Pioneering institutions in sector on real estate appraisal

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ABSTRACT

The institutions that take the leading role in the evaluation of the real estate should be determined. Real estate valuation takes place in a multi-headed organizational structure and is benefited from institutions in both the public and private sectors. The method of determining the institutions will be examined through the social network analysis methodology of the network of relations between public institutions and the private sector. With the numerical and visual analyzes the following questions will be examined: "Which is the director and responsible institution to undertake the task of collecting the institutional structure under one roof?", Which is the institution that uses the real estate appraisal results most in their works?, Which institution is the most cooperating in acquiring data on real estate appraisal?, Which are the most known institutions that make real estate appraisal?, Which of the institutions that make real estate appraisal are most trusted?". The study will be conducted in order to find answers given to the related questions. As a result, relations between institutions engaged in real estate appraisal business are assessed by social network analysis and interoperability issuing "awareness network" will be put forward.

1. INTRODUCTION

In the competitive and variable environment of life in recent years, it has become compulsory for any service providing process to be fast, quality and economical in general. A new approach to service provisioning is possible only if different service providers can cooperate or collaborate effectively. Interoperability infrastructures are required for this (Zutshi et al. 2012; Charalabidis et al. 2015; Diallo et al. 2016). TNCIS (Turkey National Geographic Information System) and services not in the field, in all other areas, such as e-government has emerged in a very significant way (Güney et al. 2015; Polat et al. 2015; Ozbek et al. 2016; Saralioğlu et al. 2019).

According to significant studies carried out regarding today's public and private sector structures show that requires active collaborations, both functional and physical and within hierarchical boundaries (Vaubel 2016; Smith and Wen 2017; Wang et al. 2019). Such a study is carried out through informal networks between institutions. In this study, collaborations and communication networks are put forward by using social (organizational) network analysis and suggestions are

introduced (Tichy et al. 1979; Borgatti and Molina 2003; Carrington et al. 2005; Ujwary-Gil 2019). The awareness network can be established as to whether or not the institutions are aware of each other's data and which exchange data among themselves and which institutions are represented with network analysis that often happens (Thibaut et al. 2012; Barabási 2016; Jones et al. 2017). These two analyses can be integrated and interpreted.

Throughout the country, public and private sector institutions that make property appraisal were identified, and a network of invisible relationships between them were uncovered and thus; it was attempted to determine the premise institution to undertake the task of gathering under a single roof in the evaluation of real estate with the obtained numerical and visual analysis data (Friedman et al. 2017; MacGregor et al. 2018).

In this study, targeted benefits across Turkey by determining the roofing Institution of real estate valuation are summarized below:

Determination and registration of real estate values is necessary for the provision of tax justice and planned development in the country. It is important to know the

value of real and legal persons ' private property in terms of recording economic transactions. It is important to determine the value of the real estate in terms of expropriation, housing sector, reduction of company assets and litigation load, to arrange expert reports on real estate values in cases based on Geographical Information Systems, scientific technical data, and to carry out the expropriation operations fairly and smoothly. Urban transformation projects of public, the property rights of real and legal persons to be treated with respect, urban rent and the city of society, social peace, and peace in terms of a public service that is the view of stakeholders that must be performed immediately.

2. REAL ESTATE VALUATION

Planning of cities and economic development of the reconstruction plans are only possible by evaluating the real estate with appropriate methods (Yu 2016; Kauko 2018; Ertas 2019; Nanda 2019). Moreover, the revaluation of the real estate value increases arising from public investments can be realised by evaluating these properties before and after the investment (Wang et al. 2018). Real estate appraisal is also of great importance in terms of selecting new settlement areas, consolidating of fragmented parcels in urban areas and arranging them following the plan, clarity and trust of real estate markets, monitoring price changes in the market, guiding real estate buyers, sellers, owners and entrepreneurs (Lucius 2001; Krause and Bitter 2012). Real estate valuation is one of the essential economic bases of developed societies. In our country, real estate appraisal transactions are not dependent on any standard, and they have adverse effects on economic and social balances. Since the real estate appraisal system still does not exist, many valuation cases have come to our country, economically there are significant tax losses of the state, and there are many differences in the real estate market. Due to the increasing number of discussions in this subject and the increasing need for information related to the subject, it is necessary to provide a more healthy system of valuation of real estates (Whitney et al. 2009; Smith 2016; Unel et al. 2017). The same or similar activities for real estate can be realised by more than one institution. In our country, inter-institutional coordination is of great importance in terms of preventing repetitive work and, if necessary, sharing of acquired experiences. On the other hand, according to the administrators and employees of the institutions operating in the real estate, there is no effective coordination among the institutions in our country (Iversen et al. 2016; Çay et al. 2017; Lundsgaarde et al. 2018).

3. SOCIAL NETWORK ANALYSIS

The earliest findings of SNA are known to be found in the writings of ancient Greek scholars. The primary development regarding this area started in the 1930s with studies in different fields progressing independently of each other (Scott 1988; Wasserman and Faust 1994; Knoke and Yang 2019). Network analysis which is being examined in the fields of psychology, sociology, mathematics, statistics and informatics, is today a research area which is mentioned with its applications spreading in a comprehensive framework including social scientists, informatics experts, politicians, economists, sociologists and mathematicians (Freeman 2004; Carrington et al. 2005; Borgatti et al. 2009). A study by the American scientists Moreno and Jennings (1938), a sociogram or diagrammatic map benefiting dots and lines to illustrate social relations has been adopted as an important starting point for the development of social network analysis. In his study of the foundations of sociometry, Jacob Moreno used methods including graphical representations, which allowed individuals or social groups to identify the relationships within quantifiable quantitative parameters. Moreno focused on the relationships between people rather than people and has made concrete ideas about the social network or social texture that had not been previously apparent (Freeman 1996; Borgatti and Ofem 2010)

SNA is a method of investigating the structure of social relationships that exist between people. ; It is also an analytical framework for examining the relationships between social entities. Through SNA, the social network is defined as the relationship between social actors, mapping and surveying studies. The SNA is based on the assumption that the importance of the relationship between interactive groups. Social entities, defined as actors, are represented as nodes in the plane. Social relations are a result of people's experiences, in other words, how it felt and that also affects the subjective field to which information or resources available with these experiences. The benefit of the SNA is that it allows us to examine the relationships among people and then examine their interconnectedness. SNA is a method that is frequently used to reveal social dynamics in sociological and organizational studies. Identifying information, sharing patterns in education and online learning environments are used to understand social capital accumulation in the network. Since knowledge is an essential factor in the formation of wealth, economic actors want to direct information to themselves. It is one of the reasons that make SNA valuable. The answer to the question of the conditions under which actors who are close to knowledge can use this situation as an advantage can be obtained through the SNA (Freeman et al. 2017; Borgatti et al. 2018).

3.1. The Criteria of Social Network Analysis

In the process of examining the network structure with the SNA, it is observed that SNA focuses on the connections between the actors rather than the attributes of the network. During the analysis process, several values obtained as a result of identifying and digitizing the relationships between actors in the network are called criteria. With the criteria used in the SNA is provided by comparing networks, identifying types, analyzing the complex structure of networks, and making the network understandable. By determining criteria such as density, centrality for a network, the position, connections and weaknesses or strengths of an actor in the social network can be revealed. Various

criteria can be achieved by performing SNA at different levels when the analysis is done for the whole network. There are different criteria for examining subgroups in the network and in evaluating each actor in the network. Although they have different names, basically each node in a network is called a node, while linking connections/relationships between entities. In visualization applications, the connections between the two nodes are generally expressed as "edge", since they are indicated by a line connecting the nodes (Wasserman and Faust 1994; Carrington et al. 2005; Knoke and Yang 2019).

Table 1. Social network mechanism measures used for actors (Jablin and Putnam 2001; Taktak and Demir 2019)

Measure	Definition
Degree	The number of direct connections to other actors.
Indegree	Number of connections of other elements to the actor (receiving connections).
Outdegree	The number of connections of the actor to other elements (sending connections).
Closeness	The closeness of an actor to other actors within the network or the degree of accessibility. It is generally calculated by averaging an actor's path distance (direct or indirect connections) to all others. While a direct relation is valued at 1, indirect relations are valued at a lower number proportionately.
Between	It is the degree of an actor's preference to be or intermediate between two actors, which are closest to each in the network mechanism. It is generally calculated according to the average of all possible bilateral relations in the network.
Centrality	It is the measure of an actor's degree of being positioned in the center in the network mechanism. The measures of degree, closeness, and between are generally used as the determinants of the centrality. Some centrality measures weight an actor's relation with others by using others' degree of centrality.
Density	The ration between current connections and possible connections in the network mechanism.

In order for the SNA to be carried out, a number of data must be available describing Which actors are connected. Mathematical measurement and calculation methods are used to identify and analyze the social network mechanism created after the introduction of network relation data; It is differentiated from the statistical methods used in data analysis of any quantitative research in the field of social sciences. In the social network analysis, specific measurement methods are used to explain the position of the actors in the network and formed as a whole in order to define the network mechanism. In order to explain the relations between the actors and the network mechanism, Jablin and Putnam discussed the methods of measurement in four groups. These are (Jablin and Putnam 2004);

- Measurements of social network mechanism used for relationships: It provides the analysis of the structure of the relations between the actors in a network organization and the determination of the extent of the actors within the network. It is also used to describe the qualitatively differentiated aspects of network relationships.
- Measurements of social network mechanism used for actors: The hierarchical structure of a network mechanism is very important in terms of determining the power relations and determining the communication patterns.
- The roles of the actors in the network mechanism: It shows the tasks played by the actors on the network.

Measurements of the social network mechanism used to identify network devices: It is used to define the network features as a whole. Information such as the size or density of the network mechanism generated. Also, it is after entering the data by determining network relationships. In organizational research, it provides the determination of the effectiveness of established relations within an area of activity.

Table 2. The role of actors in network (Jablin and Putnam 2001; Taktak and Demir 2019)

Measure	Definition
Star	An actor had a high centrality in the network.
Liaison	An actor who provides the relationship of two or more groups that cannot otherwise be related to each other.
Bridge	An actor who is a member of two or more groups.
Gatekeeper	An actor was controlling the flow of information with a single connection between one part of the network and the other part.
Isolate	An actor who has no or very little connection with others.

4. IMPLEMENTATION

Based on the institutions shown in Table 3, the cooperation of the institutions, which have a network of relations within the scope of real estate appraisal, is examined by using SNA method.

Survey questions were asked to each institution in Table 3 in the form of face-to-face interviews to the relevant experts on Real Estate Appraisal. For five survey questions which are functional in terms of SNA method, the numerical values given by the people who filled out the questionnaire were prepared as a separate Table. The obtained data were statistically and visually evaluated, and the evaluations were performed by Gephi 0.9.1 software which is one of the SNA software and preferred for scientific publications. As the sample of the study, 26 organizations in public and private sectors that used or generated spatial data were selected (Tab. 3).

Likert type scale was used in this study. Based on the recommendations, an odd-numbered scale was used. Additionally, the scale of 0-8 was chosen to show the weight in the network figures clearly. As the study would have a network mechanism sample, the sample was selected to be limited in space. The position-based approach was used to define the limits of samples (Burt

and Minor 1983). In the position-based approach, the presence of a membership relation for the network in which actors are in can be proved. The reason why limited space is used in the study is that the number of researched and compared relations increase exponentially with the number of volunteers. Therefore studies in which sociometric data is collected and use a matrix approach usually have 40 or fewer samples (Seevers et al. 2015). For that reason, it can be concluded that the sample used in this study is adequate for sociometric research. All of the volunteers in the sample were engineers or people with a technical job.

Table 3. Organizations associated with real estate valuation In Usak Province (Taktak 2013)

Name of Institution	Abbreviation
Usak Municipality	UM
Special Provincial Administration	SPA
State Hydraulic Works	SHW
Housing Development Administration	HDA
Forest Management Directorate	FMD
The Directorate of Highways	DH
Department of Environment and Urbanization	DEU
Directorate of Title Deed Registry and Cadastre	DTDRC
Foundations	F
Turkish Electricity Distribution Company	TEDC
Governorship	G
Provincial Directorate of Agriculture	PDA
Real Estate Agent	REA
Banks	B
National Real Estate Department	NRED
Licensed Bureau of Surveying Engineering	LBSE
Telecom Directorate	TD
Directorate of Disaster Affairs	DDA
Independent Survey and Cadastre Office	ISCO
Chamber of Commerce	CC
Chamber of Agriculture	CA
Directorate of Museums	DM
University of Usak	UU
Courts	C
Natural Gas Distribution Company	NGDC
Directorate of Provincial Food Agriculture and Livestock	DPFAL

4.1. Showing Relations of Cooperation, Trust and Data Sharing Within Social Network

Without proper coordination and cooperation between institutions, it is not possible to reach institutional and social goals. Stability and development are realised through inter-agency cooperation and compliance. When corporate relations are carried out, healthily, stability and social development become easier. The institutions need to obtain public trust towards the decisions and actions they take and to get approval and support from their target groups. It is essential to establish public trust and pay due attention to institutions operating in the public sector. Because public institutions are state governing bodies, they have the responsibility of both the administrative power and the public benefit that this administrative power brings. Effective data sharing of organizations is an interoperability system that provides instant access to

and use of services. The data needed by the institutions to carry out their activities; It is a comprehensive application that tries to create a fast, economical and efficient way to reach it. Data-based technological applications are increasing day by day and the number of users increases, as well.

Table 4. Social network analysis survey questions

No	Relations which show the network potential for data sharing	disagree ←→ agree
1	Which are the most known institutions engaged in the business of real estate valuation ?	0 1 2 3 4 5 6 7 8
2	What is the institution that uses the real estate valuation data in its work ?	0 1 2 3 4 5 6 7 8
3	Which institutions are cooperated most to obtain the data related to real estate valuation ?	0 1 2 3 4 5 6 7 8
4	Which of the institutions that make real estate appraisal are trusted the most ?	0 1 2 3 4 5 6 7 8
5	Which is the guiding and responsible body to undertake the task of gathering institutional structuring under a single roof?	0 1

Today, for data sharing between institutions, it is necessary to determine the functional, physical and hierarchical boundaries of institutions and to ensure practical cooperation between them. Social networks are the systems that will reveal the invisible cooperation between institutions. SNA, which can be expressed as the digitization and scientific nation of the relations between the actors, is used to transform the existing networks of relations between organizations or organizations into numerical data. According to the digitized data, the shape and characteristics of the network obtained will reveal the efficiency of the institutional or inter-institutional communication network. It also guides taking necessary measures or providing support on the issues analysed.In this study, in order to be able to have an idea about the functioning of the institutions. Besides, the way in which they are perceived by those concerned, an application has been made at the local dimension. In the central district of Uşak province, the existing relationship network between public institutions, local administrations, private sector and real estate appraisal and business sectors that produce data on real estate valuation is presented. The resulting existing networks are aimed to obtain information about the status of the real estate appraisal at the national scale. In the thesis, the relationship between the institutions was examined from a social point of view. It is not from a technical point of view. With this examination, a study has been carried out which can reveal the interoperability of the

institutions which are not aware of them and which do not depend on a particular rule. In the research, social network analysis is examined, and the organizational structure between institutions is put forward.In this context, the survey questions 1, 2, 3, 4, 5 given in Table 4, which would reveal the cooperation within the network, were directed to the concerned.

Survey Question 1: Each organization that uses or produce data on real estate valuation was asked the question "Which are the most known institutions engaged in the business of real estate valuation?". Network and centrality graphs were created using the data obtained from the answers to this question. Actors and data access network among actors is shown in Fig. 1.

The numerical value of the frequency of public institutions meeting with each other was calculated as 415. The maximum number of bonds that can occur in the network is 650 (n (n-1) = 26.25 = 650). Based on this number of bonds, the overall density of the network was calculated as 415/650 = 0.638. For a network of 26 public institutions, this value is seen to have a density above average. 63.8% of the maximum number of ties that can occur between the actors are in the network. It can be said that public institutions' awareness of real estate valuation among each other is above the middle level.

The calculated "in degree, out degree, in closeness, out closeness, in eigenvalues, out eigenvalues and between values" and the institutions with the highest and lowest values are shown in Table 4, according to the answers of the public institutions, namely the actors, to the first question of the survey.
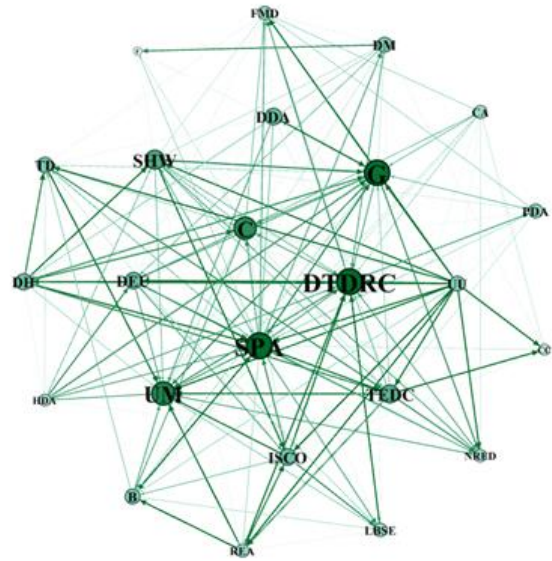

Figure 1. Network map of actors and links between actors according to answers to the first question

Table 4. "Which one is known to most real estate appraisal organization?" In-out degree, in-out closeness, in-out eigenvalues and between proximity values results for this question are:

No	Institutions	OutDeg	Indeg	OutClose	InClose	OutEigen	InEigen	Between
1	UM	2.28	5.88	0.806	1	0.195	0.411	0.03
2	SPA	4.36	4.56	1	1	0.338	0.313	0.068
3	SHW	2.84	3.04	0.806	1	0.239	0.217	0.036
4	HDA	1.88	0.76	0.694	0.658	0.188	0.061	0.003
5	FMD	1.16	1.76	0.641	0.735	0.111	0.119	0.002
6	DH	2.6	2.16	0.694	0.926	0.247	0.169	0.01
7	DEU	2.56	1.76	0.758	0.658	0.232	0.156	0.007
8	DTDRC	3.12	6.36	0.962	1	0.248	0.441	0.059
9	F	1.2	0.48	0.641	0.568	0.115	0.039	0
10	TEDC	2.16	1.92	0.694	0.781	0.18	0.147	0.006
11	G	3.56	3.84	1	1	0.291	0.261	0.068
12	PDA	1.48	0.76	0.714	0.595	0.132	0.079	0.001
13	REA	1.56	3.8	0.658	1	0.14	0.272	0.006
14	B	1.6	2.32	0.641	0.962	0.149	0.187	0.01
15	NRED	1.16	2.48	0.61	0.862	0.119	0.218	0
16	LBSE	1.36	1.2	0.694	0.595	0.128	0.143	0.003
17	TD	1.8	1.48	0.714	0.625	0.16	0.137	0.003
18	DDA	1.84	0.64	0.806	0.581	0.171	0.071	0.003
19	C	2.48	2.04	0.962	0.658	0.204	0.183	0.019
20	ISCO	2.12	2.16	0.694	0.694	0.186	0.197	0.005
21	CC	0.92	1.08	0.581	0.658	0.093	0.07	0
22	CA	1.8	0.36	0.694	0.568	0.151	0.034	0
23	DM	2.12	0.64	0.781	0.595	0.188	0.065	0.004
24	UU	3.76	0.96	0.862	0.962	0.32	0.069	0.041
25	DPFAL	1.52	0.88	0.714	0.581	0.134	0.11	0.001
26	NGDC	2.04	1.96	0.694	0.758	0.167	0.151	0.004

Survey Question 2: Each organization that uses or produce data on real estate valuation was asked the question "Which institution uses the real estate valuation data in its work ?" and network and centrality graphs were created using the data obtained from the answers to this question. Actors and data access network among actors is shown in Fig. 2.

The numerical value of the frequency of public institutions meeting with each other was calculated as 415. The maximum number of bonds that can occur in the network is 650 (n (n-1) = 26.25 = 650). Based on this number of bonds, the overall density of the network was calculated as 519/650 = 0.798. For a network of 26 public institutions, this value is seen to have a density above average. 79.8% of the maximum number of ties that can

occur between the actors are in the network. It can be said that the public institutions use real estate valuation studies among each other, and it is above the middle level.

Survey Question 3: Each organization that uses or produce data on real estate valuation was asked the question "Which institutions have cooperated the most to obtain the data relating to real estate valuation?". Network and centrality graphs were created using the data obtained from the answers to this question. Actors and data access network among actors is shown in Fig. 3.
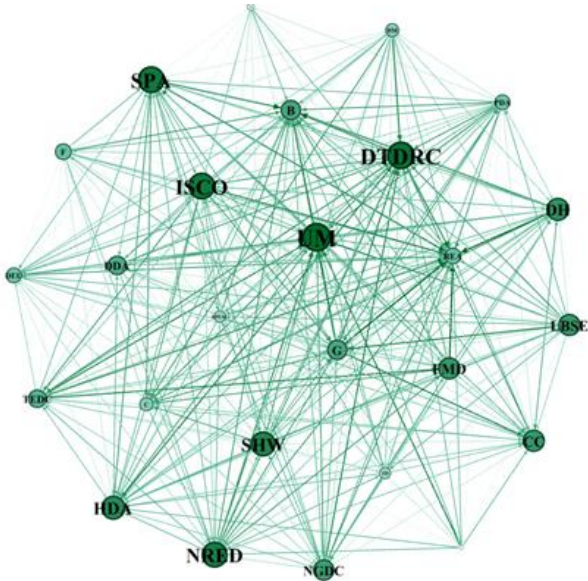

Figure 2. Network map of actors and links between actors according to answers to the second question
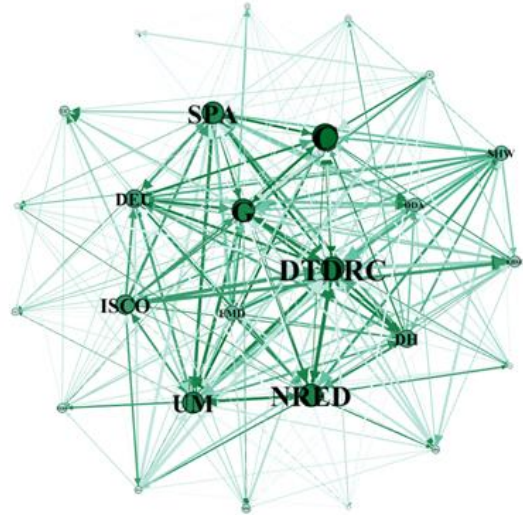

Figure 3. Network map of actors and links between actors according to answers to the third question

Table 5. "Which institution uses the real estate valuation data in its work?" In-out degree, in-out closeness, in-out eigenvalues and between proximity values results for this question are:

No	Institutions	OutDeg	Indeg	OutClose	InClose	OutEigen	InEigen	Between
1	UM	3.92	5.24	1	1	0.225	0.278	0.03
2	SPA	4.64	3.84	1	0.926	0.255	0.216	0.019
3	SHW	3.88	3.32	0.962	0.893	0.222	0.193	0.018
4	HDA	3.48	4.48	0.833	1	0.207	0.245	0.016
5	FMD	3.96	3.12	0.926	0.833	0.225	0.183	0.007
6	DH	4.52	3.04	1	0.806	0.248	0.177	0.008
7	DEU	2.56	3.12	0.735	0.833	0.153	0.175	0.003
8	DTDRC	4.48	5.4	1	0.962	0.245	0.289	0.023
9	F	3.04	1.44	0.962	0.676	0.175	0.079	0.002
10	TEDC	3.56	3.24	0.806	0.833	0.211	0.198	0.005
11	G	4.64	3.44	0.962	0.758	0.257	0.181	0.005
12	PDA	4.28	1.88	1	0.641	0.241	0.106	0.001
13	REA	1.88	6	0.658	1	0.109	0.323	0.002
14	B	2.4	5.72	0.735	1	0.142	0.306	0.007
15	NRED	3.88	4.12	0.893	1	0.226	0.215	0.018
16	LBSE	4	2.28	1	0.781	0.23	0.126	0.006
17	TD	2.4	2.4	0.714	0.758	0.139	0.136	0.001
18	DDA	3.36	2.56	0.893	0.781	0.198	0.146	0.004
19	C	1.44	3.68	0.61	1	0.072	0.198	0.003
20	ISCO	4.56	3.84	1	0.926	0.255	0.212	0.022
21	CC	2.6	4.4	0.781	1	0.152	0.244	0.01
22	CA	1.48	1.08	0.676	0.694	0.076	0.058	0
23	DM	3.24	1.2	0.893	0.658	0.183	0.069	0
24	UU	1.84	0.76	0.625	0.694	0.1	0.042	0.001
25	DPFAL	1.88	3.08	0.641	0.862	0.106	0.17	0.002
26	NGDC	3.84	3.08	0.962	0.781	0.221	0.171	0.005

Table 6. "Which institutions are cooperated with the most to obtain the data relating to real estate valuation?" in-out degree, in-out closeness, in-out eigenvalues and between proximity values results for this question are:

No	Institutions	OutDeg	Indeg	OutClose	InClose	OutEigen	InEigen	Between
1	UM	2.48	4.52	0.735	1	0.241	0.346	0.031
2	SPA	2.8	4.68	0.758	1	0.254	0.354	0.032
3	SHW	2.84	1.72	0.714	0.735	0.275	0.169	0.009
4	HDA	2.32	0.44	0.658	0.556	0.23	0.055	0.001
5	FMD	2.32	1.4	0.694	0.758	0.23	0.134	0.013
6	DH	2.4	2.28	0.714	0.833	0.241	0.222	0.02
7	DEU	2.48	3.28	0.714	0.862	0.251	0.275	0.021
8	DTDRC	2.88	5.76	0.806	1	0.265	0.422	0.046
9	F	0.68	0.72	0.581	0.625	0.068	0.073	0.004
10	TEDC	1.08	0.92	0.641	0.658	0.107	0.079	0.004
11	G	2.76	4.12	0.781	1	0.258	0.308	0.048
12	PDA	1.4	1.08	0.625	0.641	0.15	0.112	0.002
13	REA	2.36	0.68	0.714	0.556	0.234	0.048	0.002
14	B	2	0.96	0.676	0.595	0.185	0.048	0.01
15	NRED	2.4	3.4	0.833	0.926	0.229	0.295	0.061
16	LBSE	2.04	1.52	0.735	0.625	0.212	0.149	0.008
17	TD	1.64	0.24	0.625	0.556	0.172	0.022	0.001
18	DDA	2.04	1.6	0.758	0.658	0.204	0.171	0.012
19	C	1.84	3.48	0.926	0.962	0.174	0.278	0.09
20	ISCO	2.52	1.76	0.893	0.735	0.249	0.166	0.038
21	CC	1.16	1.16	0.625	0.694	0.115	0.132	0.007
22	CA	0.64	0.36	0.625	0.556	0.063	0.029	0.002
23	DM	1.08	0.6	0.694	0.595	0.109	0.072	0.003
24	UU	0.68	0.76	0.61	0.641	0.072	0.09	0.001
25	DPFAL	0.84	0.32	0.658	0.556	0.084	0.026	0.001
26	NGDC	0.76	0.68	0.595	0.625	0.083	0.053	0.001

The numerical value of the frequency of public institutions meeting with each other was calculated as 368. The maximum number of bonds that can occur in the network is 650 (n (n-1) = 26.25 = 650). Based on this number of bonds, the overall density of the network was calculated as 368/650 = 0.566. For a network of 26 public institutions, this value is seen to have a density above average. 56.6% of the maximum number of ties that can occur between the actors are in the network. For public institutions it can be said that the intensity of establishing cooperation with each other in obtaining data on real estate valuation is at a moderate level.

Survey Question 4: Each organization that uses or **produce data on real estate valuation** was asked the question " Which of the institutions that make real estate appraisal is trusted the most ?". Network and centrality graphs were created using the data obtained from the answers to this question. Actors and data access network among actors is shown in Fig. 4.
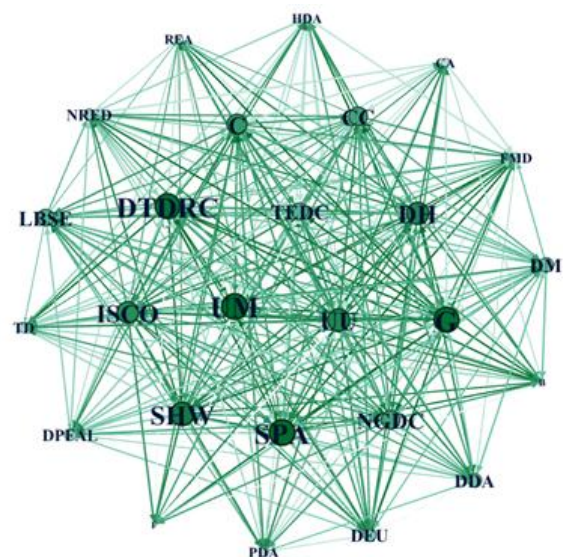

Figure 4. Network map of actors and links between actors according to answers to the fourth question

Table 7. "Which of the institutions that make real estate appraisal is trusted the most ?" in-out degree, in-out closeness, in-out eigenvalues and between proximity values results for this question are:

No	Institutions	OutDeg	Indeg	OutClose	InClose	OutEigen	InEigen	Between
1	UM	6.72	6.32	0.962	0.862	0.248	0.241	0.041
2	SPA	7.04	6.88	0.962	0.862	0.252	0.262	0.042
3	SHW	7.2	5.6	1	0.758	0.258	0.222	0.021
4	HDA	3.84	3.16	0.658	0.581	0.157	0.128	0.002
5	FMD	0.32	6.32	0.49	0.833	0.015	0.249	0
6	DH	8	5.12	1	0.714	0.283	0.205	0.017
7	DEU	2.16	5.16	0.658	0.714	0.092	0.209	0.003
8	DTDRC	6.04	7.04	0.926	0.862	0.231	0.273	0.074
9	F	2.04	2.88	0.581	0.568	0.086	0.115	0
10	TEDC	3.92	5.76	0.676	0.806	0.154	0.222	0.011
11	G	7.96	6.48	1	0.806	0.281	0.246	0.031
12	PDA	2.76	3.6	0.658	0.625	0.121	0.155	0.001
13	REA	1.28	3.96	0.568	0.694	0.049	0.166	0.002
14	B	0	4.88	0.25	0.758	0	0.193	0
15	NRED	2.32	5.44	0.595	0.735	0.08	0.219	0.004
16	LBSE	5.24	4.24	0.833	0.658	0.199	0.179	0.005
17	TD	3.52	3.96	0.641	0.658	0.142	0.167	0.002
18	DDA	4.28	3.88	0.735	0.658	0.186	0.163	0.003
19	C	8	4.2	1	0.658	0.283	0.175	0.013
20	ISCO	7.04	4.2	1	0.694	0.259	0.172	0.02
21	CC	6.4	4.2	0.893	0.676	0.223	0.176	0.015
22	CA	3.36	3.04	0.641	0.61	0.128	0.132	0
23	DM	5.56	3.36	0.806	0.625	0.194	0.141	0.004
24	UU	6.72	6.44	0.862	0.806	0.244	0.244	0.02
25	DPFAL	3.92	3.96	0.676	0.658	0.154	0.167	0.001
26	NGDC	8	3.56	1	0.625	0.283	0.153	0.005

The numerical value of the frequency of public institutions meeting with each other was calculated as 425. The maximum number of bonds that can occur in the network is 650 (n (n-1) = 26.25 = 650). Based on this number of bonds, the overall density of the network was calculated as 425/650 = 0.654. For a network of 26 public institutions, this value is seen to have a density above average. 65.4% of the maximum number of ties that can occur between the actors are in the network. Public institutions; It can be said that the reliability of public institutions among each other about real estate valuation is above the middle level.

Survey Question 5: Each organization that uses or produce data on real estate valuation was asked the question "Which is the guiding and responsible body to undertake the task of gathering institutional structuring under a single roof?". Network and centrality graphs were created using the data obtained from the answers to this question. Actors and data access network among actors is shown in Fig. 5.
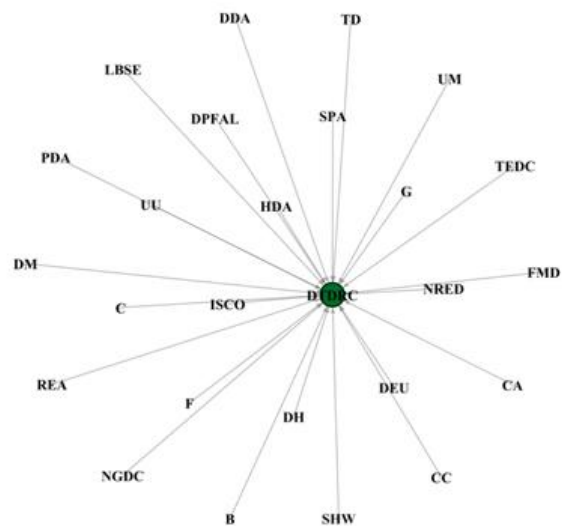

Figure 5. Network map of actors and links between actors according to answers to the fourth question

Table 8. " Which is the guiding and responsible body to undertake the task of gathering institutional structuring under a single roof ?" in-out degree, in-out closeness, in-out eigenvalues and between proximity values results for this question are:

No	Institutions	OutDeg	Indeg	OutClose	InClose	OutEigen	InEigen	Between
1	UM	0.04	0	0.51	0.5	1	0	0
2	SPA	0.04	0	0.51	0.5	0	0	0
3	SHW	0.04	0	0.51	0.5	0	0	0
4	HDA	0.04	0	0.51	0.5	0	0	0
5	FMD	0.04	0	0.51	0.5	0	0	0
6	DH	0.04	0	0.51	0.5	0	0	0
7	DEU	0.04	0	0.51	0.5	0	0	0
8	DTDRC	0	1	0.5	1	0	-1	0
9	F	0.04	0	0.51	0.5	0	0	0
10	TEDC	0.04	0	0.51	0.5	0	0	0
11	G	0.04	0	0.51	0.5	0	0	0
12	PDA	0.04	0	0.51	0.5	0	0	0
13	REA	0.04	0	0.51	0.5	0	0	0
14	B	0.04	0	0.51	0.5	0	0	0
15	NRED	0.04	0	0.51	0.5	0	0	0
16	LBSE	0.04	0	0.51	0.5	0	0	0
17	TD	0.04	0	0.51	0.5	0	0	0
18	DDA	0.04	0	0.51	0.5	0	0	0
19	C	0.04	0	0.51	0.5	0	0	0
20	ISCO	0.04	0	0.51	0.5	0	0	0
21	CC	0.04	0	0.51	0.5	0	0	0
22	CA	0.04	0	0.51	0.5	0	0	0
23	DM	0.04	0	0.51	0.5	0	0	0
24	UU	0.04	0	0.51	0.5	0	0	0
25	DPFAL	0.04	0	0.51	0.5	0	0	0
26	NGDC	0.04	0	0.51	0.5	0	0	0

It is understood from the calculated in-degree centrality values that institution "DTDRC" is found to be the most directing and responsible institution by other institutions in the survey. On the other hand, all institutions with the lowest in the degree of centrality were determined to be the least needed institutions by other institutions.

4.2. Conclusions on the Roles of Organizations in the Network

Centrality measurements are important in determining the positions and roles of institutions in the network. In Table 2, five actor roles defined for social networks have been identified in the Social Network Analysis Criteria section. In order for the determination of roles, institutions with high values regarding degree, closeness and between centrality measurements are shown.

Star: The central actors in the network were star roles. When the degree, closeness and between chart values are considered, the institutions that are the star of the network are DTDRC, SPA, UM, REA, B and G. These institutions are also in a critical position for social networking because they have the most direct connections. The active involvement of these institutions in the network appears to play an important role in terms of network mobility.

Liaison: It connects two different groups within the social network structure and identifies discrete actors who are not included in these two groups. When the analysis of social network structures is observed/ examined, it is seen that there are not two independent groups within each other, but also there are no institutions that act as linkages and are separated from the groups.

Bridge: The role of the actor is defined as being a member of several groups and providing the connection with other groups. When the analysis of the social network structures is examined, there are no institutions in the role of bridges since there are no two or more blocks in this social network.

Gatekeeper: It is defined as the actor who mediates or controls the flow of information within the social network structure. It is possible to determine the intermediary institutions with the help of measurements of the centrality. When Table number? Is examined in this context, it can be seen that DTDRC, UM, C, G and SPA are gatekeeper institutions. These institutions have a high potential to control the flow of data between institutions within the network and are intermediaries of shared data. If these institutions leave the network, it may be possible to break the relationship of other institution pairs.

Isolate: It refers to those institutions that have little connection with other institutions within the social network structure. Degrees centrality table results are the analysis values that allow the identification of private institutions within the network. When the degree centrality charts are analyzed, it is seen that TD, DPFAL, CA, HAD and DM institutions have the lowest degree centeredness within the network. It is clear that these actors have low effectiveness in terms of accessing, sharing data and participating in communication within the network. In order to increase the mobility of the network, it is essential to identify the institutions in this isolated role rather than randomly increasing communication and data exchange.

5. CONCLUSION

In this study, awareness of institutions producing or using spatial data is tried to be revealed. Thus, it is aimed to contribute to the ongoing future planning process on Real Estate Appraisal. The relation between spatial data for real estate appraisal and all sectors doing business have been examined from the social side, not from the technical side. It is tried to put forward with the "social networks" the system of working together, which the institutions have created unconsciously and which do not adhere to an absolute rule. It is thought that these results and evaluations can be reflected in the whole country.

General evaluation; The overall inter-institutional assessments in connection with the characteristics of the resulting networks are summarized below:

- A large number of institutions in different fields of activity communicate with each other in the areas they need.
- The information or data requested from the institutions is not at a level that will contribute to the development of the strategy of the institution in an advanced dimension.
- The personnel of the institutions have a moderate level of awareness in terms of operating and achieving quality. However, their request for such data sharing is at the forefront.
- It can be said that there is a demand for access to information and data of some institutions, but the level and quality of this demand is generally insufficient.
- It is seen that some institutions are not in a very useful position in the network relationship and do not have any mobility to take part in the Real Estate Appraisal business.
- It can be said that the institutions are willing and conscious about consulting each other in the decision-making processes, but there is not much mutual contribution yet.
- It is understood from the survey that there are many deficiencies in the institutions regarding technological infrastructure, which is considered to be one of the essential components of Real Estate Appraisal.
- It is determined that the qualified and trained personnel in the institutions are insufficient in terms of quantity and quality. It is understood from the survey data that there are no in-service support programs in parallel with the developing technology.

As a result, the current study has made many conclusions and evaluations visible about, how real estate appraisal function is; which institutions play an active role in this matter, which institutions produce and use the most data. Therefore, it is possible to shed light on which institutions should be taken into consideration in all kinds of arrangements and initiatives for real estate appraisal.

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