

RESEARCH ARTICLE/ARAŞTIRMA MAKALESİ

# Innovation efforts in the supply of health services after the Health Transformation Program in Türkiye

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## Abstract

Health innovation is defined as innovations and improvements in health policies, health system, health products and services, health technologies and service delivery methods in order to improve people's health. The emphasis on innovation in healthcare has been increasing in recent years due to challenges such as rising costs and an aging population. Innovation, which is of vital importance for the health sector, becomes one of the main determinants of social welfare and quality of life with the innovations and advances it brings. Innovative products and services increase the possibilities of early diagnosis and treatment, thus preventing future costs. In this way, alternative solution options can be created for the benefit of the patient, with the increase efficiency of the health system in the long term. In addition, positive externalities can be provided to many health-related sectors. With innovation, it is possible to produce cheap and accessible solutions by using advanced technologies in health services where resources are very limited.

In this study, it is aimed to draw a conceptual framework on innovation and health innovation and to explain the innovations in health service supply within the framework of the Health Transformation Program put into practice in 2003. In recent years, significant changes have been made in the Turkish health system, especially in the financing, presentation and organization of the service within the scope of health innovation. Although significant progress has been made in the health system with the impact of these changes, there is still some work to be done. As a result of the study, what has been done has been evaluated and recommendations and suggestions have been made about what should be done.

**Keywords:** Innovation, Healthcare, Supply, Türkiye, Health Transformation Program

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## 1. INTRODUCTION

Innovation is of great importance for countries to increase their basic development forces and have a say in the global change process. Innovation is the determining factor affecting the capacity and efficiency of institutions and organizations in countries, increasing national and international competitiveness, and sustainable growth. Therefore, it is necessary to realize innovation in all areas of life. The health sector is one of these areas.

Today, changes in disease forms, rapid advances in diagnosis and treatment methods have brought the concept of innovation to the agenda in the delivery and application of health services. In addition, the expectation of quality and innovation in health services increases in countries where the income level rises. These factors increase the demand and aggravate the burden of the budget allocated by the state for health expenditures. Therefore, health systems seek to increase efficiency by controlling costs, apart from improving accessibility to health services. At this point, it is seen that innovation studies provide positive returns to health services in many aspects such as quality, efficiency, flexibility and accessibility. The innovation approach ensures that the negative situations that may arise in the delivery of health services are eliminated. It also helps to increase the quality of life of the patient by ensuring that his health needs are met. In addition, by adopting this approach, health institutions use their existing resources effectively and efficiently and can respond to changing demands and competition.

The health sector draws attention as a dynamic sector where many innovation investments are made. Innovation approaches in healthcare institutions include mobile health applications, robotic devices, wearable technologies, diagnostic tools, etc. digital innovations. In addition, different applications such as Machine Learning, Artificial Intelligence, Deep Learning, Big Data, Internet of Things (IoT), Cloud Computing, and 3D Printer are also seen. More choice alternatives are now available for healthcare consumers. For example, personalized medicine makes it possible to provide unique treatment by integrating the

patient's health history, genetic information, and personal needs and preferences. Too many tools of choice have emerged, such as telemedicine, home health care, and online care. Instead of going to a building (for example, a hospital) to reach health services, health care has started to come to where you are. It has become accessible to health services regardless of place and time.

In this study, the concept of innovation, its importance and types are explained first. Then, what innovation means in health services, why and how it will take place, and its potential benefits are mentioned. After that, examples of innovation in healthcare are given. In the fourth chapter, what kind of innovation practices were carried out with the Health Transformation Program (entered into force in 2003) which created a significant change and transformation in health services in Türkiye, is explained in detail. After evaluating the innovations brought with the Health Transformation Program in Türkiye in the supply of health services and making some suggestions and recommendations, the study was concluded.

## 2. INNOVATION: DEFINITION, IMPORTANCE AND TYPES

Innovation is a very popular concept today. The concept of innovation, which means to do something new in Latin, derives from the word *innovare*. Drucker pointed out that innovation is a tool rather than an end. According to him, innovation is the tool that enables entrepreneurs to make changes to create a different business or service. It can be shown as a discipline, the ability to learn, the ability to apply. (Drucker, 1985: 30).

The Oslo Manual, published by the OECD in 2006, is one of the leading internationally accepted sources on the definition of innovation. An innovation is defined as the realization of a new or significantly improved product/service or process, a new marketing method or a new organizational method in business practices, workplace organization or external relations (OECD & Eurostat, 2006: 50).

Innovation, as a process, refers to the activity of transforming an idea into a marketable product or service, a new or improved production or

distribution method, or a new social service method, and a new or improved marketable product, method or service that is revealed at the end of this transformation process (TÜSIAD, 2003: 9-10). In short, innovation is the whole process that ends with a new product, service, application based on thought, discovery and invention (Armentia et al., 2003).

Economist Joseph Alois Schumpeter sees innovation as a driving force of development. According to Schumpeter, the main indicators of innovation are:

- Launch of a new product
- Launch of a new feature of an existing product
- Implementation of a new production method
- Creation of a new market
- Finding a new source for the procurement of raw materials or semi-finished products
- It is the reorganization of the business.

Innovation has become an indispensable source of dynamism for both businesses and today's national economies. Price and John (2014: 73) argue that innovation contributes greatly to improving the performance of organizations, facilitates entry into new markets through developed new products and services, and helps design new products and services for consumers with different needs. Thanks to the innovation activities carried out, the customer bases of the organizations are expanding and the incomes of the organizations from their activities are increasing. Thus, organizations grow faster, provide employment opportunities for more people and contribute more to the country's economy. At the micro level, they help organizations gain a competitive advantage and increase their operational efficiency (Ilinca, 2012: 198). At the macro level, they positively affect the competitiveness of the country. Therefore, organizations that make innovations make a significant contribution to the development of the country. In summary, innovation has become the basic dynamic of sustainable economic growth for regional and national economies, welfare and social development for societies, and

competitiveness for both national economies and businesses (Uzkurt 2010: 27). Innovation, which also has a social impact, shows itself in the form of increasing the quality of life of the society and creating social and economic benefits.

In the Oslo Manual, innovation is classified under four headings: product, process, market and organization. The innovation types are as follows: (OECD & Eurostat, 2006:52-55; OECD, 2005: 48-50).

- **Product Innovation:** This type of innovation involves introducing a new or significantly improved product with existing features. It can be defined as developing a new and different product or service and introducing it to the market, or adding higher quality and superior features to existing products or services.
- **Process Innovation:** Process innovation is the application of a new or significantly improved production or delivery method. This includes significant changes in techniques, hardware and/or software. Process innovations may be designed to reduce production or delivery unit costs, improve quality, or produce or offer new or significantly improved products.
- **Marketing Innovation:** Marketing innovation is the implementation of a new marketing method that involves significant changes in product design or packaging, product placement, product promotion or pricing. Marketing innovations aim to better meet the customer's needs, open new markets, or place a firm's product on the market in order to increase the firm's sales.
- **Organization Innovation:** In order to gain an advantage against their competitors in market conditions, they need to develop their business methods and provide difference and innovation. Organizational innovation is the development of working and business methods or the adaptation of new methods to the business. It includes innovations or improvements in the workplace organization or the firm's relationships with outside firms and institutions. In other words, this type of innovation involves the application of a new organizational method in the business practices, organization or external relations of the enterprise.

### 3. INNOVATION IN HEALTHCARE

Health services include activities related to diagnosis, treatment and rehabilitation of diseases, prevention of diseases and improvement of the health level of the society (Ateş 2011: 2).

Health services are at the forefront of the areas where innovation is most intense. The concept of health innovation is defined by the World Health Organization Health Innovation Working Group as “innovations and improvements in health policies, health system, health products and services, health technologies and service delivery methods in order to improve people’s health, with a particular focus on the needs of vulnerable groups” (WHO, 2016). As can be understood from the definition, the concept of health innovation is not only about products or services, but also covers a much wider area.

It is possible to express innovation activities within the scope of health services as the realization of new ideas, services, processes or products in order to develop diagnosis and treatment services, education, preventive measures and research methods and to achieve long-term goals (Omachonu & Einspruch, 2010: 5). According to Goes and Park (1997: 674), innovation in health services is expressed as medical technologies, organizational structures, management systems or new services that are new in the sector and have just begun to be adopted by hospitals. In this context, healthcare institutions can carry out innovation activities in a wide variety of areas, from drug treatment methods, devices used, diagnosis and treatment methods, surgical procedures, training of healthcare professionals, management of healthcare institutions and service delivery models (Dixon-Wood et al., 2011: 47). In other words, innovation in healthcare is defined as those changes that help healthcare practitioners focus on the patient by helping healthcare professionals work smarter, faster, better and more cost effectively (Thakur et al., 2012: 562).

Health innovation is expressed by the World Health Organization as the development and delivery of health systems, policies, services, technologies and delivery methods that improve

the health of individuals (WHO, 2016). In this definition, the World Health Organization claims that health innovation increases the effectiveness, efficiency, quality, safety, sustainability and reduces the cost of the health services provided. The innovation approach in health services aims to use the health system in the best way to meet the needs and expectations of individuals in the best way. It includes patient and employee satisfaction, new and improved health policies, practices, technologies, and better health outcomes (Kimble & Massoud, 2017: 90).

Innovation has an importance in the health sector that affects human life and quality of life. The biggest reason for this is population growth in the world. With the increase in population, the disease structure has changed, and chronic diseases have emerged. Thus, the need for care has increased and this has led to an increase in health expenditures. Health expenditures also brought cost control and efficiency approach to the agenda. Innovation in the health system has increased the efficiency of new products and services and has led to a decrease in costs (Ökem, 2011: 43). In addition to these reasons, many reasons such as the increase in the expectation of the society, advances in technology and developments in the health system reveal new needs in the health system and important changes are experienced in line with these needs.

While providing health services, many innovations have occurred both in our country and in the world from past to present. For example, people had not met the surgical innovation called closed surgery until 25 years ago, and they were not aware of an application such as dental implants. All these have emerged as a result of the R&D studies and innovation processes (Köktepe Karahüseyinoğlu & Karahüseyinoğlu, 2021: 88). Today, many innovative applications are encountered in health institutions. Virtual patient rooms developed for the development of community health services and individuals in need of long-term care, video conferences in psychiatric treatment, telehealth applications, a wearable device that sends a cancer warning to the smart phone via a sensor in the bloodstream, etc. are shown as an example



(Schnarr et al., 2015: 42).

Innovation is critically important to the healthcare industry. The increase in early diagnosis and treatment opportunities prevents more costly and difficult processes that may occur in the future and contributes to the increase in efficiency in health services. (Sengün, 2016: 196). The technologies, materials and long work processes used increase the costs in the health sector. It has been reported that it is possible to save on factors that increase costs with innovation (Lal & Adair, 2014: 25). Due to geographical barriers, not all regions of the countries may have the same opportunities. Providing equal quality health services to every individual in every region is also among the reasons that necessitate innovation. Compared to previous periods, the formation of a more conscious society structure about healthy living, the fact that patients are starting to be more selective and seeking the best and quality service are among the reasons that make innovation in health services obligatory. In addition to this, the increase in income level, technological advances and the widespread use of health insurance systems aiming to cover the whole society in all countries increase the demand for better health services, and thus innovation in the health sector is becoming a necessity.

Health care innovation can be explained as clinical, technical and educational innovation. The main purpose of clinical innovation is the development of new treatment methods. Studies in which new drugs, vaccines, diagnostic methods, medical products, devices and software, consumables are developed are technical innovations. With technical innovations, clinical innovations are facilitated and it becomes easier to try new methods. Educational innovation, on the other hand, can be defined as studies that follow the innovations in the field of medicine and improve the quality of medical education (Köktepe Karahüseyinoğlu & Karahüseyinoğlu, 2021: 92-93).

The types of innovation carried out in healthcare institutions are generally product-service innovation, process innovation and structural innovation. Product-service innovation includes

the development of products and services purchased by customers (Varkey et al., 2008: 382-383). In product-service innovation, new product-services such as early diagnosis and treatment methods and preventive applications are developed. In order for the new products-services developed to be successful, attention should be paid to the social, cultural, economic and epidemiological characteristics of the society (Nodari et al., 2015: 3079-3080). Process innovation includes innovations in the production and distribution methods of products and services, and aims to increase the value obtained by one or more stakeholders by innovating in production and distribution methods (Varkey et al., 2008: 382-383). Process innovation brings about significant changes in the production methods of products and services. Performing the tests needed in the diagnosis of the disease, together with the appropriate equipment, in the patient's own home is an example of process innovation. In this way, it is possible to prevent the interruption of the treatment process by minimizing the patient's preference for other health institutions and the rate of absenteeism (Nodari et al., 2015: 3081). Structural innovation affects internal and external infrastructures and creates new business models. Structural changes are often radical. Therefore, structural innovation offers great changes in the way of delivering health services to the patient (Varkey et al., 2008: 382-383).

Innovative activities create new products such as drugs and medical devices and new service processes such as e-health. By providing early diagnosis and treatment opportunities with innovative health products, more costly treatments and bigger health problems that may occur in the future will be prevented. The services provided in the health sector can be provided more effectively and with higher quality, provided that high technology and qualified workforce complement each other. New treatment methods, drugs and medical devices constitute the intermediate inputs of the health sector and increase the performance of health services with technological advances in this sector. For example, e-health services implemented for the purpose of sharing and

tracking medical and financial information not only increase the quality, reliability, accessibility and efficiency in service delivery, but also enable more effective decisions to be made in healthcare financing.

The final output of the health sector is a healthy society. A healthy society increases labor productivity. Improvements in health sector performance and productivity increase the overall competitiveness of the economy. Innovative goods or services will provide competitive advantage by providing the priority given to the company and country in which they are developed. Due to the technology and information density, the R&D and innovation flow in the health sector spreads to other sectors it is connected to.

Supporting innovation practices in health services not only improves the level of public health, but also positively affects the health market economy. However, the point that should not be forgotten in innovation is that innovation is not a spontaneous process (Şengün, 2016: 196). All countries strive to activate the determinants of innovation in order to raise the health status of people. But this is not as easy as it seems. Because of the complex functions that must be carried out together, governments can only carry out innovative processes by determining and planning their policies at the strategic level and developing a comprehensive and integrated approach.

Innovation is the key to economic growth, employment increase and quality of life. Especially innovations made in the health sector directly affect human life and quality of life. The final output of health is a healthy population, which directly affects labor productivity. Due to the public aspect of health services, the state has a regulatory and supervisory role on the sector. Government policies, laws and incentives have a significant impact on the development and introduction of a new drug, device or treatment method (Ökem, 2011:16).

In countries with developed social security systems, the state is also the largest purchaser of health services on behalf of citizens.

The licensing, certification, pricing and reimbursement decisions of the government are of fundamental importance in the introduction of a new drug or treatment method and its reach to the citizens. The policies and incentives to be put forward by the authorities that plan and implement these processes shape R&D, investment and production decisions, which are the main determinants of innovation in the health sector. In addition, factors such as patents and data protection, market access, and domestic and international trade also significantly affect innovation in healthcare.

In realizing innovation in health services, especially those who implement it have important duties. Managers of health institutions need to be able to put innovative services such as technology management, home care, remote monitoring, and education of patients and their relatives on track. Thus, it will enable the managers to focus on the tasks that should be given priority (Şengün, 2016: 195). In addition, depending on the innovation developments in health services, the fields of expertise of physicians, job descriptions of nurses and other health personnel are changing, and new professions are emerging in the health sector. In the success of innovative processes, it is important that all occupational groups in the sector adopt and implement innovative developments quickly.

With the spread of genetic diagnosis and treatment methods, laser technologies, bloodless surgical methods, telemedicine, robotic medicine, information technologies that enable remote monitoring and health infrastructure, hospitals will soon turn into telemedicine platforms completely and all health procedures and services will be provided via more advanced mobile devices. It is thought that hospitalization rates and durations will decrease further, and home care and follow-up services will come to the fore. For example, the "virtual patient room" innovation in the UK has been considered as a strategy for managing chronic diseases within the scope of community health services development efforts. The virtual patient room is an application based on the care of patients who need long-term and similar care as a group in a house formed as

a hospital room (Schnarr et al., 2015: 51).

Many of the innovations in health have been initiated by stakeholders in the health sector (patients, patient advocacy groups, healthcare organizations, physicians, other healthcare professionals, etc.). In some cases, the need for change is being forced on healthcare organizations by the government. Once the need has been identified, the next challenge is in determining whether the need will be met internally or by a healthcare innovation company. If innovation originates from within the healthcare organization, it is tested, modified and accepted. If it does not originate from the health institution, it is covered by a health technology company that develops, tests and markets the technology to health institutions. In some cases, a healthcare innovation company takes products that they can attempt to innovate in a healthcare organization and turns it into a better product and markets it to healthcare organizations. It is important to understand the internal process of innovation in a healthcare organization such as a hospital, nursing home, health center or nursing company. These organizations often do not have the facilities of a large R&D department and therefore must rely on the talent and creativity of internal staff and work teams (Omachonu & Einspruch, 2010: 12). From a micro point of view, while the innovation process works in this way in health institutions, macro innovation practices (process and structural innovations) in the health system are generally implemented with the incentives or coercion of governments. It is seen that many developed and developing countries have implemented important reforms in their health systems since the 1980s (Günaydın, 2011: 324). It is possible to evaluate these reforms as health innovations. Countries such as Estonia, Türkiye, the United States of America, Iran and England are some of the countries that implement innovative reforms in the health system.

#### 4. INNOVATION APPLICATIONS IN HEALTHCARE SUPPLY

In addition to many structural and process-related innovations such as organizational, financial and service delivery within the scope of health innovation, many developments

have been made, especially in the last century, from electronic health records to mobile health platforms (Sullivan, 2015). Here, in this part of the study, some current important health product/service innovation examples that emerged in the supply of health services are included.

Transition to full automation systems in hospitals is one of the leading examples of innovation in the supply of healthcare services. Now, even the most difficult surgeries in the surgical field can be performed in a short time, giving the patient successful results with the least damage. These closed surgeries and related devices remote machine surgery are among the most important examples to be given to them.

Electronic health (e-health), which can be defined as the use of information and communication technologies in health services, is an innovative health field whose share in the health sector is increasing day by day. Electronic health (e-health), which we can see as a reflection of innovation in health, can be defined as the use of information and communication technologies at every level in the field of health (Eysenbach, 2001: 20). E-health encompasses many applications such as data and information sharing between patients, doctors, other healthcare providers and hospitals, electronic health records, telemedicine services, portable patient monitoring devices, operating room planning software and robotic surgery. E-health, which covers such a wide area, is one of the areas where innovation is used most intensively in the health sector. In other words, e-health contributes to the formation of a more effective health sector by increasing the access and quality of service of the whole society.

Mobile health (m-health) is a sub-segment of e-health and refers to the use of mobile devices in health (Gülhan, 2016: 108). Mobile health applications include sending warnings and guiding messages about diseases, performing video tele-consultation and tele-visit applications, making an appointment via mobile phone or website, transmitting health information via portable or wearable devices, making a color blindness test with the help of smartphone applications. and remotely managing chronic diseases (TÜSİAD, 2016). Thus, mobile health

technologies help facilitate face-to-face and voice communication, effectively manage relations between patients and health professionals, and access health services (Singh et al., 2014). In addition, mobile technologies help in the management of chronic diseases (blood glucose measurement, medication reminder, etc.), maintaining a healthy life (weight loss, regular sleep, water consumption, calorie counter, etc.) and reducing bad habits (stopping smoking, etc.) (Kopmaz & Arslanoglu, 2018: 253).

Wearable technologies are electronic devices that are attached to the body, placed on clothes or accessories (wristbands, watches, glasses and belts, etc.) (Tehrani & Andrew, 2014). Wearable technologies connect with smart devices and exchange information instantly. The user is informed with the help of the data provided by wearable technologies (Demirci, 2018: 986). These technologies appear in clinical (sugar level, heart rate, etc.) and behavioral (stair climbing, walking, etc.) fields. For example, systems that remind when to take drugs, biochemical sensors, systems that inject insulin for diabetes patients, reminder glasses developed for Alzheimer's patients, and systems used for tracking and strengthening motor movements (Bostancı, 2015: 549).

With the rapid development of technology, artificial intelligence robots have started to be used in the field of health. These robots are effectively used in a variety of tasks, from helping patients with daily tasks such as dressing and bathing, moving and transporting patients, helping to transport therapeutic materials, and providing emotional support to patients (Bacaksız et al., 2020: 462). Today, robotic surgical systems have been seen more widely in the field of application in the health sector. Robot doctors, robot nurses, robot caregivers and robots used for surgical purposes have started to be used in health institutions (Kılıç & Tosun, 2021: 549). For example, robot nurses, with the help of human-like strong arms and high-sensitivity touch sensors, prevent accidents that are frequently encountered when carrying patients to bed or lifting a fallen patient (Çam, 2016).

The Internet of Things is creating an important

innovation in the supply of healthcare services. The Internet of Things is a network system that produces information and contributes to business processes by integrating physical tools into information networks easily and unnoticed. If we look at the applications of the Internet of Things in the field of health, examples are given as sensor systems to prevent the elderly and disabled people from falling, and surveillance systems related to the health status of the elderly people in their homes or health institutions (Hossain & Muhammad, 2016: 192). In addition, thanks to the Internet of Things, data is automatically uploaded and transmitted to the system when no medication is taken or health professionals are warned with the help of smart medicine boxes with sensors.

Digital hospitals, which are another innovative tool in the provision of health services, are also called paperless hospitals. In these hospitals, medical records such as the results of analysis, examination and treatment services are kept in digital environment. In digital hospitals, appointment systems such as internet, SMS, call center, laboratory information and radiology information system, closed-circuit medicine system, systems that recognize the individual such as face recognition and RFID, instant tracking systems, smart operating room, digital archive, consultancy services systems, smart building management systems, patient orientation and information screens are used (Güleş & Özata, 2005).

Tele-medicine is a system that covers communication and information technologies used by health systems for the purpose of diagnosis, treatment and prevention of diseases, evaluation, research, education of health service providers, improvement of the health of individuals and society and exchange of information without geographical distance and distance limitation (WHO, 2009). The tele-medicine application enables the transmission of health data from one region to another, the patient's ability to talk to the health system with the physician in a remote location (video conference, etc.), and allows diagnosis and treatment. As an example of telemedicine



application, the family physician sends the image of the skin of the patient applying for a skin condition to the physician in another region, and the physician diagnoses the patient remotely (Dorsey & Topol, 2020: 859).

Another example of innovation in healthcare is electronic shorts that prevent bedsores. About 60,000 people die each year from bedsores and the resulting infections. Developed by Sean Dukelow as part of the SMART project, electric shorts transmit a small electrical charge every 10 minutes, providing the same effect as the patient walking by himself. With this method, the muscles are activated, blood circulation is increased, and bedsores are effectively destroyed and life is saved (Çam, 2016). In addition, The cyberknife stereotactic radiosurgery system is used by physicians to deliver high doses of radiation with great accuracy, which allows incisionless surgery for previously inoperable tumors. It minimizes radiation exposure in healthy tissues and allows physicians to study multiple tumors at various locations (Omachonu & Einspruch, 2010: 7-8).

In the supply of health services, many new studies such as the examples mentioned above have been made and continue to be done. In this section, we only mentioned the prominent applications. But the most important point is that as artificial intelligence applications develop, innovative studies in health services will increase even more. Artificial intelligence studies have already been carried out in the health sector for the first time. Therefore, it can be stated that artificial intelligence, which has emerged as a digital health service innovation, is an important innovation area to eliminate long-standing deficiencies in health services and improve patient care. Considered a transformative innovation, artificial intelligence has proven to outperform human clinicians in diagnosing certain medical conditions, especially in image analysis in dermatology and radiology. In addition, the digitization of patient records has played an active role in revealing the potential of artificial intelligence by making artificial intelligence stronger with the internet of things (Arora, 2020: 223).

## 5. INNOVATION STUDIES IN HEALTHCARE SUPPLY WITH THE HEALTH TRANSFORMATION PROGRAM IN TÜRKİYE

Türkiye has significant opportunities for innovative products and services to be created in the health sector. Türkiye is an important source of demand for innovative products and services to be created by the health sector in terms of its population size and increasing health care demand with the expansion of health insurance coverage, its geographical proximity to world markets and its technological infrastructure. Supporting innovation will contribute to improvements in the health level of the society, as well as to the health sector and the economy. The Health Transformation Program (HTP), which was put into practice in Türkiye in 2003, contains many examples in terms of process innovation, product/service innovation and structural innovation. In this study, the innovations in the Turkish Health System are also evaluated in general within the scope of the Health Transformation Program.

The Health Transformation Program initially consists of six basic reforms that can be considered as structural and process innovation in the health system. The main purpose of these reforms is to facilitate the functioning of the health system, to provide people with quality and affordable health services, to ensure the financial sustainability of the health system, to respond to the health needs of the society, and to make progress especially in the health status indicators, which Türkiye lags behind in international comparisons. While doing all these, not compromising the indispensable principles of the health system is the basic principle of the Health Transformation Program. These principles are effectiveness, efficiency, equity and people-centredness (Aslan et al., 2018: 793).

The restructuring of the Ministry of Health comes at the forefront of the arrangements made within the scope of innovative transformations in the health sector. As can be seen in the Decree Law No. 663, it is clearly stated that the duty of the Ministry of Health is to determine policy at

the national level, to manage the system, and to supervise rather than providing services. The Ministry of Health was restructured. The excessive centralization and growth of health services caused the Ministry of Health to move away from its primary duties as a result of the increased work and transaction load. After the completion of the studies carried out within the scope of the Health Transformation Program, the authority and responsibility of making decisions in the provision of hospital services, generating income and spending was transferred to the administratively and financially autonomous public hospitals. One of the most important examples of organizational units established to support the Ministry of Health, which undertakes a regulatory, supervisory and guiding function in the field of health, is the "Health Policies Board". The purpose of the establishment of the Board is to create a mechanism to transfer the main duties of the Ministry such as planning, policy development and rule determination (Küçük, 2017). The health policy board is an important example within the scope of structural innovation in the implementation of the first principle of the Health Transformation Program. Moreover, in order to fulfill the functions related to service delivery within the scope of structural and process innovation, Turkish Public Hospitals Agency (hospital services), Turkish Public Health Agency (preventive and primary health care services), Turkish Medicines and Medical Devices Agency (pharmaceuticals, medical devices and products) and The General Directorate of Borders and Coasts were established. Later, the Presidency of Turkish Health Institutes (TUSEB) and Health Sciences University (SBU) were added to these institutions. The Turkish Health Institutes Presidency (TUSEB) was established to meet the advanced technology and innovation needs of our country in the field of health science and technologies. In addition, there are nine research institutes established in line with the needs of the country in the field of health science and technologies within the body of TUSEB. All of these are important structural and process health innovations in the Turkish Health System in the last ten years (TUSEB, 2023).

With the HTP, serious regulations and changes

were made in many areas from health service delivery to financing, from manpower to information system, from drug pricing system to quality and accreditation. At the beginning of these arrangements is the connection of SSK Hospitals to the Ministry of Health and the unification of hospitals under one roof. Thus, it is aimed to eliminate the complex and multi-headed structure in the organization and presentation of health services, and to prevent the structure that reduces service efficiency and quality, leads to lack of standards and inequality. In this way, it will be possible to ensure that citizens who have difficulty in accessing health services in the public sector can access the services more easily (Ministry of Health, 2012: 197). In addition to this merger, private hospitals were opened to the use of everyone, local management approach was made dominant in hospitals and hospital services were restructured. Thus, the burden of public hospitals, which play an important role in the delivery of health services, was partially weakened and this burden was shared with private health institutions. In this way, on the one hand, it became easier for state hospitals to provide health services, and on the other hand, the quality of service increased. Within the framework of decentralization approach, authority was transferred to hospitals, management flexibility was ensured, it was decided that hospitals could use their own resources freely and hospital employees would be paid additional payments from revolving funds according to performance (Ministry of Health, 2012: 199-200). On the one hand, a payment system according to the performance was envisaged and additional payments were made to the healthcare professionals in order to motivate the healthcare professionals to work more efficiently and on the other hand, to increase the quality-of-service delivery.

"Integrated health campuses" and "city hospitals" projects based on the public-private partnership model are another of the regulations implemented within the scope of health transformation and innovation in health care. With the public-private partnership, which can be expressed as making public health investments by the private sector and leasing them to the

state for a certain period of time, it is aimed to increase the quality of service, especially the effective and efficient delivery of health services, to spread the variety of treatment throughout the country and to provide cost-effective health services (Ministry of Health, 2012: 233). Hospitals built by the private sector in line with the public-private partnership are leased to the government with a contract drawn up within a certain period of time. City hospitals created within this scope are capable of responding to needs in terms of service diversity, technological infrastructure and service capacity. Thanks to the variety of services, it has become possible to find many branches in a single location. Unnecessary referrals can be minimized. In addition, it was stated in a study that large-scale hospitals could save at least 50% of energy. Another study reveals that large-scale hospitals benefit from technology efficiently in terms of energy savings (TÜSAP, 2018: 16).

Significant innovations have been made in the health financing system in Türkiye within the framework of the Health Transformation Program. Until 2006, the Turkish health system was dominated by a fragmented, multi-headed, non-standard financing system (such as SSK, Bağ-Kur, Retirement Fund, Active Officers and Green Card programs). However, with the Social Security Institution and General Health Insurance Laws enacted in 2006 within the scope of Health Transformation and Social Security Reform, health financing institutions were combined under one roof (Yıldırım, 2013: 55). In this way, the fragmented and multi-headed structure in service financing and provision has been prevented. This innovation in the financing system is important in terms of equality and equity, which are indispensable principles of the health system.

With the Law No. 5510, it is aimed to provide equal and easily accessible, quality health services for the entire population and to establish a sustainable health system. In accordance with Law No. 5510, health services will be provided through contracts to be made between the Social Security Institution and health service providers. Insured persons will be able to apply

to any of the public and private health service providers that have signed a contract with the Social Security Institution and can benefit from contracted health institutions without paying any fee. It is possible for contracted private health institutions to receive additional fees within the determined limit. Thus, it was passed from an institutional structure that both provides and finances health services to a structure that separates the institution that provides the service and the institution that finances the service. In this structure, the institution that purchases health services sets various standards for health services, and health services are purchased from both the public and private sectors in line with these standards (Tatar, 2011: 121).

One of the main components of the Health Transformation Program is the implementation of the family medicine model in service delivery. The family medicine system, which started with a pilot application in 2005, spread throughout the country in 2010 (Ministry of Health, 2012). Family medicine is the contemporary practice of primary health care. With the family medicine model, it is aimed to deliver health services to all individuals in a geographically balanced manner, provide primary health care services with preventive, diagnostic treatment and rehabilitative aspects in the places where individuals live and work in a way that ensures the participation of the society, give weight to the preventive health system and implement an acceptable referral system.

An important pillar of the transformation in health is the e-transformation studies in health and the National Health Information System. In this way, national standards in health information systems have been developed and an effective information system infrastructure has been established. With the National Health Information System, it is aimed to ensure data standardization in health, to establish data analysis support and decision support systems, to accelerate data flow among e-Health stakeholders, to create electronic personal health records and to increase efficiency by saving resources (Ministry of Health, 2012: 233).

With Türkiye's Health Transformation Program in 2003, important e-health applications have come. Health Information System (Health-NET) comes first among these applications. Health-NET has been prepared for people to access their own health data when necessary to share data among authorized health professionals. Within the scope of the Health Transformation Program, it has become possible to record all activities by establishing information processing systems in hospitals, to create a system that generates information by collecting and reporting all kinds of health data produced in health institutions in accordance with the standards, and to share the health records of citizens among health institutions with the Health-Net Application. Again, in this context, the creation of new systems such as the Central Hospital Appointment System and the Family Medicine Information System have been important innovative applications in terms of information infrastructure (Lamba et al., 2014: 62).

Another innovative application in the supply of health services in Türkiye has been the Medula system. Medula is a system developed by the Social Security Institution in 2006 in order to collect the invoice information about the services in the health institutions to the beneficiaries in electronic environment, and to control this information and to make the payment of the services easily. Invoicing is carried out by querying the referral, prescription, payment information in Medula according to the rules set by the Health Implementation Communiqué. Today, all health institutions have Medula records. Another application realized within the scope of innovative works is the Pharmaceutical Tracking System. With the Pharmaceutical Track and Trace System, it has become mandatory to manufacture, import, record and sell all medicines with data matrix. Thanks to this system, the consumption of a drug that has not been produced is prevented and the second prescription of the same drug is prevented.

An important innovative application is Telemedicine. With the Telemedicine System, physicians can access medical images from anywhere and anytime, as well as allowing any medical image to be reported and to give a

second opinion by another radiologist in another province and hospital in our country. With this system, which eliminates the need for patients to carry their old films with them, physicians can conduct live and video consultations. Thus, unnecessary repetitions are avoided and savings are achieved (TÜSAP, 2018: 23).

There are many mobile health applications in Türkiye. To provide remote telemedicine service, Healthmeter, Remote Safe Patient Tracking, My Health Tracker and Wimax Ambulance Pilot Project for mobile data transmission in emergency services, Health 365 for health portal and mobile application platform, Mymedics Personal Health Tracking System to provide access to personal health record and chronic diseases and Doro Kolay Telephone Mobile Medicine Reminder are given as examples of mobile health applications used in our country (Tezcan, 2016). In addition, the e-Pulse system is one of the most important mobile applications, allowing people to access laboratory results, radiology images, medical treatments, which diseases have occurred, health records such as blood pressure, sugar, pulse, weight control through a system. Moreover, the e-Prescription application, the Medicine Tracking System, the Organ Transplant Information System, the Central Hospital Appointment System, the Family Medicine Information System, the MEDULA system and the Core Resource Management System, in which all the resources of the Ministry of Health are recorded, are other mobile health applications used in our country (Toygar, 2018: 101). With the Health Tourism Portal, it is aimed to display all the capabilities of our health facilities, to communicate with health personnel and to share files live (TÜSAP, 2018: 23).

With the e-Triage System, which does not have a long history, it is aimed to make the family medicine practice more effective by directing the citizens who will make an appointment to the right branch by electronically asking questions about their disease and by reducing unnecessary applications to hospitals (TÜSAP, 2018: 18). In this context, it emerges as an important health innovation tool. In addition, innovation studies in healthcare continue intensively, especially



within the scope of technological means. So, studies continue in our country on the topics of Wearable Devices, Genomics, Robotic Surgery, Anti-aging, Assistive Tech, fertility technologies, Gene Therapy, Mental Health Technologies, Nanomedicine, Neurotechnology and Sleep Technologies (Altunbudak, 2022)).

One of the highlights after the Health Transformation Program is patient rights and patients' right to choose a physician. Before the Health Transformation Program, patients did not have the right to choose a physician, but with the transformation program, "Patient Rights Unit" was established in all hospitals affiliated to the Ministry, and patients were given the right to choose a physician both in public hospitals and in family medicine practice. In order to meet the increasing expectations and demands of citizens and to increase patient satisfaction, public hospitals were technologically renewed and their service capacities were increased with the Health Transformation Program. All hospitals of the Ministry of Health have been fully automated. Home healthcare services have also been initiated for bedridden patients who cannot come to the hospital.

## 6. CONCLUSION AND EVALUATION

The health sector is one of the sectors most affected by technological developments and innovative studies, as in the aviation and space sectors. The main purpose of the health system is to provide people with access to quality, adequate and low-cost health services. Especially with the 21st century, improvement and innovation studies in the health sector have gained momentum all over the world. In Türkiye, the health system and health services have been largely reformed with the Health Transformation Program. A new era has begun in the supply of health services. The effects of this reform movement and innovation practices in health services have only just begun to emerge and be evaluated. Some of the outputs are the improvement of service delivery, facilitating access to health, making the operation of the system simpler, providing service in physically more modern buildings and with more technological devices. With the implementation of innovative studies in hospitals and other health

service providers, important contributions such as effective use of insufficient hospital resources and reducing costs can be achieved. The health system has started to work more efficiently and effectively. The efforts of health institutions to meet expectations, to achieve differentiation and sustainability goals continue in the light of innovative developments. While it has become possible for patients to access services and receive quality service with innovation in service delivery, modernization of management and organization methods, rationality in decision mechanisms, documentation of information systems and the functionality of communication mechanisms have increased.

Health innovation is extremely important for the production of quality, sustainable and qualified services, as well as for the added value it creates in the international health market and its possible contribution to the country's economy. For this reason, it is important to focus on health innovation and to create units working on this issue, both in terms of service delivery and its contribution to the country's economy. Since this situation has been realized in Türkiye, innovation studies in the health sector and investments in this field are emphasized. Despite technological innovations in medical devices, medicine and biology, health information technology, medical and surgical procedures, and improvements in health care, much remains to be done. But Türkiye still has some shortcomings and some handicaps in front of it. There are still structural problems that need to be resolved in the Turkish health system. Financial sustainability, illegal practices (knife money, etc.) that can be seen due to the structure of the system, problems of university hospitals, increasing dissatisfaction and loss of motivation of health professionals, and the performance system discussed are among these problems (Göktaş, 2011). More structural innovation is needed in the health system to address these problems in the near future.

According to the Healthtech 2022 report, trends such as remote diagnosis, mobile devices, molecular and genetic testing, robots, nano devices, wearable technologies, complementary diagnostic tests, voice technology, the use of artificial intelligence in health, portable

dialysis machines, personalized modular and comprehensive care packages and electronic health records will shape the future of health technologies (Altunbudak, 2022). However, high-level R&D investment is required for the production of high-tech medical devices. Apart from this, it is not easy for this sector to invest in Türkiye due to high infrastructure costs, limited market and competitive opportunities, and the monopolization of large international organizations in the sector. In addition, organizational culture, stakeholders and employee status also affect innovation in healthcare services. The motivation and dissatisfaction of the healthcare professionals harms the success of the innovations brought by the Health Transformation Program. In order to modernize hospitals, facilitate access to services, and make the system more effective, efficient, sustainable and high quality, it is primarily necessary to internalize the service providers and increase their motivation. The basis of this is to eliminate financial inadequacies and ensure financial sustainability. At this point, the state should make more efforts in the resources allocated for health and the health policies created. According to the changing world and increasing expectations, innovation studies in the health system and health service delivery should be intensified. In the light of current developments and advances, the health sector should be continuously improved and quality service provision should be standardized.

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