


DIGITALIZATION IN HEALTH MANAGEMENT SYSTEM AND NEW MEMBER IN THE TOP MANAGEMENT TEAM: CHIEF DIGITAL OFFICERS

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Abstract

In the last few decades, technology has been more influential in our lives than ever before. Digital transformation, which is one of the outcomes of technology, has brought new application areas and new managerial positions. One of the effective areas of digital transformation is health organizations. The digital transformation in the health sector can only be realized effectively and efficiently with competent senior managers. Chief Digital Officers (CDO) are the top managers responsible for digital transformation and applications in organizational structures. In today's conditions, CDOs are the senior managers responsible for managing digitalization in global and national health organizations, health service providers and individual health practices. In the near future, we will see an increasing number of CDOs in healthcare organizations.

Keywords: Top Management, Digitalization, Health Management System.

1. Introduction

In our lives, technology has ascended to a new level of effectiveness. The industrial revolution, which started in the XVII century, has been active for centuries and evolved into technological innovations in the second half of the last century and finally into the digital revolution a few decades ago. The industrial revolution created great innovations on in the production system and business functions. The development of digital technologies also creates rapid changes in many areas of life from individual to organizational level. Digital transformation is becoming more ingrained into everyday life and is a talking point among researchers today (Rakovic, Maric, Milutinovic, Sakal & Antic, 2022).

One of the primary conditions for people to survive is to be healthy. The field of health services, where the health and continuity of human life is the subject, should be in a position to provide this service in the most equipped way for people (Yorulmaz & Demirhan, 2022). Individuals and society need various health organizations in order to be healthy. Like other organizational structures, health organizations are also affected by technological changes. The health sector and organizations are of the areas where scientific principles and knowledge are used most intensively. Technology has become an important phenomenon that directs health in protecting, developing and managing human health both in our country and the world (Şimşir & Sağ, 2022). The interaction between the health sector and technology takes many forms. There is a rapid transformation from classical applications to technological developments in health services. One of the technological development methods is digitalization. A paradigm shift in digital technologies, from traditional health services to smart health services, is developing in a way that will revolutionize health systems globally (Sarıyıldız, 2022).

In today's conditions, digitalization is a strategic issue which is becoming increasingly important. Strategic issues are handled only by managers with special skills. Top management teams formulate and carry out business and organizational strategies. The success of all business operations, especially in the long run, is up to the senior executives. All firms are evaluated thoroughly by top management teams who have an objective point of view (Dresner, 2008). Top managers evaluate the internal and external conditions rather than the execution of daily work, perceive the changes and developments in them in a timely manner and determine the vision and mission of the enterprises. Especially rapidly changing external conditions are the special interests of senior managers.

The biggest change experienced today is the increasing impact of technology. Technology directly or indirectly affects an individual's life as well as organizations. One application area of the increasing use of technology is digitalization. With the digital transformation that has emerged as a result of technological developments, new administrative applications have emerged. Digitalization, which is such an important phenomenon, is at a strategic level for individuals and businesses. The achievement of digitalization, which is a strategic phenomenon, at the organizational level, can only be achieved by qualified managers. The digital transformation of businesses has created a new position in senior management teams. The Digital Director is the new member of the "Chief Digital Officer/CDO" senior management team. Given the challenges and opportunities that DT holds for companies across industries, an increasing number of companies have created a new managerial position: the Chief Digital Officer (CDO) (Singha, Klarnerb & Hessa, 2020). In this context, the first known CDO started to work in the early 2000s. Today, CDO works in many enterprises operating in different sectors of Western countries.

One of the sectors rapidly affected by digitalization is the health sector. Health services have been of vital importance since the first moments of humanity. Changes in time have also led to changes in health services. In parallel with the developments in science and technology in health services, where natural and inexpensive techniques were used in the past, both the techniques used and the technologies used have been developed, diversified and complex by entering into a rapid and continuous change (Sargutan, 2005). One of the main reasons for the changes in the health sector in the last few decades is digitalization. The progress in information technologies and digital transformation have come a long way in a short time in the field of health (Akalin & Veranyurt, 2020). The digital transformation experienced affects the health sector at the individual, organizational, and public levels. In all these dimensions, expert senior managers are needed to sustain technological developments. As in other sectors, the top manager responsible for digital transformation and applications in the health sector is CDO.

Digitalization, which has begun to deeply affect human life both in individual and organizational dimensions, and digital transformation, which is a strategic phenomenon created by it, is a topic that has just begun to be studied in scientific studies. Despite the growing importance and relevance of Digital Transformation strategies, few studies have examined the CDO's roles (Singha, Klarnerb & Hessa, 2020). One of the sectors where digitalization is used effectively is the health sector and its services. Digitization and digital transformation in the healthcare sector, its strategic manager CDO, has not yet been adequately studied. Our aim is to trigger future research by conducting a study on digitalization, CDO, and its use in the health sector. Our study will fill an important gap in the literature by examining digitalization, the use of digital transformation in the health sector and the function of the CDO as a strategic officer.

2. Upper Echelon Approach and Chief Digital Officer

2.1. Upper Echelon Approach and Top Management Teams

At the beginning of the last century, management science subjects began to be studied intensively. In the following process, the fact that professional managers started taking place in management levels instead of founding entrepreneurs led to new studies and approaches. Especially strategic management levels have been an important field of study for management scientists. In their 1932 study, Berle and Means defined and graded management as a board of directors and senior executives (Davis, 1994; Mizruchi, 1983). After the Second World War, in the 1960s, the Carnegie School's theoretical studies highlighting behavioral factors and Pfeffer's demography approach became important steps in understanding top managers. According to Pfeffer (1985); organizational demography is the most important, if not the only, factor in managing and analyzing the organization. The first comprehensive and fundamental study on strategic management teams was made in 1984. Hambrick and Mason's study has attracted all the attention since its publication in 1984 with the "Upper Echelon" upper-level approach (Hambrick & Mason, 1984). According to the Upper Echelon approach, senior managers work in positions where the strategic decisions of the enterprises are made. The top managers of the organization are the people who make important decisions about the future of the organization and also play an important role in its current course and have the right to choose (Thomas & Simerly, 1995). Senior managers differ from other managers with in their cognitive structures. Demographic characteristics are accepted as indicators of the cognitive approaches, perceptions, and interpretations of the managers in the team (Besler, 2006). According to the upper-level approach, the source of the managers' cognitive structures is their demographic characteristics. Demographic characteristics are observable and objective variables of individuals. Demographics in the organization is a useful method for managers in terms of providing social patterns and some specific indicators (Pfeffer, 1985).

Demographic characteristics used in the initial studies; age, gender, income status, tenure, education features, and functional background, but diversified in the following processes. According to Halverson and Tirmidhi (2008); Social identity is often based on group identity and includes various dimensions such as national origin (belonging), family, race, age, religion, gender, psychological and mental ability, family structure, socio-economic status, education level, language, dialect, geographic location, military status, business structure, and business level. Top managers evaluate the internal and external conditions of the enterprise with their cognitive structures based on demographic characteristics. Senior managers make strategic decisions as a result of their analysis and evaluation. As a result of the strategic decisions taken, the performance of the business emerges (Hambrick & Mason, 1984). Herrmann and Datta (2005) list the relationship between demographic structure and organizational performance as creativity, strategic change and competitive behaviors.

Although demographic values are effective in the individual dimension, the concept of distribution comes into play in the team dimension. The distribution of democratic variables within the team is explained with the concepts of homogeneous and heterogeneous. Top managers working in homogeneous structures have the same or similar characteristics. It has been determined that the similarity between team members directly or indirectly affects team behaviors (Salas, Burke & Eduardo, 2009). The behaviors of teams consisting of members with similar individual

characteristics are also similar. In contrast to the contradiction and conflict arising from diversity, homogeneous senior management teams are more successful in strategic decision-making and implementation (Pitcher & Smith, 2001). Unlike homogeneous teams, in heterogeneous teams, the demographic characteristics of the members are completely or partially different. Diversity can be defined as the differences and variations of a group in certain demographic variables (Auh & Menguc, 2005). The difference in demographic values provides cognitive diversity and provides managerial richness to the team. The heterogeneity of the senior management team with the senior approach means a difference in understanding among team members, and this provides information from many different sources (Hambrick & Mason, 1984). Diversity in the decision-making team in the business ensures high-quality decision-making (Milliken & Martins, 1996). Diversity brings different solution approaches together. Heterogeneous teams have the ability to produce high-quality solutions with different perspectives (Milliken & Martins, 1996).

Top management teams make the vital decisions of the business by being at the top of the organizational charts of the enterprises. The most important decisions of businesses are strategic decisions. The right strategic decisions are those that only competent people can make. Strategic decisions of businesses are made by top managers. Top managers formulate strategies in businesses and adapt them to daily activities (Brinckmann, 2007). Strategic decisions and management is an issue that a competent team can achieve, not an individual. The central and dominant element in traditional strategic planning studies is the senior management team (Sheila, 2005). The senior management team is concerned with long-term planning and principles that will carry the business into the future, rather than the execution of daily activities. The strategy created by the top managers covers the entire business and becomes determinant on the vision of the business (Dresner, 2008). The reason for the existence of the business, the points they want to be in the future, the determination of general policies including ethical codes are determined by the senior management team. Managers should have a longer-term perspective be ready for the events that may occur, and even create them (Gottschalk, 2007). Senior management teams are a strategic advantage for businesses.

Performance outputs are concrete indicators of the success of strategic decisions and practices of senior managers. Businesses need to achieve high performance in order to gain an advantage over their competitors. Performance indicators are indicators of a wide range of activities and evaluation processes that show how inputs are transformed into outputs (Sheila, 2005). Many indicators, including financial results, are used to measure the performance of senior management teams. In today's conditions, issues such as technological development and adaptation to innovations are indicators of business performance. Thanks to the performance, managerial control of the enterprise can also be made.

1.2. Top Management Teams, Diligence and Chief Digital Officer

One of the focal points of the work of the senior management team is the team structure. There is no standard approach in determining who the senior management team consists of. The structures of senior management teams differ depending on the activity sectors, sizes and structural characteristics of the enterprises. In the old days, when it comes to the top level where the enterprises' strategic decisions are made, the board of directors was the structure that comes to mind. Afterward, new top management teams started to emerge as professional managers started to

take charge in the enterprises instead of entrepreneurs. Over time, the managerial relations between the new managers and the managers, mostly shareholders, began to become clear. The board of directors observes the activities of the senior management teams and the enterprise, represents the enterprise against the external environment, maintains relations within the country and other country managers, supervises and approves the appropriateness of the decisions taken by the senior management, and elects the new senior management members (Aydemir. 2020). The managerial authority and responsibilities of business owners and entrepreneurs passed to professional managers.

Today, when the top manager is mentioned, the first thing that comes to mind is the CEO. In their research on the top management position, Harrison, Torres, and Kukalis (1988) place the CEO in the most critical place in the team, as he is primarily responsible for the operations of the business in defining the top management team. However, the concept of top management has a transpersonal team dimension. According to Hambrick (1995a); The senior management team approach goes far beyond addressing the issue as strategic leadership or simply focusing on the CEO.

A major topic in the studies is the senior management team's composition. According to some approaches, the senior management team consists of managers who serve up to certain levels and report to the CEO. In this approach, CEOs were asked who the team consisted of, and they were asked to describe their teams. When CEOs were asked who was part of their senior management team, they cited direct reports and two lower levels (Hambrick, 1995b; Thomas & Simerly, 1995), two lower levels to twelve lower levels (Hambrick 1981b), two lower levels to five lower levels (Wiersema & Bantel, 1992). According to another approach, the senior management team is associated with the organizational structure. According to this approach, the senior management team consists of the CEO and the managers of the functional units affiliated to him in the organizational structure. Carpenter and Fredrickson (2001), Davis and Useem (2002) emphasize the senior management team as the most important unit of the business and state that it consists of the CEO, president and department managers. Accordingly, the senior management team is the managers of the business functions, and the managers directly report to the CEO and facilitate his managerial work. Although the managers in the first group differ from business to business, they are usually managers responsible for business functions such as finance, marketing, production, human resources, research and development. The second group of managers, on the other hand, consists of managers such as operations manager (COO), legal counsel (CLO), which are defined as staff. Senior management team assignments differ from country to country and from business to business. In the Aydemir (2020) study, 16 senior management teams, some of which also work in Turkey, have identified job types.

In the long-lasting classical period, similar organizational structures continued their existence without significant changes. However, new management structures emerged as technology began to dominate the life and especially the activities of businesses. The structures of the senior management teams working at the strategic level have also changed depending on the developments. While the fields of activity of some enterprises are technology, the managerial functions of all other enterprises have been integrated with technology, and the structures of senior management teams have been shaped accordingly.

As technology began to take place in business activities, new job descriptions began to take place within the senior management teams. The first of these new top managers is the Chief Technology Officer (CTO). The use and management of technology in businesses is carried out by the Chief Technical Officer or Chief Technology Officer (CTO). The CTO is the CEO's advisor and assistant in technology management. The CTO function is research, development and engineering, but the area of responsibility and influence is quite broad in business and industry (Bottger & 2008: 182). As the CTO job descriptions expanded, sub-tasks of technology began to emerge. For example, the Chief Information Officer (CIO) is one of the new top managers of the sub-task. The CIO is responsible for the processing of the data and data of the enterprise for the purpose. Big data piles flowing inside and outside the business every day are processed and made ready for use by these top managers. The CIO and the chief data officer typically lead functional silos (Kunisch, Menz, Langan & 2022).

Another top executive associated with technology is the Chief Knowledge Officer (CKO). CKO aims to maximize the output of the business through knowledge. While the CIO only considers the applications of information technologies, the CKO also evaluates how to obtain comprehensive information from information technologies (Gottschalk, 2006). Another top executive who uses technology intensively within the business is the Chief Communications Officer (CCO). It is a top manager that emerged as a result of the widespread use of high technology and the rapid change in the business world, making managerial communication more important. CCOs are responsible for the strategic communication of businesses.

Recently, a new manager has been included in the senior management teams in enterprises. The era of digitalization has emerged as a result of the rapid development of technology, the expansion of usage areas and the transformation of businesses as well as people. Traditionally, companies have employed chief information officers (CIOs) and have made these individuals responsible for everything concerning the firm's information technology (IT) infrastructure (Culasso, Gavurova, Crocco & Giacosa, 2023). Digitalization has revealed a new function above technology and related management styles. A new function means new management and manager. The history of the emergence of digital technology, its transformation into a managerial position, the appointment of the first CDO is less than 20 years old. The first known CDO was hired by MTV Networks in 2005 (Culasso, Gavurova, Crocco & Giacosa, 2023). With the transition from the industrial age to the digital age, a notable phenomenon is the adoption of the chief digital officer—a senior executive position dedicated to digital issues—in large firms (Kunisch, Menz & Langan, 2022).

The entry of digital technology into all areas of life has brought about changes and transformations at the same speed. Over the past decade, digital technologies have had a huge impact on businesses and people's daily lives (Giebe, 2019). Digital technology has revealed changes and transformations in both personal and organizational dimensions. The introduction of digital technology into our lives in this way facilitates personal life, and although it provides certain advantages for the business world, it has also brought some difficulties. Using and integrating new digital technologies is one of the biggest challenges facing businesses today (Giebe, 2019). Many businesses have made efforts to adapt to the emerging digital transformation. CDO has started to fulfill an important function in order to manage digital transformation in a healthy way and to make it a competitive advantage. The rise of digital technology has resulted in new opportunities for companies across the globe, but it has also led to an increasingly

significant need for specific knowledge to make the most of technological advancements (Culasso, Gavurova, Crocco & Giacosa, 2023). Researching emerging digital technologies and making them useful to businesses is CDO's main responsibility. With these responsibilities, CDOs are emerging as the focal leaders of digital transformation (DT) (Singha, Klarnerb & Hessa, 2020).

For businesses, the decision to hire a CDO within their senior management team is an important choice. Internal and external possibilities for CDOs to take charge in senior management teams, strategic management, the performance of enterprises, their positions in the organizational structure, their relations and behavior patterns are academic sub-titles that attract attention. Among all these sub-titles, the main fundamental issue has been the successful execution of the digital transformation. For success, first of all, decision-makers must have technological awareness. Another issue for success is the timely adaptation process to innovations. Therefore, the process of making a digital transformation decision and proceeding is a process that needs to be implemented very quickly.

CDO is a new senior manager hired to achieve the strategic level operations of the businesses. Businesses have started this position in order to adapt to newly emerging conditions at a strategic level. In response to the growing demands for effectively managing the growing volume of data and leveraging them for analytics, firms are adopting new information strategies to run their businesses (Zhan, Mu, Nishant & Singhal, 2022). In the new world, where economic conditions are globalized and competitors are diversified, the amount of information that is vital for businesses has increased significantly. It is a strategic choice and practice to reach these data, whose numbers and different speeds reach incredible levels, to classify them, to process them, to turn them into decision proposals and to carry out these transactions at a level that covers the entire enterprise. These strategic applications are only possible with digital transformation. The greatest responsibility of a CDO remains to guide the organization through the transformation and accompany it in the adoption of the right tools and the best processes to increase efficiency and optimized business strategies (Scuotto, Magni, Theofilos & Giudice, 2022).

With the emergence of CDO, CTO, CIO etc., one of the topics discussed was the similarities or differences between technology and responsible senior managers, and their relationship with their duties. Technology management in enterprises, information processes and digital transformation are almost intertwined fields of activity carried out in close cooperation. However, the fact that each task has a managerial counterpart is an indication that there are significant differences between them. Prior research suggests that firms differ with respect to the role of information and communication technologies and the use of a CIO, which, in turn, may affect the use of a dedicated digital role like the CDO (Kunisch, Menz & Langan, 2022). Studies show that the strategic use of technology in some businesses has different top managers in teams. Kunisch, Menz & Langan (2022) found in their study that CIOs are among 64% of businesses that have CDOs in their senior management teams. Many CIOs are actively embracing new opportunities in digital innovation, so the relationship between the CDO and CIO is an important one (Tumbas, Berente & Brocke, 2017). The researchers explain the existence of both positions in senior management teams with the complementary nature of their duties, the distribution of tasks and the interaction between them. CDO does not only have close managerial relations with the managers responsible for the management of technology within the senior management team. Department managers in CDO businesses establish close managerial relationships with general senior managers. For example, CDO collaborates with the chief marketing officer (CMO) to comply with

key requirements for digital innovation, such as technical conditions and customer demands (Firk, Gehrke, Hanelt & Wolff, 2022). Companies were found to establish reporting from CDOs to CEOs, or from CDOs to other TMT members, e.g., CIOs, CMOs, or chief financial officers (Kessel, Lorenz & Graf-Vlachy, 2022). Firk, etc. (2021); CDO CIOs, an advantaged top manager, not only carry out the digital transformation with the CTOs, but also the finance, marketing and operations officers in the C-suite fulfill the task of leading the digital transformation.

Although CDO and other technological top managers work in cooperation, it is a matter of debate what functional differences exist. While the CIO and CTO focus on the strategic use of technology, CDOs also emphasize digital business models, not only by participating in technological opportunities, but also addressing the customer and ecosystem perspective to achieve value creation and capture (Firk, Hanelt, Oehmichen, & Wolff, 2021).

3. Concept of Health, Technology, and CDO

3.1 The Concept of Health and Human

Health is a concept at the center of human life. Health and people are inseparable from each other. Health is one of the most basic needs that people need to have in order to protect their existence and maintain their lives. In the historical process, different health practices have been done since the first moments of human history. Various health organizations have started to be established in order to protect the health of people and to regain their lost health. In the following process, the provision of health services has turned into a professional structure. Health care procedures, which were carried out in primitive conditions in the early ages, have turned into modern techniques and organizational structures today.

The phenomenon of health affects us from birth to death, even before we are born. Health is one of the basic conditions for maintaining our physical and spiritual existence. It is impossible to replace health needs with any other method other than their special conditions. Health is a phenomenon that everyone needs homogeneously, regardless of country and class. In affluent civilizations and the upper classes, health is an increasing value that correlates with social status and position; in poorer societies and the lower classes, it is a service that is required (Açıkgöz, 2021).

Although health needs are of the same importance for people and societies, they differ depending on their culture and technologies. Today, health systems are organized in different dimensions. These concepts, which are disease-centered, patient-centered, community-centered and human-centered, have been decisive in the design of the healthcare system (Demir, 2020). In the beginning, the size of the health system, which puts people in the center, has reached the size of covering all humanity. Especially after the pandemic, it has made it necessary to address the health system on a global scale. Health services are one of the cornerstones of the economy as a global perspective (Akalin & Veranyurt, 2020). It is tried to create a universal digital health system that integrates with the traditional health system by using health technologies in the world (Şimşir & Mete, 2021). The health sector, whose scope has reached the global dimension from the individual dimension, has become a multivariate model. The healthcare industry faces a major change concerning the place professionals, patients, and other stakeholders have within the whole service ecosystem (Crisani, 2022).

The priorities of health services and the way they are implemented have evolved as technological and social conditions have changed. When we look at the developments in health services and medical practices since the past years, it is seen that an approach focused on disease prevention, prevention, lifestyle, guiding habits and increasing the quality of life is now dominant (Şimşir & Mete, 2021).

3.2 Health Sector and Technology

The development of technology has caused extensive changes in almost every aspect of human life. Technology has not only created changes in business functions. The health sector is required to be one of the sectors where the development of scientific knowledge is most intense (Şimşir & Sağ, 2022). New applications that emerged as a result of technological developments have started to be used in different sectors. Developments in science and technology have led to changes in the health sector as well as in production, industry and service sectors (Akalin & Veranyurt, 2020). Technology has become an important phenomenon that directs health in protecting, developing and managing human health both in our country and the world (Şimşir & Sağ, 2022).

As in today's sciences, health has become a multidisciplinary science. Health science has not remained as it was in the early periods, it has entered into close interaction and cooperation with other sciences. The sources of today's medical technologies come from other disciplines. In particular, the contribution of the engineering discipline to health science and industry is undeniable. According to Sargutan (2005); sub-disciplines of the engineering discipline in the medical technology sector are listed as mechanical, electrical-electronics, chemistry, metallurgy and computer engineering. Informatics, a result of technology, is frequently used in the health sector and applications. The importance of information systems is increasing day by day in the health sector, as it is in almost every field (Yücel, Aytekin, Ayaz & Tüminçin, 2018). The use of technology in the health sector has brought many developments and innovations. The health sector has an important potential in innovative product development and technology (Aslan & Şerife, 2020). Health applications of technology increase the quality of services and positive results. Technology and the improvements it always brings positively affect the quality of life (Akalin & Veranyurt, 2020). It is known that the use of advanced technology in the health sector facilitates and shortens the diagnosis, treatment and post-treatment processes of patients in general (Şimşir & Sağ, 2022).

According to Sargutan (2005); technology in health is not limited to the use of new devices and tools in new diagnosis and treatment methods. It is a holistic approach. Health technology is a concept, idiom and characterization that expresses all kinds of health-related philosophies, systems, ideas, methods, practices and similar techniques and technological adaptations that allow applying some techniques with the help of health equipment and drugs (Sargutan, 2005).

Today, the use of technology in the health sector is in different ways. Akalin and Veranyurt (2020) include the application areas of technology, especially artificial intelligence, in health services; medical health services are listed as digital health. Artificial intelligence-based solutions appear with solutions such as voice response systems in mobile health, and applications such as diagnosis and diagnosis in the medical field (Akalin & Veranyurt, 2020). Similarly, Yücel, et al. (2018) states that technological applications in the health sector are important in the early diagnosis and treatment phase.

3.3. Health Sector Digitization and CDO

One of the comprehensive changes in the health sector is the changes created by digital innovation and applications. The use of digital technologies in the health sector is increasing rapidly. Digital technologies will be among the sine qua non of health services in the near future, as in many areas (Aslan & Güzel, 2020).

Sargutan (2005) states that the use of technology and its result, digitalization, in the health sector will be handled in two stages. It is possible to say that the managerial areas in the development and implementation of technology policies consist of two different levels; country level technology management in the health sector and unit level technology management in health organizations (Sargutan, 2005). The said approach does not cover the global health system and the effects of technology and digitalization in the health sector at the individual level. For this reason, we can examine technology and especially the health sector, and applications of digitalization under three main headings. CDO, which will manage digitalization, can also be considered in this context. The first of the application areas of the health sector of digitalization is global and national health organizations, the second is the organizational structures that provide health services and the systems they use, and the last one is the health practices at the individual level. Table 1 includes digitalization and CDO applications in health systems.

3.3.1. Digitalization and CDO in Global and National Health Organizations

Global health organizations have been established, such as the World Health Organization, which was founded in the last century. These organizations, which ensure that health issues are handled on a global scale, carry out effective tasks. Global health organizations, whose effectiveness we feel especially after the pandemic, will be even more active in the coming years. In cases where health problems can occur in different dimensions from the size of the whole world to local problems, the solution should also be fast and comprehensive. In this context, managerial solutions come from the effective use of technology and digitalization. Technology development increases the use of information systems in many sectors (Yücel, Aytekin, Ayaz & Tüminçin, 2018). New tools and technologies are starting a digital transformation in all health systems around the world (Şimşir & Mete, 2021). Health services have evolved from a regional dimension to a global dimension with the opportunities brought by technology. The health paradigm integrated with digital technologies, which will cover all health services worldwide, is in the development phase with an increasing pace (Şimşir & Mete, 2021). At the global level, acquiring information and coordinating transactions between countries and regional health organizations require speed and consistency. In this context, the importance of the authorities who will use digital technology cannot be denied. For this reason, CDO responsible for digital management should take part in both global and regional health organizations. With the emergence of CDO, it should increase the effectiveness and efficiency of health practices by giving priority to technology and rapidly following the developments in the world (Doonan, 2018). Coordination is important for effective coordination in a global and multi-unit network. Today, it is the use of digital technology that facilitates coordination and control and the transformations experienced in this context. As a central role explicitly developed for digital transformation, CDO can therefore coordinate between these existing functions (Firk, Hanelt, Oehmichen, & Wolff, 2021).

When the health organization is mentioned in the country, the first organizational structure that comes to mind is the regulatory organizational structures related to the ministry and its affiliates, non-governmental organizations NGOs. The first issue that draws attention in the health system at the country level is the creation of health policies. NGOs provide complementary support while the relevant ministries of the countries create general policies. The relevant ministry of the countries protects public health by creating a vision of health and general policies in this context. NGOs support the creation of regulatory measures by identifying deficiencies in their official policies. Information systems in health services accelerate access to correct information and service, and provide coordination between institutions (Aslan & Güzel, 2020).

One of the most important arguments the ministry can use in today's conditions is technology, especially digitalization. In particular, the efforts of governments to create a health system that supports the use of digital technologies should support the development of the digital health system, and in this context, the vision of equitable service provision, which covers the whole society, places digital technologies at the center of the health system (Mete, 2021). Digitalization prepares society for the future by facilitating the determination and implementation of issues that affect the health of the whole society, especially those related to protecting public health. The health sector is also preparing for a transformation and the approaching new age with the rapid integration of digital technologies (Semiz, 2022). Opportunities that arise with digitalization are translated into practice on time. CDOs have a key responsibility for the digital technology strategy and activities (Singha, Klarnerb & Hessa, 2020). The top manager to manage the opportunities provided by digital transformation is CDO. CDO develops a digital strategy, and organizes its digital transformation (Rakovic, Maric, Milutinovic, Sakal & Antic, 2022).

3.3.2. Digitalization and CDO in Healthcare Organizational Structures

When it comes to organization that provides health services, the first thing that comes to mind is hospitals. The prominent feature of modern hospitals is their maximum use of technology, especially digital technology. There are proofs that information technology is part of the new services developed within the healthcare industry, as there are proofs that the use of information technology leads to services that increase patients' participation in service production. (Crisani, 2022). Health services benefit from digital transformation to increase efficiency and service quality (Aslan & Güzel, 2020, 1642). Digital transformation has been initiated in management and clinical processes in the field of health (Akalin & Veranyurt, 2020). Health organizations use technology in hospitals in two ways. In line with current developments in the health sector, it can be said that a patient-oriented and digital health ecosystem has begun to be created with the latest technologies (Semiz, 2022). When it comes to organization that provides health services, the first thing that comes to mind is hospitals. The prominent feature of modern hospitals is their maximum use of technology, especially digital technology. There are proofs that information technology is part of the new services developed within the healthcare industry, as there are proofs that the use of information technology leads to services that increase patients' participation in service production. (Crisani, 2022). Health services benefit from digital transformation to increase efficiency and service quality (Aslan & Güzel, 2020). Digital transformation has been initiated in management and clinical processes in the field of health (Akalin & Veranyurt, 2020). Health organizations use technology in hospitals in two ways. In line with current developments in the health sector, it can

be said that a patient-oriented and digital health ecosystem has begun to be created with the latest technologies (Semiz, 2022).

The primary task of CDO healthcare businesses in their digital transactions is digital transformation and in this context, the determination and implementation of the strategy. The top management teams (TMT) priority task is determining and implementing the strategy. In particular, the TMT is key to laying the foundation for digital innovation due to its responsibilities in recognizing digital innovation's strategic potentials, articulating its strategic relevance, and allocating resources (Firk, Gehrke, Hanelt & Wolff, 2022). CDO will know digital technologies that will be used both in diagnosis and treatment and in the management of health services, and will create strategies for their holistic use in TMT. The implementation of the identified strategies increases the management quality of the system as well as the effective execution of individual health processes. According to Akalın and Veranyurt (2020); using digital technology and artificial intelligence in health service processes reduces administrative and clinical costs, accelerates processes such as diagnosis, diagnosis and treatment in clinical processes, and increases service quality by reducing human interaction.

3.3.3. Digitalization and CDO in Healthcare Practices at Individual Dimension

One of the transformations created by digitalization in the health system is health practices at the individual level. The individual practices in question are realized together with global health organizations in the managerial dimension. CDO also manages individual-sized digital applications. Digitalization in the health system has made it easier for people to benefit from the system. Depending on the development of technology, Rapid people's use of the health system has accelerated, and its effectiveness has increased.

Rapid developments in technology, especially in digital technology, have made it easier for people to access health services. The increase in the effectiveness of digital technology in the field of health has accelerated the transition from the traditional health system to the modern health system. In particular, digital consultation, tele-medicine, remote treatment, and mobile health applications that will help improve health services have begun to replace the traditional health system (Şimşir, Mete, 2021, 34). Even more importantly, the spread of digital technologies and the chance to be used by large populations have increased the use of protective and preventive health practices. In more advanced applications, daily exercises and personalized programs can be offered (Akalın, Veranyurt, 2020, 136). Thus, the opportunities of individuals to benefit from health services will increase and the provision of health services will be homogenized.

Digital health applications allow people to benefit from health services outside of health institutions. Mobile health applications (m-Health) have the power to digitize medical care to a large extent, thanks to their ubiquity and ease of use (Mete, 2021). According to Akalın, Veranyurt (2020); using artificial intelligence in medical devices, sensors can measure individuals' instantaneous heart rate, blood pressure, calories burned, steps taken, etc., and helps them stay healthy. Smartphones are already integrated with special devices to make certain laboratory methods available at home or in health care centers for the diagnosis of infectious diseases as a practical healthcare tool (Mete, 2021). In addition, the information collected from the patients can be used for improvement in many areas later (Aslan & Güzel, 2020). Thanks to database applications, one of the applications made thanks to digital technology, the quality

of health services of individuals increases. Thanks to the health database of the doctors, it is important for patients to access the treatments they have seen before and the drugs they have used in terms of effective and correct treatment (Yücel, Aytekin, Ayaz & Tüminçin, 2018). The top manager who will plan and organize all these digital developments is CDO. The person who will manage the digital transformation that will create all these developments is CDO. CDOs have become a critical factor in digital transformation, as well as change agents are in organizational changes more generally (Lorentzen et al., 2022).

Table 1. Digitalization and CDO applications in health systems

Health Organization		Health Applications	Digitization and CDO
Digitalization and CDO in Global and Nationwide Health Organizations	Global health organizations	Effective use of technology for the effective use of the network between the global central health organization and local/country health organizations	To manage technological developments and especially digital transformation in a proper way, - To carry out the administrative activities and especially the coordination between the central organizations and regional organizations in a healthy way.
	Nationwide health organizations	Establishment of country health policies and compliance with technology	- It follows the digital changes and transformations and determines the compatible vision, strategy and policies. - Uses digital technologies to protect public health.
Digitalization and CDO in Healthcare Organizational Structures	Hospital etc. health organizations	Creating and implementing strategies for the technical and managerial use of technological developments to be used in healthcare organizations	- To follow the technological developments used in new diagnoses and treatments, - To determine the effects of digital innovations on the managerial dimension of health organizations, - To identify strategies for the use of digital developments in both dimensions in a holistic way and to determine the principles of application.

Digitalization and CDO in Individual-level Health Applications	Health practices at the individual level	Applications that will enable the individual health system to benefit from the developments in digital technology	<ul style="list-style-type: none"> - Implementing practices that will make it easier for people to benefit from the health system - To determine the principles of the use of protective and preventive health practices of individuals, - To create databases of individuals and enable their implementation in the health system.
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4. Conclusion

Health and human is concepts that cannot be considered separately. Health practices and organizations are necessary in order to sustain life smoothly. Health care, which was tried to be protected with extremely simple methods at the beginning, has been diversified and detailed depending on the development of technology. One of the points that technology has reached recently is digital technology. Digital technology has also caused serious changes in the health sector.

It is a strategic issue to ensure that digitalization, which has entered our lives in such a comprehensive way, and the transformation caused by it are carried out in a healthy way. Strategic issues can only be achieved by senior management teams, and expert managers. Various managers work in senior management teams according to their functions. The management of digital transformation, which has emerged in recent years and affects organizations at a strategic level, has led to the emergence of a new top manager position. CDO is the top manager responsible for the strategic execution of the digital transformation.

One of the areas where digitalization effectively used is the health sector and its applications. The dimensions of the change and transformation created by digitalization in the health sector are global and national health organizations, organizational structures that provide health services and the systems they use, and individual health practices. . Expert senior managers are needed in order to carry out digital applications in all these dimensions in a healthy way. CDO plans, organizes and executes the strategic digital transformation of healthcare organizations and individuals. CDO determines the policies and visions within this scope and determines the principles of implementation.

CDO, which has just started to take place in the senior management teams of organizational structures, will also occur in health organizations. The interest in digitalization and especially CDO, which has not yet taken place in the literature of health organizations, will increase in the future. Our study will increase the interest in CDO responsible for digital transformation in health organizations and will start filling the literature gap. In the next period, a nalytical studies may be started as the number of CDOs in the senior management teams of health organizations increases.

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