period 1839-1876, education works were arranged for those who wanted to go to engineer schools. (Şen, 2013: 483) In the period between 1839-1876, education affairs were arranged entirely according to Western legislation and the idea that the state could be re-raised by Westernization was adopted.

The most striking innovation in the field of Education has been seen in organization. Another innovation in education was the opening of the Sultanis with the advice of the French, in 1868. Galatasaray Sultani Idadi, i.e., to provide education at the high school level. In the year 1868 Sultanahmet Industrial School was opened. The Maarif-i Umumiye regulation was published on 1 September 1869 during the reign of Sultan Abdul Aziz, and with this regulation, all schools including foreign and minority schools, including education levels, curriculum of Schools, Organization, incentives and financial issues, teacher training were planned as a single system. (Şen, 2013: 480-485)

Thus 17th century in the education system established based on the transfer of knowledge from Western Europe, a structure with no investigative direction and based only on transferring knowledge from the West to the students has been established, with the exclusion of the accumulation of knowledge and skills that Madrasas have created over the years. Thus, a system of Education connected to the path of knowledge transfer from the West has emerged.

The same orientation in education continued during the constitutional era and Westernization continued gradually. (Şen, 2013: 485-486) After the proclamation of the Republic, the madrasas were closed with the adoption of the Tevhid-i Tedrisat (Incorporation of Education System)law on March 3, 1924, and in the madrasas were renamed Daru'lfunun (House of Sciences) and reshaped under the name of Istanbul University. Of Darulfunun's 155 teachers, 96 were suspended from duty. (Sen, 2013: 486-487) Thus, in a sense, the path-bound education system based on knowledge transfer has been strengthened by the exclusion of the knowledge and ability accumulation of Darulfunun, which is partly trying to accommodate the madrasa tradition, traditionally based on the nature of teachers.

Although many changes were made in the education system during the Republican period, the structure and functioning of the University focused on education continued until the 2000s. 1961, 1973, 1991, and in 1997 made the arrangements, which was removed in 1981 higher education law 2547 and higher education institutions gathered under one roof and YOK (higher education council) was established. (Şen, 2013: 486-488)

We can say that the Ottoman industrialization effort failed just as it did in the field of Education.

We can say that the Ottoman Empire did not have a closed social structure with its social structure which gave absolute authority to engage in learning and scientific activities. Thus, the Sultans had complete freedom to provide their support and patronage for the provision of knowledge and knowledge which they believed would be beneficial to the Muslim community and for the research and testing of new ideas. Its introduction in the early Ottoman history was achieved through the work of the group known as “Taife-i Efrenciyan” in the palace. Members of this group of paid servants, who worked under the Sultan's command, contacted the West and implemented the latest scientific developments in civil and military projects within the framework of their interests. (Murphey, 1992: 7-8)

However, starting from the 17th century, the Ottomans were unable to follow the technical developments in the west as closely as they had in the past. Since the beginning of the 15th century, the Ottomans were able to come into direct contact with Hungarian and Central European culture and civilization through the communities that lived in the border areas of their Balkan countries. The contacts formed due to the geographical location of the Empire also ensured the enrichment of Ottoman society in terms of ideas and culture. By the end of the 15th century The Jews and Marrons who had been exiled from Spain and Italy at the beginning of the 16th century were accepted by the

Ottoman Empire and benefited from their knowledge and experience in European techniques. The Ottomans, fleeing religious oppression in Europe, also granted asylum to Calvinists who had come from Hungary. This enabled the European knowledge and technique to be easily transferred. (Murphey, 1992: 9-10)

The Ottomans quickly learned to use new weapons, ammunition such as bullets, and were able to adopt their subtleties and make improvements. For example, the rifles used in the wars with Austria in the 1680s were found to be superior in some ways. In the long war between 1645 and 1669 between the Venetians and the island of Crete, the Ottoman forces fought equally and were drawn. This situation appeared to have been caused by a setback in Ottoman war technology. The most important reason for this decline to come about a hundred years after the beginning of technological developments in Europe is to look for the difficulties experienced in the supply of materials. The Ottomans, besides their own sources of gunpowder, were dependent on the open exchange routes with England and the Netherlands. The most advanced technology of its time, namely European technology, was used in mining. The work of Takiyuddin Efendi is important in clock making. His 1550s treatise on weight and working hours was the only scholarly work of the period. The application of the technology developed in the field of clockwork was carried out by the watchmaker's Guild in Galata, Istanbul between 1630-1700, and the clocks manufactured here were found to be as good as those of Swiss and English craftsmen. However, as the clockwork began to collapse from the 1680s, we can say that the difficulties in the supply of materials have been effective. Because at these dates, Swiss and British watch manufacturers realized the interest of Turks in watches and to produce watches specifically for the Turkish market (Murphey, 1992: 10-17)

After all, Ottoman society has been open to adopting new ideas and developing foreign technology since its earliest history. (Murphey, 1992: 17)

We can understand this situation by examining the method of obtaining and accumulating knowledge in the Ottoman Empire. We can give the word knowledge in Ottoman as knowledge. Ingenuity, on the other hand, means non-religious knowledge obtained through experience and skill. Skill means technical ability belonging to a particular branch of art. The word science or art means the ability to do business. Science also includes the knowledge of all the principles of a particular art field, that is, all the knowledge gained through manual labor and education. Therefore, the term science or skill includes the technical details of the construction of something and the knowledge of the construction of the ocean in a good way. Moreover, science includes the knowledge of something that can be accessed through positive sciences and other means. (Tekgül, 2011: 16-22)

The accumulation of knowledge formed during the Ottoman classical period gradually disappeared as a result of later turning to Western science.

Sultan 3. Selim made great efforts to develop the manufacturing of military materials. However, starting from the 1830s and 1840s, an industrialization movement began with extensive and costly investments. With the investments made, wool and silk weaving factories, military equipment factories such as cannons and bullets were established, existing facilities were improved and technical schools were opened. However, these facilities were generally intended to produce the final product, and intermediate goods and machinery production facilities were decommissioned to a large extent. (Clark, 1992: 37-52)

During the Ottoman period, the necessity of establishing intermediate goods and machinery

production facilities was adopted in the way of decadence. In 1845, entrepreneurs named Ohannes and Boghos Dadian established a machine production plant called “GrandeFabrique” in Zeytinburnu, Istanbul, which produced machines for use in Steam Machines, pumps and small businesses. In the following years, guns (cannons, hand guns and ammunition) were produced. A foundry and dock have also been present within this facility. In addition, a vocational school for the training of technicians was also found in the facility. The facility was completely converted into an ordinary factory in 1900/1901. (Wiener, 1992: 78)

The machine production plant, which is understood to have started functioning in 1845, completely lost this feature in the following years, and this attempt to establish heavy industry during the Ottoman period failed. Attempts to establish heavy industry during the Republican period were not successful and heavy industry could not be established. The assembly industry directive issued in the 1960s failed to establish even a heavy industry based on assembly. (Dolanay, 2017; Dolanay and Oguzturk, 2018).

Thus, while light industrial plants based on installation based on license agreements have been established, we can say that the process of establishing heavy industrial plants, which is the next phase of industrialization of some kind, has not been passed. Thus, a path-bound economic development process based on technology transfer based on licensing agreements has emerged and the situation of being locked into a certain social phenomenon in history has not been broken. (Dolanay, 2017; Dolanay and Oguzturk, 2018)

The same trend continued in the post-Republic industrialization process, only the facilities producing the final product were established, and passive learning method which was taken over from the Ottoman Empire continued. (Dolanay, 2017) It is thought that the industrialization system for producing final products, which began in the industrialization process that began in the 1840s, was instrumental in the adoption of the passive learning method, thus lagging behind in the acquisition of technology development capability and the accumulation of past knowledge, experience and talent has been wasted.

We can say that both the Ottoman knowledge about creating heavy industry and the knowledge about scientific education were lost during the transition to the Republican period. Thus, in the acquisition of technology development capability (technological capability), interruptions occurred during certain periods of history and the commitment to the path based on technology transfer could not be broken.

However, when we examine the history of the Ottoman Empire carefully, it can be understood that efforts were made to develop technology.

For example, when Taqiyuddin Al-Rasid was asked to make a clock showing the time of the adhan in 1561, he examined a large number of mechanical clocks found in the treasure of the Grand Vizier of the period, Semiz Ali Pasha, and negotiated some technical details with the Masters of the Frankish clockmaker, in other words, he established knowledge on this subject. (Ihsanoğlu, 1992: 130)

Taqiyuddin Al-Rasid dealt with mechanical clock types in three parts. These are weight-operated clocks, spring-loaded clocks and pendulum clocks with tongs. He also examined the pocket clocks and re-examined the astronomy clock, which he had already developed, by dividing each hour into sixty minutes and each minute into five seconds. This shows that even the clock that he developed before is very close to the technology of today's clocks. (Ihsanoğlu, 1992: 130-131)

Although the development of technology in the field of watchmaking has been successful, this new technology was not intended to be marketed abroad, manufacturing was made only in consideration of the need for domestic watch, but the sector formed in this field could not withstand foreign competition and the sector was destroyed.(Ihsanoğlu, 1992)

During the Ottoman period, efforts were made and worked on technology transfer and technology development and the ability to develop technology in the field of clock manufacturing was gained. However, this accumulation of talent was also subsequently lost. Thus, by adhering to technology transfer path, economic development has been achieved. The knowledge of the madrasas to conduct research was lost in the following years and the research topic in today's universities was almost never brought up until 2017, and when it did, the issue of taking and developing traditional research methods in the past madrasas never came up.

Technological capability (technology development capability) refers to the capacity and ability of a business to use, select, and develop the technologies necessary to build a strategic competitive advantage. Within the scope of Vision 2023 study, the technological capability survey conducted in 2003 investigated the state of the Turkish manufacturing industry in terms of technological capability. According to the results of this research, the number of establishments that have developed innovation capability in the Turkish manufacturing industry is less than 10% of the total number of establishments. In general, it is understood that a significant proportion of technological capabilities are made up of product innovations. Businesses considered themselves more successful in terms of developing product design. Therefore, the establishments that can develop process technology were generally able to develop product technology, and the proportion of those who can develop process technology remained lower among the establishments that can develop product technology. When we look at the sectoral level, it is understood that the level of technological capability in the food, textile and transportation sectors, which are the leading sectors of importance in terms of export revenues and capacity to create employment, is of concern. In particular, the ability of the transportation sector to develop its competitive power seems to be due to its rapid development of its technological ability. (Taymaz, 2004: 1 and 24-25)

In the local automobile project, which is also important in terms of developing the technological capability in the transportation vehicles sector, it has been announced that prototypes will be manufactured in 2015, but it has been announced that a fully domestic prototype will be introduced in 2019. However, the fact that 4 years have been devoted to developing the prototype has been a very delaying factor in the implementation of the project. While the maximum prototype development period is one year worldwide and in South Korea, it has been concluded that the electric car technology has not been adequately mastered since it was allocated 4 years in Turkey. (Dolanay, 2017) Moreover, Turkey, which has been able to produce prototypes even below the world average in the past 4 months, has been considered to have suffered technological capability decline over time.

Indeed, in 2018, a study conducted in cooperation with TURKONFED (Turkish Confederation of Enterprise and business) and SEDEFED (Federation of sectoral associations) to measure the level of technology use of various industries found that the entire domestic sectors were far from the 4:0 level of industry. According to the same research, the automotive industry was found at 2.9 level. Despite efforts to manufacture domestic car prototypes, the sector remained far away from the 4:0 level of industry. (https://www.turkonfed.org; https://www.hurriyet.com.tr)

Turkey's lack of ability to develop technology was thought to be due to the lack of education system. On the one hand, how compatible the information received from outside and taught in the country can be with the social structure, the fact that no other method could be developed that could be an alternative to the method of teaching in the country by taking the readily available information emerged as another problem area.

As a matter of fact, with the current education system, only generations that can memorize very well can be raised, that is, when students are asked to memorize something and write it down, they are very successful, but they have difficulty applying their knowledge creatively. (https://tr.sputniknews.com)

The lack of education system and the lack of ability to develop technology are the main reasons why Turkish students are not able to demonstrate the expected success in PISA exams.

Indeed, Turkey is 41st in the OECD's assessment of 2015 based on the Pisa exams. Ranked 1 was Singapore, in the same assessment South Korea is 3rd ranked. The U.S. was 28th The assessment shows how far South Korea has gone in education. (https://www.bbc.com)

Moreover, Turkey's status in Pisa exams deteriorated between 2003 and 2015. (https://bianet.org)

5. General Assessment

Since the years when the principle of Westernization was adopted in the Ottoman Empire, the changes in the education system have mostly been shaped and neglected. The arrangements made in the field of maarif (education) in the Ottoman Empire were made in order to eliminate the ills that were against the structure of the state and the main aim was to do the same as the West did, that is, to become Westernized. The changes made in the education system during the Republic period were aimed at reaching the level of modern civilizations. However, the intended ones have not been reached. (Sen, 2013: 488-489) In South Korea, the only goal was to accelerate economic development, changes were functional, regulations aimed at solving the problem and to make the education system work more efficiently. As a result of these regulations, South Korea has become an example to the world with its national innovation system, which includes the higher education system. (Cho, 2013)

South Korea's ability to rapidly increase its technological capability over time, especially in the automotive industry, is based on three elements. The first is technology transfer from multiple sources. The second is reverse engineering. The third is to successfully pass the active learning process. With these three elements, South Korea has been able to build a new path of technology development while increasing its technological capability. (Dolanay, 2017; Dolanay and Oguzturk, 2018) beyond that, South Korea has been able to establish the triple helix (triple helix) national innovation system with its arrangements in the 1990s and 2000s.

Viotti said that through the licensing agreement, technological talent can be obtained from technology transfer through passive learning pathway, meaning that as much technological talent is gained as the licensing firm teaches. However, he stated that when technology transfer is made from multiple sources, the responsibility of acquiring technological talent is in the licensee's company, but technological talent can be acquired through active learning. (Quoted by Dolanay, 2017; Dolanay and Oguzturk, 2018)

In the last months of 2017, it was announced that 10 of the state universities were designated as research universities. However, it has not been explained what these universities will add to their function after that and how they will transform and become research-oriented. Only the press was informed that they could use more resources than research funds. Just as the main purpose of the companies in technoparks is to avoid tax, it may be said that there is a suspicion that these ten universities can aim to enrich their universities by transferring their research funds to their universities. (Dolanay, 2017; Dolanay ve Oguzturk; 2018)

Kim emphasized the importance of appropriate sociocultural structure on the rapid realization of technological developments in the case of South Korea. (Quoted by Dolanay, 2017; Dolanay and Oguzturk, 2018) due to Anan in Turkey, it is understood that socioculturel structure has not been effective enough in developing research and technology.

After the elimination of Darülfunun in 1933 and the transition to the university system in education, the removal of some dissident faculty members from the University led to the removal of some of Darülfunun's accumulation in the field of education, on the one hand, while on the other hand, the political power of the person in the hands of the faculty members in opposition As a matter of fact, 147 lecturers were removed from universities by a similar method after 1960. (Ultanir, 2017: 1-14)

From time to time, the investigative aspect of universities has been brought to the fore. For example, with the law No. 1750 issued in 1973, the investigative aspect of universities was considered a priority in terms of teaching. However, the higher education law dated 04.11.1981 and numbered 2547 again gave priority to the teaching direction of universities. (Ultanir, 2017: 13-16)

Thus, we can say that throughout the history of the Republic, universities have remained focused on teaching (Dolanay, 2017; Dolanay and Oguzturk, 2018). The research has been so excluded that scientists such as Gazi Yaşargil and Aziz Sancar have made successful studies and discoveries in universities abroad (www.medimagazin.com.tr; www.kırmızıbeyaz.com; www.hurriyet.com.tr; www.istka.org.tr; tr.sputniknews.com; www.tuba.gov.tr; www.koc.com.tr). Conversely, while brain drain may be of great importance in the technological development of South Korea (Dolanay, 2017), we can say that Turkey has always dealt with the problems brought about by brain drain.

In addition, as we have seen while studying the process of acquiring technology development capability in South Korea, we can say that the sociocultural structure has had an effect on the acquisition of technological capability and has accelerated the process. (Dolanay, 2017) therefore, efforts to change the sociocultural structure in Turkey in the 2000s (Ültanır, 2017) were expected to accelerate technological development, as Turkey was able to make progress in producing its local automobile in the 2000s.

6. Result

South Korea has been able to adapt its education system to the requirements of the age without severing ties with its past traditions and constantly adding new ones to its knowledge of the past. Thus, while the technology is being developed, knowledge can be used to the maximum extent.

Turkey, from the Ottoman Empire a tradition of radical education system although the Ottoman Empire to the Republic passes as radical madrasas of the Ottoman Empire occurred here had closed and the knowledge that educational institutions have been wasted. In accordance with the principle of Westernization, which is adopted to reach the level of modern civilizations, similar universities, which are higher education institutions of the west, were opened and the curriculum taken from the West was taught there, and the process of teaching the scientific knowledge obtained from the West continued. Thus, an education system has been established that is connected to the development path of the Western education system. Therefore, while the Islamic Research tradition and education system were excluded, foreign educational institutions and system has transferred and new sociocultural structure of society emerged. What needs to be done is either wait for the sociocultural structure of the society to change and become compatible with the structure of the education system, or reorganize the education system to make it compatible with traditions and its sociocultural structure.

In addition, while the education system was created in the past by taking the example of Western Europe and the United States in order to rise to the level of modern civilizations, the education system of Far East Asian countries is seen to have gone further today, but there has not been a change of course in the education system. Thus, the education system connected to the path of getting ready information from the West continued

Referances

Books

Bilkan Ali Fuat (2017), **Fakihler ve Sofuların Kavgası 17. Yüzyılda Kadızadeliler ve Sivasiler (The Fight between the Fakihs (Scientific Persons) and the Sofu (Religious Persons) in the 17th Century)**, İletişim Yayınları (Communications Publications) 2387, Tarih Dizisi (History Serial) 109, 3. Baskı (3rd Eedition), İstanbul,

Dolanay Sıtkı Selim and Oguzturk Bekir Sami (2018), **Otomotiv Sanayinde Teknolojik Gelişme (Güney Kore-Türkiye) Teknoloji Öncülüğünde Ekonomik Gelişme ve Patika Bağlılığı Güney Kore ve Türkiye Otomotiv Sektörlerinde Tarihsel Gelişimi Temel Alan Bir İnceleme (Technological Developments in the Automotive Industry (South Korea-Turkey) Technology-Led Economic Growth and Path Dependency to South Korea and Turkey A Study Base on a Historical Development of Automotive Industry)**, Alter Yayıncılık Ltd. Şti. lter Publishing House), Birinci Basım, Ankara,

Göker Harun Aykut (2013), **Yaratıcılık ve Yenilikçiliğin Kültürel Kökenleri ve Bizim Toplumumuz-Çözümleme Denemesi (Cultural Origins of Creativity and Innovation and Our Society-Analysis Trial)**, Ankara, http://www.inovasyon.org>pdf>AYK.Yar.Y..., Date of Access:11.05.2018,

Uzunçarşılı İsmail Hakkı (1988), **Osmanlı Devletinin İlmiye Teşkilatı (Ottoman State's Scientific Organizations)**, Atatürk, Kültür, Dil ve Tarih Yüksek Kurumu (Atatürk, Higher Institution of Culture, Language and History), Türk Tarih Kurumu Yayınları (Publications Of The Turkish Historical Society), VIII. Seri (Serial), Sa. (No.) 17b, Türk Tarih Kurumu Basımevi (Turkish Historical Society Printing House), 3. Baskı (3rd Edition), Ankara, https://edoc.site>osmanlı-devletinin-ilmiye.., Date of Access: 27.01.2019,

Articles

Arnkil Robert, Jürvensivu Anu, Koski Pasi, Piirainen Tatu (2010), "Exploring the Quadruple Helix Report of Quadruple Helix Research For the CLIQ Project", Work Research Centre University of Tampere, Financed by Europen Fund, Made posible by the INTERREG IVC Programme, CLIQ hrough A (Creating Local Innovation Through A Quadruple Helix), England, https://www.researchgate.net>2620…, Date of Access: 15.06.2019,

Arslan Ahmet Turan (1999), "Osmanlı İlmi Hayatına Genel Bir Bakış" (An Overwiev of Ottoman Scientific Life), Osmanlı (Ottoman) 8, Bilim (Science), Ed. Eren Güler, Türkiye Yayınları (Turkey Publications), Ankara içinde (inside), ,https://media.turuz.comTurkoloji>14, Date of Access: 27.01.2019,

Campbell David F. J. ve Carayannis Elias G. (2016), "The academic firm: a new design and redesign proposition for entrepreneurship in innovation-driven knowledge economy", Journal of Innovation and Entrepreneurship (2016), 5: 12, a Springer Open Journal, https://innovation-entrepreneurship.springeropen.com>..., Date of Access: 30.05.2019,

Cho Myung Hwan (2014), "Technological catch-up and the role of universities: South Korea's innovation based growth explained through the Corporate Helix model", Triple Helix a Springer Open Journal, Triple Helix 2014 1:2, USA, http://link.springer.com/article/10.1186/s40604-014-0002-1, Date of Access: 20.05.2017,

D'Este Pablo, Mahdi Surya, Neely Andy (2010), "Academic Entrepreneurship: What are the Factors Shaping the Capacity of Academic Researchers to Identify and Exploit Entrepreneurial Opportunities?", DRUID :..(DanishResearch Unit for Industrial Dynamics), DRUID Working Paper No. 10-05, Denmark, http://www.druid.dk, Date of Access: 28.05.2019,

Etskowitz Henry and Leydesdorff Loet (2000), "The Dynamics of innovation: from National Systems and "Mode 2" to a Triple Helix of university-industry-government relations", Research Policy 29, ELSEVIER, 109-123, www.elsevier.nl/locate/econbase, Date of Access: 18.05.2019,

Günay Ünver (2003), "XV. Yüzyıl Osmanlı Toplumunda Sosyo-Kültürel Yapı, Din ve Değişme" (Socio-cultural structure, religion and change in 15th Century Ottoman society), Sosyal Bilimler Enstitüsü Dergisi (Journal Of The Institute Of Social Sciences), Sayı: (Number:) 14, Yıl: (Year:) 2003/I, 22-48, Kayseri, http://www.sbedergi.erciyes.edu.tr>05_gunay, Date of Access: 22.12.2018,

İhsanoğlu Ekmelettin (1999), "Osmanlı Bilimine Toplu Bakış" (An Overwiev of Ottoman Science), Osmanlı 8, Bilim, Ed. Eren Güler, Türkiye Yayınları, Ankara içinde, https://media.turuz.comTurkoloji>14, Date of Access: 27.01.2019,

İhsanoğlu Ekmelettin (2003), "Osmanlı Medrese Geleneğinin Doğuşu" (Birth Of Ottoman Madrasa Tradition), Belleten, C. LXVI, 54, İstanbul, http://www.academia.edu>Osmanlı_Medrese_..., Date of Access: 14.01.2019,

Levent F. ve Gökkaya Z. (2014), "Education policies Underlying South Korea's Economic Success" ("Güney Kore'nin Ekonomik Başarısının Altında Yatan Eğitim Politikaları"), Journal Plus Education, 10(1), 275-291, http://www.faruklevent.com>dosyalar>Gune..., Date of Access: 06.01.2019,

McAdam M. Miller K. and McAdam R. (2016), "Understanding Quadruple Helix Commercialisation: A Micro Level Approach", Studies in Higher Education, Peer reviewed version,2016 Societyf or Research into Higher Education, Queen's University Belfast –Research Portal, Belfast, https://doi.org/10.1080/03075079.2016.1212328, Date of Access: 01.07.2019,

Şanal Mustafa (2003), "Osmanlı Devletinde Medreselerde Ders Programları, Öğretim Metodu, Ölçme ve Değerlendirme, Öğretimde İhtisaslaşma Bakımından Genel Bir Bakış" (A General Overview in Terms of Specialization in Teaching, Teaching Methods, Teaching Method, Assessment and Evaluation in Madrasahs in the Ottoman State), Erciyes Üniversitesi Sosyal Bilimler Enstitüsü Dergisi (Erciyes University, Journal Of

Institute Of Social Sciences), Sayı: (Number:) 14, Yıl: (Year:) 2003/I, Kayseri, 149-168, http://www.sbedergi.erciyes.edu.tr>14_sanal, Date of Access: 11.01.2019,

Unan Fahri (2006), "Osmanlı Medrese Uleması (Scientific Person, Teacher, Lecturer and Researcher): İlim Anlayışı ve İlmi Verim" (Ottoman Madrasa Ulama: Understanding of Science and Scientific Efficiency), Sosyal Bilimler Dergisi, İstanbul, 14-34, journals.manas.edu.kg/mjsr/oldarchives/Vol03_Issue05_2003/272.pdf, journals.manas.edu.kg>mjsr, Date of Access: 18.05.2019,

Yıldız İlhan (ts), "Osmanlı'da Medrese: İşleyiş Tarzı ve Ortaya Çıkan Sorunlar" (Madrasa in the Ottoman Empire: Functioning Style and Emerging Problems), Zonguldak, https://core.ac.uk>download>pdf, Date of Access: 23.01.2019,

Yıldız İlhan (2010), "Osmanlı'da Medrese: İşleyiş Tarzı ve Ortaya Çıkan Sorunlar" (Madrasa in the Ottoman Empire: Functioning Style and Emerging Problems), Vakıflar Genel Müdürlüğü (General Directorate Of Foundations), Vakıflar Dergisi (Journal of Foundations), Yıl: (Year:) Haziran 2010 (June 2010), Sayı: (Number:) 33, Ankara, http://www.isamveri.org, http://www.dergipark.gov.tr, Date of Access: 30.06.2019

Thesis

Dolanay Sıtkı Selim (2017), Otomotiv Sektöründe Teknoloji Transferi ve Teknoloji Geliştirme Yeteneğinin Kazanılması: Güney Kore ve Türkiye Örneği (Acquiring the Automotive Sector Technology Transfer and Technology Development Talent: The Case of South Korea and Turkey), Doktora Tezi (Phd Thesis), Isparta,

Karademir Zafer (2008), Osmanlı Döneminde Medreseli Olayları (Madrasa Events in the Ottoman Period), Cumhuriyet Üniversitesi Sosyal Bilimler Enstitüsü Tarih Anabilim Dalı Yeniçağ Tarihi Bilim Dalı (Republic University Institute of Social Sciences Science of History Department of New Age History) , Yüksek Lisans Tezi (Master's Thesis), Sivas, http://www.docs.neu.edu.tr>library>221276mScience edr..., Date of Access: 29.12.2018,

Tatlısumak Uğur (2016), Osmanlı Uleması (Scientific Persons) ve Patronaj İlişkisi (Ottoman Ulema and Patronage Relations),T.C. Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Tarih Ana Bilim Dalı Yeniçağ Tarihi Bilim Dalı (Seljuk University Institute of Social Sciences Science of History Department of New Age History), Doktora Tezi (Phd Thesis), Konya, http://www.acikerisim.selcuk.edu.tr>xmlui>handle, Date of Access: 07.01.2019,

Tekgül Nil (2011), Reflection Of An External World In The Ottoman Mind The Production And Transmission Of Knowledge InThe 18th Century Ottoman Society, Master'sThesis, Department of History, Bilkent University, Ankara, http://www.thesis.bilkent.edu.tr>..., Date of Access: 15.02.2019,

Ulusoy Ahmet (2007), Kuruluşundan 17. Yüzyıla Kadar Osmanlı Medreselerinde Eğitim-Öğretim Faaliyetleri (Education and Training Activities in the Ottoman Madrasas from its establishment until the 17th century), Selçuk Üniversitesi Sosyal Bilimler Enstitüsü İlköğretim Ana Bilim Dalı Sosyal Bilgiler Öğretmenliği Bilim Dalı (Selçuk University Institute Of Social Sciences Primary Education Department Social Studies Teaching Department), Yüksek Lisans Tezi (Master Thesis), Konya, https://media.turuz.com>Tarix>391-Q.., Date of Access: 24.12.2018,

Publishments by Institutions

Clark Edward C. (1992), "Osmanlı Sanayi Devrimi" (Ottoman Industrial Revolution), **Osmanlılar ve Batı Teknolojisi Yeni Araştırmalar Yeni Görüşler (Ottomans and Western Technology New Researches New Opinions)**, Hazırlayan (Prepared by) İhsanoğlu 5eddin, İstanbul Üniversitesi Edebiyat Fakültesi Yayınları (Istanbul University Faculty Of Letters Publications), Edebiyat Fakültesi Basımevi (Faculty Of Letters Printing House), İstanbul içinde (inside), 37-52, https://kupdf.net>embed>ekmeleddin-..., Date of Access: 01.02.2019,

Education, the driving force for the development of Korea, Ministry of Education, , Republic of Korea, South Korea, http://www.koreaneducentreinuk.org>..., Date of Access: 19.04.2019

İhsanoğlu Ekmelettin (1992), "Osmanlıların Batı'da Gelişen Bazı Teknolojik Yeniliklerden Etkilenmeleri" (The Ottomans being affected by some technological innovations developing in the West), **Osmanlılar ve Batı**

Teknolojisi Yeni Araştırmalar Yeni Görüşler (Ottomans and Western Technology New Researches New Opinions), Hazırlayan (Prepared by) İhsanoğlu Ekmeleddin, İstanbul Üniversitesi Edebiyat Fakültesi Yayınları (Istanbul University Faculty Of Letters Publications), Edebiyat Fakültesi Basımevi (Faculty Of Letters Printing House), İstanbul içinde (inside), 121-139, https://kupdf.net>embed>ekmeleddin-..., Date of Access: 01.02.2019,

Murphy Rhoads (1992), "Osmanlıların Batı Teknolojisini Benimsemedeki Tutumları: Efrenci Teknisyenlerin Sivil ve Askeri Uygulamalardaki Rolü" (Attitudes of the Ottomans in Adopting Western Technology: The Role of Effective Technicians in Civil and Military Practices), **Osmanlılar ve Batı Teknolojisi Yeni Araştırmalar Yeni Görüşler (Ottomans and Western Technology New Researches New Opinions)**, Hazırlayan (Prepared by) İhsanoğlu Ekmeleddin, İstanbul Üniversitesi Edebiyat Fakültesi Yayınları (Istanbul University Faculty Of Letters Publications), Edebiyat Fakültesi Basımevi (Faculty Of Letters Printing House), İstanbul içinde (inside), 7-20,https://kupdf.net>embed>ekmeleddin-..., Date of Access: 01.02.2019,

Taymaz Erol (2004), Türkiye İmalat Sanayiinde Teknolojik Yetenek, Vizyon 2023 Ulusal Teknoloji Envanteri Projesi (Turkey Manufacturing Technological Capabilities, Vision 2023 National Technology Inventory Project), Ulusal Teknolojik Yetenek Raporu (National Technological Capability Report), Ekim 2004 (October 2004), Ankara, http://www.inovasyon.org>pdf>Ulusal.Tekn..., Date of Access: 11.12.2018,

Wiener Wolfgang Müller (1992),"15-19 Yüzyılları Arasında İstanbul'da İmalathane ve Fabrikalar" (Workshops and Factories in Istanbul Between 15-19 Centuries), **Osmanlılar ve Batı Teknolojisi Yeni Araştırmalar Yeni Görüşler (Ottomans and Western Technology New Researches New Opinions)**, Hazırlayan (Prepared by) İhsanoğlu Ekmeleddin, İstanbul Üniversitesi Edebiyat Fakültesi Yayınları (Istanbul University Faculty Of Letters Publications), Edebiyat Fakültesi Basımevi (Faculty Of Letters Printing House), İstanbul içinde (inside), 53-120, https://kupdf.net>embed>ekmeleddin-..., Date of Access: 01.02.2019,

Internet Sources

Aziz Sancar kimdir, kaç yaşındadır (Who is Aziz Sancar, how old is he), https://www.hurriyet.com.tr>gundem>aziz-sancar-kimdir-ka..., Date of Access:

Dijital Anadolu 2 Raporu Açıklandı: Endüstri 4.0'a En Yakın Sektör Otomotiv (Digital Anatolia 2 Report Announced: The Industry Closest to Industry 4.0 Automotive), 14 Aralık 2018, https://www.turkonfed.org, Date of Access: 28.12.2018,

Dünyaca Ünlü Beyin Cerrahı Gazi Yasargil Türkiye'de (World Renowned Neurosurgeon Gazi Yaşargil in Turkey), https://www.hurriyet.com.tr>Egitim Haberleri, Date of Access: 18.07.2019,

Endüstri 4.0'a en yakın sektör otomotiv (Automotive industry closest to Industry 4.0), 14 Aralık 2018, https://www.hurriyet.com.tr, Date of Access: 02.01.2019,

Gazi Yaşargil'in Film Gibi öyküsü (The Story of Gazi Yaşargil Like a Film), https://www.medimagazin.com.tr>guncel>tr-gazi-yasargil-in..., Date of Access: 18.07.2019,

https://www.hurriyet.com.tr, Date of Access: 14.07.2019,

https://www.koc.com.tr>NewsMagazineDocuments, Date of Access: 13.05.2017,

Küresel Rekabet Edebilirlikte Beyin Göçü ve Beyin Kazanımı Konferansı Sonuç Kitabı (Brain Migration and Brain Acquisition Conference Conclusion Book in Global Competitiveness,), Boğaziçi Üniversitesi Rekabet Odaklı Kalkınma Çabaları Uygulama ve Araştırma Merkezi, https://www.istka.org.tr>media>küresel-rekabet-edilebilirlikte..., Date of Access: 18.07.2019,

Nobel Ödüllü Aziz Sancar: Ben küsüm ülkeye (Nobel Prize Winner Aziz Sancar: I'm offended country), https://tr.sputniknews.com>turkiye>201808261034897970-..., Date of Access: 14.07.2019,

Osmanlıda iki bilim adamının katli (The murder of two scientists in the Ottoman Empire), https://blog.milliyet.com.tr>Blog, http://blog.milliyet.com.tr/osmanlıda-iki-bilim-adamının-katli/Blog/?BlogNo=58385, 11 Mart 2018 (11 March 2018), Date of Access: 25.02.2019,

PISA Direktörü Schleicher: Türk eğitim sistemi dünyaya uyum sağlayamadı (PISA Director Schleicher: Turkish education system could not adapt to the world)-Sputnik Türkiye, https://tr.sputniknews.com>turkiye, Date of Access: 16.07.2019,

PISA Sonuçları ve Düşündürdükleri (PISA Results and Suggestions)-Rıfat Okçabol-biamag-Bianet, https://bianet.org>biamag>eğitim, Date of Access: 16.07.2019,

Son Yüzyılın en önemli bilim adamlarından biri: Prof. Dr. Mahmut Gazi Yaşargil (One of the most important scientists of the last century: Professor. Dr. Mahmut Gazi Yaşargil), https://www.kırmızıbeyaz.com>son-yuzyılın-en-onemli-bilim..., Date of Access: 18.07.2019,

Uludoğan Betül (2015), Molla Lütfi (Molla Lutfi), T.C. Üsküdar Üniversitesi, İnsan ve Toplum Bilimleri Fakültesi, Felsefe Bölümü, İslam Felsefesi Dersi I. Dönem (T. R. Üsküdar University, Faculty of Humanities and Social Sciences, Department of Philosophy, Islamic Philosophy Course I. Semester), İstanbul, 1-8, https://s3.amazonaws.com/academia.edu.documents/36349...disposition=attachment%3B%20filename%3DMolla_Lütfi.docx, Date of Access: 25.02.2019

Ültanır Mustafa Özcan (2017), "Medrese Üniversitelerinden Araştırma Üniversitelerine mi?" (From Madrasa Universities to Research Universities?), 3 Kasım 2017 (3 November 2017), http://ultanırplatformu.com/03-11-2017-medrese-üniversitelerinden-araştırma-üniversitelerine-mi.html, Date of Access: 29.01.2019