Discussing the Development in the Real Estate Sector in the Framework of University-City Interaction

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Abstract

Universities exert a considerable influence on urban economies through the direct and indirect consumption they generate within the city. The former is attributable to the expenditure of students and staff, while the latter is a consequence of the demands they create for accommodation, transport, trade, and services. One of the most fundamental areas where these effects can be monitored is the housing and accommodation shaped by the demands of students and staff. Following the establishment of Kırklareli University in 2007, a notable increase in human mobility has been observed in the city center of Kırklareli, accompanied by significant changes in the spatial order. The principal objective of this study is to examine the housing-based spatial transformation and tendency in the city center of Kırklareli in terms of the defined periods following the establishment of the university. In this context, housing sale data and its distribution were analyzed in a spatial/structural dimension using the "Land Registry Transaction Statistics" and "Parcel Query-Analysis-Independent Section Sales Density Distribution database," which were published by the Republic of Turkey Ministry of Environment, Urbanization and Climate Change-General Directorate of Land Registry and Cadaster. The increase and tendency were evaluated. A statistical query and correlation analysis were conducted on the data, with a particular focus on establishing a comparison between the change in population and the number of students, as well as academic and administrative staff. The resulting data were then subjected to a process of interpretation. In addition, current master plans were evaluated, and suggestions were developed for the factors that should be considered in urban planning. The study revealed that, regardless of the current population development, student-oriented dynamics directly affect the real estate sector in terms of housing sales, mobility, and spatial transformation due to the growth of the urban population and the increase in demand.
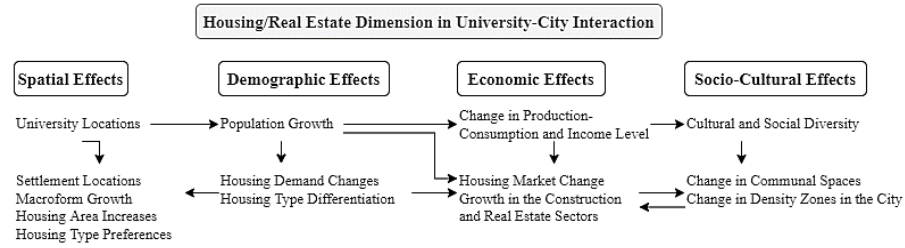
INTRODUCTION

Universities are institutions that undertake education, research missions, and they have significant effects and contributions to the development of the cities where they are established and to the mobilization of economic sectors (Felsenstein, 1996). It is believed that universities will have a significant positive effect on the income levels of the regions where they are established and on the employment data in the region. Accordingly, the establishment of universities in relatively less-developed regions of developing countries represents a significant opportunity for boosting economic growth (Phelps, 1998). The possible effects of universities on the regions where they are established are evaluated under the following four main headings (Florax, 1987):

- Economic: increase in regional income, mobilization of the economy and the labor force structure in the region,
- Physical infrastructure: boost in the development of housing, health, transportation infrastructure,
- Socio-cultural infrastructure: increase in cultural diversity, increase in social and cultural activities, improvement in the quality of life, and
- Demographic: increase in educational attainment, decrease in education-related migration.

It is stated that higher education has an impact on the consumption preferences of individuals. As the level of education increases, new cultural and artistic consumption preferences are added. Education, which has a significant role in social development, appears as an effective factor in the distribution of social tasks according to ability and capacity and in increasing productivity (Özaslan, 1998). In addition, universities contribute to the economic development of cities by providing employment opportunities, bringing knowledge, production, and labor to the region, increasing purchasing and technology connections, providing tax opportunities, and creating brand value (Munnich & Nelson, 2003).

For the purposes of this study, Kırklareli city center and Kırklareli University, which made significant spatial, demographic, and economic impact on the medium-sized city since it was established in 2007, were selected as the sample area. (Gündoğdu & Özkök, 2017) is one of the reference sources on this subject, and it served as a guide to identify the changes in spatial layout and typology. As an extended evaluation, the sectoral, social, and spatial reflections of the university-city interaction were summarized as follows (Figure 1):

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Housing/Real Estate Dimension in University-City Interaction

Spatial Effects	Demographic Effects	Economic Effects	Socio-Cultural Effects
University Locations	Population Growth	Change in Production-Consumption and Income Level	Cultural and Social Diversity
Settlement Locations Macroform Growth Housing Area Increases Housing Type Preferences	Housing Demand Changes Housing Type Differentiation	Housing Market Change Growth in the Construction and Real Estate Sectors	Change in Communal Spaces Change in Density Zones in the City

Figure 1. Impacts on University-City interaction (Reproduced from Gündoğdu & Özkök, 2017, p. 85)

When the direct effects of the establishment of a university are evaluated, it becomes evident that these effects manifest in a multitude of interrelated and multifaceted dimensions, including social, economic, and cultural spheres. It is possible to observe the contributions to the city in the interaction process that starts with the spatial location of the university through a comparative evaluation of the current situation and the developing infrastructure. Figure 1 demonstrates that the "real estate" intersection in the university-city interaction has a wide impact. More precisely, the "real estate" issue in university-city interaction leads to repercussions such as the creation of new housing areas because of increased urban demands, changes in structural/spatial typologies, and increased mobility of sectors such as services and trade with the effect of location. When the change in real estate prices related to housing sales in Kırklareli city center (between 2015 and 2023[1]) are analyzed, unlike the former continuous increase trend, 2017, 2021 and today can be identified as individual breakdown segments (Figure 2). There are studies that show the spatial dependence of these price values (also in the Tekirdağ-Edirne-Kırklareli sub-region including the study area), which are shaped according to the supply-demand relationship (Türkyılmaz, 2023). Analyzing the spatial effects of these breakdowns in values is important in terms of addressing planning, design and urban management issues and analyzing spatial change & transformation processes. In addition, making a thematic inquiry in this context and examining the interrelationships in the study area where post-university change was referred to in previous sentences, constituted the starting point of this study.

[1] The earliest data available on the reviewed sites starts in 2015. The real estate prices presented in Figure 2 calculated as the average of the values obtained from three different online real estate sales platforms (Hepsi Emlak, Zingat, Sahibinden) and one real estate analysis platform (Endeksa) for April each year.

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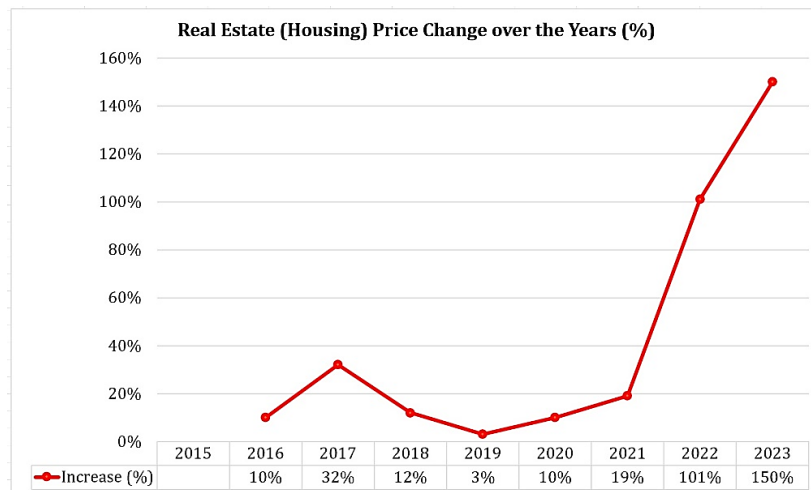
Figure 2. Change in Real Estate (Housing) Prices between 2015 and 2023 (compiled and calculated by authors)

Real Estate (Housing) Price Change over the Years (%)

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Increase (%)		10%	32%	12%	3%	10%	19%	101%	150%

In this context, the research questions addressed in the study are as follows:

1. Are there breaking points in the post-university development in Kırklareli city center? Do these effects have a spatial dimension?
2. Can the effects of the housing and real estate sector be observed in the process of spatial transformation and reproduction?
3. Did the changing and increasing demands in the city create different growth directions? Did the university create an attractive effect in this respect?

Based on the research questions, the main aim of the study is to examine the spatial transformation and orientations in the city center of Kırklareli in the post-university period -specific to the periods that were identified- in terms of housing. In this context, housing sale data and its distribution were analyzed in spatial/structural dimension, and upward trends were evaluated. Statistical inquiries and interpretations were made by comparing these data with population values as well as the changes in the number of students, and academic & administrative staff under the influence of the university. In addition, current master plans were evaluated, and suggestions were developed pertaining to the factors that need to be addressed in planning. The general flow chart of the study is as follows (Figure 3):
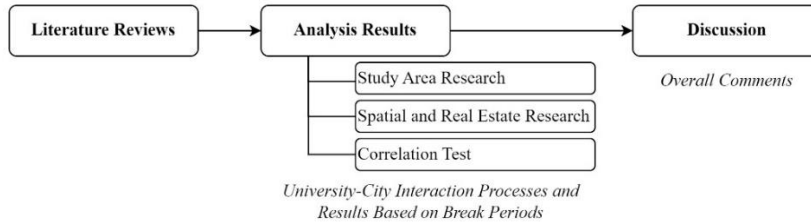
Figure 3. Flowchart of the study

LITERATURE REVIEWS

"The destinies of cities and their universities are inseparable, one cannot develop without the other"(Volker, 1971, p. 6)

One of the first studies on the role of universities within the urban tissue and the spatial/economic/social/cultural transformation effects they create can be seen in (Nash, 1973). Prior to the nineteenth century, universities were isolated and independent from interaction with their surrounding urban settlements. However, following the nineteenth century, particularly in the United States, universities began to be perceived not only as scientific institutions but also as a significant contributor to the reputation and the appeal of the cities in which they were located (Brockliss, 2000, pp. 159–162). This situation led to the establishment of a relationship between university administration and local governments in proportion to the level of urban development, regardless of the location of the university (Bender, 1988; Goddard, 1994). (Nash, 1973, pp. 3-5, 20-25) highlighted the sociological

dimension of university-city interaction. He stated that universities should play a role that should produce solutions to sociological and cultural problems in cities and provide communication & interaction between groups that experience conflict in the city. However, when the general views during this period are analyzed, it is seen that the impact of universities on urban macroform and development processes is ignored, and universities are considered as institutions independent of urban relationship networks.

The research conducted by (Van Der Wusten, 1998, pp. 4–10) is one of the first sources to include a spatial dimension to the process between universities and urban development. One of his main arguments in this regard is that universities dominate spatial, economic, and social development in the city. The influx of academics, administrative staff, and students from universities to the city inevitably results in an increase in consumption demands, particularly in areas such as the housing market, retail trade, and the service sector. This, in turn, affects the supply of resources within the city. In addition, universities can support the development of different activities in the city with the knowledge they produce or trigger different sectors to relocate to the city[2]. Politically, universities are important urban actors that influence both strategic planning and spatial planning. Therefore, universities play an influential role in urban form and spatial development processes, and the location preferences of land use types change with the attraction effect created by their location. Access to universities is particularly important in urban transportation and public transportation planning. In addition, the housing and accommodation preferences of these "newcomers" with different socio-economic and cultural profiles may lead to different residential areas and/or preferences in the city. Therefore, universities have the potential to rebuild and reshape the macroform with their "urban developer" structure (Ogur, 1973). At this point, Van Der Wusten considers the definition of "urban developer" as a cumulative accumulation of indirect effects over time rather than the direct impact of universities. Furthermore, it is stated that the role of universities as sociological actors, which was discussed in the literature in the 1970s, diminished in the 1990s, and their spatial-economic effects came to the forefront (Rothblatt & Wittrock, 1993, pp. 1–4; Readings, 1997; Van Der Wusten, 1998, p. 8). Similarly, (Bender, 1988, pp. 18–20) states that the university-city relationship consists of indirect effects, and that the role of sociological guiding/unifying actor remains in the background due to the differences between urban culture and academic culture. After the mid-2000s, site selection for universities and related student flows have been used as the main trigger for boosting the urban economy, as well as increasing urban consumption and spatial change[3] (Fincher & Shaw, 2009; Baron & Kaplan, 2011, pp. 10–11; Kinton et al., 2018, p. 247). In this respect, universities are also considered as a trigger in the development of small cities (Berdahl, 2010).

[2] See also (Florax, 1992).

[3] (Cortes, 2014, p. 348) argues that university-community networks are a direct influencer of the housing market.

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(Perry & Wiewel, 2005) examined the spatial-economic impacts of universities together with the real estate sector, which is a cross-sectional issue. Sources such as (VerMeulen, 1980; Beeson & Montgomery, 1990; Pick, 1993), prove to be the first studies that addressed "residential area development/location choice-real estate sector development-university impact" for the first time as a distinct perspective. In a detailed and extended study, (Perry & Wiewel, 2005, pp. 6–11) stated that universities have a prominent position in the changes that occur in the real estate sector in the spatial development process. They stated that the urban fabric has changed as a result of university-affected land use location, the provision of housing for students, the increase in parcel prices and the construction of urban projects in idle areas. In their study in Oakland, California (Deitrick & Soska, 2005) found that with the change in the socio-economic profile in the neighborhoods where campuses are located, the existing users had to relocate to other places due to increased demand, rent and land prices. The concept of "studentification"[4], which is translated as "studentization/student-based gentrification", is another issue addressed in the research on "university-city interaction and residential areas". In context, studentification refers to the fact that residential areas in a city are preferred by university students over time, and local users end up moving to another area. (Smith, 2005) was the first to identify this phenomenon in UK "university cities" (namely, Birmingham, Nottingham and Leeds) in terms of spatial effects such as the increase in housing supply, changes in land prices, and the dominance of student-oriented trade and service sectors over other economic activities. In addition, changes in rental prices affect the fluidity and location preferences of urban users over time (Aikman, 2014). Therefore, "university-urban planning-real estate sector" relations have been one of the issues that came to the forefront after 1990s and have been studied with quantitative analysis after 2000s (Perry & Wiewel, 2008). Similar results were found in studies conducted in Germany, Scotland, and Japan (Anacker & Altrock, 2008; Peel, 2008; Takeuchi, 2008).

(Cortes, 2014, pp. 348–351) acknowledged the impact of universities on the housing market but noted that measuring these effects is difficult and fuzzy. The reasons are as follows: (1) the university-city relationship has different effects at macro & micro scales and these effects are variable and difficult to measure, and (2) there are data limitations for different parameters that can be considered (for example, housing market indicators). These issues, which narrow the scope of the research, make it difficult to track the housing market effects at the university level. Cortes also suggested that interrogations can be made between quantitative data such as housing sales values, rental prices[5], land market values, etc. and data such as education level, number of students, ratio of the young population, etc. to identify the university effect.

[4] See also (Yılmaz, 2011; Tuncer & İslam, 2017).

[5] See also (Feng, 2019).

When the development of higher education and universities in Türkiye is examined, it is seen that different approaches wew adopted in different periods. With the 1933 University Reform, universities, which were designed as a modern institution, have the roles of supporting and developing social reforms and increasing scientific production (Averbek & Yazar, 2018). When the 1960s are evaluated, the view that universities are institutions for training professional people is dominant (Velidedeoğlu, 1967; Başkan, 2001, p. 23). Although there were legislations between 1960 and 1973, a second break can be seen in 1973 with the Universities Law No. 1750. Similar to international literature, universities were considered as a sociological actor in the Development Plan-II for 1968-1972, and universities were considered as institutions that would ensure technological production in the Development Plan-III for 1973-1977 (Averbek & Yazar, 2018, p. 1350). After the 1980s, legislations continued, and in the Development Plan-VI for 1990-1994, it was suggested that universities should increase their capacity, foster university-industry relations, and develop special projects, special training programs, etc. (DPT, 1990, pp. 295–296). Therefore, the number of universities and students began to increase after the 1990s. The periods 1992 and 2000-2006 were other periods when the number of public universities was increased (Günay & Günay, 2017). After the 1990s, there was not a significant difference in the roles defined for universities; however, increasing the number of students was one of the priorities (Gültekin et al., 2008; Işık, 2008, pp. 127–130; Averbek & Yazar, 2018). With the legislations that followed, a university organization was established in each province in Türkiye after 2008. (Sargın, 2007, pp. 148–149) stated that when the location of the universities that were established after the 1980s were selected, medium-sized cities in Anatolia were at the forefront, except for the big cities. The reason behind this was to reduce the development gap between regions, to ensure economic development in cities, and to attract the young population to other cities. In this respect, it is possible to suggest that, after the 2000s, the outlook in Türkiye was similar to what was suggested in the international literature as the objectives and triggering roles of the location of universities. In Türkiye, academic studies on "university-city interaction" started in the late 1990s and increased after the 2010s (Kavili Arap, 2016; Savaş Yavuzçehre, 2016, p. 236). It is seen that the scope of the studies generally address social aspects, while quantitative studies on spatial changes are limited. Another conclusion that can be drawn is that students are the main actors in the development of the city economy, and the main effects are seen in real estate, services and food & beverage services in parallel with housing (Kavili Arap, 2016, p. 115; Kaya, 2014, p. 242). National studies on "residential area development-real estate sector development-university impact" can be summarized as follows:

- In a study conducted in 2005, it was found that in neighborhoods with university campuses in Istanbul, changes

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were observed primarily in the retail trade sector over time, housing demand increased, and as a result, there were significant increases in values such as rent/land value (Çetin, 2005).

- In a study conducted in 2008, spatial consequences of the university as a local factor in the housing market in Çanakkale were analyzed. The study mentions a significant population increase following the establishment of Çanakkale Onsekiz Mart University in the central district, and states that this increase affected the development of the services sector, and the city grew by 1,550 hectares between 1993 and 2006 (Çalışkan & Sarış, 2008).
- It was asserted that the dynamism generated by universities in their respective cities had a favorable impact on the urbanization rate in Türkiye. Additionally, the housing sector began to expand concurrently with the establishment of 41 universities between 2006 and 2008. Furthermore, it was indicated that in 41 provinces, there was a 268 percent surge in the production of new housing units (Altıntaş, 2015).
- In another study conducted in 2018, it is stated that Dumlupınar University increased the housing need in Kütahya and caused the formation of new neighborhoods. It is also mentioned that new housing typologies that are smaller (usually 1+1 room) have become widespread (Toprak & Işık, 2018).

When the available studies are evaluated, economic effects (price change, growth of the real estate sector, etc.), spatial effects (formation of new residential and commercial areas, etc.) and social effects (change in user groups, etc.) can be observed in cities after a university is established. This outlook makes it important as a research and urban policy issue to consider the housing sector with a temporal evaluation as before and after the university effect. The spatial dimension has been discussed as an umbrella issue in the literature - in terms of its direct/indirect impact on other social and economic issues. In this study, the spatial effects of the housing issue have been addressed. In the national studies mentioned above -in parallel with the views of Cortes (2014)-, there are limitations in providing quantitative data in studies on university-real estate sector issues.

MATERIALS and METHOD

The methodology of the study is summarized below (Figure 4): first of all, (1) based on the conceptual framework defined in the literature, the break periods in the university-urban interaction in Kırklareli city center were identified. Afterwards, (2) spatial examinations were made and the effects on the real estate sector were identified. The primary data that was used to examine the housing-oriented spatial transformation in Kırklareli city center were obtained from the "Land Registry Transaction Statistics" and "Independent Section (Housing)

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Sales Density Distribution" sections published by the Ministry of Environment, Urbanization and Climate Change - General Directorate of Land Registry and Cadastre (TKGM) (TKGM, 2022a, 2022b). Then, (3) statistical inquiry and correlation analyses were used to evaluate the consistency levels of the relationships and evaluations between the data. Finally, (4) concluding comments were developed under several subheadings. The study aims to contribute to similar comprehensive studies in the future by identifying accessible and temporally interrogable components at the same scale. The limitations of the data sets used during the study period are summarized below:

- Statistics on housing sales in Türkiye are published by several institutions in different contexts, and this study compiles available data in a way that enables comparisons to be made.
- The data obtained is house sales values and there are no temporal statistics on rented dwellings. In addition, there is no data on sales to provide a socio-economic profile (age distribution of purchasers, housing purchase rate per capita, etc.). Therefore, assessments can only be made based on sales transaction values and locations.
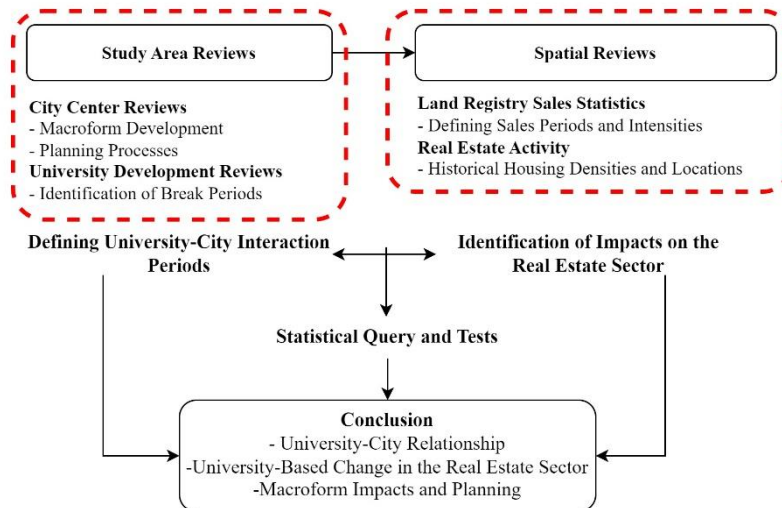

Figure 4. Graphical abstract of study method

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FINDINGS

City Center-University Interaction Processes and Breaking Periods in the Study Area

When the historical development of Kırklareli city center is examined, unlike the neighboring provinces with intense urban dynamics such as Istanbul, Tekirdağ, Edirne, it has a rather narrow economic hinterland, has developed with its internal dynamics, and has had limited population growth (Table 1) (TÜİK, 2022a) (Figure 5). Industrialization in the Thrace region started in the 1970s and accelerated in the 1980s. However, Kırklareli province, especially the city center, has not been able to fully benefit from these industrialization trends due to its lack of direct access to main highways, relatively low level of local capital, and insufficient share of investment incentives. Kırklareli was able to receive limited investment in the service and manufacturing sectors (mostly in Lüleburgaz district, which is

connected to the main highways) and remained dependent on the agricultural economy (Aysu et al., 1984; MSGSÜ, 1991; Özkök, 2016).
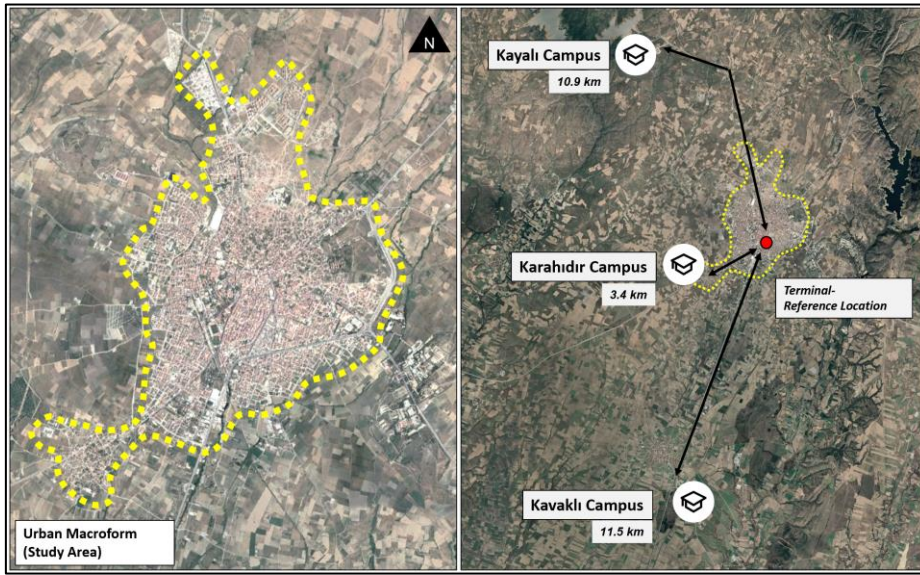

Figure 5. Location of study area

Table 1. Population development in and around Kırklareli province (TÜİK, 2022a)

Years	Province Level (Urban Population)						District Level (Urban Population)	
	Edirne	Increase	Tekirdağ	Incr.	Kırklareli	Incr.	Kırklareli -Merkez	Incr.
1990	210421	---	258940	---	149532	---	43017	---
2000	230908	10%	395377	53%	189202	27%	53221	24%
2007	259809	13%	494342	25%	212390	12%	59970	13%
2014	283845	9%	906732	83%	236502	11%	70161	17%
2021	308700	9%	1113400	23%	267908	13%	83248	19%
2022	313561	2%	1142451	3%	271471	1%	85493	3%

When the macroform development of the Kırklareli is analyzed, the effects of slow economy and population growth can be observed more clearly. After 1980, public facilities and highway investments have been effective in the development of the macroform. After 2006, the establishment of Kırklareli University has been one of the main factors that boosted development in Kırklareli. The urban core which developed with the city's internal dynamics and limited public investments between 1980-2006, has entered an exogenous shaping process in line with the population flows and retail trade, housing and service needs following the establishment of the university. The western, southern, and southwestern regions of the city have been transformed from agricultural areas to residential areas. In addition, different development axes were formed in the north of the city in 2007 with mass housing projects. Today, growth continues in the west and north of the city with a focus on housing and real estate (Özkök, 2016). When this growth process is compared with the planning process in the city, a different picture emerges. The current master plan of the city[6] is a 1/5000 scale master development plan approved in 1986, and a 1/1000 scale implementary development plan approved in 1991. Over the 31 years between 1991 and today, no other planning work was prepared. Urban needs and spatial demands due to the external factors mentioned

[6] In 2023, the new plans approved by Kırklareli Municipality (2022) were suspended by the court (MO, 2023).

[7] The term fragmental implementations refer to specific parcel-based decisions developed outside of the development plan decisions.

[8] The values presented in the cited source have been compiled with new sources and updated for the relevant period.

[9] Monthly parliamentary decisions obtained from the archive of Kırklareli Municipality between 2016-2021 were compiled by the authors.

above have been tried to be met through fragmental implementations[7]. As a result, with the growth directions that emerged after 2006, the growth of the city went beyond the boundaries that were defined in the current zoning plan. The number and distribution of fragmentary applications between 1995-2021[8] (excluding the period between 2000-2010 due to lack of data) are presented (Table 2). (Gündoğdu & Altın, 2015, p. 321) found that the implementations affecting the urban form increased after 2010 and they were mostly concentrated in the northern parts of the city and the peripheral areas in the west. When the period 2016-2021[9] was evaluated, it was revealed that implementations that involved the transformation of different land uses into residential areas increased approximately five times compared to the previous five-year period, and their value in total increased three times. After 2020, when the COVID-19 pandemic started, -in parallel with the global economic slowdown- the demand for housing and construction-oriented implementations decreased, and in 2021, it was 13% of the total (24 units).
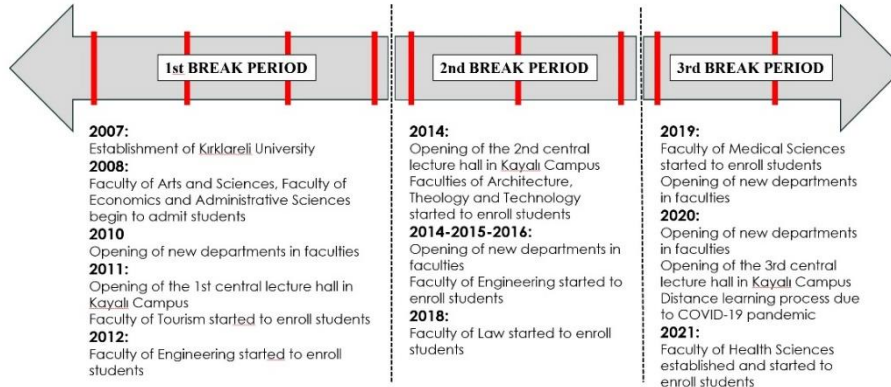
Table 2. Number and types of fragmental imp. in Kırklareli city center by year (see footnote 9)

Fragmental Implementation Types	1995-2000	2010-2015	2016-2021
Effects of Macroform *(For housing and raise development decision (plan decision))*	28	32	165
Total	301	145	249
Percentage (%)	**9.3**	**22.1**	**66.3**
Reference	(Gündoğdu & Altın, 2015, p. 321)		Kırklareli Municipality Archive

Information for the period 2016-2021 (total number of fragmental imp. /imp. for housing): 2016:69/48, 2017:84/74, 2018:43/27, 2019:20/9, 2020:9/4, 2021:24/3

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It is evident that the process of university development is accompanied by changes. Kırklareli University was established on 29.05.2007. As mentioned in the previous section, the influx of students and as well as academic & administrative staff began after 2007. The presence of three campuses close to the city center *(**Kayalı Campus** (Central Campus) (approx. 10.5 km from the city center), **Karahıdır Campus** (Vocational School of Technical Sciences) (approx. 3.4 km from the city center), **Kavaklı Campus** (Vocational School of Health Services and Social Sciences) (approx. 11.5 km from the city center))* (see Figure 5) (KLÜ, 2022a) and the concentration of students in these campuses have increased this effect. The university development process and the increase in the number of students (Figure 6, Table 3) are similar to the macroform development periods. In 2011, the construction of new buildings on the Kayalı campus and the relocation of some departments to this campus affected the flows in the north direction and increased the number of students. The main increase occurred after 2014 when new departments and faculties were opened. The number of students increased by +2409 compared to the previous year and then increased

to approximately +3400. After 2017, the number of students started to decrease (a limited increase was observed in 2022) (KLÜ, 2022b; YÖK, 2024). Differently, the main increases in academic staff occurred between 2009 and 2014, and in administrative staff between 2009 and 2011.

1st BREAK PERIOD

2007:
Establishment of Kırklareli University
2008:
Faculty of Arts and Sciences, Faculty of Economics and Administrative Sciences begin to admit students
2010
Opening of new departments in faculties
2011:
Opening of the 1st central lecture hall in Kayalı Campus
Faculty of Tourism started to enroll students
2012:
Faculty of Engineering started to enroll students

2nd BREAK PERIOD

2014:
Opening of the 2nd central lecture hall in Kayalı Campus
Faculties of Architecture, Theology and Technology started to enroll students
2014-2015-2016:
Opening of new departments in faculties
Faculty of Engineering started to enroll students
2018:
Faculty of Law started to enroll students

3rd BREAK PERIOD

2019:
Faculty of Medical Sciences started to enroll students
Opening of new departments in faculties
2020:
Opening of new departments in faculties
Opening of the 3rd central lecture hall in Kayalı Campus
Distance learning process due to COVID-19 pandemic
2021:
Faculty of Health Sciences established and started to enroll students

Figure 6. Timeline for the development process of Kırklareli University (compiled by the authors)[10]

[10] This figure includes only undergraduate programs in Kırklareli city center.

Table 3. Annual change in the number of students and staff at Kırklareli University (KLÜ, 2022b; YÖK, 2023)

Years	Student			Academic Staff			Administrative Staff		
	Total	Diff.	Incr. (%)	Total	Diff.	Incr. (%)	Total	Diff.	Incr. (%)
2007	6152	.	.	87	.	.	.	.	.
2008	6796	644	10%	94	7	8%	45	.	.
2009	8912	2116	31%	234	140	149%	120	75	167%
2010	10358	1446	16%	376	142	61%	157	37	31%
2011	12774	2416	23%	441	65	17%	212	55	35%
2012	15518	2744	21%	497	56	13%	238	26	12%
2013	16878	1360	9%	537	40	8%	266	28	12%
2014	19287	2409	14%	616	79	15%	268	2	1%
2015	22671	3384	18%	653	37	6%	284	16	6%
2016	25825	3154	14%	680	27	4%	279	-5	-2%
2017	26664	839	3%	703	23	3%	287	8	3%
2018	27665	1001	4%	722	19	3%	288	1	0%
2019	23793	-3872	-14%	762	40	6%	296	8	3%
2020	24078	285	1%	822	60	8%	300	4	1%
2021	22978	-1100	-5%	838	16	2%	297	-3	-1%
2022	23712	734	3%	863	25	3%	273	-24	-8%

The vision the establish "a university in each province", which was a political, social, and economic decision in Türkiye after 2006, aimed to create economic sectoral mobility in the city (Parlak & Kaynar, 2005). In addition to the production of knowledge and culture, it is reported that universities, which are considered important with their "income-generation" potential especially in small- and medium-sized cities, will indirectly shape the economy primarily in trade, accommodation, and transportation (Çatalbaş, 2007, p. 95; Doğan, 2013, pp. 109–110; Kavili Arap, 2016, p. 109). When the shares of the main sectors in the Gross Domestic Product in Kırklareli between 2007-2021 after the university was established are analyzed (Table 4) (TÜİK, 2023), it is evident that the share of "information and communication, wholesale and retail

trade, transportation, accommodation, other services" decreased, while the share of "social services, construction/real estate, mining, manufacturing industry" increased[11]. The fact that the construction sector is one of the few sectors that increased in value in the last four years presents a similar structure to the university-real estate relationship presented in the literature. As an outcome of these analyses, three periods with distinct characteristics were defined for the city center. In the following section, the changes in the real estate sector, housing sales statistics and spatial agglomerations are evaluated for three periods.

[11] Similarly, (Öztürk et al., 2013) found that universities established in Anatolia have a limited impact on the socio-economic structure of cities. The impact is specific to expenditures related to the consumption tendencies of staff and students.

Table 4. Value of sectors in GDP in Kırklareli province (%) (2007-2021) (TÜİK, 2023)

Sectors /Years	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Diff.
1	26.9	26	25.4	24.7	26.2	24.3	26.9	29.7	30.1	30.2	31.8	32.8	31.1	30.4	34.4	**7.5**
2	33.4	33.6	32.8	33.7	35.2	32.6	32.2	33.8	33.6	33	35.3	37.7	36.2	34.9	39.9	**6.5**
3	4.6	4.5	3.5	3.4	3.9	4.1	4.9	5.3	6.1	6.3	7.1	7.5	7.7	6.9	7.2	**2.6**
4	8.5	8.5	9.4	9.6	9.5	9.7	9.9	9.8	9.4	9.8	9.4	9.7	10.7	11	9.7	**1.2**
5	1.6	1.7	1.8	1.7	1.8	1.9	2	2	2	2.4	2.2	1.9	2	2	1.9	**0.3**
6	1.2	1.3	1.8	1.5	1.4	1.5	1.5	1.4	1.6	1.7	1.8	1.5	1.4	1.7	1.2	**0**
7	0.8	0.9	0.8	0.8	0.9	0.8	0.9	0.9	0.8	0.8	0.7	0.8	0.8	0.7	0.6	**-0.2**
8	0.7	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	**-0.4**
9	6.6	6.6	9.3	9	8.4	8.1	8	7.5	7	7	6.5	5.8	5.6	5.3	4.2	**-2.4**
10	12.6	13.3	11.9	13.4	13.3	14.2	13.5	13.5	12.1	11.2	10.8	10.2	11	11.2	9.6	**-3**
11	18.6	18.3	17.4	14.7	13.4	15	14.6	14	15.4	15.7	14.6	14.2	14.4	14.9	14.8	**-3.8**

Sectoral Codes	
1	Manufacturing Industry
2	Mining and Other Industries
3	**Construction**
4	**Public Administration and Social Service Activities**
5	**Professional, Scientific, Technical, Administrative and Support Service Activities**
6	Finance and Insurance Activities
7	Other Services
8	Information and Communication
9	Real Estate Activities
10	Agriculture, Forestry and Fisheries
11	Wholesale and Retail Trade, Transportation and Warehousing, Accommodation and Food Service Activities

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In accordance with the analytical findings, the following break periods and their characteristics were identified:

1st Break Period (2007-2013)

- Limited population growth (average 2% between 2007 and 2014),
- Macroform development is externally driven, towards the west and the north, with two triggering developments: (1) the establishment of the university, (2) the creation of additional development areas in the north,
- Increase in the number of fragmental implementations that affect the urban form (22% between 2010-2015),
- Increase in the number of students (average 19% between 2007 and 2014),
- Increase in the share of the real estate sector after 2009 (construction sector is stable),

2nd Break Period (2014-2018)
- Limited increase in population growth (average 3% between 2014-2018),
- While the macroform continued to grow towards the west and the north in 2014, limited macroform expansion and parcel-based changes are observed after 2014,
- Significant increase in the number of (housing-oriented) fragmental implementations that affected the urban form (76% between 2015-2018),
- Decrease in the number of students (average -12% between 2014-2018),
- Increase in the share of the construction sector between 2014-2018 (decrease in the real estate sector),

3rd Break Period (2019-...)
- Limited population growth (average 2% between 2019 and today),
- Macroform development is limited and parcel-based, for increasing story heights,
- Decrease in the number of fragmental implementations that affect the urban form (30% between 2019-2021),
- Decrease in the number of students (average -4% between 2019-2022),
- Developments that affect the national and urban economy: COVID-19 pandemic,
- Decline in the share of the construction and real estate sectors.

Spatial and Quantitative Analysis of the Real Estate Sector

In order to statistically analyze the development of the real estate sector in Kırklareli city center, Land Registry Transaction Statistics from (TKGM, 2022b), District-Based Housing Sales Statistics from (TÜİK, 2022b) and Housing Sales Statistics around the city center from (TKGM, 2022a) were compiled (Table 6). Given the limitations in the data, comments on the 1st Period can only be made in a general manner. Between 2010 and 2013, housing sales in and around the city center gradually increased over time, and in 2013, housing-related transactions (at the district scale) accounted for approximately 38% of sales transactions, with 44% of these sales concentrated in and around the city center. The 2nd Break Period (between 2014-2018) is the period during which a limited increase in the number of students is observed and fragmental implementations that will affect the urban form and growth in the macroform began. Accordingly, as seen in Table 6, housing sales gradually increased. Between 2014 and 2016, housing sales around the city center accounted for over 50% of the total. After 2017, there was a decline in the number of students and a similar decline in housing sales rates. Unlike the 3rd Break Period, only in 2022, housing sales were concentrated especially in the city center.

Accordingly, while there was a 33% increase in the population between 2007-2021, there was a 190% increase in the number of housing sales in the city center between 2010-2022, a 285% increase in the number of students and a 91% increase in academic staff between 2007-2022.

Therefore, it is apparent that the change in the real estate sector in the city is driven by external dynamics following the establishment of the university, rather than internal population dynamics. When the distribution of housing sales in the city is analyzed, similar findings can be reached about macroform development. It is possible to say that the city form was shaped with the effect of housing areas and additional user demands. Due to data limitations in the source (TKGM, 2022a), the query could only be started after 2010, and maps were analyzed according to the periods that were identified.

Table 5. District and city center level detailed real estate statistics (compiled by the authors)

| Break Periods	Years	District Level			City Center Level	
		Land Registry (Sales)	Housing Sales	Percent (%)	Housing Sales	Percent (%)
1st Period	2007-2009	*No data*	*No data*	---	*No data*	---
	2010	*No data*	*No data*	---	571	---
	2011	*No data*	*No data*	---	656	---
	2012	*No data*	*No data*	---	807	---
	2013	5884	2223	37.8	966	43.5
2nd Period	2014	4538	2276	50.2	1183	52
	2015	5271	2419	45.9	1462	60.4
	2016	6419	3231	50.3	1761	54.5
	2017	7299	3921	53.7	1601	40.8
	2018	6810	4291	63	1868	43.5
3rd Period	2019	5597	3027	54.1	1584	52.3
	2020	6236	3544	56.8	1448	40.9
	2021	7260	3307	45.6	1509	45.6
	2022	8323	3306	39.7	1661	50.2
References		(TKGM, 2022b)	(TÜİK, 2022b)		(TKGM, 2022a)	

1st Break Period (2010-2013):

Between 2010 and 2013, house sales in the city center increased by +395 (69%). An analysis of the zones by density reveals that in 2010, the highest density was partially located in the main core (İstasyon neighborhood, followed by Karacaibrahim neighborhood) (Figure 7). In 2012, this density moved towards the western periphery of the city in areas with relatively low land prices, (see also Gündoğdu & Altın, 2015, p. 328). In addition, the emergence of housing estates in the northern part of the city in 2012 led to the prominence of these areas in sales. (Gündoğdu & Altın, 2015, p. 322)'s map that shows the locations of fragmental implementations between 2010 and 2015 (see Fig. 7 in the related study) proved to be consistent with the housing sales density zones. In this respect, it is possible to say that the plan amendments made during the 1st Break Period were aimed at increasing and regulating the housing supply and guiding the macroform development.
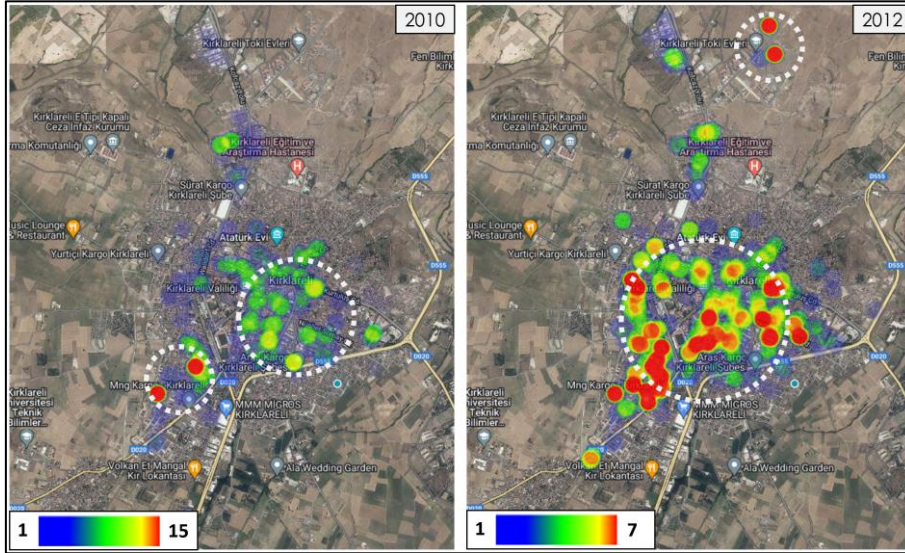
2nd Break Period (2014-2018):

Between 2014 and 2018, house sales in the city center increased by +685 (58%) and were almost double the value of the previous period. During this period, the main concentration was in the mass housing areas in the western peripheries (the peripheries of İstasyon and Karakaş neighborhoods) and in the north (around Cumhuriyet and Atatürk neighborhoods) (Figure 8). After 2014, the northern part of the city has become a prominent area in urban preferences, especially due to its relative proximity to the Kayalı Campus, and the fragmental implementations that were made in this period were concentrated, especially in this neighborhood. In their studies (Gündoğdu et al., 2019) found that urban dwellers prefer housing that it is "close to the city center and places of work". The residences in this area have become to offer a different typology than those in the city center (higher building heights, larger floor areas, etc.) (Özkök, 2016; Gündoğdu et al., 2019).
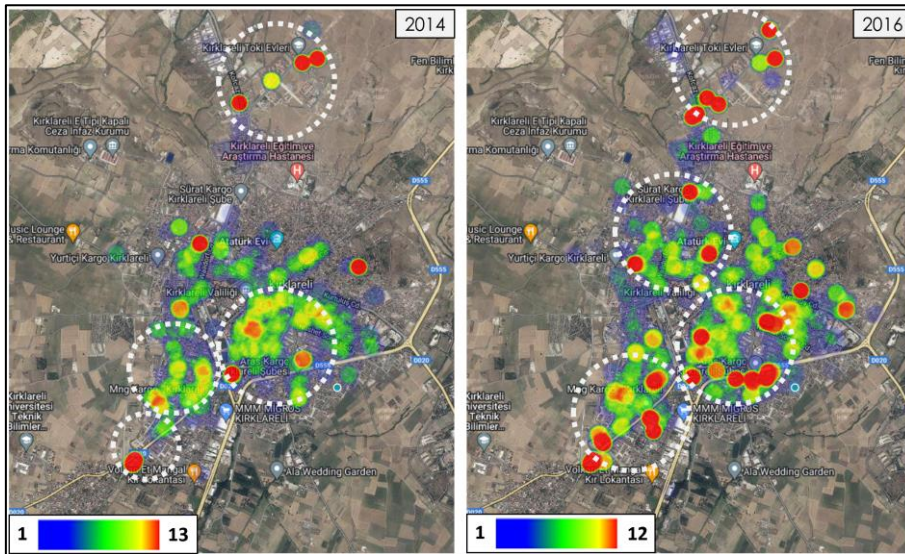
3rd Break Period (2019-Today):

Between 2019 and 2022, housing sales in the city center increased by 29 (5%). During this period, sales were mainly concentrated in the northern region, like the previous period, and then in the western periphery of the city (Figure 9). Similarly, Begen (2020) states that the northern region is at the forefront of urban development due to its convenient location on the Kayalı Campus route. The change in consumer demands after 2019 due to the COVID-19 pandemic, the decrease in urban mobility, and the increase in construction costs have negatively affected the housing sector (Usanmaz, 2021; Üstündağlı Erten, 2021; Toy et al., 2022). However, it is possible to suggest that universities' decision to switch to distance education after 2020 had an impact on the decrease in the mobility of students and academics and the decrease in housing demands in the period until 2021.
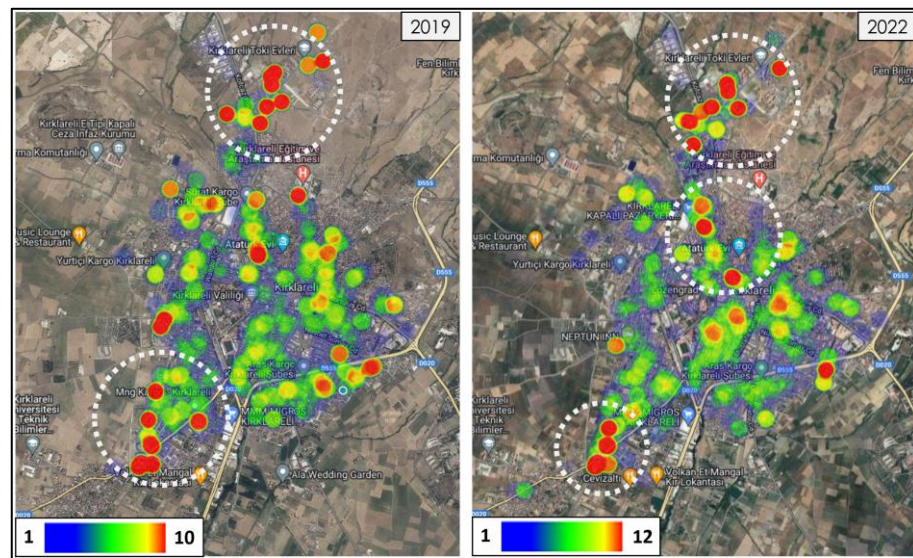
Figure 9. Cluster analysis of housing sales in Kırklareli city center in the 3rd break period (Compiled from (TKGM, 2022a))

DISCUSSION

The fluctuation in the rate of increase in housing sales between 2011 and 2022 is similar the rate of increase in the number of students (the same outlook cannot be observed with the increase in academic and administrative staff) (Table 6, Figure 10). On the other hand, the population growth rate remained stationary and independent of this fluctuation[12]. This is also supported by correlation tests (Table 7) which show a high (p: 0.797) positive correlation (sigf: 0.00) between the number of students and housing sales rates at 99% confidence level (perfect fit: 1.00)[13]. Accordingly, ***"the change in the real estate sector in the city was not caused by internal dynamics but by external dynamics following the establishment of the university"*** statement is supported by the correlation tests. When the synthesis of housing sales density zones between 2010 and 2022 is analyzed (Figure 11), the peripheral regions and the northern part of the city have come to the forefront over the last 10 years. The direction of macroform development was created by increasing the construction limits and

[12] Similarly, (Ogur, 1973, pp. 390–391) determined that the demand trend in non-metropolitan cities is proportional to the student population, contrary to the existing population effect.

[13] For correlation coefficients see (Bhandari, 2021)

transforming peripheral areas (agricultural areas) into residential areas. In this respect, the process of *"establishment of a university → student influx → increase in housing demand → regulations to supply additional housing → change in urban form"*, which can be extracted from the literature, can be observed in Kırklareli city center.
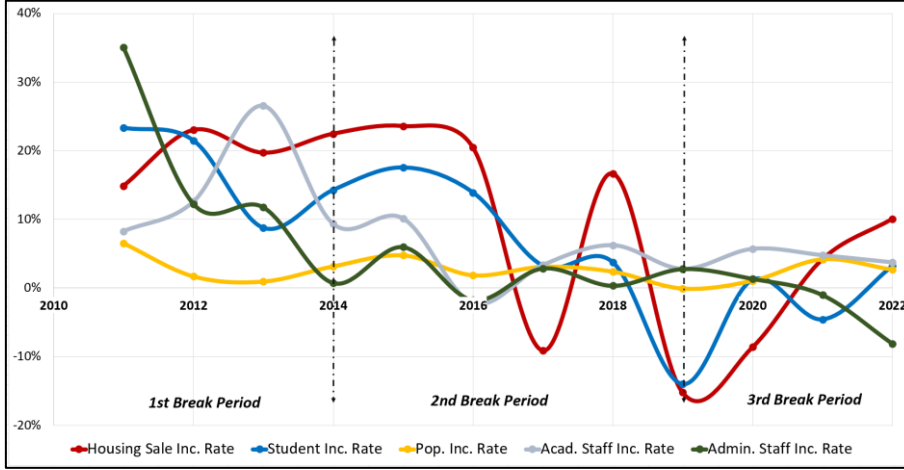
Figure 10. Cluster analysis of housing sales in Kırklareli city center in the 2nd break period (Compiled from (TKGM, 2022a))

Table 6. Population, housing sales, student and staff statistics by periods

Periods	Years	Housing Sales	Inc. Rate (%)	Population (Urban)	Inc. Rate (%)	Students	Inc. Rate (%)	Academic Staff	Inc. Rate (%)	Admin. Staff	Inc. Rate (%)
1st Period	2007	*No data*	----	59970	----	6152	----	87	----	*No data*	----
	2008	*No data*	----	61880	3%	6796	10%	94	8%	*No data*	----
	2009	*No data*	----	64265	4%	8912	31%	106	13%	120	167%
	2010	571	----	62152	-3%	10358	16%	374	253%	157	31%
	2011	656	15%	66226	7%	12774	23%	405	8%	212	35%
	2012	807	23%	67360	2%	15518	21%	456	13%	238	12%
	2013	966	20%	68004	1%	16878	9%	577	27%	266	12%
2nd Period	2014	1183	22%	70161	3%	19287	14%	631	9%	268	1%
	2015	1462	24%	73517	5%	22671	18%	695	10%	284	6%
	2016	1761	20%	74896	2%	25825	14%	680	-2%	279	-2%
	2017	1601	-9%	77226	3%	26664	3%	703	3%	287	3%
	2018	1868	17%	79093	2%	27665	4%	747	6%	288	0%
3rd Period	2019	1584	-15%	79038	0%	23793	-14%	768	3%	296	3%
	2020	1448	-9%	79884	1%	24078	1%	812	6%	300	1%
	2021	1509	4%	83248	4%	22978	-5%	851	5%	297	-1%
	2022	1661	10%	85493	3%	23712	3%	883	4%	273	-8%

Table 7. Correlation test results

Correlation Test		Increase Rate in Urban Pop.	Increase Rate in Students	Increase Rate in Academic Staff	Increase Rate in Admin. Staff
Increase Rate in Housing Sales (%)	Pearson Correlation	0.357	**0.797***	0.411	0.379
	Sig. (2-tailed)	0.254	**0.002**	0.184	0.23
	N	12	**12**	12	12
* Correlation is significant at 99% confidence level.					
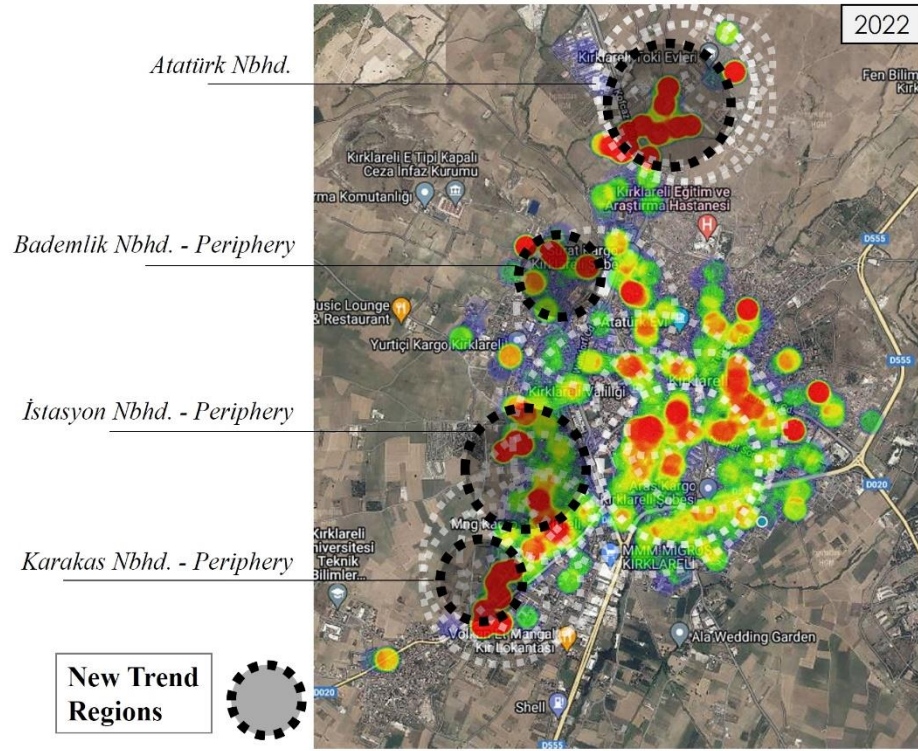
Figure 11. Cluster analysis of housing sales in Kırklareli city center (2010-2022)

CONCLUSION AND RECOMMENDATIONS

This study examined the real estate/housing sector, which plays an important role in the interaction between universities and cities, and investigated the impact of spatial change. By employing quantitative data sets, location-based analyses, and correlation tests, the research defined student-oriented changes in the market and increase levels, and identified break points. In this regard, it is anticipated that the study will contribute by providing a methodological approach and a sample data set approach to the existing literature on the subject. Furthermore, it was established that the implementation of fragmented strategies facilitates the process of change and transformation in the spatial form. It is, therefore, evident that zoning plans, which proves to be one of the most crucial instruments for regulating urban development and spatial form, must be prepared in a manner that will regulate the demands in residential areas and prevent the associated effects the spatial form. Furthermore, an evaluation of the impact of universities on cities after 2007 reveals that the economic focus, as evidenced by the criticisms presented in the literature, puts emphasis on the generation of income. Although numerous universities were established in Türkiye as a consequence of the political agenda with the objective to foster sectors such as the knowledge economy and academic services, the direct impact has been on the real estate and housing production sectors. This reveals that the **"university ↔ city"** interaction should not be considered independently from the physical construct, socio-economic infrastructure and dynamics in cities.

It is imperative to establish initiatives that integrate academic and urban cultures, particularly in medium-sized cities like Kırklareli, where

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sectoral developments are limited, and the population is stable. In the absence of such innovations, the contribution of the university to the socio-economic development of the city will remain limited, irrespective of the number of universities. Moreover, it is crucial to adopt a supportive, developmental, and complementary approach towards universities, rather than perceiving them as a burden on the city's economy. The findings and conclusions presented are primarily spatially oriented. However, they can be enhanced by incorporating economic data, such as rental prices and changes in land market prices, as well as social data, including surveys on the needs and requirements of students, academics, and administrative staff.

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