



# Identification of Planning Region with Deductive Approach: The Case of Trabzon-Vakfikebir

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## Abstract

The existing definitions of the region have become obsolete in the context of 21st-century understanding, and the concept of region alone has become inadequate for defining an area. This shift has precipitated the development of new perspectives on the region in theoretical and practical regional science. The scope of this study is to determine the boundaries of the planning region in the regional context of the Vakfikebir district, which is one of the settlements located near the border of Trabzon province, and which was determined as a sample area. The determination of boundaries was conducted through the prioritisation of spatial proximities and porosity principles within the region, which is regarded as a territorial entity. This approach entailed the juxtaposition of local units with a deductive approach. Similarity discussions/studies were carried out in the context of all districts of Trabzon and Giresun provinces. Within the scope of the data set compiled from relevant institutions/organizations in social, economic, political and spatial dimensions, the territorial/scale similar settlement classes of Vakfikebir were determined through cluster analysis method. The results obtained were interpreted, and Vakfikebir's primary and secondary "Identical Region" was defined. In this context, in order to contribute to the production of realistic and feasible regional development and development policies in regional planning practice, a context-oriented approach was envisaged in which the hierarchical, fixed structure of the region and the existence of vertical relations were revealed.

**Keywords:** Boundary, Deductive Approach, Identical, Planning Region, Vakfikebir-Trabzon

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## INTRODUCTION

With the concept of borders becoming ambiguous due to globalisation, the definition of the region is undergoing a shift in meaning and today's definitions of the region refute the idea of the unitary city and contradict the understanding of the nation state (Duara, 1995; Scott, 2001). In the traditional approach, regional boundaries, which were drawn as isolated entities expressing only an absolute area with strict borders, are now ignored with the decrease in communication and transport costs (Erzi, 2005). Along with globalisation and regionalisation, economic, social, technological and political changes, such as the transition to post-Fordist production and the increasing value of information, have made the traditional concept of the region controversial (Garipağaoğlu, 2017).

When the concept of region is examined with its changing structure and dynamics from past to present, it is seen that it includes different definitions and concepts according to different academics. In this context; common to all definitions of a region is the idea that a geographical area constitutes an entity, so that meaningful statements can be made about the area as a whole (Hoover and Giarratani, 2020). The concept of region, which is generally defined as a homogeneous block (Agnew, 2018), is also expressed as socio-spatial processes defined in different areas of social action and social consciousness (Paasi, 1986), physical areas where human interaction takes place (Wirth 1942; Weitz, 1995), social structures created in cultural and administrative practices and discourses (Paasi, 2001), and places politically defined by governments and political movements (Patriarca, 1994; Amin, 2004). The regional level has been seen as very blurred and fluid, always depending on many contextual circumstances (Glasson and Marshall, 2007). It is an open, discontinuous, relational, and internally diverse (Allen et al., 1998 and Massey, 1994) and multi-layered place (Paasi and Zimmerbauer, 2016) defined by changing relationships (Jones, 2009), as opposed to a limited area on the map (Allen et al., 1998). The concept of region, which has a dynamic structure, is not only based on geographical factors, but also on units that show functional and economic integrity with each other in a spatial sense (Friedman, 1956).

In parallel with these studies, the need to delineate PRs (planning region) in line with FRs (functional region) for the planning of growing metropolitan areas by taking into account the geographical extent to which the constituent parts of the respective cities are strongly connected to each other through daily interactions, such as commuting relationships, first emerged in regional planning (Wirth, 1942; Friedmann, 1956).

The concept of region, which in the period 1950-1970 was basically defined as a territorial, fixed, self-sufficient socio-spatial organisation, has changed, especially after 1980-1990, and taken on a new meaning in which geographical proximity and the relative size of places are less important than in the past (Batten, 1995). Thus, the phenomenon of the region, defined as globalised spaces in which local space gains in

importance, has begun to be rethought within a complex geometry of socio-economic, cultural and political geographies that extend beyond borders (Agnew, 2002; Amin, 2002). According to Amin (2004), 'cities and regions do not come with the automatic promise of territorial or systemic integrity, as they are made through the spatiality of flow, juxtaposition, porosity and relational connectivity'. (Amin, 2004; Goodwin, 2013). Although it is very difficult to create a universal and standard definition of the concept of region, which is defined as a concept whose borders can hardly be drawn (Garipağaoğlu, 2017), the concept of region is now conceptualised as an open, fluid and unbounded territory (Castells, 1996; Amin, 2004; Massey, 2005; Allen and Cochrane, 2007; Jones, 2009; Harrison, 2013; Varró and Lagendijk, 2013; Agnew, 2013).

The concept of region has been reformulated as a development policy tool when examining the impact of globalisation on the settlement system (Genç et al., 2021). Until the 1980s of the 20th century, the dominant urban formation was the metropolitan city, defined as a large, dominant city in a region that influences other cities and rural settlements around it (Arkon, 2006). However, the existence of multiple centres with specialised economic, social and cultural functions and a high degree of interaction between them means that a monocentric model is no longer appropriate for describing contemporary urban configurations at the metropolitan level (Clark and Kuijpers-Linde, 1994; Kloosterman and Musterd, 2001). Developed in the last quarter of the twentieth century and now widely used, the concept of the metropolitan area is no longer sufficient to explain large urban formations on a global scale and the spatial relationships they contain. The European Spatial Development Perspective, prepared by the European Commission in 1999, advocates a sustainable approach to increasing the effectiveness of strategic spatial planning at the metropolitan scale, supporting the development of polycentric relationships between metropolitan regions and areas beyond their monocentric structure (METREX, 2003). In this context, it is also necessary to examine the relationship between the strength and extent of functional linkages between cities in a metropolitan area and its performance as a regional urban system (Meijers and Burger, 2010).

The increasing spatial mobility and flexibility of firms and households in a changing world order, as well as changes in local and regional policies, are transforming the concept of region (De Goei, et al., 2010). In this context, the main contribution of concepts such as metropolitan area, urban region, hinterland to spatial thinking is the shift away from the formality and physical structure of the city towards a focus on the dynamics of urban functions that transcend limited perceptions of space. As Harvey (2000) puts it, 'spatial scales are never fixed, they are constantly being redefined, debated and reconfigured'.

In summary, it is important to highlight how regions and regional change are best conceptualised and how they are a catalyst for new research. On the other hand, it is also important to explore and understand how regions are actually created for specific policy purposes

(Smith 1995; Cohcrane, 2018). This is because the creation of planning regions based on normative regions, i.e. administrative regions, which is the first and easiest thing to think of when creating planning region boundaries, fails to encompass the geographical scope of interacting communities and ultimately reduces the driving force of the people behind the planning process (Beyhan, 2019).

Today, the tendency to define planning regions according to normative regions continues (Ecemis Kılıç, 2009). This is due to the rigidity of normative regions, which "can continue to exist for reasons other than those that brought them into existence" (Wirth, 1937, p. 494). In this context, the production of successful regional plans is ensured by the precise definition of the boundaries of the planning region, which are not fixed in the face of a changing socio-economic structure, and which make the embeddedness of the region visible by questioning the relationships of the core unit. Regional plans based on normative regions, however, are actually unable to cover the geographical extent of the communities that interact with each other, which ultimately reduces the driving force of the people behind the planning process. This is due to the rigid nature of normative regions, which "may continue to exist for reasons other than those which brought them into existence" (Wirth, 1937, p. 494).

From this point of view, the main purpose of the study is to determine the planning region boundary that can respond to the need for change in spatial planning practice under the influence of globalisation, which represents the transformation of time and space, by introducing a new perspective at the local scale and in the territorial context of border settlements. While the functional determination of the planning region boundary, it is envisaged that border settlements should be considered in a holistic manner that ignores/transcends strict borders by going beyond being seen as administrative entities or atomistic structures. In this context, this study will provide a conceptual innovation to the planning discipline in terms of presenting a new planning region discussion as opposed to traditional regional boundaries. In line with the defined purpose, the hypothesis of the study has been defined as follows;

"H. Administrative boundaries cannot be the main limitation in zoning because regions cannot be defined in a fixed, closed, and static context".

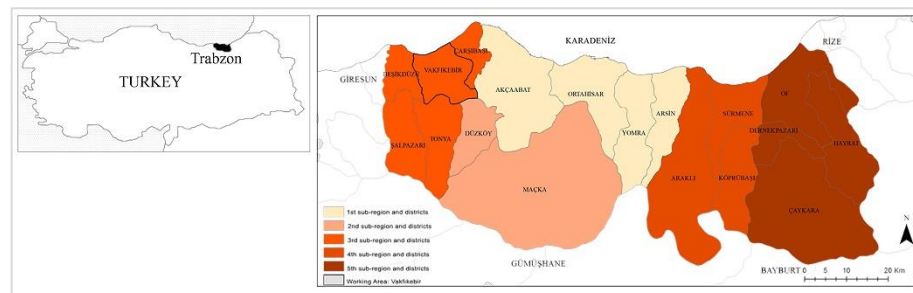
The first part of the study includes a theoretical framework that summarises the concept of region and its changing content; the methodology section includes the study model, the method and the selection of variables. The results section is a process in which the methods established are applied in the selected study area in the context of the deductive approach to the boundaries of the planning region. The last section consists of discussions and conclusions, in which the similarities and differences of the planning region boundary drawn as a result of the field study with other planning region boundaries in the planning literature are evaluated.

## METHODOLOGY

The study process was designed according to the principle that no settlement should be considered in isolation, but rather within the context of its own administrative borders. In this context, the study emphasised the geographical characteristics, spatial structure, juxtaposition and proximity of settlements, as well as the porosity of the geography and spatial structure. It also defined the region within the scope of the "territorial structure" of the place in the process of determining the planning region, especially the border or near of the border settlements. The study adopted a top-down approach, utilising the principles of "contiguity/proximity" of settlements. The discussion on the planning region boundary was conducted using a deductive approach.

The aim of the deductive (theory testing) approach is to obtain evidence of the validity of a theory through hypotheses. In deductive logic, certain hypotheses are formulated and tested based on a general theory, and thus a general proposition is reduced to the specific through reasoning (Gürbüz and Şahin, 2018: 26). Settlement units (region, settlement, grid) are gradually divided into groups according to pre-selected criteria, taking into account the relative position of the unit to the threshold value on the criteria (Ballas et al., 2003). This top-down approach has traditionally referred to compact and highly contiguous settlements in the planning literature. When determining the cluster of settlements, a specific set of functions is selected on the basis of indicators such as population size, economic performance, accessibility, intensity of commercial services, etc. (Davoudi, 2008).

The district of Vakfikebir, located within Trabzon province in Turkey, was selected as the primary study region for the delineation of the planning region boundary (see Figure 1). The selection of Vakfikebir district as the study area was primarily influenced by its proximity to the provincial border. The district is situated in the western part of Trabzon province, at a distance of 40 kilometres from the city centre, and shares borders with Beşikdüzü in the west, Çarşıbaşı in the east, and the Düzköy and Tonya districts in the south. In accordance with the 1/50,000 Scale Provincial Spatial Development Plan (NUTS-4 level) (1/50,000 Provincial Spatial Development Plan Explanation Report, 2017), Vakfikebir district is defined as the third planning sub-region, which encompasses Beşikdüzü, Çarşıbaşı, Şalpazarı and Tonya districts.



**Figure 1.** Trabzon province, its sub-regions and study area Vakfikebir.

As a result of the clustering analysis of Vakfikebir's territorial/scale similar settlement classes formed within the framework of social, economic, political and spatial dimensions, Vakfikebir's "Identical Region" was determined in the context of settlements that are most similar to Vakfikebir. Under the identical region, a cluster of "primary similar settlements" and a cluster of "secondary similar settlements" were identified in which Vakfikebir district has a similar structure in every dimension.

### Method and Dataset

The two-step clustering method is a multivariate analysis process that falls under the umbrella of cluster analysis methods. This two-step clustering method is a hybrid clustering technique that combines K-means, a non-hierarchical clustering technique, and Ward's least squares, a hierarchical clustering technique (Ceylan et al., 2017). This method was developed to address the limitations of the K-means algorithm. This approach involves a one-pass data approach that permits the concurrent utilisation of quantitative and qualitative variables. It determines pre-clusters in the initial step and subsequently performs hierarchical clustering (Wu et al., 2016; Michailidou et al., 2009). In the pre-clustering stage of the method, the data are scanned one by one and it is decided whether the current situation should be combined with previously formed clusters or not, and whether to start a new cluster according to the distance criterion (Michailidou et al., 2009). In the subsequent clustering step, the data are grouped into the desired number of clusters using the standard hierarchical clustering algorithm according to the subsets obtained from the pre-clustering step (Satish and Bharadhwaj, 2010).

The two-step clustering algorithm is notable for its ability to handle large data sets, its capacity to manage both categorical and continuous variables, its ability to automatically determine the optimal number of clusters, and its capability to remove observations that do not conform to the obtained clusters when necessary (Ceylan et al., 2017). Within the scope of the study, a two-step clustering analysis was conducted utilising the SPSS program. However, given that cluster analysis does not itself test the hypothesis, the onus falls on the researcher to verify the adequacy of the solution. At this juncture, the cluster quality bar signifies the silhouette coefficient, which is a metric of both cohesion (i.e. the similarity of items in a cluster) and dissimilarity (i.e. the difference of clusters), and ranges between -1 and 1 (Raggi et al., 2013; Bacher et al., 2004).

The study's objective is to determine the identical region of Vakfikebir using a deductive approach through cluster analysis. To this end, a comprehensive data set encompassing social, economic, political, and spatial dimensions was required to define and classify similar settlement (district-NUTS-4) clusters in Trabzon and Giresun provinces. In this



process, raw/undicted/stock data obtained from relevant institutions/organizations were utilised.

a) Social structure variables should be defined as the main component of the regional scale economic and social structure (Storper, 1995; 1997). Regional units are socio-spatial processes that emerge as part of the spatial structure of society and are defined in different social structure and social action areas (Paasi, 1986). In this context, the concept encompasses variables (i.e. stock data) that serve to measure the social structure, the spatial distribution and movement of the population, the continuity and quality of the basic education process and the continuity and quality of the subsequent education process in the context of equal opportunities, and the capacity and accessibility of health units.

b) It is imperative that economic structure variables are defined as the fundamental factors of economic growth in the formation process of regions (Hopkins, 2015). In order to ensure the effective economic structure of districts, it is essential that these variables encompass the workforce potential, financial resources, financial capacity, sectoral dynamics, and social and physical infrastructure facilities. This is to ensure consideration of the economic growth structure in the region and those who benefit from it as a whole (Agnew, 2000).

c) The necessity for self-realisation of the populace is emphasised by political structure variables, as posited by the statement of Seers in 1979 that "the realisation of human potential is the basic measure of development" (Dedeoğlu and Beyazlı, 2018). In this context, political variables consist of variables that measure the organisation, governance and participation of districts.

d) Spatial structure variables consist of variables that can be questioned within the scope of geographical pattern, natural structure and access in the spatial dimension of the spatial/administrative boundaries of settlements (Amin, 2004), which are regarded as a heterogeneous area placed side by side as a spatial organisation.

In order to prepare the data set, firstly, interviews were made with the relevant institutions/organisations and lists of data that could be provided were created. The process of determining the variables to be used within the scope of the study has been hindered by the limitation that data from relevant institutions/organisations at the district level could not be obtained. With the support of the relevant stakeholders mentioned below, the NUTS-4 level data set of the settlements of Trabzon and Giresun provinces for the most recent data year was prepared (Table 1).

The present study utilised a dataset consisting of a total of 42 variables, including 15 social, 19 economic, 2 political, and 6 spatial structure variables. This dataset was selected with a view to considering the socio-economic structure of rural areas, which were aggregated along four different dimensional axes (Table 1).

**Table 1.** Variables and Data Sources to be Used in the Deductive Approach Context.

	Variables	Year	Data Source
Social Structure	Population density	2021	Turkish Statistical Institute (TÜİK)
	The proportion of the population aged 15-24		
	The proportion of the population aged 65 and over		
	The average size of households		
	The rate of divorce		
	The rate of female literacy		
	The proportion of college and university graduates		
	The rate of in-migration	2020	TÜİK
	The rate of out-migration	2019	Urban and Rural Settlement Systems Research Project in Turkey (YER-SİS)
	The number of visits to health facilities	2018	
	The proportion of the population living in rural areas in summert		
	The proportion of the population living in rural areas in winter		
The number of students enrolled at universities	2017		
The number of specialist doctors	2021	Provincial Health Directorate	
The capacity of hospital beds			
Economic Structure	The proportion of the female workforce that is insured	2021	Social Security Institution
	The proportion of individuals whose premiums are paid by the state		
	The volume of trade sales	2018	YER-SİS
	The volume of trade purchases		
	The turnover		
	The export rate		
	The distribution of service activities in rural areas		
	The number of employees in manufacturing in rural areas		
	The per capita municipal income		
	The per capita municipal expenditure		
	The residential electricity consumption	2021	Çoruh Electricity Distribution Co.
	The industrial electricity consumption		
	The quantity of animal production	2021	TÜİK
	The quantity of grain and other crops production		
	The employment rate in the organised industrial zone	2021	Ministry of Science, Industry, and Technology
	The number of beds in tourism establishments	2021	Provincial Directorate of Culture and Tourism
	The number of farmers	2021	Provincial Directorate of Agriculture
	The number of bank branches	2021	Turkish Banking Association
	The number of registered businesses	2021	Trade Provincial Directorate
Political Structure	The number of associations	2021	Ministry of Interior
	The number of cooperatives	2021	Provincial Directorate of Agriculture
Spatial Structure	The settlement area	2011	Ministry of Environment and Urbanization
	The areas at risk of disasters		
	The forest area		
	The watershed area		
	The agricultural area	2021	TÜİK
	The distance of settlements to city center (km)	2022	General Directorate of Highways



## FINDINGS

A deductive approach was adopted, with cluster analysis methods – a multivariate analysis process – being utilised to characterise the similar settlement regions of Trabzon and Giresun provinces, and to determine the identical region of Vakfikebir district. The latter is one of the settlements located near the Trabzon-Giresun border, which was essentially determined as the study area. In the subsequent phase of the study, which aims to make multidimensional comparative evaluations of 34 districts (NUTS-4) of Trabzon and Giresun provinces with a total of 42 variables in the social, economic, political and spatial context, two-step cluster analysis was employed. The standardisation of the data was conducted utilising the SPSS 26.0 package programme, while the cluster analysis was performed with the standardised data. The clusters were defined through the evaluation of the "mean" values of the variables within the clusters, employing a holistic and comparative approach. Subsequent to this, the mapping and interpretation stages were undertaken.

### Identical Region with Social Structure Dimension

A two-step clustering analysis was conducted with 15 selected and standardized variables to characterise the social structure of the districts belonging to Trabzon and Giresun provinces. The clusters were then categorised into five subgroups, and it was observed that the most influential variable in the formation of clusters was the "number of specialist doctors," while the least influential variable was the "average household size."

The results of the clustering analysis conducted in the context of social structure with a total of 33 districts belonging to Trabzon and Giresun provinces within the scope of the study area revealed that 38.2% of the districts were in Cluster-4, 29.4% in Cluster-5, 20.6% in Cluster-3, 5.9% in Cluster-1 and 5.9% in Cluster-2. The distribution of the variable values formed as a result of the analyses made with the current social structure variables according to the clusters was examined, and the cluster characteristics were determined by comparing the "mean" values of all variables between the clusters. Following a holistic and comparative evaluation of 15 variables and 5 clusters, clusters were defined according to their social structure characteristics (Table 2).

In terms of social structure, it has been observed that some districts in Clusters 3, 4 and 5 interact due to spatial proximity. Cluster 4, which is located in the middle-lower value range for almost all social structure variable values and hosts approximately half of the total number of districts and has the second-highest elderly dependency ratio after Cluster 5, is located in proximity to other districts. The districts situated on the western border of Trabzon (4 districts) and the coastal neighbouring district Eynesil demonstrate spatially homogeneous clustering in terms of social structure (Table 2 and Figure 2).

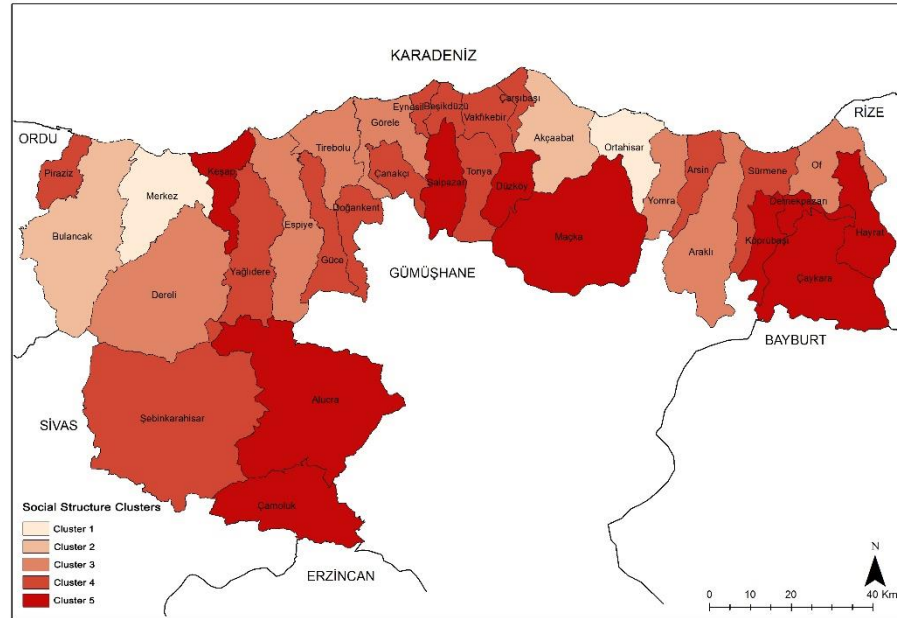
**Table 2.** Importance levels-mean values of variables influencing the formation of social structure clusters and the districts belonging to each cluster

Variables (Importance Level)	Cluster-1 (%5,9)		Cluster-2 (%5,9)		Cluster-3 (%20,6)		Cluster-4 (%38,2)		Cluster-5 (%29,4)	
	Mean	Rank*	Mean	Rank*	Mean	Rank*	Mean	Rank*	Mean	Rank*
Expert doctors (1)	75,17	1	13,65	2	1,70	3	0,63	4	0,21	5
Hospital bed count (0,97)	69,76	1	9,82	2	2,80	3	1,06	4	0,75	5
Population aged 15-24 (0,83)	40,73	1	14,99	2	5,97	3	2,54	4	1,30	5
University and college graduates (0,82)	45,95	1	15,28	2	5,02	3	2,31	4	1,23	5
Inward migration (0,74)	36,07	1	13,17	2	6,86	3	2,80	4	1,71	5
Number of students entering university (0,71)	39,33	1	15,46	2	5,80	3	2,76	4	1,29	5
Literacy rate among women (0,71)	37,04	1	15,61	2	6,06	3	2,74	4	1,55	5
Divorce rate (0,68)	42,21	1	13,71	2	5,72	3	2,41	4	1,58	5
Number of applications to health institutions (0,61)	52,37	1	11,49	2	5,30	3	2,11	4	0,89	5
Outward migration (0,53)	32,21	1	11,68	2	6,16	3	3,37	4	2,49	5
Population density (0,34)	32,00	1	7,82	2	5,20	3	5,17	4	1,68	5
Rural area winter population (0,28)	10,48	2	23,07	1	7,79	3	3,68	4	3,16	5
Rural area summer population (0,24)	9,00	3	15,34	1	9,93	2	2,96	5	4,43	4
Elderly dependency ratio (0,23)	2,83	5	3,56	4	4,82	3	5,54	2	8,49	1
Average household size (0,18)	6,51	2	6,59	1	6,18	3	6,08	4	4,90	5

\* The ranking of the districts are defined as follows: 1: top, 2: upper-middle, 3: middle, 4: lower-middle, and 5: bottom.

Cluster-4, encompassing the study area (Arsin, Beşikdüzü, Çarşıbaşı, Sürmene, Tonya, Vakfıkebir, Çanakçı, Doğankent, Eynesil, Güce, Piraziz, Şebinkarahisar, Yağlıdere), where the elderly dependency ratios are in the upper-middle range, rural summer population variable is in the lower

range, and all other social structure variables are in the middle-lower range, is referred to as the "static elderly population cluster." According to the results of the two-step clustering analysis, it is observed that 38.2% of the districts in the province exhibit the characteristic of the "static elderly population cluster."



**Figure 2.** Spatial distributions of social structure clusters in Trabzon and Giresun.

### Identical Region with Economic Structure Dimension

A two-step clustering analysis was applied with 19 standardised variables reflecting the economic structure of the districts. The most significant variable in the formation of clusters was determined as "insured female population", while the least effective variable was identified as "quantity of cereal and other plant production". The outcome of the two-step clustering analysis was that approximately half of the districts were found to be in Cluster-5 (27.8%), followed by Cluster-4 (23.5%), Cluster-3 (14.7%), Cluster-2 (5.9%), and Cluster-1 (5.9%) (Table 3). Following Cluster-5, Cluster-4, which generally has the lowest variable values, is composed of Beşikdüzü-Çarşıbaşı-Vakfikebir in the western part and Araklı-Sürmene in the eastern part of Trabzon province (Figure 3).

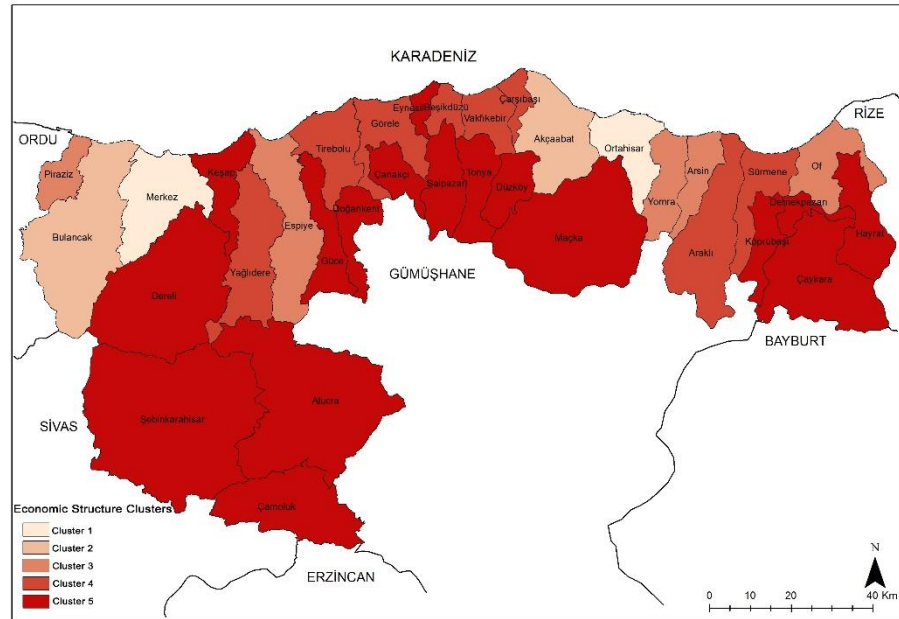
In terms of economic structure, Cluster-4, which generally falls within the lower-middle group and includes the working areas (Araklı, Beşikdüzü, Çarşıbaşı, Sürmene, Vakfikebir, Görele, Tirebolu ), moderate levels of "number of bank branches," "number of farmers," and "animal production quantity" are exhibited, while variables related to "manufacturing industry and service activities in rural areas" and "municipal income and expenditures" are at lower levels. Considering these characteristics, this cluster is referred to as a "moderate production, weak service cluster." The two-step clustering analysis

reveals that 23.5% of districts in the province exhibit characteristics of a "moderate production, weak service cluster."

**Table 3.** Importance degrees-mean values of variables effective in the formation of economic structure clusters and districts belonging to clusters

Variables (Importance Level)	Cluster-1 (%5,9)		Cluster-2 (%5,9)		Cluster-3 (%14,7)		Cluster-4 (%23,5)		Cluster-5 (%50)	
	Mean	Rank*	Mean	Rank*	Mean	Mean	Rank*	Mean	Rank*	Mean
Insured female workforce population (1)	54,62	1	12,69	2	5,21	3	2,88	4	0,96	5
Number of registered businesses in the Chamber of Craftsmen (0,73)	38,75	1	15,50	2	4,37	3	4,20	4	2,11	5
Residential electricity consumption (0,72)	35,69	1	16,24	2	5,42	3	4,38	4	2,00	5
Revenue (0,64)	45,61	1	11,70	2	9,30	3	2,98	4	0,88	5
Trade purchase volumes (0,61)	42,44	1	11,90	2	10,47	3	2,71	4	1,02	5
Number of bank branches (0,43)	38,01	1	12,30	2	4,14	4	5,30	3	2,14	5
Number of individuals whose premiums are paid by the government (0,41)	27,33	1	16,89	2	6,12	3	5,07	4	2,38	5
Number of beds in tourism businesses with operating licenses (0,41)	47,45	1	6,74	2	4,97	3	3,07	4	2,48	5
Trade sales volumes (0,35)	37,65	1	8,71	3	11,54	2	3,75	4	1,15	5
Industrial electricity consumption (0,30)	38,74	1	5,85	3	7,64	2	3,87	4	2,45	5
Number of farmers (0,27)	13,14	2	14,17	1	6,73	4	7,94	3	2,84	5
Number of people employed in manufacturing industry in rural areas (0,25)	581	3	30,83	1	14,68	2	1,75	5	2,32	4
Export rate (0,20)	30,57	1	15,36	3	18,27	2	1,74	4	0,17	5
Animal production quantity (0,18)	12,04	2	18,89	1	4,99	4	5,76	3	3,95	5
Per capita municipal expenditure (0,11)	4,33	4	5,32	3	5,91	2	3,60	5	7,20	1
Per capita municipal revenue (0,09)	4,31	4	5,59	3	5,80	2	3,91	5	7,06	1
Employment rate in Organized Industrial Zones (0,06)	29,49	1	24,63	2	15,70	3	1,66	4	0,00	5
Distribution of service activities in rural areas (0,05)	6,62	3	15,21	1	9,59	2	3,59	5	4,69	4
Quantity of grain and other crop production (0,01)	7,14	2	14,13	1	1,64	5	3,67	4	7,05	3

\* The ranking of the districts are defined as follows: 1: top, 2: upper-middle, 3: middle, 4: lower-middle, and 5: bottom.



**Figure 3.** Spatial Distribution of Economic Structure Clusters of Trabzon and Giresun Districts

### Identical Region with Political Structure Dimension

A two-step clustering analysis was conducted to describe the political structure of the districts in Trabzon and Giresun provinces. Standardised variables "number of associations" and "number of cooperatives" were used in the analysis. The obtained clusters were formed, and it was observed that the "number of cooperatives" was the more influential variable, while the "number of associations" was the less influential variable (Table 4).

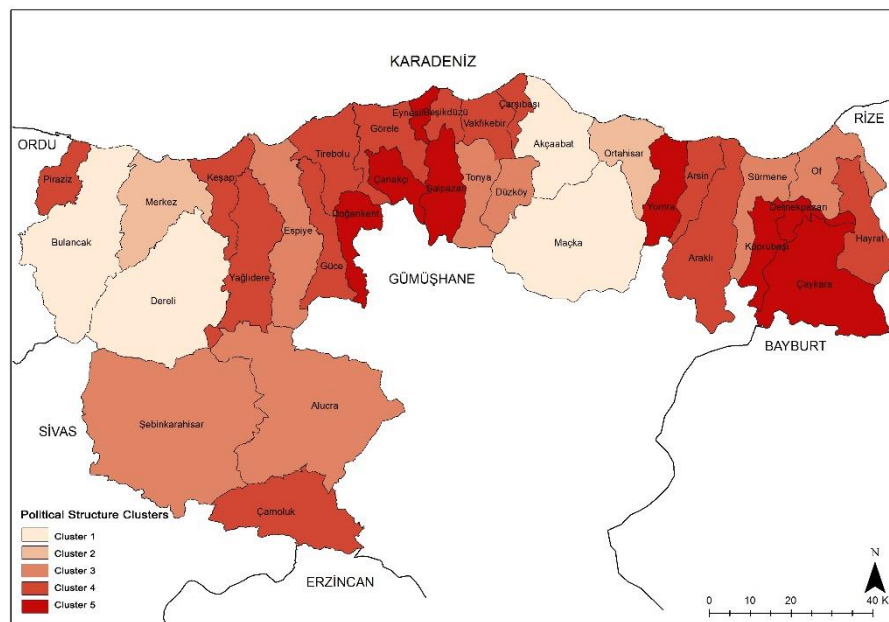
From a political perspective, it is observed that 38.2% of the total 33 districts in Trabzon and Giresun provinces are in Cluster-4, 23.5% in Cluster-5, 20.6% in Cluster-3, 11.8% in Cluster-1, and 5.9% in Cluster-2. The cluster that includes the working area and where the variables "number of associations" and "number of cooperatives" are in the "lower" values is termed as Cluster-4, labeled as the "moderate to low organization cluster." According to the two-step clustering analysis, it is observed that 38.2% of the districts in the working area exhibit the characteristic of a "weak organization cluster." It is noted that, in terms of the variables "number of associations" and "number of cooperatives," the lowest level of organization is found in Cluster-5, followed by Cluster-4 districts (Table 4, Figure 4). From a political perspective, it is observed that 38.2% of the total 33 districts in Trabzon and Giresun provinces are in Cluster-4, 23.5% in Cluster-5, 20.6% in Cluster-3, 11.8% in Cluster-1, and 5.9% in Cluster-2. The cluster encompassing the working area and where the variables "number of associations" and "number of cooperatives" exhibit "lower" values is designated as Cluster-4, and is thus labelled as the "moderate to low organisation cluster." According to the two-step clustering analysis, it is observed that 38.2% of the districts in the working area manifest the characteristic of a "weak organisation cluster." It is further observed that, in terms of the variables "number of

associations" and "number of cooperatives," the lowest level of organisation is exhibited by Cluster-5, followed by Cluster-4 districts (Table 4, Figure 4).

**Table 4.** Importance degrees and mean values of variables influencing the formation of political structure clusters and districts belonging to clusters

Variables (Importance Level)	Cluster-1 (%11,8)		Cluster-2 (%5,9)		Cluster-3 (%20,6)		Cluster-4 (%38,2)		Cluster-5 (%23,5)	
	Mean	Rank*	Mean	Rank*	Mean	Mean	Rank*	Mean	Rank*	Mean
Number of Cooperatives (1)	17,61	1	9,64	2	7,98	3	3,46	4	1,40	5
Number of Associations (0,84)	8,37	2	3,95	3	42,53	1	3,18	4	1,93	5

\* The ranking of the districts are defined as follows: 1: top, 2: upper-middle, 3: middle, 4: lower-middle, and 5: bottom.



**Figure 4.** Spatial Distribution of Political Structure Clusters of Trabzon and Giresun Districts.

### Identical Region with Spatial Structure Dimension

A two-step clustering analysis was conducted using six variables reflecting spatial structure characteristics based on land uses in the districts of Trabzon and Giresun provinces. The analysis revealed that the most significant variable in the formation of clusters is "settlement area", while "forest area" and "basin area" were found to be the least effective. The classification of the spatial structure of the 33 districts in the province revealed that 41.2% of the districts were in Cluster-5, 26.5% in Cluster-3, 14.7% in Cluster-1, 8.8% in Cluster-2, and 8.8% in Cluster-4 (Table 5).

A comparative evaluation of the mean values of the spatial structure variables reveals that Cluster-1 comprises districts with the highest values for spatial pattern variables such as "areas prone to disasters," "forest area," and "basin area," while Cluster-5 consists of districts with

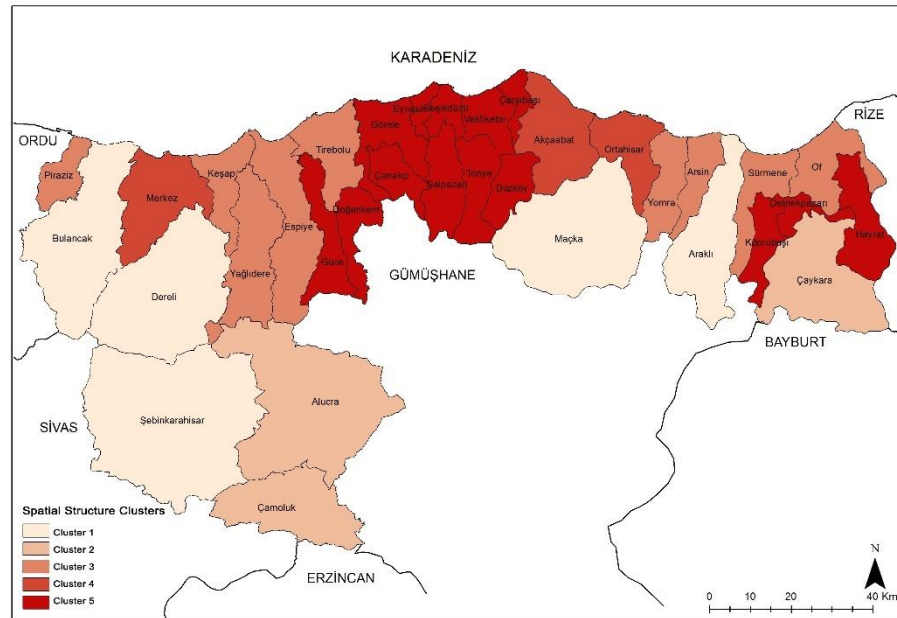


the lowest values for these variables. Cluster-5, encompassing approximately 41.2% of the total number of districts, is constituted by 13 districts neighbouring both provinces and exhibits a persistent similarity in terms of spatial structure (Table 5 and Figure 5).

**Table 5.** Importance degrees and mean values of variables influencing the formation of spatial structure clusters and districts belonging to clusters.

Variables (Importance Level)	Cluster-1 (%14,7)		Cluster-2 (%8,8)		Cluster-3 (%26,5)		Cluster-4 (%8,8)		Cluster-5 (%41,2)	
	Mean	Rank*	Mean	Rank*	Mean	Mean	Rank*	Mean	Rank*	Mean
Settlement area (1)	5,49	3	4,42	4	5,55	2	24,2 2	1	2,62	5
Distance of settlements to the city center (0,58)	5,22	3	14,48	1	3,97	4	0,57	5	6,64	2
Agricultural area (0,57)	8,95	2	1,24	5	7,70	3	12,9 5	1	3,10	4
Areas prone to disasters (0,56)	13,77	1	5,75	4	6,13	3	7,90	2	2,50	5
Forest area (0,54)	13,24	1	12,03	2	4,21	4	4,56	3	3,30	5
Basin area (0,54)	19,55	1	9,99	2	4,12	3	3,32	4	1,81	5

\* The ranking of the districts are defined as follows: 1: top, 2: upper-middle, 3: middle, 4: lower-middle, and 5: bottom.



**Figure 5.** Distribution of Spatial Structure Clusters of Trabzon and Giresun Districts.

The Cluster-5 (Beşikdüzü, Çarşıbaşı, Dernekpazarı, Hayrat, Köprübaşı, Şalpazarı, Tonya, Vakfikebir, Çanakçı, Doğankent, Eynesil, Görele, Güce), where the variable "distance of settlements to the city center" is in the middle-upper range, and the variables "agricultural area (grains/other

crops)," "settlement area," "areas prone to disasters," "forest area," and "basin area" are in the lower value range, is referred to as "periphery, middle sub-qualified area." Cluster-5, which includes the working area, reflects the spatial structure of 41.2% of the total districts (Figure 5).

## DISCUSSION AND CONCLUSION

In the 1/50.000 Scale Provincial Spatial Development Plan of Trabzon Province, the 3rd Sub-region in which Vakfikebir district is located covers the borders of Beşikdüzü, Çarşıbaşı, Şalpazarı, Tonya and Vakfikebir districts. As a result of the clustering analysis, Vakfikebir district shows identicality with the following districts in different dimensions:

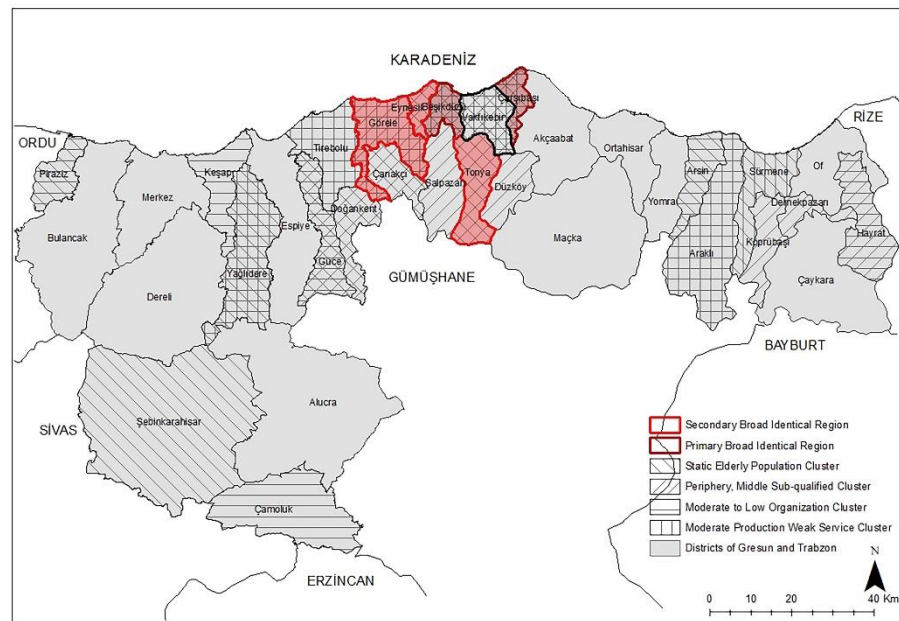
- Social Dimension: Arsin, Beşikdüzü, Çarşıbaşı, Sürmene, Tonya, Vakfikebir, Çanakçı, Doğankent, Eynesil, Güce, Piraziz, Şebinkarahisar, Yağlıdere.
- Economic Dimension: Araklı, Beşikdüzü, Çarşıbaşı, Sürmene, Görele, Tirebolu, Yağlıdere.
- Political Dimension: Araklı, Arsin, Beşikdüzü, Çarşıbaşı, Hayrat, Çamoluk, Görele, Güce, Keşap, Piraziz, Tirebolu, Yağlıdere.
- Spatial Dimension: Beşikdüzü, Çarşıbaşı, Dernekpazarı, Hayrat, Köprübaşı, Şalpazarı, Tonya, Çanakçı, Doğankent, Eynesil, Görele, Güce.

The creation of clusters of similar settlements is predicated on the delineation of identical regions, a process not informed by a singular criterion. Rather, it is based on the establishment of a spatial entity comprising units that exhibit characteristics that are proximate in all social, economic, political and spatial dimensions. Within the context of Vakfikebir, the districts that fall within the purview of the primary identical region are those that demonstrate a high degree of similarity to Vakfikebir across the aforementioned dimensions. When a comparison is made according to the clusters obtained at this point, it is seen that the districts of Beşikdüzü and Çarşıbaşı form an integral whole of Vakfikebir in all dimensions and have an integrated regional dynamism. In the 1/50,000 scale Provincial Spatial Development Plan, a social-spatial similarity is observed with Tonya, which is one of the other districts in the same sub-region, and a similarity with Şalpazarı district is found only in spatial dimensions. Conversely, Görele district, which is situated within the boundaries of Giresun province and exhibits spatial proximity with Vakfikebir, demonstrates economic-political-spatial congruence with Eynesil district, and social and spatial congruence with Eynesil district. Consequently, the secondary identical region consists of the neighbouring settlement of Tonya and the closest neighbouring districts of Giresun, Görele and Eynesil, which are located beyond the provincial administrative boundaries (Figure 6). Thus, the research results support the fact that the concept of region, defined as globalized spaces where local space has gained importance today, as expressed in the relevant literature, is a multi-layered (Paasi and Zimmerbauer, 2016) phenomenon that extends beyond borders (Agnew, 2002; Amin, 2002),

not only based on geographical factors but also showing functional and economic integrity with each other in the spatial sense (Friedman, 1956).

In consequence, the districts of Beşikdüzü, Çarşıbaşı, Tonya, Eynesil and Görele, which are defined as the identical region of Vakfikebir, correspond to the metropolitan area boundary definition in the settlement system. In this country, the definition of the metropolitan area involves the planning of settlements as a part of the urban system in which they are located, and the development of administrative boundaries based on strategic/political planning regions.

In this context, the preparation of strategic spatial plans within the planning system in Turkey, within the scope of the metropolitan area defined beyond administrative boundaries as a result of social, economic, political and spatial dynamics, will ensure a polycentric and balanced development among areas beyond the monocentric structures advocated by the European Spatial Development Perspective (METREX, 2003). The study thus sought to address the fundamental question of the existence of similar settlement clusters in the Vakfikebir district from the perspectives of social, economic, political and spatial dimensions. The study's findings support the hypothesis proposed.



**Figure 6.** Identical region of Vakfikebir district as a result of clustering analysis

Almost all regional plans in Turkey are based on either provincial boundaries (NUTS 3) or NUTS2 boundaries as planning regions. However, since the area in which the elements subject to spatial planning interact can extend beyond administrative boundaries, plans based on 'flat regions' (administrative boundaries) are unable to propose realistic and viable interventions. (Beyhan, 2010). However, regional plans based on normative territories are actually incapable of covering the geographical scope of interacting communities, which ultimately reduces the driving force of the people behind the planning process (Beyhan, 2019).

In this particular context, it would be advantageous to conduct further studies employing an inductive approach, utilising data sets encompassing the flow between settlements. In this context, it is recommended that a planning approach founded on administrative boundaries be accorded precedence over a planning approach predicated on porosity.

In the initial phase of defining the planning region within the study's scope, it was possible to ensure the visibility of the similarities and differences resulting from zoning separately in each dimension. Thus, an innovative model, different from the homogeneous and functional region types in the traditional approach, was tried and a multi-layered territorial boundary discussion was made to make the embeddedness of the zones visible in the context of the missing indicators. In this context, while creating the planning region boundary, both the generalisation made as a result of the loss of detailed data has been prevented and the production of location-specific, applicable and original policies has been enabled in the process of producing regional development/development policies.

In order to determine the planning region boundary of Vakfikebir determined as a local study area, firstly, an attempt was made to understand the urban systems (sub-regions at NUTS 4 level) with the traditional regional approach. At this juncture, it was acknowledged that districts constitute territorial entities, and a spatial structure was delineated that transcends boundaries, albeit a vertical structure that connects local interaction scales, formed by the spatial integrity of local units that coexist.

## NOTES

This work was prepared from the PhD thesis entitled "Territorial -and network- based region dialectics in regional planning practice: A model proposal for the determination of the relational regions within the scope of the plan region" at Karadeniz Technical University Graduate School of Natural and Applied Sciences in 2023.

This work was supported by Scientific Research Projects Unit of Karadeniz Technical University. Project number: FHD-2022-10346. "Territorial -and network- based region dialectics in regional planning practice: A model proposal for the determination of the relational regions within the scope of the plan region" (BAP02)

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## Resume

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