BUSINESS FOR GOALS

ANALYSIS OF CORRELATION BETWEEN SUSTAINABLE DEVELOPMENT GOALS AND SECTORAL DATA (SDGS)

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Contents

Preface

Dear Stakeholders,

Achieving sustainable development, which is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”, continues to be one of the priorities on the agenda of all the countries due to climate change, human-induced environmental problems, and increasing inequalities. Accordingly, the United Nations adopted a 2030 Agenda in 2015 and thus, by determining 17 Sustainable Development Goals, aimed to achieve a sustainable development in line with the goals and their targets for the years between 2015 and 2030.

The Business for Goals Platform was founded in 2019 under the leadership of United Nations Development Program, TÜRKONFED and TÜSİAD in order to increase the contribution of business world in the realization of the SDGs and thus, to support Turkey in approaching the objective of sustainable development. As the Business for Goals Platform, we continue to work in order to strengthen the indispensable role of the private sector in making development sustainable and to increase its contribution.

Each of the Sustainable Development Goals provides a comprehensive framework which addresses every aspect of economic and social activities by mentioning the indispensable sub-elements of development. In this comprehensive framework, as each Sustainable Development Goal is related to each other, each goal has its own subject and requirements, which makes it necessary to take action on each goal. We believe that grasping the areas and sectors for which these requirements are more central, will encourage to achieve and to be a guide for the goals. Thus, we conducted a study ‘Correlation Analysis Between Sustainable Development Goals and Sectoral Data’ by examining the correlation between SDGs and different sectors, including their employees, aiming to pave the way for the necessary steps.

In the present study, which reveals the situation of different sectors in terms of sustainable development, public official sectoral data were examined and the correlation between the SDG indicators and sectoral data was analyzed. Hereby, we aim to light the way for the preparation of sectoral policies by determining the sectors to be more addressed for each SDG specific to Turkey. This study is a step for evaluating economic, social and environmental dimensions of the growth of different sectors in Turkey and raising awareness for the indicators of Sustainable Development Goals of the institutions and organizations within the context of different sectors.

As there are vulnerable social groups, this study reveals the presence of more vulnerable sectors within the context of Turkey. Thus, taking the necessary steps in the areas where the study draws attention will both ensure the use of sectoral data for Sustainable Development Goals and facilitate the achievement of the targets by activating the comprehensive Sustainable Development Goals in more specific areas. We wish that the determination of development priorities on a sectoral basis will shed light on all the policies of public institutions, non-governmental organizations, and private sector including employees, in order to make the development sustainable.

Ümit Boyner
President of the Business for Goals Platform

1.
Importance of SDG and Sectoral Correlation and Justification of the Study

Twentieth-century development policies have evolved in three dimensions i.e. “Regional”, “Sectoral”, and “Segmental” in the policy practices of states and development policies have been applied as a combination of these 3 dimensions. The policy maker carries out a 3-dimensional prioritization in the process of achieving the development goals and related targets, and this prioritization emerges as a combination of political preferences and the sustainability principles.

On the other hand, the current sustainable development phenomenon is based on the understanding that the development optimization carried out by individual countries cannot ensure the sustainability of the globe as a result of the widespread phenomenon of globalization. Twenty first century development phenomenon determines the common ground in the economic and social development objectives of the countries as “sustainability”. It is not possible to reduce today’s development phenomenon to only environmental consciousness or to strong relationships between environment and socioeconomic development. There is a need for a sustainable development policy that is designed on a global scale ensuring the integrity and stability of the globe with all its components, and as a matter of course, this policy set have a common understanding that connects all countries.

The most recent and inclusive development regarding “sustainable development”, that has been the subject of numerous activities carried out by the United Nations (UN) in the last 50 years, is the “2030 Agenda for Sustainable Development” that was accepted by the General Assembly of the United Nations on September 25, 2015. 2030 Agenda is a comprehensive action plan that includes the goals and targets to be followed for the well-living of people all over the world and the tools necessary to reach such goals and targets for 15 years covering the period between 2016 and 2030. The Sustainable Development 2030 Agenda was accepted at the United Nations Sustainable Development Summit held on September 25, 2015 and in this context, 17 main goals (Sustainable Development Goals- SDG) and 169 targets were determined in order to achieve these goals. A global indicator set consisting of 232 indicators is formed in order to observe the level of achievement for the Sustainable Development Goals and the targets.

The fact that 21st century development policies consider the global scale and observe the principles of sustainability does not actually change the classification of theoretical development policies in practice but requires the adaptation of the development tools into the principles of sustainability.

This study aims to analyze the correlation of the Sustainable Development Goals announced by the UN in 2015 with the sectoral policies, which are inevitable elements of development policies.

In the literature, there are few studies examining the correlation of sectoral information with SDG. Among them, two studies come to the forefront in terms of their inclusion: The first one is the study **"SDG Sectors Road Map"** belonging to the "The World Business Council for Sustainable Development (WBCSD) institution. (https://docs.wbcsd.org/2018/04/SDG_roadmap%20Guidelines.pdf).

Other one is the **"SDG Industry Matrix"** (https://home.kpmg/xx/en/home/about/our-role-in-the-world/citizenship/sdgindustrymatrix.html) study conducted by KPMG. In both studies, the role that the sectors will play in the realization of the SDG targets within the scope of company policies were examined and recommendations were made via the company policy choices.

SDGS study was developed to examine the potential correlation between SDGs and sectoral indicators of the countries which are based on similar international classifications and declared regularly to public in sectoral basis.

This study differs from the studies available in the literature by two aspects:

1- SDGS study uses standardized national sector data and thus allows to realize the aforesaid analysis on a country basis and for comparison.

2- SDGS study will aid the analysis of the compliance of *sectoral resource allocation choices* of the said country with the SDG policies.

Instinctively, SDGS study tries to examine the sector-SDG correlation via the SDG indicators or the indicators that are proxies for such indicators. Although 232 indicators explained within the scope of SDGs are tried to be produced by the country administrations, all SDG indicators are not produced by such administrations. However, country administrations produce data for more indicators or develop proxy data for some of the indicators under the guidance of the official statistical institutions of the countries in order to produce such indicators every day. Integration of SDGs into national programs is important in order to achieve the SDG targets, thus, the matters such as the production, quality, and timeliness of the SDG indicators may confront us as the most critical factor in terms of the success of the SDG initiative. This situation is also of special importance for the SDGS study because the SDGS study aims to determine the sectoral projections of the said indicators and associate them with the development policies.

Besides the general problems related to the production of indicators in terms of the countries, it is an important issue that how many of the indicators can be determined on sectoral basis and the SDGS study will provide a sectoral perspective to the indicator production policies on a national basis that may also implicitly elucidate regarding this area.

In the Turkey example that forms a basis for this study, governments have taken remarkable steps in the integration of SDG and relevant indicators into national agenda and have preferred to actualize and observe SDGs and the indicators, by integrating them in the Development Plans and sectoral strategies via a holistic approach, as a policy approach. In this context, the distribution of responsibilities of the sustainable development indicators according to the national institutions was considered and 215 indicators were studied. "Sustainable Development Indicators 2010-2017 Bulletin" is published in February 2019. 71 of the 83 indicators in this bulletin are identical indicators calculated with the same methodology as the global indicators, and the proxy indicator, which is available at national level, is suitable to follow the relevant target and can be used in place of the global indicator regarding the 12 indicators. It is specified that 83 indicators (36 percent) are publishable as a result of the complication of current indicators at Turkish Statistical Institution (TURKSTAT) and other institutions and then, the evaluation of these indicators by considering statistical quality criteria (consistency, reliability, comparability, timeliness etc.).

Of 83 indicators that are published by the Bulletin, 47 are produced by TURKSTAT, 36 by other national data producers within the scope of the Official Statistics Program. Regarding 132 indicators that are not produced, 38 are under the responsibility of TURKSTAT and 94 under other national data producers within the scope of the Official Statistics Program. When examined in terms of the published indicators, it can be seen that the institution producing maximum data except TURKSTAT is the Ministry of Health with 8 indicators. In this study, as the SDG-sectoral correlation is being established in case the indicators published by Turkey are available as sectoral, they are elaborated to be used as prioritized.

The study is conducted over the Turkey example. Section II consists of the method and data sets and constraints of the study and Section III includes the development and interpretation of each SDG and the entire SDG aggregated matrix. Section IV, also the last section, makes a comparison between the "backward linkage" order of prioritization via the sectoral prioritization of the study by benefiting from the Input-Output table and "backward linkage" characteristic that has an importance in terms of the development policies.

2.
Method, Scope and Data Sets

The method used in this study provides the correlation of SDG indicators with the official data that are gathered by sectors. There is a numerical projection of the relevant SDG indicators within the sectoral data collected. When this projection is determined, the sectors can be listed according to the SDG indicators, furthermore, the vectors obtained for each SDG can be reduced to a single sectoral development priority vector via some of the optimization methods. This section provides the method used in the study, in detail.

At this step, it is required to highlight an important constraint. For some of the SDGs, either there is no information at the sectoral level or some of the SDGs are significant for governments and international institutions but not for companies and households in terms of its content. No sectoral analysis could be conducted for such SDGs.

It is obvious that 6 among 17 SDGs are not suitable for sectoral analysis. These goals are as follows: SDG 11: Sustainable Cities and Communities; SDG 13: Climate Action, SDG 14: Life Below Water, SDG 15: Life On Land, SDG 16: Peace, Justice and Strong Institutions, SDG 17: Partnerships for the Goals.

Another constraint is caused by the compilation of sectoral information used in the study via the “working class”, and although this is not a compelling constraint in terms of development goals, the results to be obtained in the study should not be extended to the whole population.

According to the NACE rev.2 classification, “segment”-level of information (18, branches of activity defined with alphabetical letters from A to U) is present for SDG 11 that includes information at the sectoral level. Only for SDG 5, “section”-level information is present according to the NACE rev.2 classification (88, two-digit branch of activity from 01 to 99). In the report, both are briefly named “sectors” in line with the economics literature. In fact, there are 21 sectors in the “segment” level according to NACE rev.2 classification.

These sectors are as follows:

A	Agriculture, Forestry and Fishery
B	Mining and Quarrying
C	Manufacturing
D	Production and Distribution of Electricity, Gas, Steam and Air Conditioning
E	Water Supply; Sewerage System, Waste Management, and Improvement Activities
F	Construction
G	Wholesale and Retail Trade; Reparation of Motor Vehicles and Motorcycles
H	Transportation and Storage
I	Accommodation and Food Service Activities
J	Information and Communication
K	Finance and Insurance Activities
L	Real Estate Activities
M	Occupational, Scientific and Technical Activities
N	Administrative and Support Service Activities
O	Public Administration and Defence; Mandatory Social Security
P	Education
Q	Human Health and Social Service Activities
R	Culture, Art, Entertainment, Recreation and Sports
S	Other Service Activities
T	Activities of the Households as Employers
U	Activities of International Organizations and Agencies

In fact, different statistics published by TURKSTAT consist of different number of sectors. While GDP data consists of 20 sectors via the production and income method (Sector U is empty because of no data). Income and Living Conditions Survey (ILCS) consists of 18 sectors (D and E, S and T and U are combined). Since ILCS data is used to derive the indicators of SDG 7 (SDG No. 1, 2, 3, 6, 7, 9 and 10), analysis was compulsorily conducted over 18 sectors and all data sets taken as a basis in the study were analyzed by aggregating according to this sector classification. On the other hand, depending on the availability of the indicators, below mentioned method for some of the SDGs (1, 4, 5, 8, 9 and 10) were also realized for 88-sector classification and submitted in the Annex of the study. The method is explicitly described below with examples.

In the first stage, for each SDG, maximum of three indicators are selected and the sectors are classified according to these indicators. There may sometimes be a positive and sometimes a negative correlation between the selected indicators and economic development. As an example, while "1.2.1 Proportion of population living below the national poverty line according to gender and age" in the Sustainable Development Indicators (SDG) has a negative correlation with economic development, "4.1.2 Completion rate (primary education, lower secondary education, upper secondary education)" has a positive correlation with economic development. As the sectors are being ranked in terms of consistency, attention will be paid to the fact that the sector in the first place is the sector having the most negative situation in terms of development goals. If this is applied to the above examples, the sectors will be ranked in descending order according to the poverty indicator. Thus, the sector in the first place will be the one having the highest poverty. On the other hand, sectors will be ranked in ascending order in terms of completion rates thus, the first sector is the one having the lowest completion rate. In this manner, the sector ranking to be made specific for each indicator will be a kind of prioritization

ranking in order to achieve the development goals. Let's summarize our approach with a simple example. Assume that there are only 5 sectors instead of 18 in order to simplify the example: A, B, C, D, E. For the fifth SDG, let's list the sectors for each of the below-mentioned three indicators:

i. Indicator 1: Gender wage difference among the employees between 25 and 54 years old. Since this wage difference has a negative correlation with economic development, sectors will be ranked in the descending order. Assume that the ranking is as follows: B, D, C, A, E.

ii. Indicator 2: Rate of female among managers. Since this rate has a positive correlation with economic development, sectors will be ranked in the ascending order. Assume that the ranking is as follows: B, A, E, C, D.

iii. Indicator 3: Gender difference in terms of the time spent on unpaid housework Since this difference has a negative correlation with economic development, sectors will be ranked in the descending order. Assume that the ranking is as follows: A, C, B, D, E.

Such information is summarized in Table 1. Sectoral ranking is given for each indicator.

Table 1. Sectoral ranking on the basis of indicators

Rank	Indicator 1	Indicator 2	Indicator 3
1	B	B	A
2	D	A	C
3	C	E	B
4	A	C	D
5	E	D	E

> It will be a priority for the selected indicators to be included in 232 indicator sets determined to achieve the Sustainable Development Goals and targets. (UN, 2020)

However, in case this is not possible due to the constraints of the data obtained, other variables that are compatible with the development goals and targets will be used. As an example, "Gender wage difference among the employees between 25 and 54 years old" does not take place in the list of indicators specified for the fifth SDG "Achieve gender equality and empower all women and girls". Despite, this indicator can be preferred because the indicator is compatible with the "5.1 End all forms of discrimination against all women and girls everywhere" target.

In the second stage a single sector order will be obtained for each development goal by taking the average of 3 indicators (weighed) that are derived for each SDG in the first stage.

Table 2. Obtaining the average order from the sectoral ranking on the basis of indicators

Sector	Indicator 1	Indicator 2	Indicator 3	Average order
A	4	2	1	2.33
B	1	1	3	1.67
C	3	4	2	3.00
D	2	5	4	3.67
E	5	3	5	4.33

While Table 1 ranks the sectors for each indicator, Table 2 shows which sector takes place in which rank for different indicators. Our focus is the way of change of the ranking of the sectors between the indicators. While determining the average rank of sector A, simple average of its rank in each indicator will be taken. Average rank of sector A will be 2.33 (Because it is 4th in Indicator 1, 2nd in indicator 2 and 1st in indicator 3; the average is (4+2+1)/3=2.33). Similarly, average rank will be 1.67 for sector B, 3.00 for sector C, 3.67 for sector D, and 4.33 for sector E. Thus, sectoral ranking for the fifth SDG will be B, A, C, D, and E.

In the third stage, the purpose is to obtain a final sector ranking considering the rankings obtained for each SDG. At the end of the second stage, a different ranking can be obtained for each SDG having sectoral level data. For 11-12 goals, 11-12 different sector ranking can be obtained when it is assumed that the sectors can be ranked from the data obtained. However, a further and meaningful objective in terms of the development policies is to reduce such different rankings to a final one. For now, let's assume that a final sectoral ranking can somehow be obtained from such different rankings. How should this final ranking be interpreted? In the first stage, it is stated that the sector in the first place would be the sector in the worst situation in terms of development goals. From this point of view, the final sector ranking can be interpreted as the "distance to the universal ideal". The final ranking will represent the rank of the prioritized sectors that must be intervened to achieve the goal.

So how can a final ranking be obtained from the ranking obtained for 11 different goals? Use of the weight of each sector in employment or added value cannot be a solution because the ranking obtained for 11 different development goals by weighing the sectors cannot be reduced to a single ranking. Instead, a final ranking can be obtained by taking the weighted average of the rankings by giving a specific weight to each goal. However, it will not be possible to determine the weight because there is no ranking among the goals. In social sciences, one of the most preferred methods is "*Principal Component Analysis*". Via this approach, the size of a (multidimensional) matrix consisting of many variables can be reduced and another matrix consisting of few variables (only one vector in this example) can be obtained. The purpose of principal component analysis is to minimize the loss of data by internally determining the weight to be given to each dimension (in this study, each SDG) (using optimization techniques) (see Jolliffe, 2002).

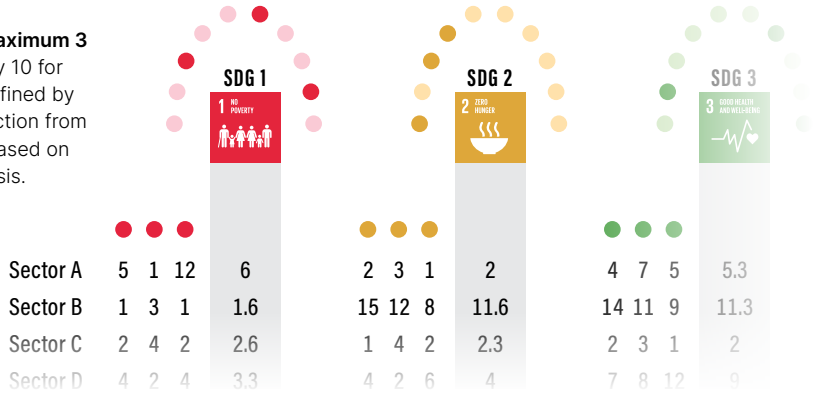
SDGS methodology

1

For each SDG a number of **maximum 3 indicators** from approximately 10 for each SDG (232 in total) as defined by the UN, is selected. The selection from the SDG indicators is made based on detectability on a sectoral basis.

2

The selected indicators for each SDG are **sorted** according to the sectoral data. (For instance, 'rate of female managers' is the most negative in agriculture sector while it is the most positive in banking & finance. In this sense, agriculture will be sorted as the first, while finance & banking are the last.)



3

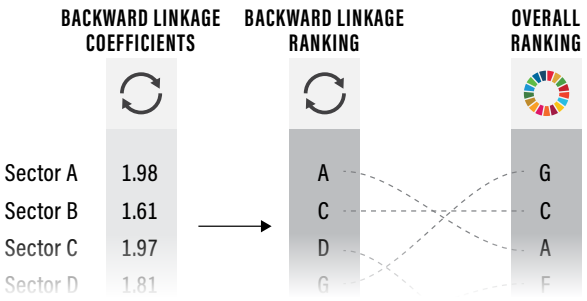
An **average ranking** of the indicators which were chosen for each SDG is calculated. In this way, for each SDG, a **sectoral importance/priority order** is provided.

4

As now each one of SDGs has a sectoral order, would it be possible to obtain a single and optimal alignment for all SDGs? Yes. The **Principal Component Analysis** is used in order to reach this aim and **a sectoral alignment for all SDGs is obtained.**

5

How could the sectoral alignment which was assessed according to the importance for the SDGs, be located regarding the total backward linkage coefficients obtained from the Input/Output tables? For answering this question, **sectoral Input/Output table is used to sort total backward linkage coefficients and compared with final alignment of SDGs.**



The final ranking obtained by Principal Component Analysis can be used as the order of priority that needs to be intervened by the policy makers.

In the fourth stage, (Section IV) it will be examined whether the prioritized sectors are "key" sectors according to the input-output analysis in terms of development goals. Key sectors are the sectors having strong backward and forward linkages and they have the priority of investment. In the present study, prioritized sectors specified within the scope of development goals (on the basis of SDG) are compared with the prioritized sectors determined by the input-output analysis.

DATA SOURCES

Data sources used in the study are as follows:

- Annual Industry and Service Statistics (AISS): AISS data compiled by TURKSTAT are submitted to the users in two ways. New AISS data consist of the period between 2009 and 2017 and derived from the administrative data of Turkish Revenue Administration. Previous AISS data are based on data that are directly obtained by TURKSTAT from the companies. Previous AISS data consists of a representative sample selected among all the companies having 20 or more employees and companies having less than 20 employees (approximately 150 thousand companies). New AISS data consists of all the companies in Turkey (approximately 3 millions of companies). Both data use NACE Rev. 2 activity classification. Activity classification is detailed: 615 activities at 4-digit level take place. Despite the new AISS data is superior in terms of the number of companies included, the previous AISS data is more prosperous regarding the information provided to the user. New AISS data includes turnover, number of employees, added value, personnel costs, intermediate consumption, number of employees (paid and total), and the production value. In addition to the same information, previous AISS data also provides detailed information about the investments, depreciation, details of expense and income items, foreign trade, and foreign capital. Thus, as we will use the previous AISS data where we will use the variables such as turnover, labour productivity, and wages, and we will use the new AISS data while using the variables such as investments. Both data does not consist of the agriculture, finance and insurance, public administration, and defence sectors.

- Household Labour Force Survey (HLFS): Cross-sectional data compiled by TURKSTAT consists of the period between 2004 and 2018. Various indicators related to the labour market consists of (employment situation, job search, wage, sector, occupation, education, information working etc.). Activity classification used in HLFS is detailed enough: 88 sectors at 2-digit level take place.

- Income and Living Conditions Survey (ILCS): This survey, including information about income distribution and living conditions, is based on data collected on-site by TURKSTAT. Data collected includes information at the household and individual level. Household identity number and individual and household data can be combined. They are submitted to the users as cross-sectional and panel data. ILCS is presented to the users for the period between 2006 and

2018. Activity classification used in ILCS relatively consists of less details, there are only 18 sectors at 1-digit. ILCS data provides detailed information about the below mentioned titles:

- Residence
- Economical status
- Social exclusion
- Real estate ownership
- Education
- Demographics
- Health status
- Labour status
- Income status

3.
Creation of a Correlation Matrix Between Sustainable Development Goals (SDGs) and the Sectors and Consequences

While the prioritized sectors are being determined in terms of development, a four-stage approach has been adopted as explained in Section II. In the first stage, insofar as data permit for each SDG, maximum three indicators were selected, and sectors for each indicator were ranked according to development priority. Regarding the reflection of the development priority of the rankings, the ranking will be ascending for the indicators showing a positive correlation with economic development (as the first sector will have priority in development), and for the indicators showing a negative correlation with economic development, the ranking will be descending (as the first sector will have priority in development). In this manner, the sector ranking to be made specific for each indicator can be interpreted as to be a kind of prioritization ranking in order to achieve the development goals.

If there is only one indicator for any SDG, the sector ranking in the indicator will also be the development priority. However, in case where there is more than one indicator, different rankings may be in question. In order to analyze this situation, in the second stage, an average ranking is found for each sector depending on the rankings in all the indicators used for the relevant SDG. This ranking should be interpreted as the average development priority of the sectors for the respective SDG.

In case the study was performed for a single SDG, the development priority of the sectors could be determined as explained above. Since this study is conducted for 11 SDGs, there are 11 different development priorities. Among these 11 different priority rankings, Principal Component Analysis was used in the third stage in order to obtain the final development ranking of the sectors. With this method, a final ranking can be obtained from 11 different rankings. The technique performed in the background calculates a weight for each ranking and expresses the final ranking as the weighted average of 11 ranks. Thus, the final ranking obtained by Principal Component Analysis can be used as "*the order of priority that needs to be intervened in terms of all SDGs*" by the policy makers.

Finally, in the fourth stage (Section IV), the ranking of the sectors obtained within the scope of the development goals is compared with the ranking of investment priority obtained from the input-output analysis.

Two points should be highlighted before explaining the indicators used and how they were obtained. At first, unless otherwise specified, all the indicators are derived from the most up-to-date data (2018). The average of the last two years is taken for some of the indicators. While the indicators are presented below, the ones that are averaged are clearly stated. Second point is related to the names of the sectors. Sector names have been shortened to facilitate the monitoring of the study.

The table below contains the short version on the left and the original version on the right:

Agriculture	01- Agriculture, Forestry and Fishery
Mining	02- Mining and Quarrying
Manufacturing	03- Manufacturing
Electricity and Water	04- Supply of Electricity, Gas, Steam, and Water, and Sewerage System
Construction	05- Construction
Wholesale and Retail	06- Wholesale and Retail Trade; Reparation of Motor Vehicles and Motorcycles
Transportation	07- Transportation and Storage
Accommodation	08- Accommodation and Food Service Activities
Information and Communication	09- Information and Communication
Finance	10- Finance and Insurance Activities
Real Estate	11- Real Estate Activities
Occupational, Scientific and Technical	12- Occupational, Scientific and Technical Activities
Administrative and Support Service	13- Administrative and Support Service Activities
Public	14- Public Management and Defence
Education	15- Education
Human Health	16- Human Health and Social Service Activities
Culture, Art	17- Culture, Art, Entertainment, Recreation and Sports
Other Service	18- Other Activities

STEP I:

Indicators selected for every SDG and sectoral scoring within the scope of the relevant indicators are presented in detail below.

1. No Poverty

a) Poverty rate: The poverty rate for each sector was calculated by using the equivalent individual income derived from the ILCS data. The definition of relative poverty, which is widely used in the literature, is preferred as the definition of poverty. Hence, at first, "equivalent household individual income" was calculated for each household by considering the number and age of the people in the household. Afterwards, median income from this equivalent individual was calculated for Turkey and people having an income that is less than 60 percent of the median income are considered as poor. The use of per capita income has a disadvantage: In addition to the individual consumption of households such as clothing, there are also common household expenses such as heating and lightening. There is a need to make a correction for such expenses that are independent of the number of people. OECD equivalence scale using coefficient of 1 for the first adult, "0,5" for individuals aged 14 and over and "0,3" for individuals under 14 years of age was employed to calculate equivalent individual income. If there are two adults and three children in the household, the total disposable income of the household is divided by 2.4 (1+0.5 +0.3+0.3+0.3) instead of 5 and equivalent income per individual is found.

b) Rate of informal employees among older and low-educated employees: Using the HLFS data, the rate of informal employees for each sector is directly derived for the said sections.

c) Rate of population living in households providing access to basic services: The rate of households with "housing and environmental problems" among the total households for each sector was obtained using the ILCS data. Household and environmental problems are as follows:

- Presence of a problem in the dwelling such as leaking roof, damp walls, rotten window frames
- Presence of a heating problem in the dwelling due to the isolation of the house
- Having dark rooms or rooms with insufficient light in the dwelling
- Noise problems in the dwelling caused by the neighbours or the street
- Insufficient usage area in the dwelling
- Air pollution, environmental pollution or other environmental problems caused by traffic or industry in the vicinity
- Dense cases with crime or violence in the vicinity

As can be seen in Table 1, while agriculture is the worst sector in terms of poverty and informal employment, the sector with the worst situation in terms of dwelling and environmental problems is the construction sector.

Table 1: Final indicators of poverty (SDG 1)

Sector	Rate of informal (%)	Rate of poverty (%)	Rate of dwelling-environmental problems (%)
Information and Communication	22.3	9.0	19.2
Other Service	59.7	20.4	23.9
Education	6.8	5.8	17.6
Electricity and Water	46.2	25.9	26.4
Finance	23.2	1.7	17.2
Real Estate	24.1	14.5	21.6
Administrative and Support Service	11.6	19.6	25.0
Manufacturing	24.0	16.9	25.1
Construction	39.7	37.1	27.1
Human Health	77.8	15.6	22.1
Public	10.9	8.5	18.8
Accommodation	39.1	21.3	24.0
Culture, Art	30.3	10.2	23.3
Mining	11.9	23.7	21.4
Occupational, Scientific and Technical	16.7	4.7	19.8
Agriculture	79.3	41.6	24.5
Wholesale and Retail	40.0	15.9	22.9
Transportation	33.1	21.8	25.5

2. Zero Hunger

a) General health status of the individual: In ILCS, the health status of the individual is his/her own statement and takes the values of "very good", "good", "moderate", "bad", and "very bad". For each sector, the rate of those declaring as "bad" and "very bad" among all the employees was calculated. A positive correlation is expected between this rate and hunger.

b) Whether the individual did not consult to a doctor despite the need for medical examination or treatment within the last 12 months: Another question in ILCS is to ask whether the individual could not go to the doctor although he/she needs. A positive correlation is expected between the rate of answering this question as "yes" and poverty.

c) Whether the dwelling has a heating system: Another question that is expected to be related to hunger is the rate of those declaring that there is no heating system in the dwelling among all the sector employees. This indicator also takes place in the ILCS data set.

When Table 2 is considered, it is seen that the rate of households without heating system is almost zero in all sectors. Since the differences are very small, it is necessary not to attribute too much meaning to the sectoral ranking in this indicator. While agriculture is the leading sector considering the general health status to be bad, the construction sector is in the worst situation in terms of the rate who cannot consult to a doctor.

Table 2: Final indicators of hunger (SDG 2)

Sector	Poor health rate (%)	Rate of those who do not consult to a doctor (%)	Rate of households with no heating system (%)
Information and Communication	2.8	7.4	0.3
Other Service	4.5	8.3	0.0
Education	1.6	5.2	0.0
Electricity and Water	5.1	8.9	0.0
Finance	0.7	4.5	0.0
Real Estate	5.0	5.3	0.0
Administrative and Support Service	3.5	8.2	0.0
Manufacturing	2.8	7.4	0.1
Construction	3.9	10.0	0.0
Human Health	5.3	6.0	0.0
Public	2.7	5.4	0.0
Accommodation	3.0	7.2	0.1
Culture, Art	3.6	7.7	0.0
Mining	2.6	7.5	0.0
Occupational, Scientific and Technical	0.8	7.0	0.0
Agriculture	9.4	8.0	0.1
Wholesale and Retail	2.6	7.6	0.0
Transportation	2.5	9.5	0.1

3. Good Health and Well-Being

a) Whether the individual has a chronic disease: By using the ILCS data, the rate of those having chronic diseases among all the employees for each sector was calculated.

b) Regular participation in leisure activities (by paying a fee) such as sports, movies, concerts: Via this question in the ILCS, the rate of people participating in cultural and artistic activities among all the employees for each sector was calculated.

c) Whether the individual could not apply to a dentist within the last 12 months despite the need: Via this question given in ILCS, it can be measured for each sector that to what extent people need to go to a dentist but cannot.

As agriculture is the leading sector in terms of the rate of chronic patients and those with no hobbies, the sector with the worst situation in terms of not being able to apply to a dentist is the real estate activities.

Table 3: Good health and well-being indicators (SDG 3)

Sector	Rate of chronic patients (%)	Rate of those who do not apply to a dentist (%)	Rate of those who do not have any hobbies (%)
Information and Communication	22.1	7.6	9.1
Other Service	29.8	7.3	37.2
Education	18.6	4.8	8.0
Electricity and Water	26.7	6.0	36.8
Finance	19.5	2.3	4.8
Real Estate	25.5	11.4	38.3
Administrative and Support Service	24.2	10.8	37.9
Manufacturing	22.8	7.6	27.7
Construction	23.3	8.6	44.9
Human Health	27.3	5.2	16.9
Public	20.6	5.0	10.7
Accommodation	22.8	8.3	32.1
Culture, Art	20.8	5.0	9.4
Mining	18.8	4.2	11.0
Occupational, Scientific and Technical	20.9	7.5	6.7
Agriculture	36.7	5.7	53.4
Wholesale and Retail	22.9	7.5	22.9
Transportation	24.1	9.3	33.0

4. Quality Education

a) Rate of undergraduates: Directly calculated from the HLFS data.

b) Parity indexes for undergraduates: This value is obtained by dividing the number of female undergraduates by the number of males. Directly calculated from the HLFS data.

c) Parity indexes for high school graduates: This value is obtained by dividing the number of female high school graduates by the number of males. Directly calculated from the HLFS data.

Since all the three indicators show a positive correlation with quality education, a high indicator value of any sector means a low priority of development.

Among the high school graduates and undergraduates, the sectors with the lowest female/male rate are mining, construction, and electricity and water. The sectors with the lowest rate of university graduation are agriculture, other service activities, accommodation, and food activities.

Table 4: Indicators of quality education (SDG 4)

Sector	Rate of female/ male (high school graduates)	Rate of undergraduates (%)	Rate of female/male (undergraduates)
Information and Communication	21.7	58.8	27.2
Other Service	41.0	5.8	46.0
Education	40.4	74.4	48.0
Electricity and Water	5.2	22.7	17.5
Finance	32.4	73.9	47.8
Real Estate	18.3	15.8	25.1
Administrative and Support Service	22.4	17.1	43.4
Manufacturing	18.3	13.6	26.9
Construction	6.4	10.9	16.4
Human Health	62.2	46.0	64.1
Public	12.4	60.1	22.2
Accommodation	19.7	10.6	31.2
Culture, Art	19.2	43.3	22.5
Mining	1.2	13.7	16.5
Occupational, Scientific and Technical	37.9	70.3	39.8
Agriculture	19.8	2.4	19.4
Wholesale and Retail	25.2	17.5	32.0
Transportation	8.6	15.8	26.3

5. Social Gender Equality

a) Rate of female in the positions of management. The rate of female among all the managers in the sector is calculated by using the occupational information in the HLFS data set.

b) The average value of the wage difference between male and female employees with the same education and age is calculated for each sector. For this calculation, a regression model, in which the logarithmic wages are the dependent variables and education, age, and gender are independent variables, is estimated for each sector. Coefficient of the gender variable provides the information required.

While the sectors with the lowest rate of female managers are agriculture, construction, and mining, the sectors with the highest wage difference by gender (to the detriment of women) are other service activities, human health, and agriculture sectors.

Table 5: Indicators of social gender equality (SDG 5)

Sector	Wage difference by gender (%)	Rate of female managers (%)
Information and Communication	-15.0	16.3
Other Service	-28.0	27.6
Education	-14.9	20.7
Electricity and Water	-9.4	13.5
Finance	-13.9	33.8
Real Estate	-12.4	12.7
Administrative and Support Service	-8.1	21.8
Manufacturing	-17.4	10.3
Construction	-16.6	4.3
Human Health	-27.5	40.0
Public	-13.4	10.6
Accommodation	-9.7	10.9
Culture, Art	-13.1	20.0
Mining	-13.6	7.3
Occupational, Scientific and Technical	-14.0	31.9
Agriculture	-26.4	2.5
Wholesale and Retail	-9.5	12.9
Transportation	-8.8	9.8

6. Clean Water and Sanitation

a) Presence of a piped water system in the dwelling

b) Presence of a bath and a shower place in the dwelling/building.

c) Presence of a water-closet in the dwelling/building.

Above-mentioned three indicators are obtained from the ILCS data set. As the rate of those giving positive answers to these questions in any sector decreases, the sector becomes prioritized in development.

Agriculture is the sector in the worst rank in all the three indicators of water and sanitation.

Table 6: Clean Water and Sanitation indicators (SDG 6)

Sector	Rate of households with no water system (%)	Rate of households with no bathroom (%)	Rate of households with no water-closets (%)
Information and Communication	0.0	0.0	0.0
Other Service	0.1	1.0	2.7
Education	0.0	0.0	0.3
Electricity and Water	0.9	1.2	5.1
Finance	0.0	0.0	0.0
Real Estate	0.0	0.0	0.0
Administrative and Support Service	0.1	0.5	1.8
Manufacturing	0.1	0.5	1.7
Construction	0.8	1.0	4.5
Human Health	0.9	0.4	1.6
Public	0.4	0.6	1.7
Accommodation	0.0	0.2	1.5
Culture, Art	0.0	0.0	1.0
Mining	0.0	1.3	3.6
Occupational, Scientific and Technical	0.0	0.0	0.2
Agriculture	1.9	3.9	14.2
Wholesale and Retail	0.1	0.3	1.2
Transportation	0.2	0.4	2.7

7. Affordable and Clean Energy

a) The fuel type that is most commonly used for heating in the dwelling. Via this question in the ILCS data set, the environmental pollution status of the fuel used in the heating system of the dwelling can be measured. List of possible answers are as follows:

1- Wood

2- Charcoal

3- Natural gas

4- Fuel-Oil

5- LPG (liquefied petroleum gas)

6- Electricity

7- Turf

8- Other

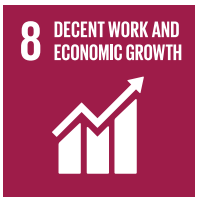
Assuming that the use of wood, charcoal, fuel-oil, and turf pollutes the environment more, the rate of the said fuels in each sector is calculated.

The leading sectors that pollute the environment due to the fuel used for heating mostly are agriculture, mining, and construction.

Table 7: Affordable and clean energy indicators (SDG 7)

Sector	Rate of households having a dirty heating system
Agriculture	93.7
Mining	67.7
Construction	52.0
Electricity and Water	44.7
Accommodation	39.2
Human Health	35.3
Other Service	35.3
Transportation	34.3
Wholesale and Retail	32.9
Administrative and Support Service	32.1
Manufacturing	31.7
Public	31.2
Culture, Art	30.1
Education	24.2
Real Estate	20.8
Occupational, Scientific and Technical	13.4
Finance	11.6
Information and Communication	10.6

8. Decent Work and Economic Growth



a) Rate of increase in labour productivity (average of the last two years). Labour productivity is measured as the gross domestic product per employee. Product information is obtained from national accounts and the number of employees from the HLFS data.

b) Rate of informal employees. This information is present in HLFS and average informal labour rate for each sector is directly calculated.

c) Average hourly wages. This information is also present in HFLS. Average hourly wages for each sector are calculated.

While the development priority of the sector is inversely proportional to labour productivity and hourly wages, it is directly proportional to informal employment.

Table 8: Decent Work and Economic Growth (SDG 8)

Sector	Hourly wage (2018 TL)	Rate of informal employees (%)	Rate of increase in labour productivity (%)
Information and Communication	19.3	9.7	12.3
Other Service	7.4	45.5	1.8
Education	19.1	2.7	2.6
Electricity and Water	13.7	27.2	-1.7
Finance	20.5	3.1	9.9
Real Estate	8.8	20.0	-7.7
Administrative and Support Service	10.1	5.8	9.9
Manufacturing	10.8	15.4	2.0
Construction	10.1	31.3	3.2
Human Health	14.5	27.6	-8.1
Public	19.9	2.4	-2.9
Accommodation	8.5	27.8	9.3
Culture, Art	14.4	13.6	-7.2
Mining	14.4	4.7	-1.2
Occupational, Scientific and Technical	19.3	7.8	2.7
Agriculture	7.2	78.1	3.4
Wholesale and Retail	9.6	22.4	3.4
Transportation	12.0	20.5	4.9

The sectors with lowest hourly wages are agriculture, other service activities, and accommodation, respectively, and the sectors with the worst situation in terms of informal labour are agriculture, other service activities, and construction.

Average labour force productivity increases are calculated by using the data of last two years because data of only one year may not reflect the general status. Accordingly, the sectors with the worst labour force productivity (descending productivity) are "human health and social service", "real estate", and "culture, art, entertainment, recreation and sports" activities.

9. Industry, Innovative, and Infrastructure

a) Share of the companies, having a number of employees between 1 and 49, within the sectoral employment: Directly derived from the HLFS data set for each sector.

b) Presence of internet by household: From the ILSC data, the rate of households having internet access is calculated for each sector.

c) Share of knowledge-based capital (software, patent etc.) investments within total investments: Using AISS, it is calculated to what extent the investments made for each sector are knowledge-based.

As the rate of households with internet access and the share of knowledge-based investments in a sector increases, it can be assumed that the relevant sector has less priority in development. However, as the share of the companies having 1-49 employees among the total employment increases, sector will become more prioritized. The reason is that as the share of the companies having 1-49 employees within sectoral employment increases, sector will be formed of smaller-scale companies. In academic literature, there is a positive correlation between the capacity to make innovations and the size of the company. Thus, it can be accepted that as the share of small-scale companies in a sector increases, the capacity of the sector making innovations decreases.

As expected, the sector with the lowest internet access is agriculture, and this is followed by the electricity and water sector. The sectors with the highest share of small-scale companies among total employment are agriculture, other service activities, and real estate activities, respectively.

The share of knowledge-based investments is very low in the administrative and support service activities and in construction sector.

Table 9: Industry, innovative, and Infrastructure indicators (SDG 9)

Sector	Employment rate of small-scale companies (%)	Rate of households with internet access (%)	Rate of knowledge-based investment (%)
Information and Communication	60.9	99.0	49.0
Other Service	97.8	93.6	14.0
Education	59.9	99.2	20.0
Electricity and Water	59.2	90.9	13.7
Finance	80.5	100.0	23.0
Real Estate	95.0	97.6	19.0
Administrative and Support Service	57.1	95.0	6.0
Manufacturing	53.9	96.3	21.0
Construction	86.4	92.7	11.0
Human Health	51.7	96.0	29.0
Public	26.6	98.5	23.0
Accommodation	85.4	94.9	14.0
Culture, Art	84.2	97.5	55.0
Mining	33.4	96.9	17.0
Occupational, Scientific and Technical	70.1	99.7	19.0
Agriculture	99.0	86.7	23.0
Wholesale and Retail	92.5	97.2	18.0
Transportation	76.0	97.0	48.0

10. Reduced Inequalities

a) Rate of low-income people: Low income is defined as 50 percent or less of the median income. Firstly, "equivalent household available individual income" is derived by using the ILCS data. Afterwards, median income from this equivalent individual is calculated for Turkey and the rate of people having 50 percent or less of the median income is calculated for each sector. OECD equivalence scale using coefficient of 1 for the first adult, "0,5" for individuals aged 14 and over and "0,3" for individuals under 14 years of age was employed to calculate equivalent individual income.

b) Share of the compensation of employees: The share of compensation of employees within the total product for each sector is calculated by using national accounts (GDP by income method).

c) Wages inequality: Wages inequality is calculated for each sector by using the HLFS data. As the inequality criterion, wages are ranked from the lowest to the highest and the rate of the wage in the 90% to the wage in the 10% segment is obtained. In the literature, this rate is expressed as p90/p10 rate. As this rate increases in a sector, it means that inequality also increases.

Table 10: Indicators of reduced inequalities (SDG 10)

Sector	Labour force share (%)	Rate of low-income households (%)	Inequality criteria (p90/p10)
Information and Communication	27.6	5.9	1.18
Other Service	47.2	13.5	1.20
Education	74.0	3.4	1.15
Electricity and Water	19.7	17.8	1.12
Finance	35.9	0.9	1.18
Real Estate	2.4	7.4	1.07
Administrative and Support Service	46.4	11.2	1.07
Manufacturing	33.6	10.5	1.10
Construction	28.9	28.1	1.11
Human Health	73.5	7.8	1.23
Public	79.9	5.7	1.15
Accommodation	46.0	14.4	1.11
Culture, Art	32.9	4.9	1.12
Mining	30.8	14.9	1.14
Occupational, Scientific and Technical	39.8	2.4	1.18
Agriculture	5.0	30.7	1.21
Wholesale and Retail	34.7	8.7	1.10
Transportation	21.0	13.9	1.13

The share of compensation of employees in added value is lowest in real estate activities and agriculture. This is an understandable situation for both sectors. As unpaid family work is common in the agricultural sector, the share of wage payments is low. In real estate activities, wage payments are very low when compared to the added value developed. When the sectors receiving half or less of the median income calculated from the equivalent individual income are considered, it can be seen that agriculture and construction sectors are the leading sectors.

It is determined that the sectors with the highest wage inequality are “human health and social services” activities, agriculture and other service activities.

12. Responsible Consumption and Production

a) Amount of carbon dioxide (CO_2) released to atmosphere per unit production: Greenhouse gas emissions for 24 sectors are taken from a report that is prepared for TUSIAD (Turkish Industry and Business Association) (Yeldan et al., 2020). Unfortunately, the distinction used in the aforesaid report is not exactly compatible with the 18 sectors used in the present report because it focuses on the producing sectors. The "other economy" sector includes both the "production industry" sub-sectors and sectors such as "water supply and sewerage system", "wholesale and retail trade", "administrative and support service activities", and "public administration". Similarly, "professional services", "financial services", and tourism sectors in the TUSIAD report are not compatible with the 18 sectors used in this report. Added value data at the level of NACE rev.2 two-digit (88 sectors) among the AISS data, assuming that the sectoral CO_2 amounts in the TUSIAD report are proportional to the sectoral added value, CO_2 data at the level of 24 sectors are aggregated in 18 sectors. Then, using the gross domestic product obtained from national accounts (at the level of 18 sectors), the amount of CO_2 released in the atmosphere per unit production for each sector is found. As a matter of course, it is accepted that the sectors with high CO_2 emissions per unit are more prioritized in the context of sustainable development goals.

Table 11: Responsible Consumption and Production indicators (SDG 12)

Sector	CO_2 amount released per one TL (g)
Electricity and Water	1679.8
Agriculture	300.0
Transportation	257.1
Manufacturing	160.4
Mining	60.3
Occupational, Scientific and Technical	9.4
Construction	9.2
Wholesale and Retail	6.4
Administrative and Support Service	5.6
Public	4.9
Information and Communication	3.9
Culture, Art	3.6
Human Health	3.0
Accommodation	2.2
Education	1.5
Finance	1.4
Real Estate	1.0
Other Service	0.9

It is noteworthy that the sector releasing maximum carbon dioxide to environment per TL added value produced is the electricity and water sector, and this is followed by agriculture and transportation sectors.

STEP II:

In the first step, the work done consists of calculating the average value/scores of the sectors for each indicator. In the second step, a sector ranking is obtained for each SDG by taking the simple average of the sectoral rankings that are obtained after ranking the sectors in terms of development priority on the basis of the indicators derived for each SDG in the first step. These average rankings are given in Table 12.

As specified before, a different ranking has occurred for each development goal. For example, when the goal no. 1 (no poverty) is considered, agriculture is the prioritized sector, while goal no.3 (good health and well-being) was considered, "administrative and support service" is the sector with the development priority. Despite this and similar differences, when Table 12 is considered as a whole, it is noteworthy that the agricultural sector generally takes the first place and the construction sector is in the second place in terms of priority. Similarly, it can be easily determined that the financial sector has the lowest development priority.

STEP III:

The purpose in this step is to obtain a final sectoral ranking in terms of the development priority considering 11 different rankings. Thus, Principal Component Analysis is used. By courtesy of this method, the aim is to take the analytical weighted average of 11 different rankings that are obtained for 11 different goals. As the weights are

Table 12: Average sectoral ranking

Sector	sdg1	sdg2	sdg3	sdg4	sdg5	sdg6	sdg7	sdg8	sdg9	sdg10	sdg12
Information and Communication	14.0	7.3	11.3	11.7	8.5	14.0	18.0	15.0	14.3	7.3	11.0
Other Service	6.0	6.7	5.7	11.3	8.0	6.7	7.0	3.7	3.3	8.3	18.0
Education	17.0	13.7	16.7	17.0	10.0	12.7	14.0	13.3	12.7	13.3	15.0
Electricity and Water	3.0	5.3	7.0	5.3	13.0	2.7	4.0	7.0	6.0	5.7	1.0
Finance	16.0	18.0	17.3	15.7	13.0	15.0	17.0	17.0	13.3	11.7	16.0
Real Estate	11.3	12.3	3.0	6.7	10.5	16.0	15.0	5.0	8.0	10.3	17.0
Administrative and Support Service	9.7	6.7	4.0	11.7	16.0	7.0	10.0	12.0	7.0	13.0	9.0
Manufacturing	8.0	8.0	8.3	7.0	4.5	8.0	11.0	8.7	11.3	11.0	4.0
Construction	3.0	5.3	4.7	2.7	3.5	3.7	3.0	7.0	3.3	7.3	7.0
Human Health	8.0	10.3	9.0	16.3	10.0	7.3	6.0	6.3	12.7	9.3	13.0
Public	16.0	14.3	14.3	8.3	8.5	6.7	12.0	13.0	15.0	13.3	10.0
Accommodation	6.7	8.3	8.0	7.7	10.5	12.7	5.0	7.3	5.3	10.3	14.0
Culture, Art	10.3	8.7	14.0	8.7	12.0	15.3	13.0	8.3	12.3	11.7	12.0
Mining	10.7	12.0	15.3	3.0	6.5	7.7	2.0	11.0	10.7	6.7	5.0
Occupational, Scientific and Technical	15.0	14.7	13.0	14.7	12.0	17.0	16.0	13.0	12.0	11.3	6.0
Agriculture	2.7	4.0	4.7	5.0	2.0	1.0	1.0	5.0	4.7	1.7	2.0
Wholesale and Retail	8.3	9.0	9.0	11.7	12.0	11.0	9.0	8.0	7.3	12.0	8.0
Transportation	5.3	6.3	5.7	6.7	10.5	6.7	8.0	10.3	11.7	6.7	3.0

Note: An average ranking for each sector is obtained by taking the simple average of the sectoral rankings obtained on the basis of indicators.

being determined, the only criterion is to minimize the information loss in Table 12. Thus, although the final ranking obtained is different from the previous 11 rankings, it can be specified that it is the closest ranking to all rankings. Thus, the final ranking obtained by Principal Component Analysis can be used as the order of priority that needs to be intervened by the policy makers. This ranking is given in Table 13.

Table 13. Final sectoral ranking in terms of development priority

SECTOR	FINAL RANKING
Agriculture	1
Construction	2
Electricity and Water	3
Transportation	4
Other Service	5
Mining	6
Manufacturing	7
Accommodation	8
Administrative and Support Service	9
Wholesale and Retail	10
Human Health	11
Real Estate	12
Culture, Art	13
Public	14
Information and Communication	15
Occupational, Scientific and Technical	16
Education	17
Finance	18

As can be expected, while agriculture and construction take place near the top, finance is in the last place. While this final ranking is being obtained, it is stated that the weights of Principal Component Analysis are given to the rankings obtained for each SDG and a "weighted average" is obtained.

Weights used are as follows:

sdg	weight
sdg7	13.1%
sdg1	12.3%
sdg6	11.3%
sdg3	9.3%
sdg4	9.2%
sdg2	9.0%
sdg12	8.7%
sdg9	8.0%
sdg8	7.5%
sdg10	6.5%
sdg5	5.0%

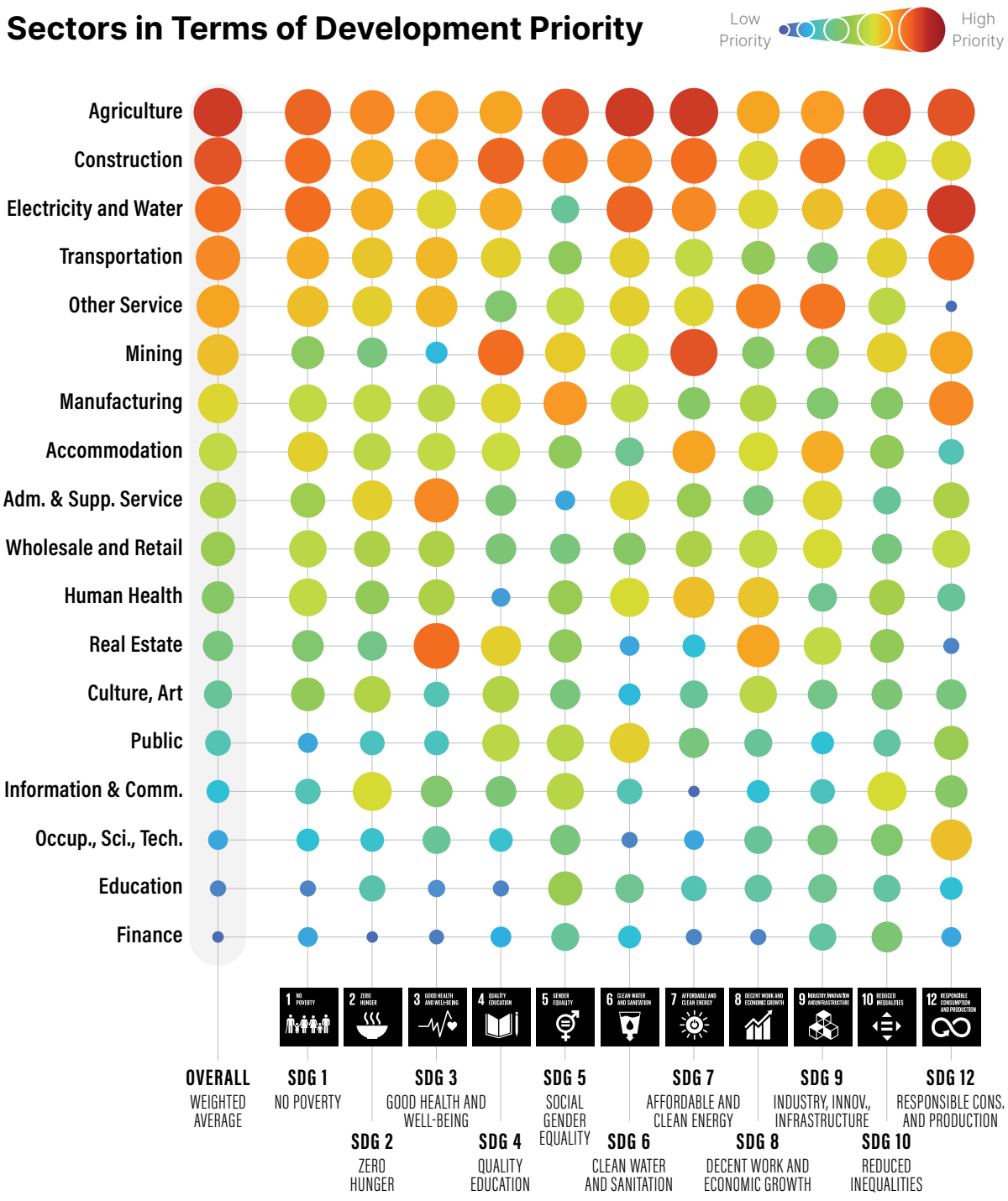
SDGs with the highest weight are as follows: 7 (Affordable and clean energy), 1 (No Poverty) and 6 (Clean Water and Sanitation). The goals with the lowest weight are 5 (Social Gender Equality) and 10 (Reduced inequalities).

Finally, the amount of information lost should be noted when the final ranking in Table 13 is used instead of 11 different rankings in Table 12. First component in Table 13 explains 59 percent of the total variance in Table 12. By using 1 ranking instead of 11 different rankings, the same information can be represented with an accuracy of 59 percent.

At this stage, a development priority table is prepared in order to facilitate for readers to see and to follow both Table 12 and 13 together.

	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10	PC11
Std. Deviation	11.16	5.60	3.91	3.52	2.89	2.38	2.03	1.89	1.74	1.20	1.01
Variance	0.59	0.15	0.07	0.06	0.04	0.03	0.02	0.02	0.01	0.01	0.00
Cumulative variance	0.59	0.74	0.81	0.87	0.91	0.94	0.96	0.97	0.99	1.00	1.00

Sectors in Terms of Development Priority



4.
Comparison of SDG Ranking with the Investment Priority of Input-Output Table

Sectoral development priority is important for policy makers, however, it is not the only criteria in investment-related decision-making processes. It is without doubt that many political, cultural, economic reasons and concerns are also influential. Nevertheless it is difficult to quantify those political and cultural reasons. Looking from the economic side, the Input-Output approach is often used to determine investment priorities and helps to predict which sector needs to be invested in order to maximize economic growth and employment increase. The typical question of this approach is " Currently, in which sector/sectors does the additional investment of 1 Turkish Lira contributes most to economic growth?" Analyses from other countries and past studies show prominence of the construction and industry sectors. To this respect, technical coefficients obtained by the Input and Output analysis will be considered as representative of the investment priority in economic terms for Turkey.

In this section, the ranking of the sectors obtained within the scope of the development goals will be compared with the ranking of investment priority obtained from the input-output analysis. In Table 14, the total backward linkage coefficients obtained from the Input-Output analysis are presented for 18 sectors. The most up-to-date Input-Output table published by

In Table 14., Total backward linkage coefficients

SECTOR	FINAL RANKING
Agriculture	1
Construction	2
Electricity and Water	3
Transportation	4
Other Service	5
Mining	6
Manufacturing	7
Accommodation	8
Administrative and Support Service	9
Wholesale and Retail	10
Human Health	11
Real Estate	12
Culture, Art	13
Public	14
Information and Communication	15
Occupational, Scientific and Technical	16
Education	17
Finance	18

SECTOR	TOTAL BACKWARD LINKAGE COEFFICIENT
Electricity and Water	1.98
Construction	1.97
Manufacturing	1.81
Accommodation	1.71
Other Service	1.64
Transportation	1.63
Culture, Art	1.61
Human Health	1.59
Occupational, Scientific and Technical	1.55
Wholesale and Retail	1.54
Information and Communication	1.54
Mining	1.52
Public	1.52
Finance	1.50
Administrative and Support Service	1.49
Agriculture	1.47
Real Estate	1.25
Education	1.24

TURKSTAT for the year 2012 is aggregated at the level of 18 sector and at first, the technical coefficients matrix, and then the total backward linkage effects are calculated for each sector based on this matrix. Increase in the total production caused by 1 unit of final demand increase in any sector is called as the **total backward linkage effect**. Thus, it can be specified that the ranking in Table 14 is also the ranking of development priority. According to Table 14, the top three sectors with investment priority are electricity and water, construction, and production industry sectors, respectively.

When Table 13 and Table 14 are compared, it can be easily found that there is a dramatic situation. The first 6 sectors having investment priority also have the development priority.

These sectors are as follows:

- Electricity and Water
- Construction
- Production Industry
- Accommodation
- Other Services
- Transportation

There are two sectors that do not have an "investment priority" but have a development priority: "mining and quarrying" and agriculture sectors.

ADDITIONAL STUDY: RANKING OF DEVELOPMENT PRIORITY FOR 88 SECTORS

There is (at least in principle) information at the level of 88 sectors among the HLFS data regarding five development goals. By using such information, 88 sectors can be ranked according to the development priority. Development goals having information at the level of 88 sectors are as follows: 1 (no poverty), 4 (quality education), 5 (social gender equality), 8 (decent work and economic growth), 9 (industry, innovative and infrastructure), 10 (reduced inequalities). Development priority ranking obtained by Principal Component Analysis is given in Table 15.

Table 15. Final sectoral ranking in terms of development priority sector (for 88 sectors)

Rank	NACE code - name of the sector
1	88- Social work activities without accommodation
2	01- Crop and animal production, hunting and related service activities
3	38- Waste collection, treatment, and disposal activities; materials recovery
4	56- Food and beverage service activities
5	47- Retail trade (except of motor vehicles and motorcycles)
6	43- Specialized construction activities
7	15- Manufacture of leather and related products
8	41- Construction of buildings
9	49- Land transport and transport via pipelines
10	92- Gambling and betting activities
11	95- Repair of computers and personal and household goods
12	68- Real estate activities
13	16- Manufacture of wood and of products of wood and cork (except furniture)
14	96- Other personal service activities
15	45- Wholesale and retail trade and repair of motor vehicles and motorcycles
16	31- Manufacture of furniture
17	14- Manufacture of wearing apparel
18	77- Rental and leasing activities
19	74- Other professional, scientific and technical activities
20	65- Insurance, reinsurance and pension funding (except compulsory social security)
21	02- Forestry and industrial and firewood production
22	32- Other Manufacturing
23	90- Creative, arts and entertainment activities
24	46- Wholesale trade (except of motor vehicles and motorcycles)
25	25- Manufacture of fabricated metal products (except machinery and equipment)
26	10- Manufacture of food products
27	13- Manufacture of textile products
28	33- Repair and installation of machinery and equipment
29	69- Legal and accounting activities
30	94- Activities of membership organisations
31	94- Üye olunan kuruluşların faaliyetleri
32	93- Sports activities and amusement and recreation activities
33	80- Security and investigation activities
34	79- Travel agency, tour operator and other reservation service and related activities
35	82- Office administrative, office support and other business support activities
36	52- Warehousing and support activities for transportation

Rank	NACE code - name of the sector
37	66- Activities auxiliary to financial services and insurance activities
38	22- Manufacture of rubber and plastic products
39	08- Other mining and quarrying
40	58- Publishing activities
41	81- Services to buildings and landscape activities
42	73- Advertising and market research
43	23- Manufacture of other non-metallic mineral products
44	28- Manufacture of machinery and equipment n.e.c.
45	55- Accommodation
46	53- Postal and courier activities
47	42- Civil engineering
48	61- Telecommunication
49	17- Manufacture of paper and paper products
50	71- Architectural and engineering activities; technical testing and analysis
51	87- Residential care activities
52	75- Veterinary activities
53	50- Water transport
54	27- Manufacture of electrical equipment
55	24- Manufacture of basic metals
56	60- Programming and broadcasting activities
57	59- Motion picture, video and television programme production, sound recording and music publishing activities
58	63- Information service activities
59	78- Employment activities
60	37- Sewerage
61	62- Computer programming, consultancy and related activities
62	20- Manufacture of chemicals and chemical products
63	64- Financial service activities (except insurance and pension funding)
64	19- Manufacture of coke and refined petroleum products
65	99- Activities of extraterritorial organizations and bodies
66	35- Electricity, gas, steam and air conditioning supply
67	91- Libraries, archives, museums and other cultural activities
68	29- Manufacture of motor vehicles, trailers and semi-trailers
69	30- Manufacture of other transport equipment
70	05- Mining of coal and lignite
71	85- Education
72	36- Water collection, treatment and supply
73	26- Manufacture of computer, electronic and optical products
74	11- Manufacture of beverages
75	84- Public administration and defence; compulsory social security
76	12- Manufacture of tobacco products
77	21- Manufacture of basic pharmaceutical products and pharmaceutical preparations
78	86- Human health activities
79	72- Scientific research and development
80	70- Activities of head offices; management consultancy activities
81	51- Air transport
	03- Fishing and aquaculture
	06- Extraction of crude petroleum and natural gas
	07- Mining of metal ores
	09- Mining support service activities
	39- Remediation activities and other waste management services
	97- Activities of households as employers of domestic personnel
	98- Undifferentiated goods- and services-producing activities of private households for own use

Note: No information could be obtained for the 7 sectors at the bottom of the table (sectors with codes 03, 06, 07, 09,39,97,98) because there is no observations in HLFS data and thus, it is not possible to make a ranking.

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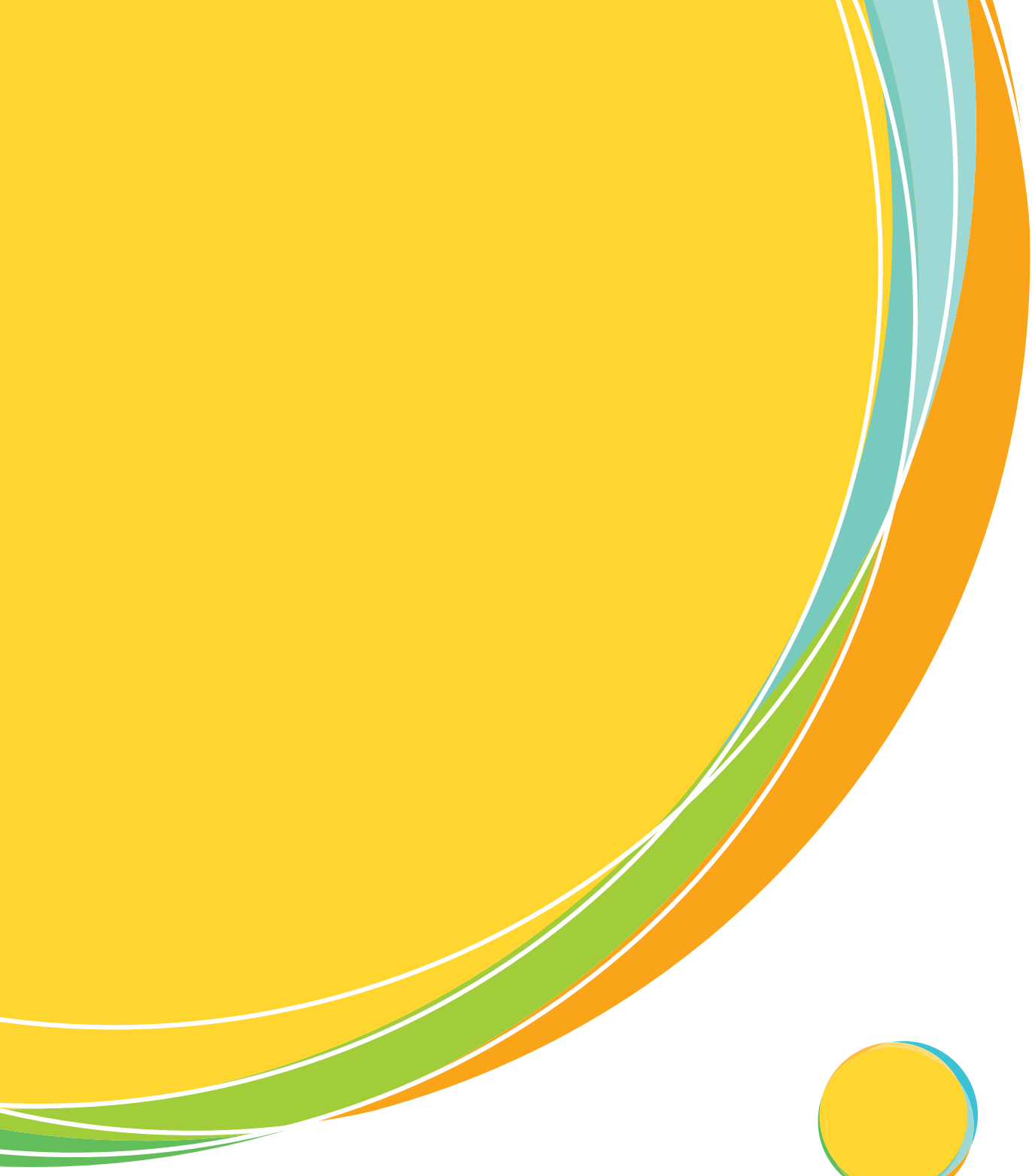

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