



## Socio-Economic Development Disparities Among Districts of Bursa Province: A Comparative Analysis of 2017 and 2022 SEGE Results

Bursa İli İlçeleri Arasında Sosyo-Ekonomik Gelişmişlik Farklılıkları: 2017 ve 2022 SEGE Sonuçlarının Karşılaştırmalı Analizi

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## SOCIO-ECONOMIC DEVELOPMENT DISPARITIES AMONG DISTRICTS OF BURSA PROVINCE: A COMPARATIVE ANALYSIS OF 2017 AND 2022 SEGE RESULTS

### ABSTRACT

This study evaluates the socio-economic development levels of the districts of Bursa Province by comparing the results of the 2017 and 2022 Socio-Economic Development Index (SEGE) prepared using Principal Component Analysis (PCA). The findings indicate that districts with lower socio-economic levels were unable to adequately benefit from or access metropolitan services, leading to exclusion from urban opportunities. While some districts, such as Karacabey, experienced upward mobility in development rankings, others, including Orhaneli, declined despite their geographical and sectoral advantages. The results highlight the uneven distribution of socio-economic development across districts and reveal that local potentials were not effectively utilized in planning and investment processes. Recommendations are proposed to address disparities through targeted interventions in infrastructure, healthcare, education, agriculture, industry, and tourism, emphasizing the need for province-wide integrated planning to ensure balanced regional development.

**Keywords:** Bursa Province, Socio-Economic Development, Principal Component Analysis (PCA), SEGE Index, Regional Disparities, District-Level Planning, Urban Exclusion.



## BURSA İLİ İLÇELERİ ARASINDA SOSYO-EKONOMİK GELİŞİMİŞLİK FARKLILIKLARI: 2017 VE 2022 SEGE SONUÇLARININ KARŞILAŞTIRMALI ANALİZİ

### ÖZ

Bu çalışma, Temel Bileşenler Analizi (PCA) kullanılarak hazırlanan 2017 ve 2022 Sosyo-Ekonomik Gelişmişlik Endeksi (SEGE) sonuçlarını karşılaştırarak Bursa ili ilçelerinin sosyo-ekonomik gelişmişlik düzeylerini değerlendirmektedir. Bulgular, sosyo-ekonomik düzeyi düşük olan ilçelerin büyükşehir hizmetlerinden yeterince yararlanamadığını ve kentsel olanaklara erişimde dışlanma yaşadığını göstermektedir. Karacabey gibi bazı ilçeler gelişmişlik sıralamasında yukarı yönde bir hareketlilik gösterirken, coğrafi ve sektörel avantajlarına rağmen Orhaneli gibi ilçelerde gerileme gözlenmiştir. Sonuçlar, ilçeler arasında sosyo-ekonomik gelişmenin dengesiz dağıldığını ve yerel potansiyellerin planlama ve yatırım süreçle-

rinde etkin şekilde değerlendirilmediğini ortaya koymaktadır. Çalışmada, altyapı, sağlık, eğitim, tarım, sanayi ve turizm alanlarında hedefe yönelik müdahalelerle bu eşitsizliklerin giderilmesine yönelik öneriler sunulmakta; dengeli bölgesel kalkınmayı sağlamak amacıyla il genelinde bütüncül bir planlama yaklaşımının gerekliliği vurgulanmaktadır.

**Anahtar Kelimeler:** Bursa İli, Sosyo-Ekonomik Gelişmişlik, Temel Bileşenler Analizi (PCA), SEGE Endeksi, Bölgesel Farklılıklar, İlçe Düzeyinde Planlama, Kentsel Dışlanma.



## INTRODUCTION

The unequal distribution of limited natural, social, and economic resources leads to socio-economic and spatial segregation. With the globalization process bringing local dynamics to the fore, cities have begun to gain greater importance than nation-states. The aspiration to align with the global city order, particularly among cities striving to become global, has generated a new demand for restructuring. This demand directs capital toward urban space, targeting all cities with consumption potential. The resulting urban interventions not only produce spatial disparities but also adversely shape the socio-economic conditions of society. Consequently, this process increases inequalities and contributes to unplanned developments at the societal level (Smith 1979; Harvey 2008; Cobankaya et al 2025; Zeren Cetin et al 2025; Atesoglu et al 2025; Zeren Çetin 2024; Zeren Cetin et al. 2023; Degerli & Cetin 2022; Cetin et al. 2021; Cetin 2015; Gungor et al. 2024; Alkan et al. 2024; Uslu et al. 2024).).

Such segregation and differentiation observed in urban space give rise to various problems in cities. Therefore, identifying and analyzing the extent of socio-economic segregation and differentiation is crucial for designing more equitable urban environments and formulating corresponding policies.

Rather than being a single-dimensional problem, urban segregation is a multi-dimensional phenomenon encompassing two key aspects: socio-economic segregation and spatial segregation. These two forms are closely interlinked, functioning as both drivers and reinforcers of each other. The urbanization process shaped by neoliberal policies at the global scale, through its inherent logic and tools, further intensifies segregation in these two dimensions (Sassen 2014; Van der Wusten & Musterd 2013; Cobankaya et al 2025; Zeren Cetin et al 2025; Atesoglu et al 2025; Zeren Çetin 2024; Zeren Cetin et al. 2023; Degerli & Cetin 2022; Cetin et al. 2021; Cetin 2015; Gungor et al. 2024; Alkan et al. 2024; Uslu et al. 2024).).

It is well established that income levels exert a significant segregating effect on residential locations and the use of urban spaces. Even individuals who use, reproduce, and sometimes plan urban spaces tend to accept this segregation as a given. Particularly, actors such as the state and the private sector, who play decisive roles in the production of urban space, often take decisions that exacerbate the degree of segregation.

The guiding research question of this study is as follows: How do socio-economic disparities observed across districts influence spatial development, and under what conditions and in which areas can they lead to segregation?

Building on these considerations, this study utilizes the SEGE (Socio-Economic Development Index) Report prepared by the Ministry of Development Agencies General Directorate using principal component analysis. By analyzing districts' socio-economic development levels, and conducting comparative evaluations across years, the study aims to reveal the impacts of socio-economic development on urban space.

## THEORETICAL FRAMEWORK

### The Concept of Spatial Segregation

The concept of spatial segregation is often explained in conjunction with social segregation. social segregation as the spatial separation of ethnically or socially distinct groups, stemming from growing socio-cultural differences between classes. Urban segregation, in this sense, represents the spatial manifestation of social segregation. Thus, separating the two concepts is virtually impossible (Çetin, 2012).

Although the Chicago School first explored the issue of different social groups settling in distinct urban areas, the topic of segregation as linked to social class differences began to be seriously examined in the 1970s. A number of definitions exist for urban segregation, yet they all converge on the idea that groups with differing social, economic, and cultural characteristics either choose or are compelled to reside in separate parts of the city (**Table 1**).

Urban segregation comprises two interrelated components: socio-economic segregation and spatial segregation. These two dimensions are mutually reinforcing and co-producing, jointly shaping the phenomenon of segregation in urban contexts (Harvey, 2010; Cobankaya et al 2025; Zeren Cetin et al 2025; Atesoglu et al 2025; Zeren Çetin 2024; Zeren Cetin et al. 2023; Degerli & Cetin 2022; Cetin et al. 2021; Cetin 2015; Gungor et al. 2024; Alkan et al. 2024; Uslu et al. 2024).

**Table 1.** Definitions of Segregation (Johnston, 1981; JGAG. 1986; Massey,1990; Massey & Denton 2018 ; Firman, 2004; Sassen 2014; Van der Wusten & Musterd 2013; Jurgen, 1998; Friedrichs, 2013)

### Spatial Segregation – Literature Overview

Author(s)	Definition / Theory	Key Points
Johnston (1981); Massey & Denton (2018)	Definition of spatial segregation	Spatial segregation refers to the regional separation of sub-groups within a larger area, often based on religious beliefs, income levels, ethnic identity, or racial groups. In general terms, it is "the degree to which two or more groups live separately in different parts of urban areas." It reflects the unequal spatial distribution of population groups as measured by segregation indicators.
	Three Theories of Segregation	<ol style="list-style-type: none"> <li>1. Class Theory: Explains segregation as an outcome of socio-economic stratification.</li> <li>2. Self-Segregation: Occurs when individuals of the same group choose to live together voluntarily.</li> <li>3. Discrimination Theory: Views discrimination as the primary driver of spatial segregation.</li> </ol>
Jurgen (1998); Firman (2004);	Determinants of Segregation	Three main factors define the level of segregation: (1) income inequality, (2) educational differences, and (3) discrimination. Spatial segregation represents the unequal distribution of social groups in urban space.
	Macro vs. Micro-Level Segregation	<ul style="list-style-type: none"> <li>-Macro-level:Segregation arising from social inequality in housing areas.</li> <li>- Micro-level: Segregation linked to income, lifestyle, ethnicity, and religion.</li> </ul>
General Findings	Causes & Dynamics of Spatial Segregation	<ul style="list-style-type: none"> <li>- One of the main reasons is socio-economic differences among urban groups.</li> <li>- A group's presence in a space may be voluntary (self-preference) or involuntary (social exclusion, forced cohabitation).</li> <li>- The level of economic, socio-cultural, or ethnic difference, as well as the extent of social ties groups wish to establish, determines the degree of segregation.</li> <li>- Housing market relations are identified as a central mechanism shaping spatial segregation.</li> </ul>

Johnston, 1981; JGAG. 1986: Defines spatial segregation as the regional separation of sub-groups within a given area, based on factors such as religion, income, ethnicity, or race.

Massey,1990; Massey, & Denton 2018: Describe it broadly as the degree to which two or more groups live separately in different parts of an urban area, reflecting the unequal spatial distribution of population groups.

Explains segregation through three theories:

Class Theory: Segregation as a manifestation of socio-economic stratification.

**Self-Segregation Theory:** Segregation resulting from groups voluntarily choosing to live together.

**Discrimination Theory:** Segregation as a product of discriminatory practices.

Jurgen, 1998; Friedrichs, 2013; Firman (2004), and Sassen 2014; Van der Wusten & Musterd 2013: Highlight key determinants such as income inequality, disparities in education, and discrimination. They distinguish macro-level segregation (linked to social inequality in housing areas) from micro-level segregation (related to income, lifestyle, ethnicity, or religion).

Overall, socio-economic disparities among urban groups are among the most prominent drivers of spatial segregation. Such segregation can occur voluntarily (as in self-selection) or involuntarily (as in social exclusion). The extent of segregation depends on factors such as economic, cultural, and ethnic differences, as well as the nature of desired social connections. Ultimately, housing market dynamics are seen as the principal mechanism shaping spatial segregation.

### **Socio-Economic Segregation and Urban Space**

Spatial segregation, as the spatial manifestation of socio-economic segregation, both feeds and reinforces social segregation. Neoliberal urban policies—by facilitating rent accumulation and incentivizing capital investment in urban space—have increased the influence of capital holders in urban decision-making. These groups capture surplus value from cities while simultaneously exploiting and distancing themselves from lower-income groups (Krishnamurthy, 2000).

The relationship between socio-economic segregation and urban space was first highlighted in 19th-century urban sociology, particularly within the Chicago School. Engels' study of Manchester examined how residential patterns reflected individuals' positions in the labor market. Later, Simmel emphasized the influence of age, gender, intellect, religion, and interests on social differentiation. Burgess (1925) conceptualized urban zones in concentric rings tied to income levels, while Hoyt's sector model categorized urban strata by sectors. Harris and Ullman's multiple nuclei model (1945) further emphasized income and occupational differentiation in urban space (Lefebvre, 1991).

Marx defined social stratification based on economic roles—wage laborers, capitalists, and landowners—while Weber argued that this was insufficient, incorporating ethnicity, political power, and income into his multidimensional framework. Weber highlighted status, prestige, and class as key dimensions, suggesting that status-based differentiation can be broader and sometimes more restrictive than purely economic stratification (Massey, 1990; Massey, & Denton 2018).

In recent decades, research has examined socio-economic segregation more deeply, extending beyond class, race, and ethnicity to include income, education, occupation, social life, and cultural structures. For instance, Kanbur and Venables identify accessibility to public services and transport opportunities as additional drivers of segregation. Accessibility is strongly shaped by socio-economic disparities: while higher-income groups concentrate in advantageous, well-served areas, lower- and lower-middle-income groups are often excluded from such opportunities (Sassen 2014; Van der Wusten & Musterd 2013).

### **Sectoral Dimensions of Segregation: The Case of Transportation**

Among the many dimensions of urban space, the transport system deserves special attention as it connects all other parts. Transport modes, related policies, shifting consumption habits, and new mobility demands reflect class-based differences in needs and access.

Economically, affordable transport networks facilitated rural-to-urban migration, bringing diverse social classes together in cities. While this produced urban heterogeneity, it also accentuated spatial segregation. The easing of mobility spurred rapid urban population growth, particularly in developed cities, intensifying socio-spatial differences (Smith 1979; Harvey 2008).

With changing production modes and consumer culture, urban functions—housing, work, leisure, and shopping—became more spatially segregated, especially in upper-class areas. This heightened reliance on daily mobility and transport systems. As a result, new forms of segregation and contradictions emerged. Public transport, while offering accessibility, also entails crowding, rigid schedules, and perceived risks. In contrast, private automobiles provide independence and flexibility, aligning with the logic of capitalism as well as cultural ideals of individualism and competitiveness. However, access to private cars remains stratified along class lines, reinforcing socio-economic inequalities in mobility and urban space.

## **MATERIALS AND METHODS**

Research on district-level development rankings requires a multidimensional approach, working with a variety of indicators that reflect different dimensions of development. For such studies, multivariate statistical analyses—where numerous variables are jointly assessed—are preferred. Cobankaya et al 2025; Zeren Cetin et al 2025; Atesoglu et al 2025; Zeren Çetin 2024; Zeren Cetin et al. 2023; Degerli & Cetin 2022; Cetin et al. 2021; Cetin 2015; Gungor et al. 2024; Alkan et al. 2024; Uslu et al. 2024).

Among the various multivariate techniques developed to draw inferences from multiple variables, Principal Component Analysis (PCA) stands out as the most widely used. Originally introduced by Karl Pearson in 1901 and significantly advanced by Hotelling in 1933, PCA has since been applied across diverse fields ranging from psychology to economics (Pearson, 1901).

Broadly, PCA is employed to eliminate interdependencies among variables or to reduce a large set of variables into a smaller number of core components. It can be used as a stand-alone analysis or as a data-preparation technique for subsequent analytical methods (Tatlidil, 1996).

The concept of development encompasses a wide range of indicators, including economic dimensions, social and cultural life, environmental conditions, and competitiveness. In studies that seek to measure development, it is necessary to identify and calculate variables that capture these dimensions in a balanced and multidirectional manner. While some variables evaluate individual welfare and development, others reflect the position of settlements relative to the country as a whole.

This study is based on the SEGE Report (Socio-Economic Development Index) prepared by the Ministry of Development Agencies General Directorate using PCA. According to SEGE, socio-economic development levels of districts are identified, and comparative analyses across different years are conducted to reveal the impacts of socio-economic development on urban space.

**Table 2.** Variables of the SEGE Report (Ministry of Industry and Technology, 2022)

Demographic Variables (Source: TURKSTAT)
Educational Variables (Sources: MoNE, ÖSYM, YÖK, TURKSTAT)
Health Variables (Sources: TURKSTAT, MoH, TİTCK)
Financial Variables (Sources: BRSA, ICCA, MoTF, MoIT)
Employment and Social Security Variables (Sources: SSI, TURKSTAT, MoFLSS)
Competitiveness Variables (Sources: TEDAŞ, TOBB, MoIT, TKGM, MoCT, TURKSTAT)
Innovation Variables (Sources: SSI, TURKSTAT, MoIT, Turkish Patent Office)
Quality of Life Variables (Sources: TURKSTAT, AYD, MoCT, GDBRA, TEDAŞ)

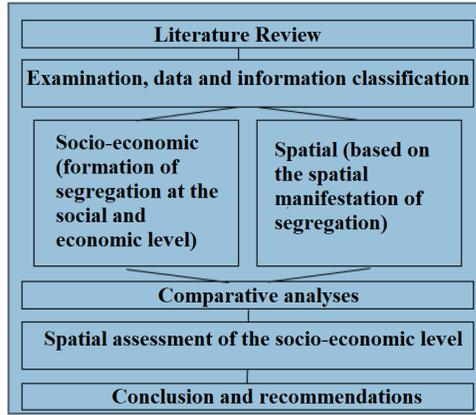
In the District SEGE-2022 study, some variables represent the cumulative capacity of districts and their relative position within Türkiye (expressed as absolute or proportional values), while others measure individual welfare levels (e.g., per capita, per household, or per enterprise values).

## SEGE Report Variables

**Table 2.** Variables of the SEGE Report (Ministry of Industry and Technology, 2022)

Variable Category	Data Source(s)
Demographic Variables	TURKSTAT (Turkish Statistical Institute)
Educational Variables	MoNE (Ministry of National Education), ÖSYM (Student Selection and Placement Center), CoHE (Council of Higher Education), TURKSTAT
Health Variables	TURKSTAT, MoH (Ministry of Health), TİTCK (Turkish Medicines and Medical Devices Agency)
Financial Variables	BRSA (Banking Regulation and Supervision Agency), BKM (Interbank Card Center), MoTF (Ministry of Treasury and Finance), MoIT (Ministry of Industry and Technology)
Employment and Social Security Variables	SSI (Social Security Institution), TURKSTAT, MoFLSS (Ministry of Family, Labor and Social Services)
Competitiveness Variables	TEDAŞ (Turkish Electricity Distribution Corporation), TOBB (Union of Chambers and Commodity Exchanges of Turkey), MoIT, TKGM (General Directorate of Land Registry and Cadastre), MoCT (Ministry of Culture and Tourism), TURKSTAT
Innovation Variables	SSI, TURKSTAT, MoIT, TÜRKPATENT (Turkish Patent and Trademark Office)
Quality of Life Variables	TURKSTAT, AYD (Shopping Centers and Investors Association), MoCT, NVIGM (General Directorate of Population and Citizenship Affairs), TEDAŞ

In this study, a total of 56 indicators representing socio-economic development across the dimensions of demography, employment and social security, education, health, finance, competitiveness, innovation, and quality of life were utilized. Using these variables, the development scores, rankings, and categories of districts were determined (Ministry of Industry and Technology, 2022). The study workflow is illustrated in **Figure 1**.



**Figure 1.** study workflow

## Study Area

The study area is Bursa Province, located in Türkiye's Marmara Region. By the end of 2023, Bursa had a population of 3,214,571, making it the fourth largest city in Türkiye after Istanbul, Ankara, and İzmir, and the second largest city in the Marmara Region after Istanbul. In terms of NUTS-2 regions, Bursa is part of the TR41 Region along with Eskişehir and Bilecik (Bursa Provincial Directorate of Culture and Tourism, 2023). Bursa Büyükşehir Belediyesi 2022; Bursa Eskişehir Bilecik Kalkınma Ajansı. 2023; Bursa İl Kültür ve Turizm Müdürlüğü 2023; Bursa Valiliği 2022; Bursa İmar ve Şehircilik Dairesi 2023; Tarım ve Orman Bakanlığı 2022 Ministry of Industry and Technology 2017 Ministry of Industry and Technology 2020

Bursa consists of 17 districts (Büyükorhan, Gemlik, Gürsu, Harmancık, İnegöl, İznik, Karacabey, Keles, Kestel, Mudanya, Mustafakemalpaşa, Orhaneli, Orhangazi, Yenişehir, Nilüfer, Osmangazi, and Yıldırım), 230 towns, and 659 villages. Bursa Büyükşehir Belediyesi 2022; Bursa Eskişehir Bilecik Kalkınma Ajansı. 2023; Bursa İl Kültür ve Turizm Müdürlüğü 2023; Bursa Valiliği 2022; Bursa İmar ve Şehircilik Dairesi 2023; Tarım ve Orman Bakanlığı 2022 Ministry of Industry and Technology 2017 Ministry of Industry and Technology 2020)

Within this study, a comparative analysis was conducted of the socio-economic development levels of Bursa's districts for the years 2017 and 2022, based on PCA results from the SEGE research. The findings indicate that the socio-economic levels of certain districts have declined, and potential underlying factors for this decline were identified. (Bursa Büyükşehir Belediyesi 2022; Bursa Eskişehir Bilecik Kalkınma Ajansı. 2023; Bursa İl Kültür ve Turizm Müdürlüğü 2023; Bursa Valiliği 2022; Bursa İmar ve Şehircilik Dairesi 2023; Tarım ve Orman Bakanlığı 2022 Ministry of Industry and Technology 2017 Ministry of Industry and Technology 2020)

## RESEARCH FINDINGS AND DISCUSSION

### Socio-Economic Development Level of Bursa Province (2017–2022)

According to the SEGE report (2017), which classified provinces in Turkey into six stages of socio-economic development, the distribution was as follows: 9 provinces in the 1st stage, 15 in the 2nd stage, 13 in the 3rd stage, 14 in the 4th stage, 14 in the 5th stage, and 16 in the 6th stage (Ministry of Industry and Technology, 2017).

Bursa was ranked in the 1st stage, placing 6th overall in Turkey. The classification considered broad indicators such as demographics, quality of life, employment, education, health, finance, competitiveness, and innovation capacity.

Within Bursa Province, the district-level assessment in 2017 revealed the following:

1st stage: 2 districts (Osmangazi, Nilüfer)

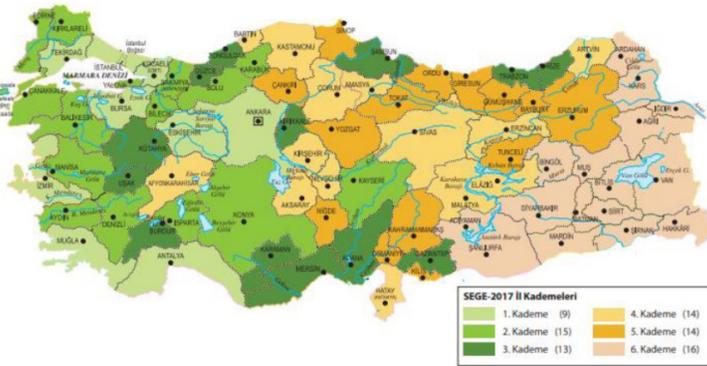
2nd stage: 6 districts (Yıldırım, Gemlik, Kestel, İnegöl, Mudanya, Orhangazi)

3rd stage: 6 districts (Mustafakemalpaşa, Karacabey, Yenişehir, Gürsu, İznik, Orhaneli)

4th stage: 2 districts (Harmancık, Keles)

5th stage: 1 district (Büyükorhan)

6th stage: none (Ministry of Industry and Technology, 2017).



**Figure 2.** SEGE-2017 Provincial Stages Map (Ministry of Industry and Technology, 2017)

At the TR41 region level, Bursa was evaluated alongside Eskişehir and Bilecik. Eskişehir ranked in the 1st stage (7th place nationally), while Bilecik was in the 2nd stage (19th place nationally) (Bursa Eskişehir Bilecik Development Agency, 2023).



**Figure 3.** 2017 TR41 Region Socio-Economic Development Ranking (Ministry of Industry and Technology, 2017)

The SEGE report (2022) assessed socio-economic development at the district level, again across six stages. The national distribution was as follows: 67 districts in the 1st stage, 173 in the 2nd stage, 175 in the 3rd stage, 215 in the 4th stage, 222 in the 5th stage, and 121 in the 6th stage (Ministry of Industry and Technology, 2022).

For Bursa's districts in 2022:

1st stage: 2 districts (Osmangazi, Nilüfer)

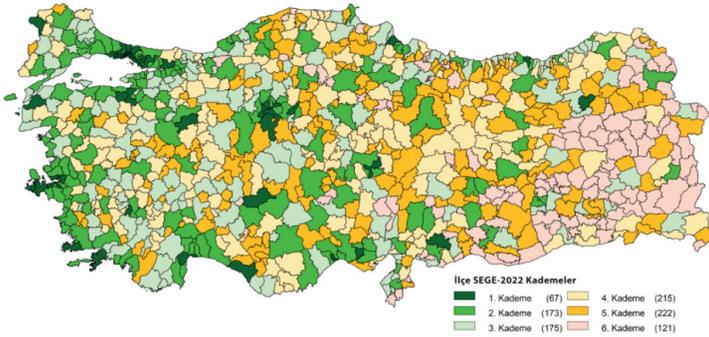
2nd stage: 7 districts (Yıldırım, Gemlik, Kestel, İnegöl, Mudanya, Orhangazi, Karacabey)

3rd stage: 4 districts (Mustafakemalpaşa, Yenişehir, Gürsu, İznik)

4th stage: 3 districts (Orhaneli, Harmancık, Keles)

5th stage: 1 district (Büyükorhan)

6th stage: none (Ministry of Industry and Technology, 2022).



**Figure 4.** SEGE-2022 District Stages Map (Ministry of Industry and Technology, 2022)

#### Comparative Analysis of Socio-Economic Development (2017–2022)

A comparison of SEGE results for Bursa in 2017 and 2022 shows that Karacabey improved, rising from the 3rd stage to the 2nd stage. In contrast, Orhaneli

declined: in 2017, it was in the 3rd stage with a score of  $-0.100$ , but by 2022 it had dropped to the 4th stage with a score of  $-0.354$ .



**Figure 5.** 2017 District-Level Socio-Economic Development Map



**Figure 6.** 2022 District-Level Socio-Economic Development Map

Although Orhanlı is geographically closer to the metropolitan area compared with Harmancık, Keles, and Büyükorhan—suggesting potentially better access to urban services—it still experienced decline.

Nilüfer and Osmangazi, bordering Orhanlı, are the most socio-economically developed districts of Bursa, excelling in both the services and industrial sectors, not only within the province but also nationally. Mustafakemalpaşa, another neighboring district, holds strong potential in both industry and agriculture. Given

these dynamics, one would expect Orhaneli to improve through local governance support and inter-district cooperation. However, the opposite trend was observed.

Instead, Orhaneli has increasingly resembled less developed districts such as Harmancık, Keles, and Büyükorhan—characterized by insufficient education, healthcare, and infrastructure, low income levels, limited socio-cultural activities, and population outmigration.

Additionally, the agricultural potential of Orhaneli, Büyükorhan, Keles, and Harmancık has been overlooked in development strategies. Despite being predominantly agricultural, these districts were not fully integrated into the province's broader agricultural activities.

Furthermore, Orhaneli's mining potential and the archaeological heritage sites concentrated in Keles and Harmancık have not been effectively leveraged, as reflected in their low socio-economic scores.

**Table 3.** Comparative Socio-Economic Development Scores, 2017–2022 (Ministry of Industry and Technology, 2022)

District Rankings and Scores (2017 vs. 2022)

District Name	2017 Overall Rank	2017 In-Province Rank	2017 Score	2017 Tier	2022 Overall Rank	2022 In-Province Rank	2022 Score	2022 Tier
Nilüfer	9	1	3.349	1	8	1	4.072	1
Osmangazi	23	2	2.301	1	32	2	2.374	1
Yıldırım	119	3	1.109	2	116	3	1.085	2
Gemlik	124	4	1.034	2	171	7	0.743	2
Kestel	126	5	1.029	2	166	6	0.777	2
İnegöl	131	6	1.003	2	131	5	1.018	2
Mudanya	136	7	0.981	2	126	4	1.037	2
Orhangazi	227	8	0.536	2	223	9	0.486	2
Mustafakemalpaşa	235	9	0.479	3	263	10	0.285	3
Karacabey	242	10	0.466	3	208	8	0.560	2
Yenişehir	255	11	0.390	3	318	13	0.062	3
Görsu	267	12	0.351	3	281	11	0.176	3
İznik	279	13	0.312	3	302	12	0.099	3
Orhaneli	424	14	-0.100	3	524	14	-0.354	4
Harmancık	473	15	-0.174	4	533	15	-0.372	4
Keles	564	16	-0.333	4	549	16	-0.392	4
Büyükorhan	747	17	-0.652	5	815	17	-0.752	

### The Impact of 2022 Investments on Spatial Differentiation

When examining the reasons behind the socio-economic shifts between 2017 and 2022, investment allocation emerges as a key factor. Districts whose socio-economic scores improved were generally those where significant investments were made, while neglected districts stagnated or declined.

Orhaneli, which showed regression, serves as a critical case for understanding which potentials were overlooked by local authorities.

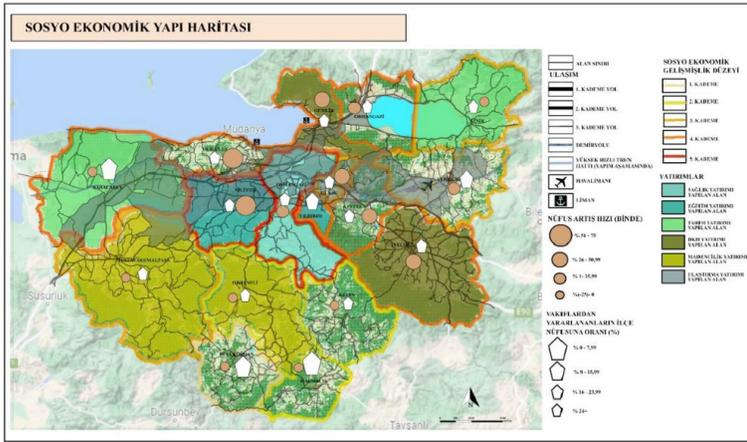
**Table 4.** Investments by Sector in 2022 (Bursa Governorship, 2022)

Sectoral Investments (2021–2022)

Sector	Number of Projects	Project Budget (TL)	Cumulative by End of 2021 (TL)	2022 Investments (TL)
Education	12	219,871,194	123,423,194	83,048,000
Health	7	1,186,126,529	437,546,354	224,387,047
Transportation	10	32,209,564,400	11,127,181,871	2,285,577,789
Agriculture	5	1,823,499,516	208,260,429	145,967,000
Energy	1	150,000,000	2,000	20,000,000
Tourism	1	64,105,000	51,855,700	12,249,300
Housing	1	8,000,000	4,000,000	4,000,000
Mining	4	420,083,000	162,355,000	94,972,000
Manufacturing	2	114,025,000	13,017,000	20,025,000
Other Public Services (OPS)*	11	4,398,463,000	815,774,000	916,256,000
Total	54	40,593,737,639	12,943,415,548	3,806,482,136

In 2022, Bursa hosted 54 projects with a total value of 40.59 billion TL, of which 3.8 billion TL represented new investments. The highest number of projects (12) was carried out by Bursa Uludağ University, followed by 8 projects from the General Directorate of Highways.

By sector, most projects were in education (12) and other public infrastructure (11). By geography, Osungazi, Nilüfer, and Yenişehir received the largest shares of investment, while Gürsu, Kestel, Keles, Büyükşehir, and Harmancık received the least.



**Figure 7.** Bursa Province Socio-Economic Structure Map

Key observations:

Nilüfer leads in industrial employment (51.66%), with the highest income level and in-migration rate.

Districts with higher education levels (e.g., Nilüfer, Mudanya) also show higher income.

Rural districts such as Büyükorhan, Harmancık, Keles suffer from low employment, high dependency ratios, and outmigration.

These same districts also have high poverty, aging populations, low education, and insufficient healthcare.

By contrast, Nilüfer and Osmangazi host the youngest, best-educated, and most service-accessible populations.

Keles and Büyükorhan have the highest rural population shares, yet low education levels.

Industrialized districts (Nilüfer, Gürsu, Osmangazi, Kestel, İnegöl) show higher urbanization and labor force growth.

No investments were made in Büyükorhan, Keles, or Harmancık, leaving them at the lowest socio-economic tier.

Yenişehir, though agriculturally strong, lacks integration into the food industry.

Gemlik, Orhangazi, and İznik—with strong olive production—are underrepresented in food processing.

The southern districts (Orhaneli, Keles, Büyükorhan, Harmancık) face structural disadvantages due to geography, limited industry, and small populations, leaving agriculture as their only viable sector.

Gemlik, despite its automotive industry presence, also hosts growing food and maritime industries.

Infrastructure in Nilüfer, Osmangazi, and Yıldırım is advanced, but Orhaneli, Keles, Büyükorhan, and Harmancık lag behind.

Trade relies primarily on Gemlik Port, with Yenişehir Airport as the secondary hub.

Tourism opportunities vary: cultural (Nilüfer, Yıldırım, Osmangazi), coastal (Mudanya, Gemlik), sports (Kestel, Keles, Gürsu), day-trip (Karacabey, Mustafakemalpaşa), agro-tourism (Orhaneli, Büyükorhan, Harmancık), and thermal (Orhangazi, İznik, İnegöl).

Education and healthcare facilities in underdeveloped districts are inadequate for their populations.

Nilüfer, Osmangazi, Yıldırım face high CO<sub>2</sub> emissions due to dense population, traffic, and industry; İnegöl and Kestel suffer from industrial air pollution.

The largest share of investment went to transportation infrastructure, particularly railway networks linking Bursa to other provinces. However, despite these investments, southern districts remain poorly connected, reinforcing their isolation.

While Gürsu improved its relative ranking within Bursa, Kestel declined despite its proximity to the metropolitan core.

Districts benefiting from industrialization and in-migration—Nilüfer, Gürsu, Osmangazi, İnegöl—improved their socio-economic scores between 2017 and 2022.

Conversely, districts with low education levels—Karacabey, Keles, Büyükorhan, İznik, Yenişehir, Harmancık, Orhaneli—remain largely dependent on agriculture and livestock. In some cases, natural pastures and meadows support employment and income (e.g., Karacabey, Mustafakemalpaşa, İnegöl, Yenişehir, Mudanya).

The absence of targeted investments in Büyükorhan, Harmancık, and Keles aligns with their continued placement in the lowest development stages.

## CONCLUSION AND RECOMMENDATIONS

### Conclusion

The study revealed that districts with lower socio-economic levels were unable to adequately benefit from or access the services provided in the metropolitan center. Although it was expected that the socio-economic levels of the districts would improve between 2017 and 2022 due to technological advancements and investments made by local administrations in line with local potentials and needs, this expectation was not realized in many districts.

When comparing the socio-economic development levels of Bursa in 2017 and 2022, it was found that only Orhaneli experienced a decline in its development stage, while Karacabey improved to a higher stage.

In 2022, compared to 2017, the socio-economic rankings of İnegöl, Mudanya, Karacabey, Gürsu, and İznik within Bursa improved, whereas Gemlik, Kestel, Orhangazi, Mustafakemalpaşa, and Yenişehir declined.

This indicates that investments were not aligned with the specific potentials of the districts, and planning across the province was not conducted in a way that ensured interconnectedness and balanced development among districts.

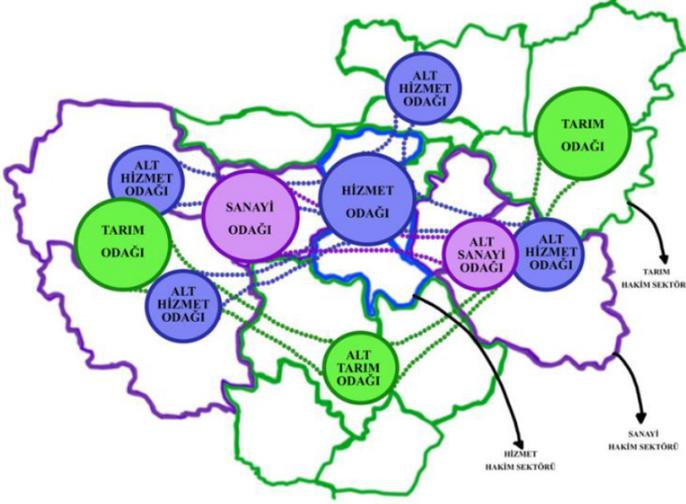
Despite its advantageous position—both due to its proximity to the metropolitan area and its agricultural and mining potential—Orhaneli has not benefitted from its strengths. As a result, it has become a district experiencing outmigration. The departure of the younger population has left behind a predominantly elderly dependent population, altering the social structure and changing local needs. This shift has also directly affected spatial development, with a noticeable decline in service sector activity.

Moreover, transportation networks that could have increased Orhaneli's accessibility to highly developed districts such as Nilüfer and Osmangazi have not been strengthened. Consequently, residents either migrated to districts offering better services or remained in Orhaneli, excluded from urban opportunities and forced to live with insufficient social and economic services.

In summary, it was observed that districts with lower socio-economic levels could not adequately benefit from the services provided in the urban center, nor could they access them. Thus, the conclusion is that socio-economically disadvantaged districts have been excluded from urban areas.

## Recommendations

The comparison of socio-economic rankings in 2017 and 2022 shows that the scores of several districts declined. Therefore, recommendations should not be limited to individual districts but should be considered at the provincial scale, taking into account natural, social, economic, and physical structures.



**Figure 8.** Agriculture-Industry-Service Sector Focus Scheme

Keles, Harmancık, Büyükorhan, Orhaneli, Yenişehir, Mustafakemalpaşa: Establish socio-cultural facilities targeting the youth.

Büyükorhan, Harmancık, Keles, Orhaneli, Yenişehir: Organize awareness programs and seminars for disadvantaged population groups.

Büyükorhan, Harmancık, Keles, Orhaneli: Increase the activities of social service associations and attract investments aligned with local potentials.

Büyükorhan, Harmancık, Keles, Orhaneli: Improve both the quantity and quality of employment to raise rural incomes.

Büyükorhan, Harmancık, Keles, Orhaneli: Establish public education and community centers to strengthen social awareness.

Büyükorhan, Harmancık, Orhaneli, Keles: Provide training programs and courses to raise educational attainment levels.

Osmangazi, Gürsu, Mudanya, Keles, Harmancık, Büyükorhan: Increase the number of doctors and healthcare professionals.

Karacabey, Mustafakemalpaşa, Yenişehir, İnegöl: Establish Organized Agricultural Industrial Zones (BOSB) and greenhouse production areas, given their high agricultural productivity.

Büyükorhan, Harmancık, Orhaneli: Develop agro-tourism areas.

Karacabey, Mustafakemalpaşa: Strengthen the role and effectiveness of agricultural cooperatives in rural areas.

İznik, Karacabey, Mudanya: Establish R&D centers to promote science-economy cooperation.

Nilüfer: Expand the automotive industry.

Mustafakemalpaşa and Gürsu: Develop the food industry.

İnegöl: Strengthen the furniture industry.

Yenişehir: Diversify glass production within the petroleum-glass casting industry and promote it as a primary sector.

Gürsu and Osmangazi: Increase capacity and product diversity in the textile industry.

Mudanya, Mustafakemalpaşa, Büyükorhan, Harmancık: Establish hospitals and family health centers.

Mustafakemalpaşa, Orhaneli, Keles, Harmancık, Büyükorhan: Strengthen primary and secondary road networks.

Enhance road and rail transport systems to improve logistics and the market accessibility of locally produced goods.

Yenişehir: Integrate air and rail transport to strengthen its role in logistics.

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## Author Contribution Rates

Design of Study:

Data Acquisition:

Data Analysis:

Writing Up:

Submission and Revision:

## Ethics Approval and Consent to Participate

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Approval was obtained from the Ethics Committee for Social and Human Sciences Research at Ondokuz Mayıs University, as well as from the Faculty of Architecture, Ondokuz Mayıs University.

## Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Conflict of Interest

All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

## REFERENCES

- Alkan, A., Adıgüzel, F., & Çetin, M. (2024). Coğrafi bilgi sistemleri kullanarak trafik kazalarının analizi: Siirt kenti örneği. *Akıllı Ulaşım Sistemleri ve Uygulamaları Dergisi*, 7(1), 1-14.
- Bursa Büyükşehir Belediyesi (2022). *Bursa Büyükşehir Belediyesi veri ve bilgileri*, Bursa.
- Bursa Eskişehir Bilecik Kalkınma Ajansı. (2023). *Bursa Eskişehir Bilecik Bölge Planı (2014-2023)*. Bursa: Kalkınma Kütüphanesi.
- Bursa İl Kültür ve Turizm Müdürlüğü. (2023). *Bursa İli Genel Bilgiler*. Bursa: T.C. Kültür ve Turizm Bakanlığı.
- Bursa Valiliği. (2022). *Kamu Yatırım Programları*. Bursa: Bursa Valiliği.

- Bursa İmar ve Şehircilik Dairesi (2023) Bursa Kenti'nin İmar Planları Süreci. Bursa: Bursa Büyükşehir Belediyesi, İmar ve Şehircilik Dairesi Başkanlığı.
- Cetin, M. (2015). Using GIS analysis to assess urban green space in terms of accessibility: case study in Kutahya. *International Journal of Sustainable Development & World Ecology*, 22(5), 420-424.
- Cetin, M., Aksoy, T., Cabuk, S. N., Kurkcuoglu, M. A. S., & Cabuk, A. (2021). Employing remote sensing technique to monitor the influence of newly established universities in creating an urban development process on the respective cities. *Land use policy*, 109, 105705.
- Cobankaya, H., Yucedag, C., Suchocka, M., & Zeren Cetin, I. (2025). Assessing Walkability for Parents With Strollers: Challenges and Recommendations for Sustainable Urban Design. *Children & Society*
- Çetin, İ. (2012). Kentsel ayrışma ve mekânsal kümelenme biçimleri. *İdealkent*, 3(7), 160-186.
- Degerli, B., & Çetin, M. (2022). Evaluation from rural to urban scale for the effect of NDVI-NDBI indices on land surface temperature, in Samsun, Türkiye. *Turkish Journal of Agriculture-Food Science and Technology*, 10(12), 2446-2452.
- Firman, T. (2004). New town development in Jakarta Metropolitan Region: a perspective of spatial segregation. *Habitat international*, 28(3), 349-368.
- Friedrichs, J. (2013). Social inequality, segregation and urban conflict: the case of Hamburg. In *Urban Segregation and the Welfare State* (pp. 168-190). Routledge.
- Gungor, S., Sucu, F., Dinc, Y., Cetin, M., & Deniz Adiguzel, A. (2024). GIS based daily tourism route proposal for surrounding provinces and districts from Ankara's Çankaya district (Turkey). *Environment, Development and Sustainability*, 1-26.
- Harvey, D. (2008). The right to the city, in «New left review», 53.
- Harvey, D. (2010). Social Justice and the City Athens: University of Georgia Press. *Social justice and the city* (Vol. 1). University of Georgia press.
- JGAG. (1986). Residential segregation, the state and constitutional conflict in american urban areas. 1986): 401-403.
- Johnston, R. J. (1981). Local government, suburban segregation and litigation in US Metropolitan areas. *Journal of American Studies*, 15(2), 211-229.
- Jurgen, F. (1998). Social Inequality, Segregation and Urban Conflict: the case of Hamburg. *Urban Segregation and Welfare State içinde*, ed. s. Sako Musterd ve Wim Ostendorf, Routledge, London, 168-190.
- Kalaycıoğlu, S., Çelik, K., Celen, Ü., & Türkyılmaz, S. (2010). Temsili Bir Örnekte Sosyo-Ekonomik Statü (SES) Ölçüm Aracı Geliştirilmesi: Ankara Kent Merkezi Örneği". *Sosyoloji Araştırmaları Dergisi*, Sayı:13 (1), s.182-220. 24
- Krishnamurthy, A. (2000). "More than abstract knowledge": Friedrich Engels in Industrial Manchester. *Victorian Literature and Culture*, 28(2), 427-448.
- Lefebvre, H. (1991). *The Production of Space*. Oxford: Blackwell Publishers.
- Massey, D. S. (1990). American apartheid: Segregation and the making of the underclass. *American journal of sociology*, 96(2), 329-357.
- Massey, D. S., & Denton, N. A. (2018). A Merican Apartheid Segregation and the Making of the Underclass. In *Inequality* (pp. 103-118). Routledge.
- Ministry of Industry and Technology Sanayi ve Teknoloji Bakanlığı. (2017). İllerin ve bölgelerin sosyo-ekonomik gelişmişlik sıralaması araştırması SEGE-2017. Bursa: Kalkınma Ajansları Genel Müdürlüğü.
- Ministry of Industry and Technology Sanayi ve Teknoloji Bakanlığı. (2020). İller ve bölgeler arası sosyo-ekonomik ağ ilişkileri raporu. Ankara.
- Ministry of Industry and Technology Sanayi ve Teknoloji Bakanlığı. (2020). Türkiye'de kırsal yerleşimler saha çalışması raporu. Ankara.
- Ministry of Industry and Technology Sanayi ve Teknoloji Bakanlığı. (2022). İlçelerin sosyo-ekonomik gelişmişlik sıralaması araştırması SEGE-2022. Ankara: Kalkınma Ajansları Genel Müdürlüğü.
- Pearson, K. (1901). LIII. On lines and planes of closest fit to systems of points in space. *The London, Edinburgh, and Dublin philosophical magazine and journal of science*, 2(11), 559-572.
- Sassen, S. (2014). *Expulsions: Brutality and complexity in the global economy*. Harvard University Press.
- Smith, N. (1979). Toward a theory of gentrification a back to the city movement by capital, not people. *Journal of the American planning association*, 45(4), 538-548.
- Tarım ve Orman Bakanlığı. (2022). Bursa Tarımsal Yatırım Rehberi 2022. Bursa: Tarım ve Orman Bakanlığı.

- Tatlıdil, H. (1996). Uygulamalı çok değişkenli istatistiksel analiz. Ankara: Cem Web Ofset Ltd. Şti.
- Uslu, D. Y., Almansouri, H. M. S., Elahsadi, A. H. M., & Çetin, M. (2024). Towards sustainable cities: Evaluating the distribution and functionality of green spaces in Atakum. *Journal of Design for Resilience in Architecture and Planning*, 5(3), 461-476.
- Van der Wusten, H., & Musterd, S. (2013). Welfare state effects on inequality and segregation: Concluding remarks. In *Urban Segregation and the Welfare State* (pp. 238-247). Routledge.
- Zeren Çetin, I., Adigüzel, F., Sandal, E. K., & Dinc, Y. (2025). Enhancing bioclimatic conditions in urban open spaces through surface material selection: The case of adana (Turkey). *Environment, Development and Sustainability*, 1-16.
- Zeren Çetin, İ. (2024). Wind speeds of bartın: impacts of climate change and settlements. *Menba Kastamonu Üniversitesi Su Ürünleri Fakültesi Dergisi*, 10(3), 223-230.
- Zeren Çetin, I., Varol, T., & Ozel, H. B. (2023). A geographic information systems and remote sensing-based approach to assess urban micro-climate change and its impact on human health in Bartın, Turkey. *Environmental Monitoring and Assessment*, 195(5), 540.