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Research Article

Social Capital Measurement in Turkiye: Creating an Index by Province*

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ABSTRACT

The aim of the study is to create a social capital index on the basis of 81 provinces covering the years between 2007-2018 in Turkiye. While creating the social capital index, the method of creating the social capital index obtained from 2 networks and 2 norm variables, which was also used in previous studies, was applied. While the number of foundations and associations on a provincial basis was used as network variables, the rate of voting in parliamentary elections and the rate of response to WVS surveys were used as norm variables. In order to perform principal component analysis, the collected data was entered into the SPSS 23 package program, and the relevant analysis was performed. For this purpose, principal component analysis was applied for the years 2007, 2011, and 2018, when parliamentary general elections were held, and the first component that emerged was taken as an indicator of social capital index. Since social capital does not change in a short period of time for countries, regions, and cities, the index values for the years between 2007, 2011 and 2018 were created with the linear interpolation method using the data, as applied in similar studies. Positive ones among the index values created on the basis of provinces indicate a high level of social capital, while negative values indicate a low level of social capital. When the social capital index values of 2007 and 2018 are examined, it is observed that the social capital levels of the provinces have increased over the years, although there has not been much change in the index values on a provincial basis over the years.

Keywords: Social Capital Index, Principal Component Analysis, Linear Interpolation, Turkiye

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1. Introduction

The concept of social capital was first used by Hanifan (1916) in the study "The Rural School and Rural Life". Subsequently, studies by important researchers such as Bourdieu, Coleman, and Putnam have been used as an important source for socioeconomic research. Yet, in the pre-industrial economy period, when capital had been mentioned, material assets such as land, labor force, and capital (Smith, 1776; Marx, 1990; Mill, 1848) defined by classical economists were considered. In the information economy period, intangible factors have come to the fore along with tangible assets.

Institutional theory states that different institutions in countries will affect the bureaucratic perceptions and thoughts of the country (Kaufmann, 2018, p. 379). Institutions and rules that affect people's perceptions can be official institutions and rules as well as informal institutions and rules. The constitutions, laws, and contracts of the countries constitute the official institutions and rules of those countries (North, 1990; Lowndes, 1996). Unwritten religion, tradition, custom, moral structure, and norms constitute the informal rules of societies (Pejovich, 1999, p. 167). Individuals, institutions, and organizations that are influenced by the rules, norms, behaviors, and procedures of the societies in which they are involved, and the behavior patterns imposed on them by the society can also be expressed as informal institutions (North, 1990, p. 5). Social capital is also shown among these informal institutional factors (Hofstede, 2001; Jin et al., 2019). Social capital, which is shown as one of the informal institutional factors, has enabled a large number of studies on the subject in the literature in order to clarify the missing areas (Putnam, 1993, p. 167).

After the 1990s, social capital, which tries to explain the areas that other types of capital do not touch on the economic levels and development levels of countries, has been evaluated and studied as an informal institutional factor, although it is an interdisciplinary concept (Kaufmann et al. 2018). The study, named "Making Democracy Work" by Putnam et al. (1993), has made a significant impact, especially on the social capital literature. Although Putnam (1993) was a political researcher, after this study, it was thought that the concept of social capital could be an important variable for economics and economics studies as well as education. It has been seen that this issue has been the subject of many studies, both theoretical, regarding economic development and growth (Fukuyama, 1995; Portes & Landolt, 1996; Knack &Keefer, 1997; Knoke, 1999; Winter, 2000a; Knack, 2002; Adam &Roncevic, 2003), and empirical (La Porta et al., 1997; Pejovich, 1999; Guiso et al. 2004 and 2008; Fountain, 1997; Akçomak & ter Weel, 2009; Barney, 1991; Dobler, 2011; Gönç Şavran, 2018; Akar & Ay, 2018; Bayramoğlu & Bozdemir, 2020; Terzioglu, 2021).

There are different social capital definitions (Bourdieu, 1986; Baker, 1990; Coleman, 1990; Fukuyama, 1995; Guiso et al., 2000) and measurement methods (Putnam, 2007; Rupasingha and Goetz; 2008; Wang et al., 2014). In terms of its importance and effects as of today, it is understood that there is a consensus on the concept of social capital. Researchers conduct research on the different effects of social capital on different subjects, sometimes on different indicators, in accordance with their fields of study and research topics. Social networks, social norms, and the element of trust are the most emphasized concepts in definitions of social capital (Bourdieu, 1986; Coleman, 1990; Putnam, 2007; Rupasingha & Goetz; 2008).

Social capital consists of connections and breadth of connections between people. It consists of the factors that make up the structure of society, such as the number of norms and the level of trust and understanding between people, which prepares the environment for cooperation between people (Cohen & Prusak, 2001, p. 21). Therefore, countries, regions, and cities with a high level of social capital are positively affected by this situation, while countries, regions, and cities with a low level of social capital are negatively affected (Putnam, 2007; Jin et al., 2017 and 2019).

In this part of the study, the concepts of social capital used in the literature, its history and content will be discussed. Then, the definition, scope, types, and importance of the concept of social capital in economics and finance literature and what is said about social capital in important studies in the literature will be mentioned.

2. Conceptual Framework

Social capital is widely used in different subjects and interdisciplinary studies. In these studies, there is a different definition of the concept of social capital according to the purpose of the study and its use in this direction. Social capital is used in a wide range from economists to educational scientists, from sociologists to business managers, and from political scientists to medical professionals. Due to the fact that social capital finds itself in a wide range, it has prepared the ground for it to be the subject of research in different fields.

Social capital, which is handled from different perspectives and defined in different ways, is generally explained through social networks, social norms, relationships, group memberships (Uphoff, 2000, p. 228; Tüylüoğlu, 2006, p. 16) and trust (Fukuyama, 1995, p. 97; Guiso, 2004, p. 528). Social capital of societies includes institutions, relationships, attitudes, and values that direct interactions among individuals and contribute to socio-economic development. In recent years, the concept of social capital has emerged as a unifying concept that includes these different views. Social capital's significant popularity has been seen in the work of researchers such as Coleman (1988, 1990), Putnam (1993), Bourdieu (1986), and Fukuyama (1995). In addition, many other authors have tried to define the concept of social capital from different perspectives and to emphasize its conceptually sound and practically useful aspects (Grootaert, 1997; Portes, 1998; Woolcock, 1998; Narayan & Pritchett, 1999; Serageldin & Grootaert, 2000; Woolcock et al. Narayan, 2000).

3. Social Capital Concept

The concept of social capital has been associated with social problems, education, and especially the economic structure and growth, thus enabling the concept of social capital to gain a new perspective. Although the number of studies on social capital has increased considerably, the history of the concept goes back a long time. The components that make up social capital are not new either. Although Marshall (1890) was the first to use the concept of social capital, he did not mean social capital in today's sense. For this reason, Hanifan (1920) and Jacobs (1961) are reported by Woolcock (1998) as the first researchers to introduce the concept of social capital.

When the concept of social capital is examined in the literature, it is seen that most studies focus on the common aspects of the concept of social capital, namely memberships, collaborations, productivity, trust, and social relationships with benefits. It is understood that the diversity of the concept of social capital in the literature is due to the unique nature of social capital as well as the complexity of its measurement and conceptualization and differentiation according to countries.

The concept does not have a clear, unchanging and always valid meaning due to the differences and ideologies of the countries (Dolfsma & Dannreuther, 2003, p. 408; Foley & Edwards, 1997, p. 552). For this reason, researchers have examined the concept of social capital from different perspectives, mainly networks, norms, and trust, and have made different definitions although they are close to each other.

Bourdieu (1993), Putnam (1993), and Coleman (1988), who are considered to be the most important writers in the social capital literature, define it as a resource for collective action that emerges as a result of economic prosperity, democracy, and the acquisition of human capital in the

form of education (Winter, 2000b, p. 2-6). When the definitions in Table 1 are examined, it will be seen that they generally have an understanding that includes this definition.

Table 1 shows different definitions of researchers. In the following, the researchers who first put forward the theory of social capital and their views are mentioned.

Table 1: Social Capital Definitions

Authors	Definition
Baker (1990: 619).	A resource that individuals derive from certain social structures and then use to pursue their interests; It is created by changes in the relationship between individuals.
Belliveau vd. (1996: 1572).	It consists of an individual's personal network and outstanding corporate connections.
Bourdieu (1986: 248) / (1986: 243).	Mutual acquaintance or recognition is the sum of real or potential resources associated with having a strong network of more or less institutionalized relationships. It consists of social obligations (links) that can be transformed into economic capital under certain conditions and institutionalized as being noble.
Bourdieu & Wacquant (1992: 119).	It is the sum of real or virtual resources accruing to a person or group due to having a solid network of more or less institutionalized relationships with acquaintance and recognition.
Boxman vd. (1991: 52).	The number of people who can be expected to provide support and the resources they have.
Burt (1992: 9)/ (1997: 355).	A collection of friends, colleagues, and more general contacts with whom you have gained opportunities to use your financial and human capital. Brokerage opportunities in a network.
Knoke, (1999: 18).	Networking of social actors within and between organizations to gain access to the resources of other social actors.
Portes (1998: 6).	The ability of actors to derive benefits through membership in social networks or other social structures.
Brehm & Rahn (1997: 999).	A network of collaborative relations between citizens that facilitates the resolution of collective action problems.
Coleman (1990: 302).	Not a single entity, but several different entities with two common features. They all consist of some aspects of the social structure and facilitate certain actions of individuals within the structure. The ability of people to work together in groups and organizations for common goals.
Fukuyama, (1995: 10; 1997b: 25).	It can be expressed as the existence of different informal values or norms shared among group members with whom cooperation is established.
Inglehart, (1997: 188).	A culture of trust and tolerance in which large networks of voluntary associations emerge.
Portes, (1993:1323).	Expectations of action within a collectivity that affect the economic goals and goal-seeking behavior of its members, even if the prospects are not directed towards the economic sphere.
Putnam, (1995: 67).	It is a set of features of social organizations such as networks, norms, and social trust that facilitate mutually beneficial coordination and cooperation.
Thomas, (1996: 11).	Voluntary tools and processes developed within civil society that promote collective development for all.
Loury (1992: 100).	Naturally occurring social relationships between people who promote or assist in the acquisition of skills and characteristics valued in the market.
Nahapiet and Ghoshal, (1998: 243).	The sum of the actual and potential resources that exist in, exist through, and derive from the network of relationships an individual or social unit has. Thus, social capital includes both the network and the assets that can be mobilized through it.
Pennar, (1997: 154).	The web of social relations that influence individual behavior and economic growth.
Schiff, (1992: 160).	Which are the inputs of the production, affecting the relations between people.
Woolcock, (1998: 153).	It consists of norms of knowledge, trust and reciprocity found in individuals' social networks.

Source: Adler and Kwon (2002: 21)

In order for social capital to emerge, more than one person must come together and interact. Because, as a result of interactions between people and groups of people, factors that affect the welfare and peace of the society in general such as networks, norms, trust, social assistance, crimes, lies, rules, opportunistic behaviors, voting, membership in associations, and foundations emerge between people and groups. Considering these emerging symptoms, the social capital existence of countries, regions and cities can be revealed.

3.1. Social Capital According to Lyda Judson Hanifan

It is stated in the literature that the first researcher to use the concept of social capital was Hanifan (1916). It is known that the study evaluating the school system in the US state of Virginia in 1916 is a very important resource for researchers working on social capital (Woolcock, 1998, p. 153). In Hanifan's study, it is known that the term 'capital' is used mostly to indicate the importance of social structure for people with a business and economic perspective (Routledge & Amsberg, 2003).

Hanifan, examining the effect of social capital on students' school performance, stated that this level of effect can increase. According to him, social capital emerges depending on the level of cooperation, friendship, and social relations that occur between individuals and communities that make up the social structure in daily life. The increasing effect of social capital can be mentioned as people cooperate with their neighbors and neighbors with other neighbors (Pinto, 2012). He states that developments in this direction will be sufficient for the socialization needs of individuals and will provide sufficient opportunities in terms of increasing social capital (Hanifan, 1916, p. 130).

3.2. Social Capital According to Pierre Bourdieu

Bourdieu has mostly worked on class differences with the concept of social capital. According to him, social capital is all individual or social resources based on individuals' knowing each other (Sabatini, 2006). In other words, social capital is an asset that can be owned by classes with high privilege levels, and these classes can use it to maintain their privileges (Field, 2008). At this point, two situations come to the fore in Bourdieu's concept of social capital. According to him, individuals can obtain various possibilities through the relationships they have. It also states that the size and quality of relationships affect the opportunities and the resources available to individuals. Therefore, social capital is the sum of real or potential resources associated with membership in a group, which is more or less institutionalized and has permanent networks of mutual acquaintance, or in other words, offering some opportunities to its members (Bourdieu, 1986, p. 210).

3.3. Social Capital According to James Coleman

Coleman (1988) stated that individuals tend to behave rationally in order to maintain their interests, and mentioned that social capital also provides benefits to those who are disadvantaged compared to others in terms of value. Coleman evaluates social capital in terms of social organization and social relations. He defines social capital as a concept that includes some institutions and structures, facilitates some activities of individuals and institutions within them, and contributes to the formation of common features (Coleman, 1990, p. 302).

Coleman emphasized that social capital represents a resource and emerges reciprocally. The network of relationships goes beyond individuals with a high level of trust and management of common values (Field, 2008, p. 29). In this respect, social capital also has a feature that facilitates

productivity. Moreover, a community with a high level of trust is capable of achieving much more than a similar community that does not.

> "A variety of different entities comprising some aspects of the social structure and facilitating certain actions of actors (personal or institutional actors) within the structure" (Coleman, 1990, p. 598).
>
> This definition shows that he cares more about intergroup relations rather than implicit individuals.

3.4. Social Capital According to Robert Putnam

Putnam et al. (1993, p. 167) states that the concept of social capital is based on three important and interacting concepts such as norms, networks, and trust. According to Putnam, characteristics such as trust, norms, and networks that enable individuals and institutions to act jointly to achieve common goals constitute social capital. The studies published by the sociologist Putnam (1993, 1995, 2000) have an important role in the development of the concept of social capital.

A political scientist, Putnam made a significant contribution to social capital theory in his research on American society and Italian society. Putnam handled the concept of social capital differently from Bourdieu and Coleman. He tried to explain social capital by taking into account the general structure and characteristics of the society. In addition, he emphasized that the social capital level of the society has an effect on the degree of development of the society and the determination of its place in the democratic and political system. While trying to explain the differences in the southern and northern regions of Italy, he noted the differential effects of public practices on relative performance. In that study, he emphasized that the relationship between government and civil society is important in the emergence of institutional performance (Field, 2006, p. 41). In these studies (Putnam et al. 1993; 1995; 2000), Putnam has contributed to the concretization of the concept by considering social capital from a theoretical and an empirical point of view. While Putnam (1993) provides evidence of strong links between social capital and economic performance indicators, especially in Italian regions, subsequent studies show that this link also applies to other countries (Whiteley, 1997; Knack & Keefer, 1997; La Porta et al., 1997).

3.5. Social Capital According to Francis Fukuyama

Fukuyama defines social capital as social norms that enable and encourage cooperation among individuals (Fukuyama, 2001, p. 8). According to him, since trust is very important for social capital, he built the concept on trust. Social capital is an acquisition that can be obtained by the existence of a sense of trust in the general or part of the societies (Fukuyama, 2005, p. 42).

Social capital is defined as a set of concrete and informal norms that provide mutual cooperation between two or more individuals. The concept of "reciprocity" here is clearly visible in groups where sincere friendships and connections arise. Thanks to the positive effect brought by social capital, transaction costs are reduced, and a democratic environment is reached, contributing to the development of the regional and national economy (Fukuyama, 2005, p. 59).

3.6. Social Capital According to OECD and World Bank

OECD expresses social capital as common norms, values, and networks that facilitate cooperation within or between groups (OECD, 2001, p. 41). As communication and trust within or between groups increase, so does the social capital level of that society. In addition to the definitions of social capital, it can also be classified according to different features in terms of private

and public institutions, together with the benefits arising from it. There are definitions for social capital, with a narrower scope, as "no more than interpersonal networks" (Dasgupta, 2000, p. 10). In some definitions, the network dimension of social capital is not taken into account, and social capital is completely reduced to trust or "confidence density" (Paldam & Svendsen, 2000).

There is a distinction between social capital, which includes institutions as well as networks and norms, and those (World Bank, 2011) that do not. The first concrete initiative on social capital, which was put forward by the World Bank and is said to have made an important contribution to the development of countries, is the Social Capital Initiative, which emerged in 1998. Here, the World Bank's statement that defines social capital as "the institutions, relationships and norms that shape the quality and quantity of a society's social relations" is the most basic form of this approach (World Bank, 2011). This perspective includes the most formal institutional relations and structures such as institutions, government, political regime, rule of law, court system, civil and political freedoms (World Bank, 2011).

4. Components of Social Capital

Multiple definitions and approaches have been considered to explain social capital. While these definitions are made, it is seen that the most striking and used indicators are the definitions made on norms, networks and trust. At this point, social capital is shaped by the characteristics of groups rather than those of individuals. Important components of social capital include social relationships, formal and informal social networks, group memberships, trust, and civic participation.

Some factors are very important in the emergence and development of social capital. Putnam et al. (1993, p. 304) states that social organization provides important features such as trust, norms, and networks that can increase the productivity of society. Among these components, interpersonal trust, norms, and social networks occupy an important area not only in social life but also in socio-economic life (Coleman, 1994, p. 91).

The World Bank (1998), which deals with the concept of social capital from a wider perspective, expresses the elements of social capital as networks, trust and cooperation, and the effective provision of information and communication. It is seen that the terms of trust, network, unity, group membership, and norm are used more frequently in studies on economics (Tüylüoğlu, 2006, p. 17). For this reason, social network and social norms and trust elements, which are the most known and used components of social capital, will be discussed.

4.1. Social Networks

One of the most important components of social capital is social networks. It arises when people come together and increases due to reciprocity and trust between groups. The level of social capital is expressed by the level of interaction between people and groups. Social capital is also expressed as "norms, values and understandings that facilitate and increase cooperation within or between networks and groups" (Lin, 2001). Social capital is about people's connections and the breadth of these connections. Networks, on the other hand, are a network of relationships that emerges when people reveal themselves openly due to the connections between people (Cohen & Prusak, 2001, p. 83).

The first studies on the network approach have reached this level with the research of Bourdieu and Coleman, who are social capital researchers. In the following period, important and effective studies were carried out by Granovetter (1973) and Burt (2005). According to Granovetter (1973), networks are an important factor that both connects and bridges social capital, represent-

ing networks within and between organizational entities such as community groups and firms as well as horizontal and vertical associations, respectively.

Some researchers can state different things about which aspects of social networks are important. There is no clear consensus on whether dense social networks or sparse social networks are better. By dense networks, strong and supportive connections; scattered networks are called extra-community ties between more diverse social groups. Coleman cares about dense networks, and Burt cares about sparse networks with more structural voids (Glanville & Bienenstock 2009, p. 1512). When the studies in the literature are examined, it is revealed that "networks" are an important component of social capital.

4.2. Social Norms

Social norms are behavioral patterns that show which actions are accepted as appropriate and right and which are considered inappropriate and wrong by some groups in the society (Coleman, 1990: 243). Norms and the accompanying potential benefits (for compliance) or harms (for non-compliance) are not the sole determinants of individuals' decisions. Norms are mostly an element that affects the costs and benefits that individuals take into account when implementing any choice (Coleman, 1987, p. 135).

In this respect, norms are expressed as a set of formal and unwritten rules that determine how and under what conditions the members of a group or community will act. Norms have no legal or other formal basis. Sometimes norms can even go beyond this and say different things with laws (Coleman, 1990, p. 244). It is natural that this situation differs from society to society. While this is sometimes due to laws, sometimes it arises due to different customs, traditions and customs of societies compared to each other.

4.3. Trust

Generalized trust, also known as social trust studies, has been studied in different ways by more than one researcher. According to the results of the research, in societies where people trust each other more easily, social relations are 'healthier'; therefore, governance can provide higher democratic standards (Putnam, 1993), economic growth is achieved more easily (Fukuyama, 1995; Knack & Keefer, 1997) and people are generally happier and better off (Subramanian et al., 2002; Helliwell & Putnam, 2004). Social capital, through generalized trust, facilitates the solution of the problems of communities and individuals, reduces the transaction costs of those involved in daily social interactions, and accelerates the flow of information from one or more people to others (Putnam, 2000). Due to the multiple positive externalities of the generalized confidence level, studies on trust have increased (Delhey & Newton, 2005; Bjørnskov, 2007).

In the World Value Survey, the measure of trust is "in general, would you say most people are trustworthy or that you should be very careful when interacting with people?" It is calculated by taking the percentage of participants who answer the question "most people are reliable" (WVS, 1994).

The generalizable trust question, "in general, would you say that most people are trustworthy or that you should be very careful when interacting with people?" is being used. There have been some criticisms that the problem may remain superficial from an international perspective (Delhey & Newton, 2005). However, there are many studies stating that trust will emerge more easily in societies with high trust (Uslaner, 2002) in universal welfare states (Kumlin & Rothstein, 2005) with neutral policies (Delhey & Newton, 2005).

5. Measuring Social Capital and Establishing a Province Based Index

5.1. Measuring Social Capital

The social capital measure produced in this study was created as an index to show the social capital level of 81 provinces of Turkiye. Index values on the basis of 81 provinces were created for the years 2007-2018. The social capital index was obtained by subjecting two social norms and two social network variables to principal component analysis. This method was first used by Rupasingha and Goetz (2008). The main variables used to create the social capital index on a provincial basis are as shown in Table 1. The index generation method used by Rupasingha and Goetz (2008) to show the level of social capital on a provincial basis is the most widely used comprehensive approach in regional and city-based studies (Putnam, 2007; Jha & Chen, 2015; Hasan et al. 2017).

In order to produce a social capital index on the basis of 81 provinces, Principal component analysis was applied to (Rupasingha et al. (2006)) four different variables (2 network and 2 norm measures). For this purpose, principal component analysis was carried out three times using the data in 2007, 201,1 and 2018 on the basis of 81 provinces. The first components obtained from the principal component analysis were used as the social capital indicator of the provinces. Higher values of the index value obtained are an indication of having more social capital. A high (positive) index value indicates a higher level of social capital, while a low (negative) value indicates a lower level of social capital. This index generation method is one of the most comprehensive methods used in many other studies (Knack, 2003; Rupasingha & Goetz, 2008; Jha & Chen, 2015; Hasan et al., 2017; Jin et al., 2019; Davaadorj, 2019).

The numbers of foundations and associations, which are among the variables shown in Table 1 and constitute social capital, represent the social network variables, and the rates of participation in elections and surveys represent the variables of social norms.

Table 1: Variables Constituting Social Capital

	Variables	Identification/Calculation	Source
Social Networks	**Number of Foundations**	Number of foundations per 100 thousand people on a provincial basis.	General Directorate of Foundations
	Number of Associations	Number of associations per 100 thousand people on a provincial basis.	Directorate of Associations (DGM)
Social Norms	**Participation Rate in Elections**	Participation rates in the general parliamentary elections held in 2007, 2011, and 2018 on a provincial basis are taken as basis.	Supreme Election Board (YSK)
	Rate of Participation in Surveys	Response rate to surveys conducted in World Value Survey. Wave 5 data for 2007, Wave 6 for 2011, and Wave 7 for 2018 was used. This ratio was calculated over the regions at TUIK Level 1 based on the ratio of each province and the region it is in.	World Value Survey

The index values of the social capital variable were calculated on a provincial basis. While calculating this value, the number of foundations on a provincial basis, the number of associations, the rate of participation in the elections and, finally, the response rate of the participants in the World Value Survey were used. While calculating the social capital index on the basis of provinces, since the General Elections for the Parliament in Turkiye were held in 2007, 2011, and

2018 in the period subject to the research, principal component analysis was made on the basis of 81 provinces for those three years. As the response rate to the surveys for the years (2007, 2011 and 2018), Wave 5 (2005-2009) for 2007, Wave 6 (2010-2014) for 2011, and 2018 Wave 7 (2017-2020) data was used for the year. Response rates to the surveys were made using the data shared by the WVS according to the 2nd Level Statistical Regional Units Classification in Turkiye (2nd Level NUTS). The rates given for the 26 regions in Level 2 were used as the survey response rates of each province in that region. The social capital index on a provincial basis was first calculated separately for the years 2007, 2011, and 2018, and then the remaining years were filled.

Since the level of social capital is not very variable in terms of countries, regions, and cities over the years, as in similar studies (Rupasingha & Goetz, 2008; Jha & Chen 2015; Jin et al., 2019), the index for the years 2007, 2011, and 2018 values was created using the linear interpolation method based on the data. Linear interpolation takes place in the form of filling the values of the remaining years between 2008-2010 and 2012-2017 in a linear manner over the data of the current years.

5.2. Establishing the Index Based on Province

The index generation method utilized in this study, consisting of four components, is one of the most comprehensive methods used in different studies (Knack, 2003; Rupasingha & Goetz, 2008; Jha & Chen, 2015; Hasan et al., 2017; Jin et al., 2019; Davaadorj, 2019).

In order to produce a social capital index on the basis of 81 provinces, principal component analysis was applied (Rupasingha et al. 2006) to four different variables (2 network and 2 norm measures). For this purpose, principal component analysis was carried out three times using the data in 2007, 2011, and 2018 on the basis of 81 provinces. The first components obtained from the principal component analysis were used as the social capital indicator of the provinces. Higher values of the index value obtained are an indication of having more social capital. A high (positive) index value indicates a higher level of social capital, while a low (negative) value indicates a lower level of social capital.

5.2.1. Principal Component Analysis

Multivariate statistical analyzes are used to analyze x features of n variables. Problems arise in the analysis if some of the variable properties used are interrelated (dependent) and the number x is too large. The fact that variable properties are related to each other does not comply with the (albeit approximate) independence rule of the variables. In addition, working with a large number of variables is not desired by researchers as it will increase the number of procedures and cause some difficulties in interpreting the findings to be obtained.

The dependent variable is not included in the principal component analysis as the variables in the data set are used for the same purpose in the analysis. One of these variables is not sought to explain or relate to the others. Principal component analysis is not a technique that restates a data set consisting of more than one variable, but is actually a method of reducing all components to one or at most three dimensions. Principal component analysis does this by reducing it to one dimension while recreating the data set (Jackson, 2004, p. 225). While producing the social capital index, the first component was taken as the social capital variable, as in similar studies (Rupasingha, 2006; Hasan et al., 2017; Hasan et al., 2019; Jin et al. 2019; Davaadorj, 2019).

Even if the processing load is not seen as a problem in a time period when computer and programming facilities are quite advanced, evaluating and summarizing the results of a multivariate analysis can be complex and difficult. Principal Component Analysis, which is one of the most

important methods applied in such cases, is generally preferred to eliminate the dependency structure between the variables or to reduce it to one dimension. (Büyüköztürk, 2007, p. 214). It can also be used as a spreadsheet to prepare data sets, variables, and indices for different analyzes.

Principal component analysis is similar to factor analysis, but not the same thing. The main thing that differentiates principal component analysis from factor analysis technique is that the error term is neglected in the calculation of the common factor variances of the variables in principal component analysis, and the error variance, which cannot be explained by the common factors and is known as residual variance, is taken into account in the model in factor analysis. In fact, this is the case when the sum of variance of x variables is explained with a linear component of n common factors in the principal components analysis, and there is another variance that the common factors cannot explain in factor analysis. This is the main feature that distinguishes principal component analysis from factor analysis.

5.2.2. Principal Component Analysis Results

Principal component analysis is a method used to express the data set, which is expressed with a larger number of variables, with an alternative, understandable and easily analyzable variable (index). In order to perform principal component analysis, it is necessary to test the suitability of Kaiser-Meyer-Olkin (KMO) variables for the analysis in general. Here, regarding the thesis that the correlation matrix is equal to the unit matrix, since the degree of freedom is greater than the Chi-square value, this assumption is rejected and it is said that the principal component analysis method can be used in this case (Şen et al. 2006, p. 162).

Kaiser-Meyer-Olkin (KMO) is a measure of sample size adequacy. This is an indexing method that compares the size of the correlation coefficients with the size of the partial correlation coefficients. If the sum of the squares of the partial correlation coefficients of the paired variables is smaller than the sum of the squares of the correlation coefficients, the KMO coefficient approaches one. Small KMO values indicate that performing a principal component analysis with these variables is not very accurate, as paired variable correlations cannot be adequately explained by other variables. When the KMO criterion is 0.90-1.00, it is considered excellent, between 0.80-0.89 very good, between 0.70-0.79 good, between 0.60-0.69 moderate, between 0.50-0.69 poor. If it takes a value below 0.50, using the data may not give very accurate results (Sipahi et al. 2008, p. 81).

Accordingly, the results of the KMO and Bartlett's test, which show the suitability of the principal component analysis conducted in 2007, 2011, and 2018 when parliamentary general elections were held in Turkiye, are shown in Table 2. Accordingly, the KMO value emerged as 0.678 in 2007, 0.702 in 2011, and 0.624 in 2018, and it was understood that it was above the acceptable value of 0.50.

Table 2: KMO and Bartlett's Test Results

		2007	2011	2018
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.678	.702	.624
Bartlett's Test of Sphericity	Approx. Chi-Square	71.279	85.179	65.764
	df	6	6	6
	Sig.	.000	.000	.000

Looking at the explained variance table for 2007 in Table 3, it was understood that the study had two sub-dimensions, and these two sub-dimensions explained 75.589% of the total variance. The

first component, which is taken as a basis while creating the social capital index, explains 55.095 of the total variance. 55.095% disclosure rate. Considering that the research is carried out on the basis of 81 provinces with 4 variables and includes social indicators, it is considered to be sufficient.

Table 3: Announced Total Variances of the Index for 2007

Variables	Initial Values			Sum of Rotated Square Loads		
	Sum	Variance %	Cumulative %	Sum	Variance %	Cumulative %
1	2.048	55.095	55.095	2.048	55.095	55.095
2	1.040	20.494	75.589	1.040	20.494	75.589
3	.657	18.625	93.214			
4	.246	5.786	100.000			

Method: Principal Component Analysis

Looking at the explained variance table for 2011 in Table 4, it was seen that the study had only one sub-dimension, and that the sub-dimension explained 58.357% of the total variance. Considering that the research is conducted on the basis of 81 provinces and includes social indicators, the disclosure rate of 58.357% is considered to be sufficient.

Table 4: Announced Total Variances of the Index for 2011

Variables	Initial Values			Sum of Rotated Square Loads		
	Sum	Variance %	Cumulative %	Sum	Variance %	Cumulative %
1	2.334	58.357	58.357	2.334	58.357	58.357
2	.803	20.077	78.435			
3	.518	12.942	91.377			
4	.345	8.623	100.000			

Method: Principal Component Analysis

Looking at the explained variance table for 2018 in Table 5, it was seen that the study had only one sub-dimension, and the sub-dimension explained 54.142% of the total variance. Considering that the research is conducted on the basis of 81 provinces and includes social indicators, the disclosure rate of 54,142% is considered to be sufficient.

Table 5: Announced Total Variances of the Index for 2018

Variables	Initial Values			Sum of Rotated Square Loads		
	Sum	Variance %	Cumulative %	Sum	Variance %	Cumulative %
1	2.044	54.142	54.142	2.044	54.142	54.142
2	.860	19.494	73.636			
3	.785	17.625	91.261			
4	.311	8.739	100.000			

Method: Principal Component Analysis

In 2007, 2011, and 2018, the first principal components were accepted as general factors that affect all of the variables simultaneously and jointly or that are affected by the variables. Therefore, in this study, as in other studies for the three years in question (Rupasingha & Goetz, 2008; Alesina & La Ferrara, 2000; Knack, 2003; Jha & Chen, 2015; Hasan et al., 2017; Davaadorj, 2019, Li et al., 2020) the first basic component was used as the "social capital index value", which shows the social capital levels of the districts.

Table 6 shows the social capital index values on the basis of 81 provinces in 2007, which were produced according to the principal component analysis. Positive values indicate a high level of social capital, while negative values indicate a low level of social capital.

Table 6: 2007 Social Capital Index Values

	Provinces	Index Value		Provinces	Index Value		Provinces	Index Value
1	Ankara	2.1821	28	Eskişehir	0.3714	55	Manisa	-0.1971
2	Sivas	2.0940	29	Kırklareli	0.3709	56	Iğdır	-0.2386
3	Rize	1.9237	30	Karaman	0.3644	57	Antalya	-0.2398
4	Yalova	1.7870	31	Sakarya	0.3279	58	İzmir	-0.2849
5	Karabük	1.6599	32	Balıkesir	0.3163	59	Mersin	-0.3816
6	Bayburt	1.5847	33	Kırşehir	0.2808	60	Osmaniye	-0.4190
7	Çankırı	1.5691	34	Uşak	0.2133	61	Adana	-0.5387
8	Düzce	1.4917	35	Kocaeli	0.1880	62	Hatay	-0.5573
9	Bolu	1.0828	36	Edirne	0.1782	63	Kahramanmaraş	-0.5908
10	Artvin	1.0205	37	Çorum	0.1712	64	Sinop	-0.6449
11	Kastamonu	0.8294	38	Aydın	0.1534	65	Kars	-0.6779
12	Kütahya	0.8290	39	Tunceli	0.1237	66	Elazığ	-0.7215
13	Isparta	0.8241	40	Niğde	0.1024	67	Malatya	-0.7528
14	Kırıkkale	0.8062	41	Kayseri	0.0926	68	Kilis	-0.9970
15	Erzincan	0.7903	42	Amasya	0.0880	69	Siirt	-1.0711
16	Gümüşhane	0.7393	43	Ordu	0.0577	70	Bingöl	-1.1116
17	Trabzon	0.7078	44	Tekirdağ	0.0461	71	Van	-1.3788
18	Bilecik	0.5897	45	Tokat	0.0025	72	Bitlis	-1.4233
19	İstanbul	0.5516	46	Samsun	-0.0154	73	Ağrı	-1.5318
20	Çanakkale	0.5427	47	Şanlıurfa	-0.0989	74	Adıyaman	-1.6134
21	Zonguldak	0.5345	48	Ardahan	-0.1047	75	Gaziantep	-1.7144
22	Nevşehir	0.5054	49	Yozgat	-0.1294	76	Muş	-1.7247
23	Burdur	0.4994	50	Bartın	-0.1332	77	Şırnak	-1.8467
24	Giresun	0.4816	51	Bursa	-0.1414	78	Batman	-1.9792
25	Denizli	0.4719	52	Erzurum	-0.1520	79	Diyarbakır	-2.0127
26	Afyonkarahisar	0.4566	53	Muğla	-0.1840	80	Hakkari	-2.0646
27	Konya	0.4047	54	Aksaray	-0.1856	81	Mardin	-2.5496

Figure 1 shows the mapped form of the social capital index values created for the year 2007 in Table 6. While the green color density shows the provinces with high social capital, the red color density shows the provinces with low social capital value. According to this, it is understood that Ankara has the highest social capital with 2.1821 and Mardin has the lowest social capital with -2.550 in 2007.

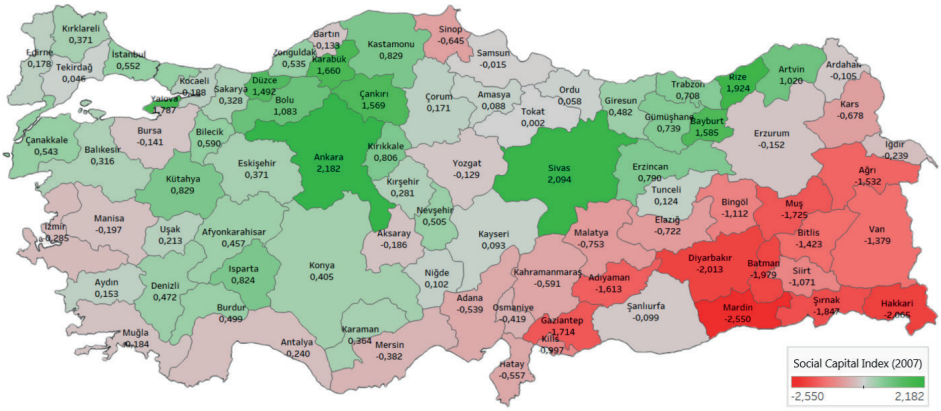

Figure 1: Turkiye's 2007 Social Capital Index by Province

Source: Derived by the author. (See Table 6).

Table 7 shows the social capital index values on the basis of 81 provinces in 2011, produced according to the principal component analysis over 2 norms and 2 network variables. Sorting was made according to the province with the highest index value and the city with the lowest index value.

Table 7: 2011 Social Capital Index Values

	Provinces	Index Value		Provinces	Index Value		Provinces	Index Value
1	Sivas	1.8502	28	Balıkesir	0.3937	55	Sinop	-0.2113
2	Karabük	1.7373	29	Amasya	0.3925	56	Erzurum	-0.2235
3	Rize	1.5740	30	Edirne	0.3675	57	Elazığ	-0.2459
4	Bayburt	1.4009	31	Afyonkarahisar	0.3403	58	Şanlıurfa	-0.2797
5	Ankara	1.3879	32	Kocaeli	0.3282	59	Manisa	-0.2888
6	Çankırı	1.3816	33	Kırşehir	0.3053	60	Kahramanmaraş	-0.3078
7	Bolu	1.3599	34	Uşak	0.2860	61	Malatya	-0.3149
8	Düzce	1.2900	35	Bartın	0.2750	62	Hatay	-0.3283
9	Yalova	1.1959	36	Samsun	0.2617	63	Mersin	-0.3658
10	Artvin	1.1511	37	Kayseri	0.2335	64	Adana	-0.4113
11	Kastamonu	0.9840	38	Isparta	0.2118	65	Bingöl	-0.5144
12	Kütahya	0.7299	39	Denizli	0.2082	66	Antalya	-0.6129
13	Gümüşhane	0.7122	40	Karaman	0.2030	67	Kilis	-0.6484
14	Bilecik	0.6865	41	Niğde	0.1929	68	Bitlis	-0.6838
15	İstanbul	0.6616	42	Bursa	0.1736	69	Kars	-0.7263
16	Kırıkkale	0.6538	43	Tokat	0.1733	70	Iğdır	-1.0751
17	Zonguldak	0.6379	44	Konya	0,.1540	71	Adıyaman	-1.0933
18	Trabzon	0.6249	45	Ordu	0.1463	72	Gaziantep	-1.4717
19	Çanakkale	0.6232	46	Ardahan	0.0371	73	Ağrı	-1.4782
20	Nevşehir	0.5861	47	Tekirdağ	0.0185	74	Muş	-1.5135
21	Giresun	0.5798	48	Yozgat	0.0115	75	Van	-1.6389
22	Sakarya	0.5610	49	Aydın	-0.0370	76	Batman	-2.2412
23	Eskişehir	0.5525	50	Burdur	-0.0768	77	Hakkari	-2.2581
24	Kırklareli	0.5495	51	Aksaray	-0.1017	78	Siirt	-2.3000
25	Tunceli	0.5123	52	Muğla	-0.1143	79	Mardin	-2.3624
26	Erzincan	0.5069	53	Osmaniye	-0.1431	80	Diyarbakır	-2.4365
27	Çorum	0.4811	54	İzmir	-0.1548	81	Şırnak	-3.0260

Figure 2 shows the mapped form of the social capital index values in Table 7, created for 2011. According to this, it is seen that Sivas province has the highest social capital with 1.8502 and Şırnak province has the lowest social capital with -3.0260 in 2011.

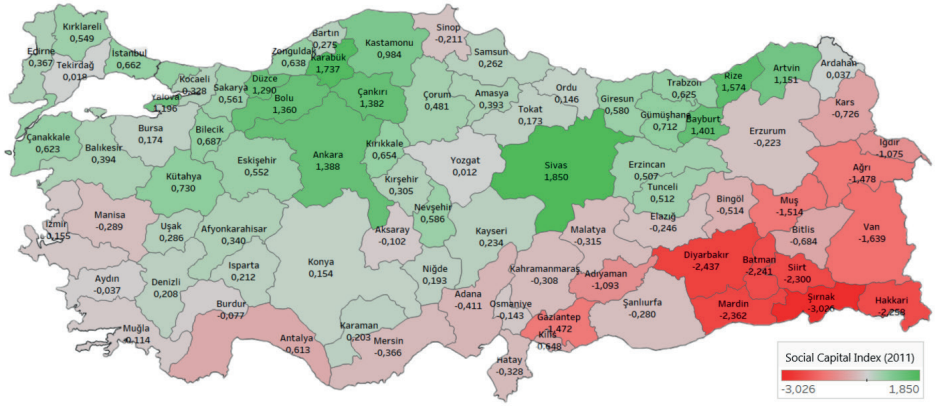

Figure 2: Turkiye's 2011 Social Capital Index by Province

Source: Derived by the author (See Table 7).

Table 8 shows the social capital index values on the basis of 81 provinces for 2018, which were produced according to the principal component analysis over 2 norms and 2 network variables. Provinces are ranked from the province with the highest social capital level to the lowest level of social capital.

Table 8: 2018 Social Capital Index Values

	Provinces	Index Value		Provinces	Index Value		Provinces	Index Value
1	Sivas	2.3752	28	Ardahan	0.4004	55	Malatya	-0.2634
2	Rize	1.9620	29	Nevşehir	0.3780	56	Şanlıurfa	-0.2665
3	Karabük	1.8211	30	Amasya	0.3234	57	Elazığ	-0.2772
4	Ankara	1.7204	31	Giresun	0.3174	58	Hatay	-0.3401
5	Düzce	1.5557	32	Isparta	0.3112	59	Osmaniye	-0.3579
6	Çankırı	1.4698	33	Bartın	0.2996	60	Manisa	-0.3588
7	Bolu	1.4189	34	Afyonkarahisar	0.2864	61	Aksaray	-0.3725
8	Artvin	1.4184	35	Tunceli	0.2492	62	Kahramanmaraş	-0.4137
9	Yalova	1.1510	36	Denizli	0.2289	63	Adana	-0.4156
10	İstanbul	1.1114	37	Uşak	0.2192	64	Bitlis	-0.7401
11	Bayburt	1.0992	38	Konya	0.1566	65	Kilis	-0.7916
12	Kırıkkale	1.0859	39	Samsun	0.1503	66	Sinop	-0.7971
13	Kütahya	0.9008	40	Karaman	0.1142	67	Antalya	-0.8157
14	Trabzon	0.8491	41	İzmir	0.0871	68	Bingöl	-0.9174
15	Çanakkale	0.7379	42	Tokat	0.0280	69	Iğdır	-1.0629
16	Kastamonu	0.7337	43	Kırşehir	0.0081	70	Kars	-1.0884
17	Kırklareli	0.6998	44	Kayseri	-0.0192	71	Adıyaman	-1.2431
18	Bilecik	0.6858	45	Ordu	-0.0667	72	Muş	-1.3273
19	Sakarya	0.6146	46	Muğla	-0.0869	73	Hakkari	-1.4532
20	Eskişehir	0.5838	47	Tekirdağ	-0.1455	74	Gaziantep	-1.5285
21	Kocaeli	0.5252	48	Aydın	-0.1663	75	Van	-1.8266

Table 8: Continue

	Provinces	Index Value		Provinces	Index Value		Provinces	Index Value
22	Zonguldak	0.5127	49	Yozgat	-0.1941	76	Batman	-1.8351
23	Balıkesir	0.4711	50	Mersin	-0.2032	77	Mardin	-1.9167
24	Edirne	0.4695	51	Niğde	-0.2276	78	Siirt	-2.0563
25	Çorum	0.4683	52	Burdur	-0.2394	79	Ağrı	-2.1230
26	Erzincan	0.4465	53	Gümüşhane	-0.2432	80	Diyarbakır	-2.1700
27	Bursa	0.4216	54	Erzurum	-0.2474	81	Şırnak	-2.2695

Figure 3 shows the social capital index values in Table 8 created for 2007, colored and transferred to the map. Accordingly, it is seen that the province with the highest social capital in 2018 was Sivas with 2.3752, followed by Rize with 1.9620, and Karabük with 1.8211 in the third place. It is seen that Şırnak province has the lowest social capital with -2.2695.

In general, it is seen that the provinces with low social capital in Turkiye are mostly located in the Eastern Anatolia and Southeastern Anatolia regions. In addition, while the highest social capital index value was 2.182 in 2007, the highest value increased to 2.375 in 2018.

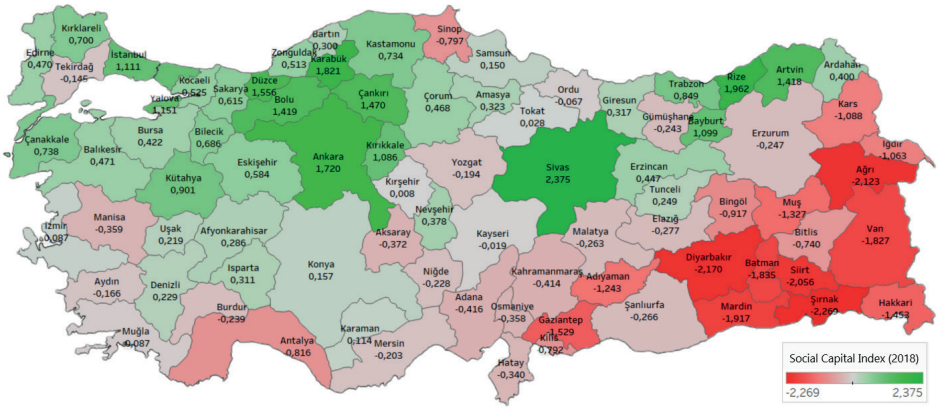

Figure 3: Turkiye's 2018 Social Capital Index by Province
Source: Derived by the author (See Table 8).

Looking at these results, it can be said that Turkiye's social capital level has been in an increasing trend over the years.

6. Turkiye's Social Capital Index

The social capital index (SCI) was calculated for the 81 provinces shown in Table 1. Social capital index by principal component analysis was applied (Rupasingha et al. 2006) to 2 networks and 2 norm variables. The first component obtained as a result of the principal component analysis was taken as the social capital index, as in similar studies (Rupasingha & Goetz, 2008; Jha & Chen, 2015; Hasan et al., 2017; Davaadorj, 2019, Li et al., 2020). The same index generation process was repeated for the years 2007, 2011, and 2018, and then the remaining years were filled with the linear interpolation method.

6.1. Linear Interpolation

Interpolation is expressed as the calculation of unknown values in a certain range using known values. According to this method, by using the data obtained with the help of calculation, observation, and experiment, it is possible to calculate, observe, and find values that are difficult or impossible to find . Linear (linear), parabolic (quadratic), Lagrange and spline interpolations are among the most used interpolation methods (Vatansever & Doğalı, 2011).

There are two data points in the coordinate frame given as (x_0, y_0) and (x_1, y_1) respectively. To find a function representing the data points, the straight-line equation representing a straight line passing through the two data points can be used. The equation of a straight line is given as follows (Abdul Wahab, 2016, p. 2):

$f(x) = y = mx + c$

Here, m represents the gradient of the line. c represents the y-intercept of the equation with y value at $x = 0$ and is given by the following formula:

$$m = \frac{(Y1 - Y0)}{(X1 - X0)} \quad \text{and} \quad c = y_1 - mx_1$$

After substituting and rearranging the values of m and c, the interpolation function $f(x)$ is written as:

$$f(x) = y = m = \frac{(Y_1 - Y_0)}{(X_1 - X_0)} (x - x_0) + y_0$$

The straight-line equation is basically a 1st order polynomial. Figure 4 shows linear interpolation.

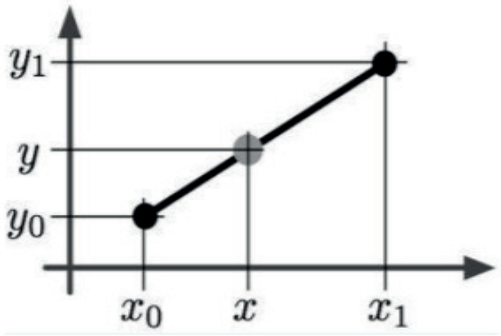

Figure 4: Linear Interpolation Plot

In this study, social capital data between 2007, 2011, and 2018 was filled with linear interpolation method.

6.2. Turkiye's Social Capital Index for the Years 2007-2018

Table 9 shows the social capital index values of the years between 2007-2018, which were created according to the linear interpolation method on a provincial basis in Turkiye, based on the social capital index values of the years 2007, 20011 and 2018. These values, as mentioned above, were determined by Rupasingha et al. (2006) using the principal component analysis method of four different variables consisting of 2 mesh and 2 norm measures. Since it is not possible to in-

clude the index values of all years and provinces in a single graphic in an understandable way, the index values are given as in the table.

Table 9: Turkiye's Provincial Social Capital Index

	Province Name	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1	Adana	-0.539	-0.496	-0.454	-0.411	-0.412	-0.412	-0.413	-0.414	-0.414	-0.415	-0.415	-0.416
2	Adıyaman	-1.613	-1.440	-1.267	-1.093	-1.115	-1.136	-1.158	-1.179	-1.200	-1.222	-1.238	-1.243
3	Afyonkarahisar	0.457	0.418	0.379	0.340	0.333	0.325	0.317	0.309	0.302	0.294	0.288	0.286
4	Ağrı	-1.532	-1.514	-1.496	-1.478	-1.570	-1.662	-1.755	-1.847	-1.939	-2.031	-2.100	-2.123
5	Aksaray	-0.186	-0.158	-0.130	-0.102	-0.140	-0.179	-0.218	-0.256	-0.295	-0.334	-0.363	-0.372
6	Amasya	0.088	0.189	0.291	0.393	0.383	0.373	0.363	0.353	0.343	0.333	0.326	0.323
7	Ankara	2.182	1.917	1.653	1.388	1.435	1.483	1.530	1.578	1.625	1.673	1.708	1.720
8	Antalya	-0.240	-0.364	-0.489	-0.613	-0.642	-0.671	-0.700	-0.729	-0.758	-0.787	-0.808	-0.816
9	Ardahan	-0.105	-0.057	-0.010	0.037	0.089	0.141	0.193	0.245	0.297	0.348	0.387	0.400
10	Artvin	1.020	1.064	1.108	1.151	1.189	1.227	1.266	1.304	1.342	1.380	1.409	1.418
11	Aydın	0.153	0.090	0.026	-0.037	-0.055	-0.074	-0.092	-0.111	-0.129	-0.148	-0.162	-0.166
12	Balıkesir	0.316	0.342	0.368	0.394	0.405	0.416	0.427	0.438	0.449	0.460	0.468	0.471
13	Bartın	-0.133	0.003	0.139	0.275	0.279	0.282	0.286	0.289	0.293	0.296	0.299	0.300
14	Batman	-1.979	-2.067	-2.154	-2.241	-2.183	-2.125	-2.067	-2.009	-1.951	-1.893	-1.850	-1.835
15	Bayburt	1.585	1.523	1.462	1.401	1.358	1.315	1.272	1.228	1.185	1.142	1.110	1.099
16	Bilecik	0.590	0.622	0.654	0.687	0.686	0.686	0.686	0.686	0.686	0.686	0.686	0.686
17	Bingöl	-1.112	-0.913	-0.713	-0.514	-0.572	-0.630	-0.687	-0.745	-0.802	-0.860	-0.903	-0.917
18	Bitlis	-1.423	-1.177	-0.930	-0.684	-0.692	-0.700	-0.708	-0.716	-0.724	-0.732	-0.738	-0.740
19	Bolu	1.083	1.175	1.268	1.360	1.368	1.377	1.385	1.394	1.402	1.410	1.417	1.419
20	Burdur	0.499	0.307	0.115	-0.077	-0.100	-0.123	-0.146	-0.170	-0.193	-0.216	-0.234	-0.239
21	Bursa	-0.141	-0.036	0.069	0.174	0.209	0.244	0.280	0.315	0.351	0.386	0.413	0.422
22	Çanakkale	0.543	0.570	0.596	0.623	0.640	0.656	0.672	0.689	0.705	0.721	0.734	0.738
23	Çankırı	1.569	1.507	1.444	1.382	1.394	1.407	1.419	1.432	1.445	1.457	1.467	1.470
24	Çorum	0.171	0.275	0.378	0.481	0.479	0.477	0.476	0.474	0.472	0.470	0.469	0.468
25	Denizli	0.472	0.384	0.296	0.208	0.211	0.214	0.217	0.220	0.223	0.226	0.228	0.229
26	Diyarbakır	-2.013	-2.154	-2.295	-2.437	-2.398	-2.360	-2.322	-2.284	-2.246	-2.208	-2.180	-2.170
27	Düzce	1.492	1.424	1.357	1.290	1.328	1.366	1.404	1.442	1.480	1.518	1.546	1.556
28	Edirne	0.178	0.241	0.304	0.367	0.382	0.397	0.411	0.426	0.440	0.455	0.466	0.470
29	Elazığ	-0.722	-0.563	-0.404	-0.246	-0.250	-0.255	-0.259	-0.264	-0.268	-0.273	-0.276	-0.277
30	Erzincan	0.790	0.696	0.601	0.507	0.498	0.490	0.481	0.472	0.464	0.455	0.449	0.447
31	Erzurum	-0.152	-0.176	-0.200	-0.223	-0.227	-0.230	-0.234	-0.237	-0.241	-0.244	-0.247	-0.247
32	Eskişehir	0.371	0.432	0.492	0.552	0.557	0.561	0.566	0.570	0.575	0.579	0.583	0.584
33	Gaziantep	-1.714	-1.634	-1.553	-1.472	-1.480	-1.488	-1.496	-1.504	-1.512	-1.520	-1.526	-1.529
34	Giresun	0.482	0.514	0.547	0.580	0.542	0.505	0.467	0.430	0.392	0.355	0.327	0.317
35	Gümüşhane	0.739	0.730	0.721	0.712	0.576	0.439	0.303	0.166	0.030	-0.107	-0.209	-0.243
36	Hakkari	-2.065	-2.129	-2.194	-2.258	-2.143	-2.028	-1.913	-1.798	-1.683	-1.568	-1.482	-1.453
37	Hatay	-0.557	-0.481	-0.405	-0.328	-0.330	-0.332	-0.333	-0.335	-0.337	-0.338	-0.340	-0.340
38	Iğdır	-0.239	-0.517	-0.796	-1.075	-1.073	-1.072	-1.070	-1.068	-1.066	-1.065	-1.063	-1.063
39	Isparta	0.824	0.620	0.416	0.212	0.226	0.240	0.254	0.269	0.283	0.297	0.308	0.311
40	İstanbul	0.552	0.588	0.625	0.662	0.726	0.790	0.854	0.919	0.983	1.047	1.095	1.111
41	İzmir	-0.285	-0.242	-0.198	-0.155	-0.120	-0.086	-0.051	-0.017	0.018	0.053	0.078	0.087
42	Kahramanmaraş	-0.591	-0.496	-0.402	-0.308	-0.323	-0.338	-0.353	-0.368	-0.383	-0.399	-0.410	-0.414
43	Karabük	1.660	1.686	1.712	1.737	1.749	1.761	1.773	1.785	1.797	1.809	1.818	1.821
44	Karaman	0.364	0.311	0.257	0.203	0.190	0.178	0.165	0.152	0.140	0.127	0.117	0.114
45	Kars	-0.678	-0.694	-0.710	-0.726	-0.778	-0.830	-0.881	-0.933	-0.985	-1.037	-1.075	-1.088
46	Kastamonu	0.829	0.881	0.932	0.984	0.948	0.912	0.877	0.841	0.805	0.769	0.743	0.734
47	Kayseri	0.093	0.140	0.187	0.234	0.197	0.161	0.125	0.089	0.053	0.017	-0.010	-0.019
48	Kırıkkale	0.806	0.755	0.705	0.654	0.716	0.777	0.839	0.901	0.962	1.024	1.070	1.086
49	Kırklareli	0.371	0.430	0.490	0.549	0.571	0.592	0.614	0.635	0.657	0.678	0.694	0.700
50	Kırşehir	0.281	0.289	0.297	0.305	0.263	0.220	0.178	0.135	0.093	0.051	0.019	0.008

Table 9: Continue

	Province Name	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
51	Kilis	-0.997	-0.881	-0.765	-0.648	-0.669	-0.689	-0.710	-0.730	-0.751	-0.771	-0.786	-0.792
52	Kocaeli	0.188	0.235	0.281	0.328	0.356	0.384	0.413	0.441	0.469	0.497	0.518	0.525
53	Konya	0.405	0.321	0.238	0.154	0.154	0.155	0.155	0.155	0.156	0.156	0.157	0.157
54	Kütahya	0.829	0.796	0.763	0.730	0.754	0.779	0.803	0.828	0.852	0.876	0.895	0.901
55	Malatya	-0.753	-0.607	-0.461	-0.315	-0.308	-0.300	-0.293	-0.285	-0.278	-0.271	-0.265	-0.263
56	Manisa	-0.197	-0.228	-0.258	-0.289	-0.299	-0.309	-0.319	-0.329	-0.339	-0.349	-0.356	-0.359
57	Mardin	-2.550	-2.487	-2.425	-2.362	-2.299	-2.235	-2.171	-2.108	-2.044	-1.980	-1.933	-1.917
58	Mersin	-0.382	-0.376	-0.371	-0.366	-0.343	-0.319	-0.296	-0.273	-0.250	-0.226	-0.209	-0.203
59	Muğla	-0.184	-0.161	-0.137	-0.114	-0.110	-0.106	-0.103	-0.099	-0.095	-0.091	-0.088	-0.087
60	Muş	-1.725	-1.654	-1.584	-1.514	-1.487	-1.460	-1.434	-1.407	-1.380	-1.354	-1.334	-1.327
61	Nevşehir	0.505	0.532	0.559	0.586	0.556	0.527	0.497	0.467	0.437	0.408	0.385	0.378
62	Niğde	0.102	0.133	0.163	0.193	0.133	0.073	0.013	-0.047	-0.107	-0.168	-0.213	-0.228
63	Ordu	0.058	0.087	0.117	0.146	0.116	0.085	0.055	0.025	-0.006	-0.036	-0.059	-0.067
64	Osmaniye	-0.419	-0.327	-0.235	-0.143	-0.174	-0.204	-0.235	-0.266	-0.297	-0.327	-0.350	-0.358
65	Rize	1.924	1.807	1.691	1.574	1.629	1.685	1.740	1.796	1.851	1.907	1.948	1.962
66	Sakarya	0.328	0.406	0.483	0.561	0.569	0.576	0.584	0.592	0.599	0.607	0.613	0.615
67	Samsun	-0.015	0.077	0.169	0.262	0.246	0.230	0.214	0.198	0.182	0.166	0.154	0.150
68	Siirt	-1.071	-1.481	-1.890	-2.300	-2.265	-2.230	-2.196	-2.161	-2.126	-2.091	-2.065	-2.056
69	Sinop	-0.645	-0.500	-0.356	-0.211	-0.295	-0.379	-0.462	-0.546	-0.630	-0.713	-0.776	-0.797
70	Sivas	2.094	2.013	1.931	1.850	1.925	2.000	2.075	2.150	2.225	2.300	2.356	2.375
71	Şanlıurfa	-0.099	-0.159	-0.219	-0.280	-0.278	-0.276	-0.274	-0.272	-0.270	-0.268	-0.267	-0.266
72	Şırnak	-1.847	-2.240	-2.633	-3.026	-2.918	-2.810	-2.702	-2.594	-2.486	-2.378	-2.296	-2.269
73	Tekirdağ	0.046	0.037	0.028	0.018	-0.005	-0.028	-0.052	-0.075	-0.099	-0.122	-0.140	-0.145
74	Tokat	0.002	0.059	0.116	0.173	0.153	0.132	0.111	0.090	0.070	0.049	0.033	0.028
75	Trabzon	0.708	0.680	0.653	0.625	0.657	0.689	0.721	0.753	0.785	0.817	0.841	0.849
76	Tunceli	0.124	0.253	0.383	0.512	0.475	0.437	0.400	0.362	0.324	0.287	0.259	0.249
77	Uşak	0.213	0.238	0.262	0.286	0.276	0.267	0.257	0.248	0.238	0.229	0.222	0.219
78	Van	-1.379	-1.465	-1.552	-1.639	-1.666	-1.692	-1.719	-1.746	-1.773	-1.800	-1.820	-1.827
79	Yalova	1.787	1.590	1.393	1.196	1.190	1.183	1.177	1.170	1.164	1.157	1.153	1.151
80	Yozgat	-0.129	-0.082	-0.035	0.012	-0.018	-0.047	-0.077	-0.106	-0.135	-0.165	-0.187	-0.194
81	Zonguldak	0.535	0.569	0.603	0.638	0.620	0.602	0.584	0.566	0.548	0.531	0.517	0.513

Source: Calculated by the author.

In Table 9, there are index values showing the social capital levels for 81 provinces and each year from 2007 to 2018. Positive and higher values of the index value obtained are an indication of having more social capital. The negative and lower values of the index value obtained are an indication of having a lower level of social capital.

When the social capital change of the provinces is examined, it has been determined that the social capital index value of 46 provinces increased from 2007 to 2018, while the social capital index value of 35 provinces decreased. In the provinces shown in Table 9 and shown in bold, the social capital index value increased whereas it decreased in the others.

7. Conclusion

Social capital is one of the important concepts that has become increasingly important in recent years and has taken its place in the literature, especially in the field of economy and education as well as in different fields. Although there are different opinions on the definition, types and measurement of social capital, the importance of the concept, its effects and the number of studies on this concept are increasing. The fact that the concept of social capital is multidimensional and an interdisciplinary concept is one of the main motives of the different views on the concept.

Institutional theory states that different institutions in countries affect the perceptions of people in that country towards bureaucratic institutions (Kaufmann, 2018, p. 380). However, the institutions and rules that affect these perceptions may not always be official institutions and rules such as the constitution, laws, and contracts. These perceptions can sometimes be influenced by informal institutions and rules. Informal institutions and rules consist of unwritten rules such as religion, morality, tradition, customs, and norms (Pejovich, 1999, p. 167). Informal institutions can also be defined as the ways in which people do business by being influenced by the rules, norms, and procedures of the societies in which they live, and the behavior, restriction, and action styles that societies direct individuals and institutions (North, 1990, p. 5). One of these informal institutional factors is social capital (Hofstede, 2001; Jin et al., 2019).

In some cases, the success of countries or regions in terms of economy, education, finance, growth, technology, cooperation, crime rate, and social welfare may not be directly dependent on their performance in these areas. Social capital levels, which is one of the non-institutional factors of societies, can emerge as a factor affecting their success. At this point, it is important to consider the social factors that affect socio-economic activities, albeit indirectly. This is why social capital, which is an important indicator of relations, social ties, reconciliation, cooperation and trust, has been the subject of important studies in many different fields, especially in economy and education in recent years (Knack and Keefer, 1997; La Porta et al., 1997; Glaeser et al., 1995; Fountain, 1997; Guiso et al. 2004 & 2008; Akçomak & ter Weel, 2009; Guriev & Melnikov, 2016).

These studies on social capital, which have been carried out in different fields, show that social capital provides higher economic growth, higher education level, more efficient and fair institutions, more efficient production, more qualified health services, lower crime rates, and a higher level of cooperation. Also, it contributes to the level of trust and more qualified human capital. Recently, there has been an increase in the number of studies on how social capital affects socio-economic structure and country and regional developments in the world. The inadequacy of other theories in explaining the results at some points and the expectation that social capital can fill the uncertainties that arise in the relevant theories over time have increased the importance of social capital.

The method used to create the social capital index in this study is the method used in previous studies (Rupasingha, 2006, p. 85; Hasan et al., 2017, p. 1024; Huang & Shang, 2019, p. 29) in addition to using the principal component analysis method using 2 networks and 2 norm variables. For this, principal component analysis was applied in 2007, 2011, and 2018, and the first component was taken as the social capital index indicator in these years. Since social capital is not a value that changes in a short time for countries, regions, and cities, as applied in similar studies, the index values for the years 2007, 2011 and 2018 were created by linear interpolation method using the data (Rupasingha & Goetz, 2008; Jha & Chen, 2015; Jin et al., 2019).

When the created social capital index was examined, it was determined that the social capital index of 46 provinces increased from 2007 to 2018, while the social capital index value of 35 provinces decreased. In addition, as of 2018, the number of provinces with positive social capital index value was 43, while the number of provinces with negative index was 38. When the course of the general index is examined, it is understood that the provinces with low social capital in Turkiye are mostly among the provinces in the Eastern Anatolia and Southeastern Anatolia regions. In addition, while the highest social capital index value was 2,182 in 2007, the highest value increased to 2,375 in 2018. Looking at these results, it can be said that there is a general increase in the level of social capital in Turkiye over the years.

In this study, Turkiye's social capital index was created on the basis of 81 provinces between 2007-2018. Although there are studies in the literature that calculate Turkiye's social capital on a regional basis (Tüysüz, 2011; Öztopçu, 2017), there is no study to create a social capital index on a provincial basis. The fact that there are few studies on a regional basis on the creation of a social capital index in Turkiye and that no studies can be found on a provincial basis constitute the main motivation and the most important aspect of this study. In this study, it is aimed to contribute to studies in the field of economy, education, and other interdisciplinary fields by using the social capital index data produced on a provincial basis.

Finally, this study aims to contribute to the relevant national and international literature by creating the necessary method and theoretical knowledge through the indirect effect method. It provides an important data set to policy makers, researchers, and other interested parties. Finally, due to the fact that the subject is about a developing country, it is thought that the same method will be used for other developing countries and it will set an example for similar studies to be done. In this study, a data set consisting of 2 norms and 2 network variables was used while calculating the social capital index. In future studies, the social capital index can be calculated on a provincial basis with more different variables.

Ethics Committee Approval: In this study, there was no need to obtain an ethics committee certificate, since data collection was not conducted through "survey, interview, focus group work, experiment and similar ways".
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