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SPATIAL ANALYSIS OF THE HOUSING MARKET THROUGH INVESTIGATING HOUSING TRANSACTION VOLUMES IN MENTEŞE, MUĞLA*

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Abstract

As there is a reciprocal relationship between the patterns of investor decisions, local and central government strategies, household mobility, and housing transactions have repercussions on both macro and micro scales. Housing transactions within a metropolitan region can alter certain neighbourhood dynamics through the cycle of housing sales regarding urban development patterns, socio-economic characteristics of the residents, tenure type, neighbourhood, and housing quality. Even though the connection between neighbourhood dynamics and housing transactions is undeniable for spatial disciplines, there are very limited studies for that matter. This study aims to explore the housing market dynamics of Menteşe via housing transactions. It employs three different datasets (Open Street Map (i), Household, housing and office data collected by the Turkish Statistical Institute (ii), Title deed transaction statistics by The Directorate of Land Registry and Cadastre (iii)). For spatial heterogeneity, Moran's I, and spatial randomness, a local indicator of spatial association (LISA) has been applied. The findings revealed the role of centrality and the importance of mixed land use in housing markets even though all the neighborhoods on the periphery are very close to the city center in terms of distance.

Keywords: *Housing Transactions, Housing Sales Volume, Owner-occupied Housing, Menteşe.*

KONUT İŞLEM HACİMLERİ ARACILIĞIYLA KONUT PİYASASININ MEKANSAL ANALİZİ: MENTEŞE, MUĞLA

Öz

Yatırımcı kararları, yerel ve merkezi hükümet stratejileri, hanehalkı hareketliliği kalıpları arasında karşılıklı bir ilişki sonucunda şekillenen konut işlemlerinin hem makro hem de mikro ölçekte çeşitli yansımaları bulunmaktadır. Metropolitan bölgede kentsel gelişim kalıplarına, hanehalklarının sosyo-ekonomik özelliklerine, ikamet süresine, yerel özelliklere ve konut kalitesine göre değişen ve bu nitelikleri değiştiren konut işlemleri mekansal disiplinler açısından büyük önem taşımaktadır. Ancak bağlantısının güçlülüğüne rağmen mekânsal disiplinler açısından yadsınamaz bir öneme sahip olan konut işlemleri konusunda yürütülen çalışmalar oldukça sınırlıdır. Bu çalışma, Menteşe'nin konut piyasası dinamiklerini konut işlemleri aracılığıyla keşfetmeyi amaçlamaktadır. Üç farklı veri seti kullanmaktadır (Açık Sokak Haritası (i), Türkiye İstatistik Kurumu tarafından toplanan hane, konut ve ofis verileri (ii), Tapu ve Kadastro Müdürlüğü tarafından toplanan tapu işlem istatistikleri (iii)). Çalışmada yöntem olarak mekânsal heterojenlik için Moran's I ve mekânsal rastgelelik için LISA uygulanmıştır. Bulgular, çeperde yer alan mahallelerin mesafe açısından şehir merkezine çok yakın olmasına rağmen konut piyasalarında merkeziliğin rolünü ve karma arazi kullanımının önemini ortaya koymaktadır.

Anahtar kelimeler: *Konut İşlemleri, Konut Satış Hacmi, Satılık Konut, Menteşe.*

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1.INTRODUCTION

A housing transaction can be defined as transferring the easement or ownership rights of a housing unit between two or more parties. Both private and public real estate entities have been monitoring housing transaction data to forecast housing market risks, housing price appreciations, housing mobility patterns, and urban growth or degrowth trends. Turnover rates and housing transactions are the key indicators of housing mobility patterns gathered by processing related data such as title deeds, sales volume, start points and endpoints of the parties. On the other hand, the frequency of housing transactions influenced by the circumstances of externalities such as natural catastrophes, epidemics, economic downturns, and exchange rate fluctuations may also exhibit diverse trends according to spatial dynamics and investment choices within short to medium time frames (Fisher et al., 2004: 241). Hence, monitoring housing transactions within their geographic territories or sub-markets is crucial.

There is a reciprocal relationship between housing transaction volumes and the patterns of material and nonmaterial decisions of governments, agencies, investors, and households regarding the housing market at both macro and micro levels. At the macro level, housing transaction volumes are procyclical to general economic market conditions (Genesove and Mayer, 1994: 1). Market conditions and market size, which indicates the number of vendees and vendors, have a substantial effect on the volume of housing sales and the frequency of housing transactions since these parameters depend on the liquidity in the real estate market and vice versa. On the other hand, at the micro level, housing transactions can potentially cause socio-spatial disparities within neighbourhoods. Regarding housing mobility, housing transactions can be seen as the two ends of the relocation process that primarily takes place within proximity, within the same submarket (Dieleman et al., 2000: 243). Therefore, household mobility patterns can alter neighbourhood dynamics such as urban growth or degrowth, quality of housing and neighbourhood, socio-economic characteristics, and type of tenure. The changes in these dynamics shape national policies regarding the local economy, social segregation, urban development, and distribution of urban services and infrastructure. To elaborate, in places where housing transaction volumes are high, deterioration happens more quickly as households do not prefer to reside long enough, causing them not to feel any commitment to the neighbourhood or unwilling to make any housing expenditure. There are a limited number of disaggregated studies with respect to how direly housing mobility can affect neighbourhood dynamics, albeit the strong relationship among them (Coulter et al., 2011: 2743).

Owner-occupation is preferable to rental housing because housing transactions involve investment decisions and money exchanges between a buyer and seller. This situation has moulded the geography of studies since the share of rental housing is much lower in the UK and the US than the owner-occupied housing ratio, as opposed to the European case. Yet similarly, Türkiye has a higher ratio of owner-occupiers at 57%, than tenants at 28%, besides others with roughly 14% due to some imprecisions (Özdemir Sarı, 2022: 24). Because of the long-standing government housing policy that has encouraged homeownership, Türkiye has this type of tenure structure, which makes it noteworthy to analyse the country's housing transaction volumes. Studies in this field are generally associated with mortgage and financial markets, price levels, socioeconomic features of households, and their life cycles, as well as the behaviour of households and investors towards housing unit attributes.

All these arguments point out the necessity of observing and evaluating housing transaction volumes and their characteristics in Türkiye to identify the existence of sub-housing markets, determine the spatial characteristics of neighbourhoods where high/low housing sales are observed, observe future housing market trends, and to reveal what kind of investments in which neighbourhoods will stimulate the housing market. This study aims to reveal possible housing development directions, buckling neighbourhoods in the Menteşe district, and dynamics through spatial statistics by using housing sales data. The main contribution of the study is having a spatial analysis of housing markets in different parts of the Menteşe after the changes in legal status through Law numbered 6360 Great Metropolitan Municipality enacted in 2012. Nonetheless, one of Türkiye's most significant challenges in conducting research is the collected data being insufficient, inconsistent, outdated and closed to the public. Even though different institutions have collected the housing data, they are not consistent with each other in terms of value, categorisation, and format, which makes it challenging to execute comparative studies. For instance, the household characteristics in a particular address are stored in the National Address Registry

Database (UAVT). However, it is devoid of dwelling unit attributes that don't align with the results of the other surveys (Sarıoğlu Erdoğdu, 2022: 72). Hence, housing sales numbers are employed as the best alternative to provide some insights into housing mobility trends on a district level. As a followed method of analysis, spatial heterogeneity of housing transaction volumes in neighbourhood level has been measured through Moran's I which is an indication of whether similar values of a particular variable are closer together in space thus detecting the presence of the clustering of similar values. Lately, a local indicator of spatial association (LISA) has been applied to detect spatial randomness of high/low housing transaction volumes.

This study consists of six main parts. A review of housing transaction volume and factors affecting household transaction decisions is presented after the introduction. The next section overviews the current condition of housing transactions in Türkiye and Muğla. It also elaborates on the spatial dynamics of Menteşe districts during the last decades. Section 4 describes the data and methods of the study. The following section reveals the findings regarding housing transaction volume and turnover ratio, local indicators of spatial association and spatial and demographic characteristics of clusters. The last section concludes the overall findings and crucial points to be included in the housing policies and market of Menteşe.

2.LITERATURE REVIEW

The changing perception in housing policies, especially the ones favouring homeownership, has triggered studies focusing on the housing transaction as a means of several social, spatial, and economic processes. However, the dominance of neoliberal, finance-centred policies and the 2008 mortgage crisis has affected the economic aspects of housing transactions, on which great hopes have been pinned regarding profit through price appreciation (Rolnik, 2013: 1059). This issue once again highlighted the problem of unequal distribution of housing stock while favouring some areas with extreme activity in housing studies and transactions.

Housing transactions are subjected to two different aspects: the first is related to household characteristics and housing mobility. At the same time, the latter is concerned with the spatial repercussions of housing policies and the surrounding built environment within a neighbourhood. Any change in housing prices, mobility patterns of households, urban development, and shrinkage due to the volume of housing transactions has been the subject of many spatial studies. For many years, the understanding that homeowner households are economically better than renter households has changed. One of the prominent supporters of this situation is that the increase in homeownership in some countries due to cultural or political factors has yet to make these countries wealthier. However, it is argued that homeowners are more likely to stay put than renters (Rohe and Stewart, 1996: 37; Kim and Horner, 2003: 1417) for many reasons. Mortgage payments are among the most inverse major drivers of household mobility decisions. Due to the lack of mortgage, tenants are considered more mobile since they have lower moving costs than homeowners and are legally flexible (Weinberg, 1979: 222; Quigley and Weinberg, 1977: 48). The higher ratios of down-payment and high transaction cost/fee defined by authorities are also associated with decreased housing transaction volume in different periods, neighbourhoods, and households (Ma and Zubairy, 2021: 629). For instance, without observing the price change in examined years between 2004-2017, Erdoğan and Memduhoğlu (2019: 224) revealed that transaction cost in the form of additional tax expectation for the upcoming year also leads to an increase in housing transactions in the last month of a year in T*ürki*ye.

Considering only the owner-occupier market, any subject leading to a decrease in housing prices, such as the experience of unemployment and high interest rates, is listed in the associations of high volume in housing sales (de Wit et al., 2013: 229). On the contrary, as Oikarinen argues, transaction volumes utilised as an early indicator of the change in housing prices (2012: 42), and findings of Clayton et al. (2010: 17) support the positive correlation between housing prices and transaction volume in the regional housing markets of the USA. Also, the opportunity cost of keeping an empty house in a high price period on the market increases. The possibility of any downward change leads to an increase in transaction volume by decreasing the reservation price of sellers (Cipollinia and Parla, 2020: 3). Yet, a study on UK 11 regional housing markets indicates the convergence for house prices and transaction volumes; also, volumes converge to their equilibrium faster than house prices (Tsai, 2014: 73). Also, including newly built but sold before the completion of housing units at the end of all processes

to the housing price index leads to distortion of the relation among prices and transactions (Hill et al., 2023: 1). The difference between these findings can be interrelated with the time lag models between the price and transaction data.

The housing transaction volume is closely connected with the household characteristics rather than their modes of tenure. If housing needs trigger housing mobility and transactions, Kim and Horner (2003: 1416) point out the dissatisfaction of households directed/oriented at the housing unit or neighbourhood. As Can argues, geographic space defines the satisfaction of the environment for households; higher satisfaction means a lower desire to change that location (1998: 61). Also, the decision to move location affects the housing transactions in geography. Residential location is primarily specific to the local dynamics since most housing relocation occurs within short distances or the same housing submarkets (Clark, 1986). Two-thirds of the households in the USA move within their county of origin or birthplace (Weinberg, 1979: 219). It is worth indicating the cruciality of short-distance mobility for planners to comprehend and control the possible changes in the spatial character and quality of neighbourhoods (Quigley and Weinberg, 1977: 42) and for real estate agencies to minimise possible housing market fluctuations. Housing typology is also considered a neighbourhood and housing characteristic to determine housing transaction volumes. Batog and Forys spatially analysed housing transactions in Szczecin for different housing estates and reached the smallest number of transactions in estates with mainly single-family houses and distance from the centre (2014: 41).

The population growth in the case of the newly formed households and the inflowing population is also associated with a rise in housing transaction volumes due to the housing needs of newcomers (Erdoğan and Memduhoğlu, 2019: 207). Any change in demographic characteristics of households affects household mobility because of changing needs, hence, the volume of housing transactions. As long as households have similar needs, they do not attempt to move. Also, for people who stay in one place longer, the possibility of moving decreases due to the social or physical ties with the housing unit, neighbours, and neighbourhood (Coulter et al., 2011: 2757). In the same study, households with younger ages are positively hypothesised to have high transaction volumes and mobility compared to their older counterparts. Regarding macro dynamics in England and Wales, the credit market liberalisation and growth in household numbers, particular cohort groups associated with a high number of housing transactions (Ortalo-Magne and Rady, 2004: 299).

In the case of the second category, housing transaction volume and turnover rates with housing prices or value appreciation are evaluated together with their spatial repercussions. In this perspective, the high share of homeownership is the first pillar of relations to low residential mobility and neighbourhood stability. The high value and good physical condition of the property are evaluated as an indicator in spatial settings that can be anchored/maintained at the same level by homeownership. Housing prices increase as homeowners are more inclined to conserve and improve their homes and community and build strong social interactions and a sense of belonging. High property values and better maintenance attract more public and private services, resulting in excellent neighbourhood stability and low transaction volume. Coulton et al. argue that residential turnover can be a source of neighbourhood vitality and progress (2012) rather than negative consequences. However, the confines of positive repercussions could be clearer since the increase in homeownership, to a certain extent, may lead to displacement and gentrification in a neighbourhood (Ding and Hwang, 2020: 6).

The existence of some desired land-use characteristics and the location of a neighbourhood has been linked to housing transaction volumes and frequencies. Accessibility to the central business district and other centres in Ohio are questioned by Kim and Horner (2003: 1418); they approached housing transactions as the duration between two sales of the same unit and shorter commuting time (0-5 minutes) is determined as a statistically significant variable indicating more housing transaction in the same period. Regarding land uses, Margulis (2001: 646) observed the apparent effects of school districts and the quality of schools on housing transactions. Jia and Ke differentiate households based on their experiences as first-time homebuyers and repeated buyers; the latter are more informed on the local housing markets and the power of accessibility to amenities such as CBD, schools, and parks (2023: 1106).

Last, other micro and macro factors have also shaped housing transactions and accompanying variables. Extremities in local housing and labour market conditions, such as tight housing supply and foreign demand (Henley, 1998: 422; van Ham and Feijten, 2008: 1161), led to the actions to limit housing transactions. For instance, restriction of transaction volume (for buyers other than their first home and foreign investors) has been used as a housing policy tool to prevent extreme increases in housing prices in China. While the restrictions affected these buyers, developers did not drop prices. They behaved in a manner consistent with an expectation that the restrictions were temporary and that waiting to sell would be more profitable than dropping prices (Somerville et al., 2020: 13).

3.HOUSING MARKET AND TRANSACTIONS IN TÜRKİYE AND MUĞLA

In Türkiye, the first cycle of a housing sale before selling a unit is being a homeowner; housing transactions are conditional on homeownership. Homeownership refers to obtaining a title deed or another legal document that justifies the ownership right of a housing unit. Legal procedures and requirements for obtaining ownership rights to a housing unit can differ among countries. However, there are four processes for legally being a homeowner in Türkiye:

(i) Monetary transfer between two holders in the form of “sale”, “sale with mortgage”, and “compulsory sale” to win full ownership.

(ii) The transfer of ownership in the form of “inheritance”, “donation”, and “trade-off”and etc. without requiring a money exchange.

(iii) Selling the ownership right to someone and transferring the right to use to someone else in the form of “bare ownership and transfer of right to the easement” embodies the first two categories.

(iv) “Expropriation” is compulsory confiscation by the government over private property for the use of public interest.

Several attempts have shaped these four main processes, yet all are focusing on homeownership in Türkiye. For a long period, the lack of housing production in quantity has been seen as a main obstacle to the increase in homeownership rate. Therefore, each government has supported housing production for sale based on its ideological orientation. Very few housing policies have focused on the private rental sector and none on public rental housing. This tendency has also continued after the 2000s by fostering the construction sector through public and mostly private bodies.

Nevertheless, more than these attempts have been needed to increase the homeownership ratio; however, Türkiye has experienced a decreased ratio from 87% in 2000 (TURKSTAT, 2000) to 60.7% (TURKSTAT, 2021). According to Coşkun (2016: 206), Türkiye remains outside the two models consisting of countries with developed housing finance and high transaction volume and the latter having underdeveloped housing finance and low transaction volume because of the high level of transactions in the housing market despite the difficulty in accessing housing loans. From another point of view, in Türkiye, the fact that there is no increase in the share of owner-occupier households does not mean that housing transactions do not continue. Based on the TURKSTAT (2023), housing production and sales represented in Table 1, more than 8 million new units were started to be produced between 2013 and 2022 and more than 14 million housing units were sold between 2013 and 2023. The decreasing share of first-hand housing sales and mortgaged sales is remarkable.

Table 1: Housing production and sales between 2013 and 2023

Years	Housing production based on construction permit	Total housing sales	The share of first-hand sales	The share of mortgaged sales
2013	836171	1157190	45,73%	39,76%
2014	1027306	1165381	46,47%	33,44%
2015	893428	1289320	46,43%	33,69%
2016	1002726	1341453	47,09%	33,51%
2017	1397778	1409314	46,81%	33,57%
2018	665948	1375398	47,37%	20,13%
2019	318275	1348729	37,94%	24,65%
2020	553338	1499316	31,33%	38,24%
2021	722994	1491856	30,94%	19,74%
2022	692952	1485622	30,97%	18,87%
2023	No data	993835	29,97%	16,75%

All these findings load a unique characteristic of the Turkish housing market. Despite this uniqueness in the housing market, the number of studies focusing on housing market transaction volumes in Türkiye could be much higher. Some of these studies, as highlighted by Aliefendioglu et al. (2019: 1), observed the factors affecting the housing turnover frequency in Çankaya as urban development trends, comfort perception, proximity to school or workplace, and household requirements through micro-data consisting of homebuyers of observed year. Also, the role of an increase in sales prices and loan interest rates on the decision to purchase housing is the postponement resulting in a decrease in sales (Atasoy ve Tanrıvermiş, 2021: 480). Muti (2020: 277) questioned the relationship between total housing sales and title deed fee rates and revealed a reciprocal and positive effect, indicating low title deed fees related to high housing sales volumes. Gürbüzer and Aksoy Khurami (2023) benefited housing transaction volumes to overview the handover process in the low-income social housing project and the administration housing project of the Housing Development Agency in Türkiye.

Housing transaction is also a tactic to heat markets. As Aksoy Khurami and Özdemir Sarı (2022) stated, the number of new annual housing plunged under the growing numbers of households in 2019, and the balance slightly slid in favour of new households between 2020 and 2021. Through the focus of cities in Türkiye, calculations regarding annual housing production per added household between 2018 and 2021 have shown clues on who has the housing transactions. 60 out of 81 provinces display different levels of oversupply, yet the sale of housing units in these provinces does not fall behind country averages. In short, housing transactions have been observed in Türkiye and have not only motivated to have a housing unit to live in but also for many other purposes. Also, these statistics indicate the existence of multiple homeownerships in the country as the share of owner-occupier households has remained the same or decreased. From another point of view, the existence of unrecorded intergenerational transfers of housing units has been evident based on the mode of tenures category in the Household Budget Survey and the Survey of Income and Living Conditions produced by TURKSTAT. Other as a mode of tenure category refers to households living in their relatives' houses without paying rent or below market level. These households can be considered one's housing is (using rights) transferred to but unrecorded in the official system.

Muğla, the focus of this study, is evaluated in the oversupply category (Aksoy Khurami and Özdemir Sarı, 2022). Also, Muğla is one of the four cities that level of construction is at the edge of meeting the demands due to the increasing number of households between 2000-2014. Considering the housing price index, Muğla has been high compared to the other cities of Türkiye; the process can be divided into two periods: 2010-2019 and 2020-2023. While the housing price index for the first period was going hand in hand with the country average for the TR32 region where Muğla is located, the difference for the second period is observed (for Türkiye, 154,9 in 2020 and 1129,6 in 2023; for TR32 region 181,7 in 2020 and 1527,6 in 2023) (TCMB, 2023). The effect of COVID-19 is noticeable. Also, Muğla includes several sub-markets; each has its characteristics and very low substitutability with others. Menteşe and some other districts far away from the coastal line host a permanent population, while

each coastal district has their specific attributes and temporary population. Therefore, to avoid any extremities in this study, the Menteşe district and the period before 2020 have been decided to study.

Before going into details of results, it is worth indicating the spatial and housing development of Menteşe concerning the land uses and spatial development. Until the Early Republican period, the urban settlement of Menteşe had preserved its spatial existence within the borders of the historical urban site, which corresponds to the following neighbourhoods: Balıbey, Camiikebir, Emirbeyazıt, Hacı Rüstem, Karamehmet, Karşıyaka, Kiremittin, Muslihittin, Müştakbey, Orhaniye, Orta and Şeyh. However, this does not indicate that all the buildings within the aforementioned neighbourhoods fall under the provisions of historical urban sites, as they cover buildings that only carry historical and architectural values of the 19th century and earlier periods, together with the buildings around Cumhuriyet Square. As a part of nationwide efforts towards conservation planning, Muğla enacted a categorisation and definition process of the mentioned urban site and registered buildings in the 1970s (Akçura, 1993: 244). Even though the efforts of preparing a conservation plan started in 1996, the Revision Plan of Muğla City Center Conservation Plan officially announced the area as a Historical Muğla Urban Site in 2001. Beginning from the 19th century, the traditional city centre located in the north-south axis had expanded east from Arasta, including small-scale production and retail shops, to a new commercial centre with inns and bigger shops. The structural changes of the Ottoman period in terms of administration and social norms required an administrative centre near the new commercial pattern. The formation of a new commercial and administrative centre reoriented the main transformation axis along the east-west axis in the city between Konakaltı and Saburhane Square in the 19th century (Aktüre, 1993: 80).

From the 20th century onwards, urban settlement gradually expanded towards the fertile lands of Muğla Plain, with the first urban development plan of Muğla prepared in 1936. The plan concentrated on the main transportation axes through the east-west axis along the new administrative centre, which was shifted from Konakaltı to Cumhuriyet Square. The primary purpose of the plan was to integrate a new urban pattern reflecting the characteristics of the early republic around new boulevards. Topographic thresholds such as mountains, creeks and forests within the historical urban site had been restraining urban growth towards north, west and south-west directions. Since Kızıldağ, Yılanlı and Hamursuz Mountains encircle the site, the urban settlement has been forced to expand towards the fertile lands in the south. As the urban population and development speed increased, the earliest examples of building cooperatives and apartment blocks with 4-storeys emerged in Emirbeyazıt and Orhaniye neighbourhoods between the 1960s and 1970s (Osmay, 1993: 216). The transition of housing stock from single houses with one or two storeys to 4-storey apartment blocks has increased the housing demand even more by pressuring the fertile lands of Muğla Plain. 1950 onwards, as the urban population had been dramatically increasing, existing housing stock could not meet such higher demands. Thus, squatter housing emerged as an illegal formation instead of the undersupplied housing sector. In the city centre, squatter houses adjoined the west, east and southeast borders of the historical urban site. Therefore, the third urban development plan of 1982 aimed to control urban development and improve urban quality. To that end, 1982 plan decisions led to urban redevelopment in three squatter housing prevention zones located on the outskirts of the historical site within Karamehmet and Orhaniye Neighbourhoods. These areas have undergone urban redevelopment; some are being transformed into 4-storey buildings in the Karamehmet region, while some of them have turned into single houses with 2-storeys in Karşıyaka and Orhaniye. Düğerek Neighbourhood was determined as a new urban growth area to prevent these types of uncontrolled urban development. Meanwhile, the south periphery of the city centre was intended to delimit with conservation policies regarding Muğla Plain and the emergence of the small-scale industrial zone.

The compact urban pattern that developed around the historical urban site, which continued until the 1990s, has now been replaced by a leap-frog development in the urban periphery due to the natural thresholds and land-use decisions. The last urban development plan in 2004, the development of the city's built environment was said to be sustained by forming strong relationships with rural areas of Düğerek, Yeniköy and Kötekli (Koca, 2015: 22). Having the passage of Denizli Highway between Kötekli, Yeniköy and Karabağlar Villages together with the construction of Muğla Sıtkı Koçman University in 1992, and Yücelen Hospital in 1996, urban sprawl can be first observed in Kötekli and Yeniköy Neighbourhoods. A new ring road connecting the provinces of Aydın and Denizli has opened to the southern edge of the Muğla Plain. Increasing the accessibility of surrounding settlements and villages with the new Aydin-Denizli Ring Road has brought important commercial, public, and industrial uses to the road between the University area and Bayır Neighbourhood. Similarly, High-rise TOKI housing estates and Muğla Training and Research Hospital, built

near the university campus area from the 2010s to the present, have also attracted important commercial and public buildings along the ring road. In the 2004 plan, Akçaova was added as an urban development area.

Metropolitan Municipality Law in 2012 and the above-mentioned land use decisions were evaluated together. Kötekli, Yeniköy and Bayır Neighbourhoods, already in the transition of the rural-urban interface, have gained urban area status. Moreover, rural villages gaining the status of urban neighbourhoods resulted in single houses / villas or single building blocks. Hereby, it can be said that from the 2000s onwards, leap-frog urban development pattern on the east-west axis goes from Düğerek to Bayır Neighbourhoods, while the north-south axis goes from the city core to the Kötekli Neighbourhood. The existence of hospitals, university, industrial and other working areas increases the housing demand relatively in Kötekli, Yeniköy, Orhaniye, Emirbeyazıt, Muslihittin, Karamehmet and Bayır Neighbourhoods compared to others. However, due to geographical thresholds, land use, and plan decisions in the city, fringe neighbourhoods remained disconnected and isolated from the city centre and each other.

4.DATA AND METHODS

4.1.Data

According to TURKSTAT's housing statistics, there are five different ranges of annual housing sales figures, of which Muğla falls into the second highest range between 2019 and 2022 (when İstanbul, Ankara and İzmir are disregarded for being outliers). Due to its abundance of tourist attractions, natural resources, and Mediterranean climate, Muğla is one of the most sought-after destinations for housing preferences. Furthermore, since the COVID-19 epidemic began, there has been an increase in housing mobility to accommodate changing trends in housing unit attributes such as being located in a warm climate, with a garden or an open space, etc. (Subaşı and Baycan, 2022: 1181). Yet, higher housing demand and having several Special Environment Protection Areas, historical, archaeological, and natural sites, geographic thresholds have limited the range of urban development in terms of available space. In other words, Muğla is one of the cities where the housing supply cannot meet the housing demand, which makes it significant to investigate this study to work on housing transaction volumes and frequencies. Menteşe, the central district of Muğla, was selected as a case study area instead of touristic coastal districts to exclude the secondary housing effect, seasonal migration, and mobility. Neighbourhoods of the Menteşe district are presented in Figure 1. It is worth indicating that after the change in the Law numbered 6360, Muğla became a Great Metropolitan Municipality in 2012, and previous villages were turned into district neighbourhoods. The other neighbourhoods in Figure 1 refer to these villages-neighbourhoods. Due to their rural characteristics, the role of agricultural land and the low number of housing units in transactions, these neighbourhoods are the first to be eliminated from the scope of this study. The remaining neighbourhoods were categorised based on their central, historical, and peripheral characteristics.

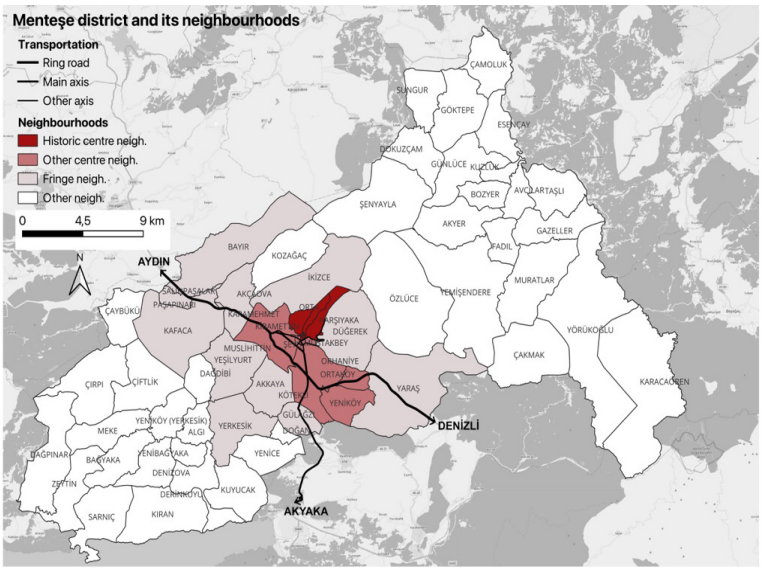

Figure 1: Menteşe district and its neighbourhood

This study employs three different datasets (Open Street Map (i), Household, housing and office data collected by the Turkish Statistical Institute (ii), Title deed transaction statistics by The Directorate of Land Registry and Cadastre (iii)) to investigate housing transactions in Menteşe district between 2013 and 2019. It first utilises and aggregates the number of housing units, households, and offices on the district level for 2013 and 2019 retrieved from the Address Based Population Registration System (ADNKS) and National Address Database. As shown in Figures 1 and 2, neighbourhoods are evaluated based on their centrality characteristics: historic city centre, city centre and fringe neighbourhoods.

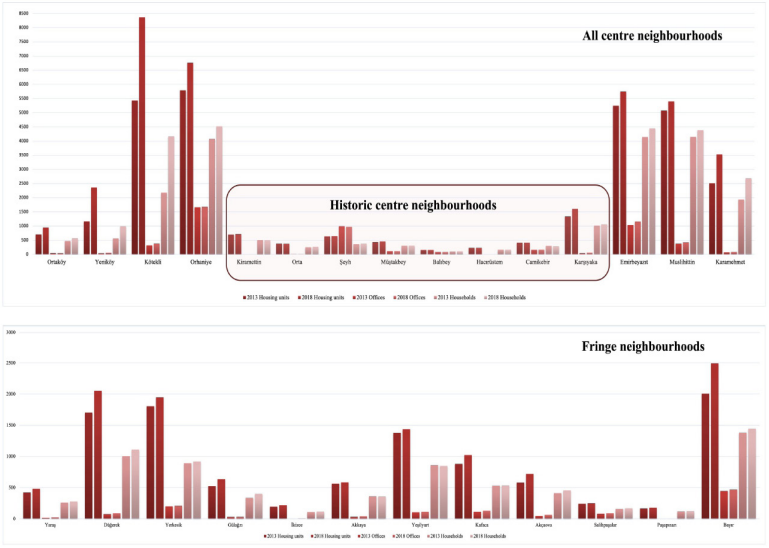

Figure 2: The number of housing units, offices, and households in 2013 and 2019

Although there are different admittances to investigate housing transaction volume, such as handling of individual transaction data (e.g., acquisitions), some others use transaction data in an aggregated form over selected geographic entities that are important in the livery of mortgage services and products (e.g., census tracts, central cities, or metropolitan statistical areas). This study adopts an aggregation based on the neighbourhood borders.

The first sales category constitutes the core part of this study since housing sale numbers are the rare data type that can be monitored since it is the only available data in Türkiye. The Directorate of Land Registry and Cadastre (TKGM), under the jurisdiction of the Ministry of Environment, Urbanization and Climate Change, is a public entity accountable for collecting data on real estate properties TKGM has promising digital databases, which still a work in progress, such as Registry and Cadastre Information System (TAKBİS), Spatial Property System (MEGSİS), etc., yet they are insufficient and have limited access. Furthermore, THGM offers an online inquiry system that provides housing sales figures for each cadastral plot on a satellite map. Hereby, this study uses the annual housing transaction data from the plot inquiry system to assess the spatial distribution of housing transaction frequencies on a district level to examine current trends in residential mobility patterns.

Since 2010, annual housing transaction data on a national level has been made available by TGKM's inquiry under four following categories: "property sales," "property sales with a mortgage," "independent section sales," and "independent section sales with a mortgage". While property sales comprise the land and buildings, independent sections cover only the buildings within a land. Therefore, the second dataset for the study is the exchange of title deeds that falls under the categories regarding independent sections in 27 neighbourhoods of Menteşe from 2013 to 2019. Since the raw data on housing sales have not been divided into different property functions, lands, offices, stores and others except for the housing units were excluded from the data.

In this process, Open Street Maps (OSM) has been employed as a third dataset to differentiate whether a transaction is observed in a residential unit. In addition to the attribute table of OSM, land use characteristics of a unit subject to transaction have been questioned through Google Maps. The processed housing transaction data aggregates housing transaction volumes within the boundaries on a neighbourhood scale, as represented in Figure 3.

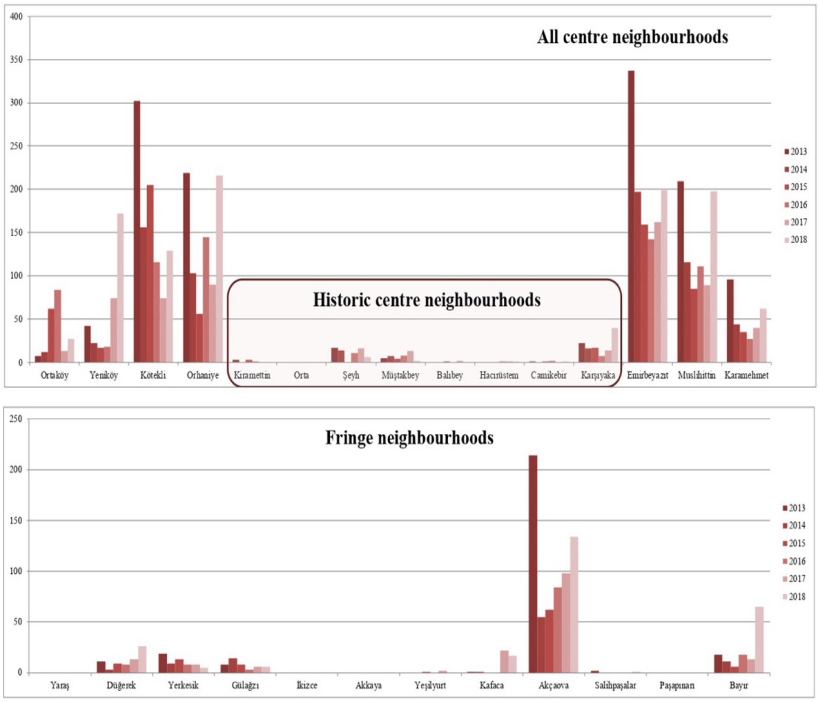

Figure 3: The number of housing transactions at the neighbourhood level between 2013 and 2019

4.2.Methods

The study concentrates on spatial analysis of housing market trends by interrogating housing transaction volumes in Menteşe, Muğla. While it employs housing transactions at the neighbourhood level, it also calculates/ utilises the housing turnover ratio as a share of housing transactions in the total number of housing units within a neighbourhood. As a first attempt, housing turnover ratio and transaction volumes are evaluated descriptively based on their accumulation in a specific location, their frequencies, and the development process and timeline of these neighbourhoods. Due to the low number of transactions and housing units, eight historic centre neighbourhoods are merged, and the total number of housing units, housing transaction volume and housing turnover ratio are considered in their evaluations. The result of the first step is visualized in Figure 4.

Secondly, the global spatial autocorrelation was first computed to show the existence of clustering within the housing transaction volumes of neighbourhoods. To check whether spatial heterogeneity exists, Moran's I is the best-known statistic to apply (Getis and Ord, 1992: 189). A negative value for I indicates that a feature has neighbouring features with dissimilar values (I=-.334). Next, local spatial autocorrelation is computed to show the individual clusters of the housing transaction volumes. After checking the spatial randomness based in favour of an alternative of clustering housing transactions, a local indicator of spatial association (LISA) has been applied. Providing a significant statistic for each location and a proportional relationship between the sum of the local statistics and a corresponding global statistic has enabled the interpretation of relations in housing transaction volumes at the neighbourhood level in Figure 5.

Lastly, observed and statistically significant clusters are evaluated in terms of their spatial and demographic characteristics, such as the existence of main axis and land use decisions, change in the number of households, and vacancy ratio of housing units. To conduct these analyses and visualise the results, geographic information system tools have benefited, and the results are represented in the following section.

4.3.Limitation and Contribution

The dataset and methods employed in this study have several limitations, yet contributions to the existing literature. First, unfortunately, due to the lack of housing price variables for housing units subjected to transactions, the price cannot be considered. For this reason, no judgment can be reached regarding the

housing price as a determinant of the housing transactions in the centre and the periphery. Secondly, since housing transactions have been aggregated at the neighbourhood level, the location and locational advantages of housing units cannot be discussed. Similarly, factors affecting the sale of housing units, such as the façade and floor of the unit, the size of the unit, the age of the building, and whether units are new or second-hand, are not included in the study.

The contribution to the existing literature stems from the fact that this study examined and revealed the effects of change in legal status from villages to neighbourhoods in the periphery of Menteşe. It also enabled the observation of the city's new growth directions, where housing development is targeted, and established its relationship with the housing market. This study also makes a profound contribution, unlike other studies that examine the housing market specifically for Muğla, as it focuses on Muğla city centre as a place free from seasonal and secondary housing effects, and at the level of neighbourhoods, and has the quality to guide sub-scale plans.

5.FINDINGS AND RESULTS

5.1.Housing Transactions and Housing Turnover Ratio

As indicated in the data section, housing transactions have been aggregated based on the neighbourhood borders of Menteşe. The volume classified on natural breaks represents a multifaceted pattern in Menteşe in Figure 4. First, the central neighbourhoods (Emirbeyazıt, Orhaniye, Muslihittin, Kötekli, Yeniköy and Karamehmet) are in higher volumes than historic centre neighbourhoods. Some neighbourhoods in the periphery become prominent due to their transactions, such as Akçaova, Bayır, Kafaca, Paşapınarı, Yerkesik, Gülağzı and Düğerek. Whereas some other neighbourhoods are represented with shallow transaction volumes, as shown by the lightest colour, the historic centre ones belong to this category. As mentioned in the literature, the low volume of housing transactions is part of a relationship that can be evaluated in multiple ways.

A low level will negatively affect the relocation process; the alternatives that households have during the relocation process will decrease, and their chances of finding a house according to their preferences will decrease. From another perspective, a low housing transaction volume may indicate high household satisfaction. The historic centre neighbourhoods are assumed to be the most stable and accessible location of a city. To query the validity of this condition in Menteşe, other factors are beginning to gain importance. In other words, to make this evaluation more accurate, it is necessary to refer to variables such as housing stock vacancy rate, housing and workplace stock and change in the number of households.

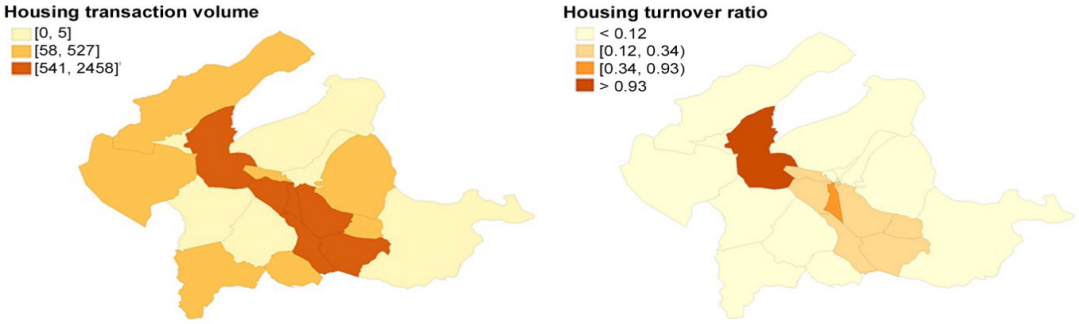

Figure 4: Housing transaction volume and turnover ratio between 2013 and 2018

Regarding the housing turnover ratio, the number of housing transactions is divided by the number of housing units in that neighbourhood. Results are given in Figure 4, right-hand side map. The ratio varies between 0 to 93 per cent, as observed the highest in Karamehmet, Muslihittin, Akçaova and Emirbeyazıt neighbourhoods and the lowest in peripheral and historic centre neighbourhoods. In these variations, the role of the development history of neighbourhoods is evitable. Karamehmet neighbourhood is one of the recently developed central neighbourhoods of Menteşe, and even though located at the periphery, Akçaova has the potential to be the new growth direction of the Menteşe district because of the natural limits in other parts of Menteşe and given development rights in Akçaova and its surroundings. Other newly developed neighbourhoods, such as Kötekli,

Yeniköy and Ortaköy, indicate a high turnover ratio. The high number and ratio of housing turnover in recently developed neighbourhoods indicate the first sales of the relevant housing units.

In addition, it is possible to interpret these neighbourhoods with high housing transaction volume. Still, the ratio of housing turnover is low, as a tiny portion of the house is changing hands compared to the high amount of housing stock. When these neighbourhoods are evaluated in terms of location, it is encountered that most of them are peripheral neighbourhoods and were described as villages in their previous legal status. Yet, they have lost their rural character with the Law on the Establishment of Fourteen Metropolitan Municipalities and Twenty-Seven Districts and Amendments at Certain Law and Decree no. 6360 since 2012 and are experiencing a transition towards urban and multi-storey housing typology (e.g., Bayır, Kafaca, Gülağzı, Yerkesik and Düğerek).

5.2.Local Indicator of Spatial Association

The spatial association model describes and visualises spatial distributions, identifies atypical locations or spatial outliers, and determines spatial association patterns, clusters, or hot spots (Anselin, 1998: 80). Locally, based on the significance map and clustering criteria, each spatial location is referred to as a characteristic. This study questions the housing transaction volumes at the neighbourhood level, as shown in Figure 5. First, evaluating the statistical significance needs a consideration of the randomisation process.

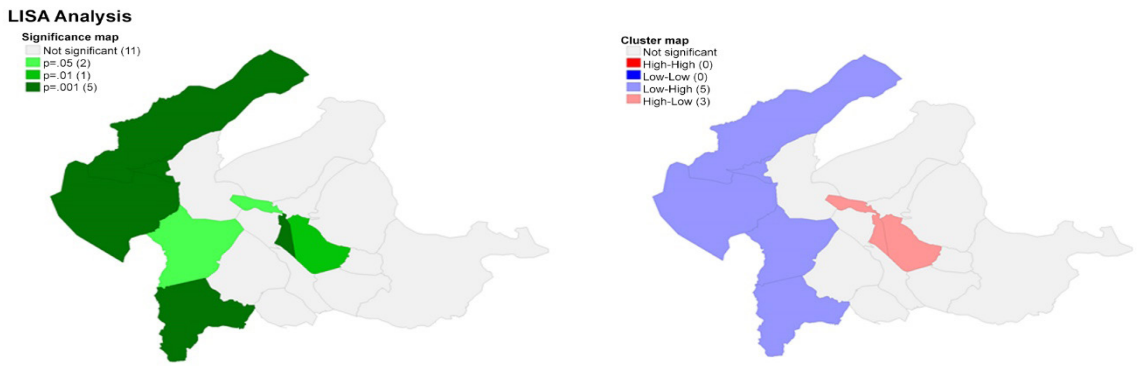

Figure 5: The results of LISA analysis based on the housing transaction volume between 2013 and 2018

While the statistical significance level at which each neighbourhood can be regarded as making a meaningful contribution to the global spatial autocorrelation outcome, this study adopts 0.05 as a score. Then, the cluster map and the significance map are combined to see which locations contribute most strongly to the global outcome and in which direction. High-High stated that neighbourhoods represent high values of the housing transaction volumes in that neighbourhood and its neighbours having high transaction volumes. As indicated in the legend, light blue neighbourhoods are in Low-High, referring to spatial outliers, low housing transaction volume neighbourhoods are surrounded by high transaction volume ones. It means that the average of the neighbours turns out to be much higher than the case under spatial randomness. In other words, lighter colour represents a significantly negative spatial autocorrelation outcome.

At the Menteşe neighbourhood level, eight neighbourhoods are revealed as statistically significant in determining their contributions. West and north peripheral neighbourhoods of Menteşe called Yerkesik, Yeşilyurt, Kafaca, Salihpaşalar, Paşapınarı, and Bayır stand out with their low housing sales volumes when compared to all neighbourhoods and their neighbouring neighbourhoods, and this prominence has also been proven to be a statistically significant difference. To question the reasons for the low volume, the beginning of the transition of these neighbourhoods from rural to urban texture and the change in the number of households and housing units between the years covered by the study should be questioned. Orhaniye, Emirbeyazıt and Muslihittin are in the High-Low cluster, referring to the high housing transaction volume in these neighbourhoods, but low transaction volume neighbourhoods also surround them.

5.3.Spatial and Demographic Characteristics of Clusters

To examine the factors affecting meaningful clusters, housing transaction volume at the neighbourhood level, the change in the number of housing units, the change in the number of offices, housing vacancy ratio at the end of the period, neighbourhoods' categories, the existence of important land-uses being worth to entire district (e.g., hospital, university, library etc.) have been questioned, and results are shown in Table 2 and Figure 6. The average represents the mean values of 27 neighbourhoods in Menteşe. Positive values in the change in the number of variables indicate an increase from 2013 to 2019.

First, neighbourhoods in the Low-High cluster (Yerkesik, Yeşilyurt, Kafaca, Salihpaşalar and Bayır) have recognised a comparatively lower change in the number of households and offices. It means that the demand due to the increase in population is not a case for observing high housing transactions. On the contrary, low housing transaction volumes have been revealed because of the limited change in population, hence, the demand side. Although there were limited changes in the number of households, the number of housing units (including under-construction and existing housing units) relatively increased, especially in the Bayır neighbourhood. However, this increase in the number of housing units did not cause a significant increase in the housing transaction volume in Bayır between 2013 and 2019. The main reason for this situation is that the housing units have not yet found their new owners (they are under construction, or the sales of the new housing units have not yet taken place even though the units have been completed).

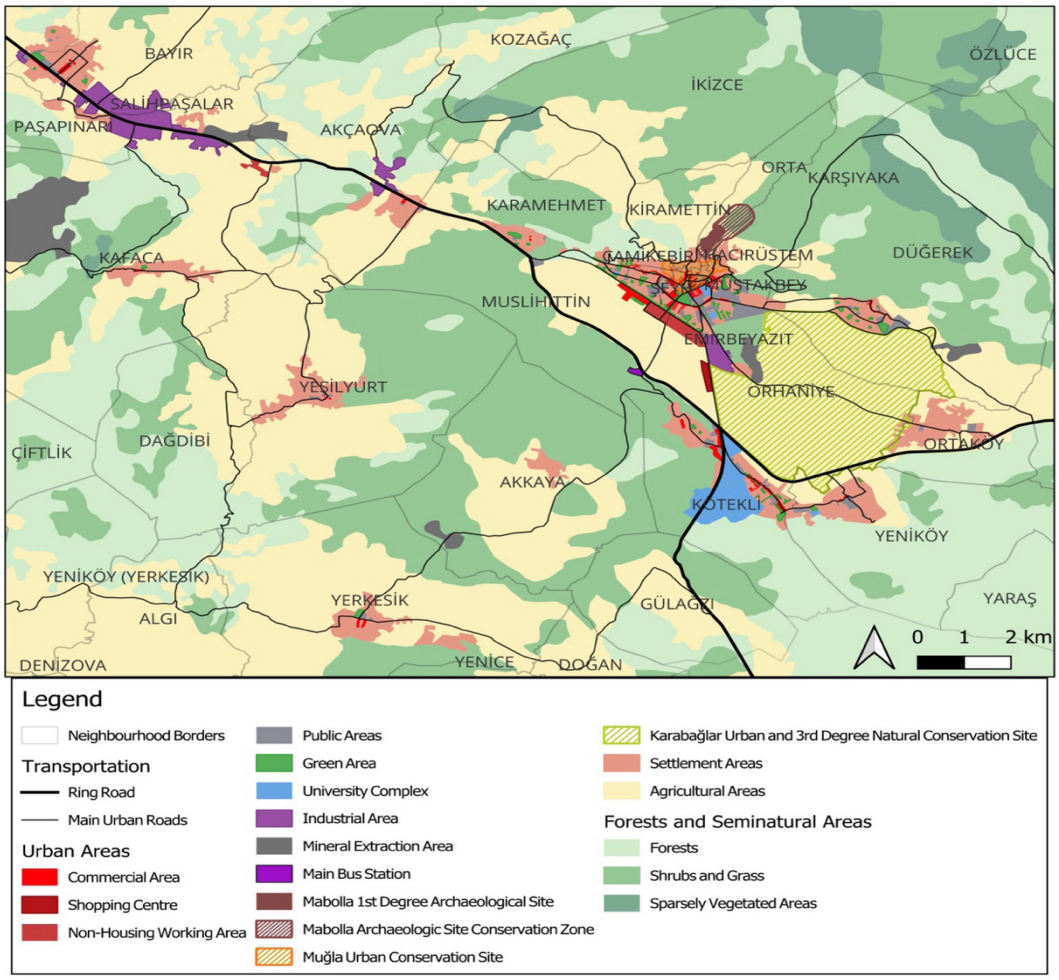

Figure 6: Landuse characteristics of selected neighbourhoods of Menteşe

On the other hand, regarding the housing vacancy ratio, the high vacancy rate of the peripheral neighbourhoods shows that they cannot be a part of the housing market in the Menteşe district. Even if the distance between peripheral neighbourhoods and the city centre is short for any metropolitan city, this is not the case for residents of Menteşe. Each commuting time is considered long, and commuting itself is expensive for Muğla. Also, it is argued that the lack of different land uses, such as working areas in these neighbourhoods, shapes these preferences.

Table 2: Spatial and demographic characteristics of statistically significant clusters

	The change in the number of households	The change in number of housing units	The change in the number of offices	Housing vacancy ratio	Neighbourhoods' categories	The existence of important land-uses being worth to entire district
Menteşe District Average	242	460	21	0,39	-	-
Yerkesik	28	145	11	0,53	Periphery	X
Yeşilyurt	-16	59	7	0,41	Periphery	X
Kafaca	4	140	16	0,48	Periphery	X
Salihpaşalar	8	9	7	0,33	Periphery	√
Bayır	63	488	22	0,42	Periphery	√
Orhaniye	439	976	19	0,33	Centre	√
Emirbeyazıt	305	500	123	0,23	Centre	√
Muslihittin	238	324	44	0,19	Centre	√

Secondly, neighbourhoods in the High-Low cluster (Orhaniye, Emirbeyazıt and Muslihittin) constitute a significant share of the population and housing stock of Menteşe. The higher housing transaction volume of these neighbourhoods compared to the neighbourhoods located in the city and their surroundings can undoubtedly be explained by the change in the number of housing units and households. However, the housing vacancy ratio is much below the hinge average, indicating that the long-term vacancy-unfilling situation observed in the peripheral neighbourhoods does not exist in these neighbourhoods. Even though these neighbourhoods host most of the lodgement housing units (units cannot be on the transaction and served for government officers), their high transaction volumes show that they are still among the preferences of households regarding housing stock quality, location, and walkability.

6.CONCLUSION

This study examined changing housing transaction patterns in the Menteşe District of Muğla through the central and peripheral divisions among neighbourhoods. The findings revealed the role of centrality in housing markets even though all the neighbourhoods on the periphery are very close to the city centre in terms of distance. On the other hand, although the previous villages of the city, the peripheral neighbourhoods, gained the status of centre with the legal regulations in 2012, it was observed that they did not have the expected acceleration between 2013 and 2018. Even though serious development and legal status changes have been made to revitalise the periphery, the existence and dominance of three central neighbourhoods (Orhaniye, Muslihittin, Emirbeyazıt) are decisive in the Menteşe housing market.

The planning decisions in Menteşe are also observed through their significant effects on the transactions in the housing market. These peripheral neighbourhoods are characterised by their dormitory characteristics, which means only housing units exist in neighbourhoods. Therefore, the role and importance of mixed land use

in making these neighbourhoods a living environment should be questioned. On the other hand, the existence and quality of urban services such as infrastructure, transportation, and education should also be increased to make these areas attractive. According to the findings, the fact that all members of households continue to come to the city centre for their daily lives (work, education, health, etc.) is an obstacle to these neighbourhoods located on the periphery becoming part of the city as expected.

Aiming to reveal possible housing development directions and buckling neighbourhoods in the Menteşe district, neighbourhoods in the west direction through Yatağan showed their dominance. As a result, it has been revealed that the investments made in this direction do not give the expected effect, even if they are supported via new housing construction. These results showed the necessity of taking a series of measures to manage the existing stock rather than new production, especially in the city centre. In that respect, the historical city centre neighbourhoods cover a significant area in Menteşe with easy access. However, evaluating these neighbourhoods regarding occupancy and vacancy revealed a high housing vacancy ratio. Whether it is a pseudo-high or not, rather than opening new areas for development and encouraging housing production in the periphery, considering housing units not actively used in the city centre through restoration studies may come to the fore as a policy.

This study did not benefit from any housing price variable due to the need for more records at the neighbourhood level. For further studies, examining housing transactions can utilize housing prices gathered from real estate value assessment reports or any real price indicators. In that way, the effects of the housing prices and the price change can be observed to predict the likelihood of high housing transactions.

Last but not least, the housing market and transaction volumes are highly responsive to the crises in society. During the previous five years, the COVID-19 pandemic and the Ukraine-Russian war have affected the Turkish housing sub-market in many ways. For instance, cities located at the Aegean and Mediterranean coastal lines of Türkiye hosted many Russian and Ukrainian tourists for years. Still, they were faced with high demand and limited supply. Although the examined period of this study did not include after 2019, it is evident that the effects of these events on housing transaction volumes should be monitored.

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