

## DEVELOPMENT OF HEALTH INFRASTRUCTURE IN TURKEY BETWEEN 2000-2020

**Lect. Metehan YAYKAŞLI**

metehanya@akdeniz.edu.tr

*Akdeniz University, Turkey*

### INTRODUCTION

The word patient means "a person whose physical or mental health is impaired due to illness, accident or injury and needs to be treated", and hospital means "health institution where inpatient or outpatient diagnosis, treatment and care services are provided by physicians, nurses and other health workers". While the understanding of health and medicine, which was previously recorded in the person of doctors, appears in mythology and the ancient world, it is possible to come across health gods or deified doctors, which are also based on individuals (Gürel and Akşit, 2018).

In pre-Islamic Turkish medicine, similarly, patients were treated with magical medicine by means of people who were called "kam" or "shaman" and who were attributed with holiness, and then with herbal and other methods applied by people who took the name "otacı" or "atasagun". The understanding of health and medicine, which evolved into an institutional understanding during the Great Seljuk period, reached facilities such as darüşşifas and nursing homes. He got into medical faculties at the beginning. This wave of development continued until higher education and the establishment of the Ministry of Health in the Republican years (Gurel and Özşenler, 2019).

In addition to the policy of institutional structuring and gathering health institutions under one roof, which is still implemented under the name of "Health Transformation Program" in the Health Policies Center after 2003, among its objectives, special attention should be paid to maternal and child health, family medicine and preventive medicine practice, in areas where there is a shortage of health personnel. There is an uninterrupted development process with the fulfillment of the need and the initiation of the e-transformation work in health in parallel with the developments in technology (saglık.gov.tr).

Among the main outputs of the Health Transformation Program is that the results of the applications provide an improvement not only for the service providers but also for the service recipients. Patients who have gained rights such as patient satisfaction, patient safety and choosing a physician have the opportunity to receive service in a more comfortable atmosphere. The right to health, which is among the 2 generation rights among the human rights, which is counted among the social rights and is categorized as 3 generations, is included in the 56th article of the Turkish Constitution: "Everyone has the

right to live in a healthy and balanced environment. It is the duty of the State and citizens to improve the environment, protect environmental health and prevent environmental pollution. In the article that started with the provision of "The State is to ensure that everyone lives their lives in a physical and mental health; It organizes health institutions to plan and provide services from a single source in order to realize cooperation by increasing savings and efficiency in human and material power." He assured it. Again, in the continuation of the same article, it has undertaken the duty of supervision of all institutions, whether public or private. With the "General Health Insurance" facility for those with financial difficulties or low income, it is aimed that no one will be left without service (anayasa.gen.tr/1982).

Patient Rights, which started to be studied in the 1970s in the USA, became official with the declaration of the Lisbon Declaration by the World Medical Association in 1981. After it was enacted in Finland in 1993, the Amsterdam and 1995 Lisbon Declarations took place in Europe in 1994 and in parallel with these developments, the "Patient Rights Regulation" was issued in 1998, and it found a response in our country. The principles governing this regulation are: the principle of respect for the right to a healthy life, the principle of protecting material and spiritual existence, the principle of treating patients equally, the principle of seeking the consent of the patient, the principle that the patient cannot be subjected to medical research without his consent, and the principles of privacy and confidentiality of private life (Aydın, 2008).

In the Patient Rights Regulation, there are all headings from the right to benefit from health services to obtaining information about the state of health, from performing the medical intervention with the consent of the patient to protecting the health of the patient in medical research (Aydın, 2008).

In short, the health sector in Turkey, in accordance with the developments in history, started from the benefit provided by the person, and has developed to the structure that provides services in the facilities called hospitals. In recent years, the activation and continuity of quality and control processes at all levels has been ensured by legally securing the rights of the service recipient.

The dimensions of the Human Development Index (HDI) include knowledge and decent living standards, as well as a long and healthy life criterion. This scale, which is accepted as an indicator of humane living, was proposed by Pakistani economist Mahbub ul Haq in 1990. It has been prepared as a report annually since 1993 by the United Nations, since it will show to what extent the country's economy affects the quality of life, as well as measuring the level of development of the country ([wikipedia.org/wiki/İnsani\\_Gelişme\\_Endeksi](http://wikipedia.org/wiki/İnsani_Gelişme_Endeksi)).

In order to keep it out of date over the years, the index has left the calculation of average life expectancy and purchasing power in USD since 2010 and started calculating on the

basis of national income with life expectancy at birth and purchasing power par. It is still calculated by taking the geometric average of the life expectancy index, education index and income index values after the regulation in 2010 ([wikipedia.org/wiki/İnsani\\_Gelişme\\_Endeksi](https://tr.wikipedia.org/wiki/İnsani_Gelişme_Endeksi)).

The Human Life Index value, which was 0.653 in 2000, reached 0.737 in 2010. Life expectancy has increased from 64.3 to 77.7 years, the expected education period has increased from 8.9 to 16.6 years, and the average education period has reached 0.82 in 2019, with an increase from 4.5 to 8.1 years.

With the G value per capita increasing from 12514 dollars to 27701 dollars, it ranked 54th among 182 countries in 2020, as stated in the United Nations 2020 Report. Considering that Turkey was ranked 85th among 174 countries in 2000, it is seen that the increase in the index is also reflected in the ranking (Bulut, Babacan and Ertekin, 2021).

There are economists who explain the reason for the limited effect of the increase in the numerical increase on the ranking among the countries with the increase in the number of countries measured and the negative effects of the fluctuations in the economy, as well as the authors who state that this explanation is insufficient, that human development cannot be measured by human welfare (Tıraş, 2019).

Ultimately, whether it is in the name of human welfare or human development, the health of women and children, which affects the life expectancy in both cases, and the quality and dimensions of service in the health sector affect the result. In addition, the values obtained in the index calculated as life expectancy or life expectancy in both types of calculations before and after 2010 show the importance of the development in the health sector and the improvement in the services provided, because the results obtained directly affect the index.

In this study, although the ranking of human development among countries has not been directly studied, the development issue in the Turkish Health Sector, which affects the ranking, in the period of 2000-2020 has been examined on a provincial basis. Gray Relational Analysis method, which is one of the Multi-Criteria Decision Making methods, was used for the analysis.

In the study, firstly, the basic health indicators obtained from the Turkish Statistical Institute (TUIK) database; The values of the total number of physicians per thousand people, the number of hospitals, the number of hospital beds, and the total number of hospital beds per hundred thousand people were used. These obtained values are weighted by the Entropy method. Then, the development in the Turkish Health Sector was evaluated between 2006 and 2019 and according to weighted criteria, since the components in the data in 2005 and before were different.

**Entropy Method:**

The entropy method was proposed by Rudolf Clausius in 1965 and has been widely used in applications in the fields of science and engineering. In fact, entropy, which is a measure of uncertainty, is used to detect useful information in the data stack (Wu and Sun, 2011). Fighting poverty (Chen, 2015), quality of life evaluation (Ömürbek, Eren et al., 2017), service quality evaluation in airline companies (Bakır and Atalık, 2018), personnel selection (Ulutaş, 2019), performance analysis of public banks (Ural, Demireli et al., 2017), measurement of R&D performance in EU countries (Çakır and Perçin, 2013), analysis of the performance of deposit banks (Ayçin and Orçun, 2019), and performance measurement of insurance companies (Perçin and Sonmez, 2018) is widely used in social sciences as well as in research.

**There are five stages in these methods:**

- The first stage decision matrix is normalized according to the benefit and cost indices,
- In the second stage,  $P_{ij}$  is calculated with normalization, so problems arising from different measurements are solved,
- In the third step, the  $E_j$  value is calculated using normalized  $P_{ij}$  values.
- In the fourth stage, DJ uncertainty is calculated,
- At the last stage, the application of the method is completed by calculating the  $w_j$  weights as the importance degree of the  $j$  criterion (Wu and Sun, 2011).

**Weighting of Criteria by Entropy Method**

Basic Health Indicators for the years 2006 and 2019 (Total number of physicians per thousand people, Number of Hospitals, Number of Hospital beds, Total number of hospital beds per hundred thousand people) were weighted with the entropy method. The criteria weights obtained with the values of 2006 are as given in Table 1.

*Table 1: Weighting of Basic Health Indicators for 2006*

	<b>Total number of physicians per thousand people</b>	<b>Number of Hospitals</b>	<b>Number of hospital beds</b>	<b>per hundred thousand people total number of hospital beds</b>	<b>Total</b>
<b>EJ</b>	-0,030659297	-0,05380407	-0,065205296	-0,030773339	4,18044
<b>DJ</b>	1,030659297	1,05380407	1,065205296	1,030773339	
<b>Wi</b>	0,24654314	0,252079581	0,254806859	0,24657042	1

The criteria weights obtained with the values for 2019 are as given in Table 2.

Table 2: Weighting of Basic Health Indicators for 2019

	Total number of physicians per thousand people	Number of Hospitals	Number of hospital beds	per hundred thousand people total number of hospital beds	Total
EJ	-0,03022	-0,05148	-0,0618	-0,02942	4,17297
DJ	1,030220	1,051486	1,06183	1,029425	
Wi	0,246879	0,251975	0,25445	0,246689	1

### Gray Relational Analysis Method:

Gray systems theory was proposed by Julong Deng in 1982 with the article "The Control Problems of Gray Systems" and is widely used as a multi-criteria decision making model. This method; determination of the optimum tool holder (Yılmaz and Güngör, 2010), optimum tire selection (Kökçam, Uygun et al., 2018), financial performance evaluation (Güleç and Özkan, 2018), examination of the financial status of tourism companies (Ecer and Günay, 2014), BIST' Evaluation of the financial performance of companies in the field of informatics and technology registered with the Internet (Tayyar, Akcanlı et al., 2014), selection of suppliers in the automotive sector (Özdemir and Deste, 2009), selection of the most suitable automobile (Şişman and Eleren, 2013), the highest net worth in Turkey It is used as an application in different subjects such as the financial performance of 20 companies with sales revenue (Günay, Karadeniz et al., 2018) and performance measurement of companies traded in the stock market (Bektaş and Tuna, 2013). The reason for its widespread use is that it can offer a solution for the decision with the available information even in cases where there is incomplete or uncertain information. The essence of this method is that it can be easily and practically adapted to any problem by symbolizing unknown information as black, partially known information as gray and known information as white (Kökçam, Uygun et al., 2018). In Table 3, the normalization process is indicated primarily in the method application.



Table 3: Evaluation of 2006 with Gray Relational Analysis Method

Normalization					Gray Relational				
Referans	1,00	1,00	1,00	1,00	Referans	1,00	1,00	1,00	1,00
Adana	0,00	0,11	0,17	0,42	Adana	0,00	0,11	0,17	0,42
Adiyaman	0,00	0,03	0,02	0,12	Adiyaman	0,00	0,03	0,02	0,12
Afyonkarahisar	0,00	0,10	0,07	0,51	Afyonkarahisar	0,00	0,10	0,07	0,51
Ağrı	0,00	0,05	0,02	0,12	Ağrı	0,00	0,05	0,02	0,12
Amasya	0,00	0,03	0,03	0,59	Amasya	0,00	0,03	0,03	0,59
Ankara	1,00	0,34	0,64	0,81	Ankara	1,00	0,34	0,64	0,81
Antalya	0,33	0,16	0,13	0,35	Antalya	0,33	0,16	0,13	0,35
Artvin	0,00	0,04	0,01	0,55	Artvin	0,00	0,04	0,01	0,55
Aydın	0,33	0,07	0,07	0,36	Aydın	0,33	0,07	0,07	0,36
Balıkesir	0,00	0,12	0,10	0,48	Balıkesir	0,00	0,12	0,10	0,48
Bilecik	0,00	0,02	0,01	0,17	Bilecik	0,00	0,02	0,01	0,17
Bingöl	0,00	0,02	0,02	0,37	Bingöl	0,00	0,02	0,02	0,37
Bitlis	0,00	0,04	0,01	0,20	Bitlis	0,00	0,04	0,01	0,20
Bolu	0,33	0,04	0,02	0,53	Bolu	0,33	0,04	0,02	0,53
Burdur	0,00	0,03	0,02	0,49	Burdur	0,00	0,03	0,02	0,49
Bursa	0,00	0,15	0,21	0,43	Bursa	0,00	0,15	0,21	0,43
Çanakkale	0,00	0,06	0,04	0,50	Çanakkale	0,00	0,06	0,04	0,50
Çankırı	0,00	0,04	0,01	0,36	Çankırı	0,00	0,04	0,01	0,36
Çorum	0,00	0,08	0,05	0,52	Çorum	0,00	0,08	0,05	0,52
Denizli	0,33	0,09	0,06	0,30	Denizli	0,33	0,09	0,06	0,30
Diyarbakır	0,00	0,08	0,11	0,39	Diyarbakır	0,00	0,08	0,11	0,39
Edirne	0,33	0,04	0,05	0,82	Edirne	0,33	0,04	0,05	0,82
Elazığ	0,33	0,06	0,09	1,00	Elazığ	0,33	0,06	0,09	1,00
Erzincan	0,00	0,05	0,02	0,68	Erzincan	0,00	0,05	0,02	0,68
Erzurum	0,33	0,06	0,11	0,76	Erzurum	0,33	0,06	0,11	0,76
Eskişehir	0,33	0,05	0,10	0,81	Eskişehir	0,33	0,05	0,10	0,81
Gaziantep	0,00	0,06	0,09	0,24	Gaziantep	0,00	0,06	0,09	0,24
Giresun	0,00	0,06	0,04	0,56	Giresun	0,00	0,06	0,04	0,56
Gümüşhane	0,00	0,02	0,01	0,42	Gümüşhane	0,00	0,02	0,01	0,42
Hakkari	0,00	0,02	0,01	0,13	Hakkari	0,00	0,02	0,01	0,13
Hatay	0,00	0,08	0,06	0,15	Hatay	0,00	0,08	0,06	0,15
Isparta	0,33	0,07	0,06	0,92	Isparta	0,33	0,07	0,06	0,92
Mersin	0,00	0,09	0,10	0,29	Mersin	0,00	0,09	0,10	0,29
İstanbul	0,33	1,00	1,00	0,39	İstanbul	0,33	1,00	1,00	0,39
İzmir	0,33	0,23	0,37	0,51	İzmir	0,33	0,23	0,37	0,51
Kars	0,00	0,02	0,01	0,24	Kars	0,00	0,02	0,01	0,24
Kastamonu	0,00	0,08	0,04	0,66	Kastamonu	0,00	0,08	0,04	0,66
Kayseri	0,00	0,09	0,09	0,40	Kayseri	0,00	0,09	0,09	0,40
Kırklareli	0,00	0,03	0,02	0,33	Kırklareli	0,00	0,03	0,02	0,33
Kırşehir	0,00	0,03	0,01	0,25	Kırşehir	0,00	0,03	0,01	0,25
Kocaeli	0,00	0,10	0,09	0,29	Kocaeli	0,00	0,10	0,09	0,29
Konya	0,00	0,17	0,15	0,37	Konya	0,00	0,17	0,15	0,37
Kütahya	0,00	0,05	0,05	0,45	Kütahya	0,00	0,05	0,05	0,45
Malatya	0,00	0,08	0,07	0,48	Malatya	0,00	0,08	0,07	0,48
Manisa	0,00	0,12	0,11	0,43	Manisa	0,00	0,12	0,11	0,43
Kahramanmaraş	0,00	0,06	0,05	0,18	Kahramanmaraş	0,00	0,06	0,05	0,18
Mardin	0,00	0,03	0,01	0,00	Mardin	0,00	0,03	0,01	0,00
Muğla	0,00	0,09	0,05	0,30	Muğla	0,00	0,09	0,05	0,30
Muş	0,00	0,03	0,02	0,20	Muş	0,00	0,03	0,02	0,20
Nevşehir	0,00	0,03	0,01	0,16	Nevşehir	0,00	0,03	0,01	0,16
Niğde	0,00	0,04	0,02	0,26	Niğde	0,00	0,04	0,02	0,26
Ordu	0,00	0,07	0,05	0,35	Ordu	0,00	0,07	0,05	0,35
Rize	0,00	0,03	0,02	0,45	Rize	0,00	0,03	0,02	0,45
Sakarya	0,00	0,07	0,04	0,21	Sakarya	0,00	0,07	0,04	0,21
Samsun	0,33	0,10	0,12	0,53	Samsun	0,33	0,10	0,12	0,53
Silirt	0,00	0,03	0,01	0,10	Silirt	0,00	0,03	0,01	0,10
Sinop	0,00	0,03	0,02	0,53	Sinop	0,00	0,03	0,02	0,53
Sivas	0,33	0,08	0,07	0,58	Sivas	0,33	0,08	0,07	0,58
Tekirdağ	0,00	0,07	0,06	0,40	Tekirdağ	0,00	0,07	0,06	0,40
Tokat	0,00	0,06	0,05	0,43	Tokat	0,00	0,06	0,05	0,43
Trabzon	0,33	0,07	0,09	0,68	Trabzon	0,33	0,07	0,09	0,68
Tunceli	0,00	0,00	0,00	0,15	Tunceli	0,00	0,00	0,00	0,15
Şanlıurfa	0,00	0,07	0,04	0,07	Şanlıurfa	0,00	0,07	0,04	0,07
Uşak	0,00	0,03	0,03	0,49	Uşak	0,00	0,03	0,03	0,49
Van	0,00	0,07	0,06	0,26	Van	0,00	0,07	0,06	0,26
Yozgat	0,00	0,06	0,03	0,27	Yozgat	0,00	0,06	0,03	0,27
Zonguldak	0,00	0,04	0,05	0,46	Zonguldak	0,00	0,04	0,05	0,46
Aksaray	0,00	0,05	0,02	0,24	Aksaray	0,00	0,05	0,02	0,24
Bayburt	0,00	0,00	0,00	0,29	Bayburt	0,00	0,00	0,00	0,29
Karaman	0,00	0,02	0,01	0,31	Karaman	0,00	0,02	0,01	0,31
Kırkkale	0,33	0,02	0,03	0,57	Kırkkale	0,33	0,02	0,03	0,57
Batman	0,00	0,04	0,01	0,07	Batman	0,00	0,04	0,01	0,07
Şırnak	0,00	0,03	0,01	0,01	Şırnak	0,00	0,03	0,01	0,01
Bartın	0,00	0,02	0,01	0,37	Bartın	0,00	0,02	0,01	0,37
Ardahan	0,00	0,02	0,01	0,40	Ardahan	0,00	0,02	0,01	0,40
Iğdır	0,00	0,02	0,01	0,18	Iğdır	0,00	0,02	0,01	0,18
Yalova	0,00	0,01	0,00	0,17	Yalova	0,00	0,01	0,00	0,17
Karabük	0,00	0,03	0,02	0,64	Karabük	0,00	0,03	0,02	0,64
Kilis	0,00	0,00	0,00	0,12	Kilis	0,00	0,00	0,00	0,12
Osmaniye	0,00	0,03	0,02	0,20	Osmaniye	0,00	0,03	0,02	0,20
Düzce	0,33	0,02	0,01	0,23	Düzce	0,33	0,02	0,01	0,23

The ranking on the basis of provinces in 2006 was realized as in the table below. Istanbul is in the first place. (Table 4)

Table 4: Ranking of Provinces for 2006 by Basic Health Criteria

il	k1	k2	k3	k4	Ortalama	Sıralama
İstanbul	0,1057	0,2521	0,2548	0,1108	0,1808	1
Ankara	0,2465	0,1088	0,1475	0,1783	0,1703	2
Elazığ	0,1057	0,0875	0,0904	0,2466	0,1325	3
Isparta	0,1057	0,0879	0,0888	0,2112	0,1234	4
Eskişehir	0,1057	0,0869	0,0911	0,1788	0,1156	5
Edirne	0,1057	0,0863	0,0882	0,1811	0,1153	6
Erzurum	0,1057	0,0875	0,0914	0,1671	0,1129	7
İzmir	0,1057	0,0993	0,1125	0,1247	0,1105	8
Trabzon	0,1057	0,0882	0,0903	0,1509	0,1088	9
Sivas	0,1057	0,0885	0,0889	0,1336	0,1042	10
Samsun	0,1057	0,0901	0,0925	0,1272	0,1039	11
Kırıkkale	0,1057	0,0852	0,0865	0,1333	0,1027	12
Erzincan	0,0822	0,0869	0,0863	0,1509	0,1016	13
Kastamonu	0,0822	0,0888	0,0873	0,1473	0,1014	14
Bolu	0,1057	0,0860	0,0863	0,1275	0,1014	15
Antalya	0,1057	0,0941	0,0929	0,1076	0,1001	16
Karabük	0,0822	0,0858	0,0862	0,1431	0,0993	17
Aydın	0,1057	0,0879	0,0890	0,1083	0,0977	18
Amasya	0,0822	0,0858	0,0869	0,1352	0,0975	19
Bursa	0,0822	0,0931	0,0985	0,1149	0,0972	20
Giresun	0,0822	0,0875	0,0873	0,1314	0,0971	21
Denizli	0,1057	0,0891	0,0883	0,1031	0,0965	22
Balıkesir	0,0822	0,0914	0,0912	0,1209	0,0964	23
Afyonkarahis	0,0822	0,0897	0,0889	0,1247	0,0964	24
Çorum	0,0822	0,0885	0,0880	0,1261	0,0962	25
Artvin	0,0822	0,0860	0,0857	0,1296	0,0959	26
Adana	0,0822	0,0904	0,0956	0,1140	0,0955	27
Sinop	0,0822	0,0855	0,0859	0,1275	0,0953	28
Malatya	0,0822	0,0885	0,0888	0,1214	0,0952	29
Konya	0,0822	0,0948	0,0943	0,1091	0,0951	30
Manisa	0,0822	0,0910	0,0918	0,1152	0,0950	31
Çanakkale	0,0822	0,0875	0,0874	0,1230	0,0950	32
Uşak	0,0822	0,0858	0,0866	0,1219	0,0941	33
Burdur	0,0822	0,0855	0,0861	0,1222	0,0940	34
Zonguldak	0,0822	0,0863	0,0881	0,1183	0,0937	35
Kütahya	0,0822	0,0866	0,0879	0,1178	0,0936	36
Kayseri	0,0822	0,0894	0,0905	0,1124	0,0936	37
Düzce	0,1057	0,0849	0,0858	0,0970	0,0933	38
Diyarbakır	0,0822	0,0885	0,0918	0,1106	0,0933	39
Tokat	0,0822	0,0875	0,0879	0,1147	0,0931	40



il	k1	k2	k3	k4	Ortalama Sıralama	
Rize	0,0822	0,0855	0,0864	0,1173	0,0928	41
Tekirdağ	0,0822	0,0882	0,0882	0,1122	0,0927	42
Gümüşhane	0,0822	0,0852	0,0854	0,1140	0,0917	43
Kocaeli	0,0822	0,0901	0,0904	0,1021	0,0912	44
Ordu	0,0822	0,0879	0,0879	0,1068	0,0912	45
Ardahan	0,0822	0,0849	0,0853	0,1122	0,0911	46
Mersin	0,0822	0,0891	0,0911	0,1020	0,0911	47
Bingöl	0,0822	0,0849	0,0859	0,1095	0,0906	48
Çankırı	0,0822	0,0860	0,0855	0,1085	0,0905	49
Muğla	0,0822	0,0891	0,0877	0,1031	0,0905	50
Bartın	0,0822	0,0849	0,0855	0,1091	0,0904	51
Kırklareli	0,0822	0,0858	0,0861	0,1054	0,0899	52
Gaziantep	0,0822	0,0875	0,0901	0,0982	0,0895	53
Van	0,0822	0,0879	0,0882	0,0991	0,0893	54
Karaman	0,0822	0,0849	0,0856	0,1038	0,0891	55
Yozgat	0,0822	0,0872	0,0865	0,1001	0,0890	56
Sakarya	0,0822	0,0882	0,0873	0,0957	0,0883	57
Bayburt	0,0822	0,0840	0,0850	0,1020	0,0883	58
Niğde	0,0822	0,0860	0,0859	0,0991	0,0883	59
Aksaray	0,0822	0,0869	0,0859	0,0975	0,0881	60
Kırşehir	0,0822	0,0855	0,0855	0,0989	0,0880	61
Kars	0,0822	0,0852	0,0858	0,0979	0,0877	62
Hatay	0,0822	0,0888	0,0884	0,0916	0,0877	63
Kahramanmaraş	0,0822	0,0872	0,0876	0,0936	0,0877	64
Bitlis	0,0822	0,0863	0,0857	0,0952	0,0874	65
Osmaniye	0,0822	0,0858	0,0861	0,0945	0,0871	66
Muş	0,0822	0,0855	0,0859	0,0947	0,0871	67
Iğdır	0,0822	0,0849	0,0852	0,0936	0,0865	68
Nevşehir	0,0822	0,0855	0,0855	0,0919	0,0863	69
Bilecik	0,0822	0,0849	0,0853	0,0925	0,0862	70
Yalova	0,0822	0,0843	0,0852	0,0928	0,0861	71
Ağrı	0,0822	0,0866	0,0859	0,0893	0,0860	72
Şanlıurfa	0,0822	0,0879	0,0875	0,0861	0,0859	73
Adıyaman	0,0822	0,0858	0,0861	0,0893	0,0858	74
Hakkari	0,0822	0,0849	0,0853	0,0900	0,0856	75
Tunceli	0,0822	0,0840	0,0849	0,0912	0,0856	76
Siirt	0,0822	0,0855	0,0853	0,0879	0,0852	77
Kilis	0,0822	0,0840	0,0850	0,0891	0,0851	78
Batman	0,0822	0,0860	0,0856	0,0860	0,0849	79
Şırnak	0,0822	0,0855	0,0853	0,0829	0,0840	80
Mardin	0,0822	0,0855	0,0856	0,0822	0,0839	81

When we examine the ranking results, Ankara comes right after Istanbul. It is seen that these two provinces are ranked with very close values. If we evaluate this situation together with the details of Turkey's two largest provinces and the clustering of investments and educated manpower, it can be stated that the result is as expected. Although the provinces of Elazığ, Isparta and Eskişehir, which follow immediately, are ranked with values close



to each other, it should be noted that Ankara province is 28.5% larger than Elazığ and there is a significant difference between them. In addition, Batman, Şırnak and Mardin are in the last three places in the ranking.

### Evaluation of 2019 with Gray Relational Analysis Method

In 2019, the ranking on the basis of provinces was realized as in the table below. It is seen that Istanbul, which is in the first place, maintains its place. (Table 5)

Table 5: Ranking of Provinces for 2019 by Basic Health Criteria

il	k1	k2	k3	k4	Ortalama Sıralama	
İstanbul	0,1234	0,2520	0,2545	0,1091	0,1847	1
Edirne	0,2469	0,0865	0,0874	0,2062	0,1567	2
Isparta	0,2469	0,0875	0,0875	0,1944	0,1541	3
Ankara	0,2469	0,1096	0,1239	0,1339	0,1536	4
İzmir	0,2469	0,1010	0,1059	0,1138	0,1419	5
Elazığ	0,1234	0,0865	0,0890	0,2467	0,1364	6
Erzurum	0,1234	0,0896	0,0900	0,2126	0,1289	7
Bolu	0,1234	0,0865	0,0867	0,2010	0,1244	8
Kırıkkale	0,1234	0,0855	0,0864	0,1861	0,1203	9
Sivas	0,1234	0,0888	0,0884	0,1660	0,1167	10
Trabzon	0,1234	0,0891	0,0894	0,1599	0,1154	11
Eskişehir	0,1234	0,0875	0,0898	0,1568	0,1144	12
Samsun	0,1234	0,0904	0,0921	0,1431	0,1123	13
Konya	0,1234	0,0960	0,0967	0,1328	0,1122	14
Zonguldak	0,1234	0,0867	0,0879	0,1485	0,1116	15
Malatya	0,1234	0,0883	0,0889	0,1444	0,1113	16
Tokat	0,1234	0,0875	0,0879	0,1436	0,1106	17
Adana	0,1234	0,0921	0,0958	0,1255	0,1092	18
Giresun	0,1234	0,0880	0,0869	0,1370	0,1088	19
Manisa	0,1234	0,0913	0,0917	0,1285	0,1087	20
Antalya	0,1234	0,0967	0,0963	0,1177	0,1085	21
Kayseri	0,1234	0,0907	0,0915	0,1275	0,1083	22
Denizli	0,1234	0,0896	0,0894	0,1235	0,1065	23
Bursa	0,1234	0,0951	0,0975	0,1096	0,1064	24
Rize	0,1234	0,0865	0,0862	0,1281	0,1061	25
Çorum	0,1234	0,0877	0,0870	0,1232	0,1053	26
Çanakkale	0,1234	0,0872	0,0870	0,1229	0,1051	27
Afyonkarahı	0,1234	0,0893	0,0878	0,1195	0,1050	28
Yozgat	0,1234	0,0877	0,0864	0,1210	0,1047	29
Aydın	0,1234	0,0899	0,0892	0,1152	0,1044	30
Diyarbakır	0,1234	0,0907	0,0918	0,1114	0,1043	31
Balıkesir	0,1234	0,0902	0,0895	0,1114	0,1036	32
Mersin	0,1234	0,0907	0,0918	0,1084	0,1036	33
Kocaeli	0,1234	0,0910	0,0914	0,1023	0,1021	34
Kahramanm	0,1234	0,0883	0,0889	0,1074	0,1020	35
Karabük	0,1234	0,0852	0,0856	0,1132	0,1019	36
Kars	0,1234	0,0857	0,0857	0,1086	0,1009	37
Muğla	0,1234	0,0891	0,0876	0,0975	0,0994	38
Erzincan	0,1234	0,0862	0,0854	0,1017	0,0992	39
Yalova	0,1234	0,0855	0,0855	0,1015	0,0990	40

il	k1	k2	k3	k4	Ortalama Sıralama	
Kilis	0,1234	0,0842	0,0851	0,1006	0,0983	41
Sakarya	0,1234	0,0885	0,0874	0,0933	0,0982	42
Ardahan	0,1234	0,0845	0,0849	0,0987	0,0979	43
Düzce	0,1234	0,0857	0,0857	0,0959	0,0977	44
Artvin	0,1234	0,0857	0,0851	0,0959	0,0975	45
Gaziantep	0,0823	0,0918	0,0943	0,1204	0,0972	46
Tunceli	0,1234	0,0852	0,0848	0,0914	0,0962	47
Uşak	0,0823	0,0857	0,0864	0,1302	0,0961	48
Kütahya	0,0823	0,0870	0,0873	0,1278	0,0961	49
Ordu	0,0823	0,0880	0,0878	0,1183	0,0941	50
Kastamonu	0,0823	0,0883	0,0861	0,1157	0,0931	51
Hatay	0,0823	0,0902	0,0909	0,1081	0,0929	52
Bitlis	0,0823	0,0857	0,0860	0,1149	0,0922	53
Van	0,0823	0,0872	0,0890	0,1101	0,0922	54
Tekirdağ	0,0823	0,0885	0,0886	0,1086	0,0920	55
Burdur	0,0823	0,0860	0,0857	0,1138	0,0919	56
Sinop	0,0823	0,0855	0,0854	0,1106	0,0909	57
Siirt	0,0823	0,0860	0,0858	0,1086	0,0907	58
Kırklareli	0,0823	0,0862	0,0859	0,1067	0,0903	59
Bingöl	0,0823	0,0857	0,0856	0,1067	0,0901	60
Amasya	0,0823	0,0855	0,0858	0,1055	0,0898	61
Niğde	0,0823	0,0857	0,0859	0,1050	0,0897	62
Osmaniye	0,0823	0,0862	0,0864	0,1039	0,0897	63
Çankırı	0,0823	0,0860	0,0853	0,1034	0,0892	64
Karaman	0,0823	0,0855	0,0854	0,1030	0,0890	65
Nevşehir	0,0823	0,0862	0,0856	0,1017	0,0889	66
Şanlıurfa	0,0823	0,0885	0,0905	0,0941	0,0889	67
Batman	0,0823	0,0867	0,0865	0,0991	0,0887	68
Adıyaman	0,0823	0,0867	0,0865	0,0987	0,0886	69
Bayburt	0,0823	0,0840	0,0849	0,1030	0,0885	70
Bartın	0,0823	0,0845	0,0852	0,0991	0,0878	71
Aksaray	0,0823	0,0862	0,0858	0,0956	0,0875	72
Gümüşhane	0,0823	0,0852	0,0851	0,0954	0,0870	73
Kırşehir	0,0823	0,0850	0,0853	0,0944	0,0867	74
Muş	0,0823	0,0855	0,0857	0,0933	0,0867	75
Mardin	0,0823	0,0867	0,0867	0,0905	0,0865	76
Ağrı	0,0823	0,0862	0,0858	0,0891	0,0859	77
Bilecik	0,0823	0,0857	0,0851	0,0873	0,0851	78
Iğdır	0,0823	0,0847	0,0850	0,0880	0,0850	79
Hakkari	0,0823	0,0847	0,0852	0,0862	0,0846	80
Şırnak	0,0823	0,0855	0,0855	0,0822	0,0839	81

While the provinces of Edirne, which is in the second place, Isparta, which is in the third place, and Ankara, which is in the fourth place, have very close values to each other, there is a 8.2% difference between them and İzmir, which is the fifth runner-up. The last three places are Iğdır, Hakkari and Şırnak.

### Comparison of 2006-2019 Rankings

The comparison of the ranking obtained for the year 2006 with the ranking obtained for the year 2019 and the arranged table of developments or regressions in the ranking are below. (Table 6)

Table 6: Comparison of 2006-2019 Rankings

Pozitif Gelişme				Negatif Gelişme			
İl	2006	2019	Değişim	İl	2006	2019	Değişim
Kilis	78	41	37	Denizli	22	23	-1
Yalova	71	40	31	Çorum	25	26	-1
Kahramanmaraş	64	35	29	Şırnak	80	81	-1
Tunceli	76	47	29	Ankara	2	4	-2
Yozgat	56	29	27	Trabzon	9	11	-2
Kars	62	37	25	Samsun	11	13	-2
Tokat	40	17	23	Elazığ	3	6	-3
Zonguldak	35	15	20	Niğde	59	62	-3
Siirt	77	58	19	Bursa	20	24	-4
Konya	30	14	16	Afyonkarahisar	24	28	-4
Rize	41	25	16	Antalya	16	21	-5
Kayseri	37	22	15	Ordu	45	50	-5
Sakarya	57	42	15	Ağrı	72	77	-5
Mersin	47	33	14	Hakkari	75	80	-5
Malatya	29	16	13	Düzce	38	44	-6
Muğla	50	38	12	Eskişehir	5	12	-7
Bitlis	65	53	12	Kırklareli	52	59	-7
Manisa	31	20	11	Muş	67	75	-8
Hatay	63	52	11	Bilecik	70	78	-8
Batman	79	68	11	Balıkesir	23	32	-9
Kocaeli	44	34	10	Karaman	55	65	-10
Adana	27	18	9	Iğdır	68	79	-11
Diyarbakır	39	31	8	Aydın	18	30	-12
Bolu	15	8	7	Bingöl	48	60	-12
Gaziantep	53	46	7	Bayburt	58	70	-12
Şanlıurfa	73	67	6	Aksaray	60	72	-12
Çanakkale	32	27	5	Kütahya	36	49	-13
Adıyaman	74	69	5	Tekirdağ	42	55	-13
Mardin	81	76	5	Kırşehir	61	74	-13
Edirne	6	2	4	Uşak	33	48	-15
İzmir	8	5	3	Çankırı	49	64	-15
Kırkkale	12	9	3	Karabük	17	36	-19
Ardahan	46	43	3	Artvin	26	45	-19
Osmaniye	66	63	3	Bartın	51	71	-20
Nevşehir	69	66	3	Burdur	34	56	-22
Giresun	21	19	2	Erzincan	13	39	-26
Isparta	4	3	1	Sinop	28	57	-29
				Gümüşhane	43	73	-30
				Kastamonu	14	51	-37
				Amasya	19	61	-42

The highest progress in the ranking was realized in Kilis (37 rows up), Yalova (31 rows up), Kahramanmaraş and Tunceli (29 rows up), respectively. It was observed that the first six provinces with the highest positive development were not among the first 50 provinces in the 2006 ranking.

The provinces that regressed the most in the ranking are in the Black Sea Region. These provinces are Amasya (42 rows behind), Kastamonu (37 rows behind), Gümüşhane (30 rows behind), Sinop (29 rows behind), respectively. It has been observed that these provinces are among the first 30 provinces in the 2006 ranking, excluding Gümüşhane (43) provinces.

Although not shown in the positive development and negative development table, there are four provinces whose order has not changed. It can be said that Istanbul, which is among these provinces, has put forward a very successful performance as it is in the first place by preserving both its order and weight value. Again, it should be noted that Erzurum, which held its seventh place between 2006 and 2019, and Sivas, which maintained its tenth place, were also successful, although they were not clearly included in the results table, because they were among the top ten in both years. When the findings are evaluated, the Human Development Index calculates the welfare and development level of the countries according to the criteria and ranks the countries, and in a sense gives homework to the countries to live in a decent way. For this purpose, it not only records the years lived, but also provides projections for the future, enabling countries to focus their attention on deficiencies. As a matter of fact, the fact that projections until 2025 were presented in the report published in 2010 shows this (Şeker, 2011, p.22).

Working using the same projection, the Ministry of Development works with its own national policies and sets national projections by setting further targets. The projections of the Ministry include more advanced targets than the United Nations projections (Şeker, 2011, p.22). According to the ranking obtained in 2020, Turkey's 54th place, advancing five places compared to the previous year, is a result of this. Under the heading of health policy and practices, which is one of the factors that increase the "average life expectancy" criterion in this index and taken from TUIK data (basic health indicators; Total number of physicians per thousand people, Number of hospitals, Number of hospital beds, Per hundred thousand people) Ranking was made between provinces using entropy and gray relational analysis using values (total number of hospital beds). It is important to create an infrastructure in order to prepare better projections by increasing the actions and practices carried out in provinces with positive results and giving positive results, by abandoning or improving the applications made in provinces with negative development and giving negative results.

It will not be the final numerical goal of this study, as it will come first and last in each ranking. As underlined in the quality standards and patient safety issues, better health care and better living conditions will be provided at the end of the continuous learning and improvement process. This will ultimately pave the way for our country to move up its current 54th place in the Human Development Index.



## CONCLUSION

Many indicators and approaches are used to show the development performance of countries. For example, we can show GSYİH, per capita national income or purchasing power parity, welfare level, cross-country comparative indicators approach, sectoral distribution of employment approach, quality of life index and human development index as examples. While some of them are purely economic, the scope of others is broad. The last two examples are among the most widely used. We have to find our last two examples more meaningful than the others, as it will not be sufficient to measure the development of countries only with monetary assets. As a matter of fact, when we look at the content of the quality of life index developed by Morris D. Morris, it will be seen that two of the 3 basic criteria (life expectancy, infant mortality rate, literacy rate) are directly related to health.

In the human development index, the scope is slightly wider, and these are; In this study, it was aimed to measure the development performance of the countries based on the per capita income, life expectancy and education parameters according to the purchasing power parity. Here again, since the life expectancy variable is directly related to health, it is understood that health is indispensable as one of the most comprehensive indicators.

With this aspect, the area of interest of this study gains a strategic dimension. It is understood that health is one of the priority areas in order to gain superiority and competitive advantage in comparisons between countries.

Apart from the stated strategic dimension of this study, there were different findings.

*1-* The success achieved on a country basis in a certain period is to achieve a level that will provide superiority to many countries.

*2-* In order to carry this success to higher levels, it is possible to make a significant contribution to the current success by transforming the negative indicators on the basis of provinces into positive ones by developing appropriate policies.

*3-* It is the fact that the health parameter is a variable with the greatest effect and coefficient power in all related indices.

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