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MIXED-USE DEVELOPMENTS IN PHOENIX AND TEMPE, ARIZONA: SUSTAINABILITY CONCERNS AND CURRENT TRENDS

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Abstract
In parallel with the growing concerns of climate change, sustainability, and a perceived lack of urban vibrancy and vitality, an increased number of planning and design movements, policies, and incentives have emerged in the US during the last decades, criticizing urban sprawl and praising the idea of 15-minute, compact cities. However, the tools meant to achieve these, including transport-oriented and mixed-use developments were typically hampered by residential perceptions and demand, especially in the spread, auto-dependent urban regions of the western USA. The aim of the research was to explore current trends in the development of mixed-use projects and the extent to which these processes are stimulated by sustainability concerns in Phoenix and Tempe, Arizona, located in one of the most spread urban regions in the world. Interviews were conducted with planners and city representatives in the Phoenix Metropolitan Area, which are complemented by the review of municipal strategies and zoning ordinances, visualization and analysis of GIS data, and implementation of site visits. The findings show that the strategic aspirations towards mixed-use developments lack environmental considerations due to public perceptions being tied to other issues related to mixed-use developments, which can be traced primarily to Phoenix Downtown. As general difficulties, concerns aggravated by political, administrative, and funding problems. However, decoupled from sustainability, mixed-use developments are likely to proliferate in the Phoenix and Tempe areas due to political will and continuous gentrification processes.

Keywords
Urban planning, Phoenix MPA, Mixed-use developments, Sustainability, Trends, Interviews, GIS

INTRODUCTION

Urban sprawl, and the concept, and physical manifestations of the 15-minute cities became one of the prominent topics of geographical research and academic discussion (Ismael, 2021; Moreno et al. 2021). Indeed, the concept of 15-minute city is primarily built upon the research fields of the disciplines rooted in modern geography of the 20th century (Mocák et al. 2022). During the last decades the

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concept of 15-minute cities emerged globally, and in the urban development principles of European Union. Meanwhile, in North America in response to the growth of American suburbs and the decline of city centers, pioneers of the New Urbanism (NU) Movement and Smart Growth (SG) Network played a key role in encouraging more criticism of exclusionary zoning, which has contributed to urban sprawl (Knaap and Talen, 2005). NU and SG are flagship advocates of creating compact cities, vibrant neighborhoods, and walkable urban spaces in the United States: one of their common tools to achieve this desire is mixed-use developments. Due to these aspirations, principles of NU and SG have been attached to the concepts of sustainable urban development in general, promoting the virtues of mixed-use developments including the increase of walkability, and vibrance (Jepson and Edwards, 2010). Nevertheless, the popularity growth of mixed-use developments seems to be lagging, as it represents a radical contrast to the urban development of the past, which is compounded by several institutional issues (Grant and Perrott, 2011).

OBJECTIVES

This paper focuses on the Phoenix Metropolitan Area (PMA); an urban region that consists of one of the fastest-growing, sprawled, and auto-dependent cities in the United States (Gammage, 2016). The research sought answers to two main research questions: (1) To what extent increasing sustainability concerns are stimulating mixed-use developments in cities of Tempe and Phoenix, Arizona? (2) What planning and policy solutions could exist to overcome the barriers that impede the appearance of mixed-use developments in Tempe and Phoenix, Arizona, according to planners and city representatives?

THEORETICAL FRAMEWORK

During the 20th century, suburbanization and urban sprawl had crucial roles in shaping urban development in both Europe and the United States. Although, to some extent, urban sprawl has occurred during different periods and taken on diverse forms on the two continents (Duany et al. 2000; Bueno-Suárez and Coq-Huelva, 2020). Additionally, suburbanization processes have went through on different patterns after the second world war also in Europe, which is influenced highly by the specific goals and aspirations of communist regimes regarding economic and urban development in the CEE countries (Matlovič and Sedláková, 2007; Kocsis, 2015b; Kocsis and Kassay, 2018; Losonczy et al. 2022). For example, manifesting suburbanization patterns in an "intra-urban" form, within the boundaries of the administrative area of the cities (Hegedűs et al. 2023).

Reflecting on the consequences of urban sprawl and suburbanization, global awareness on the concept of 15-minute cites started to emerge, included in

international, national, and city-level policy papers, guidelines, and incentives. Concerns related to urban sprawl highlight the issue of expanding land use and natural land loss, and the growing pressure on transportation infrastructure due to increased traffic. These processes not just cause higher environmental impact, but also have economic and social aftereffects. The concept of 15-minute city emerges in the urban realm as a compact form of urban fabric. Ultimately changing how people use the city, 15-minute cities indented to provide the essential amenities and services for its residency within a 15-minute distance of walk, cycling, or public transport (Bueno-Suárez and Coq-Huelva, 2020; Moreno et al. 2021; Mocák et al. 2022). Primarily in the North American context, discussion on 15-minute cities supplemented by the concepts of transit oriented, and mixed-use developments (Jepson and Edwards, 2010).

The geographical relevance of the topic discussed by this paper is essential. The topics of behavioral geography and time geography are strongly embedded in the visions of 15-minute city, as the main research fields of these disciplines includes how people behave in the urban realm, and how they react to physical changes in the urban space (Matlovič and Matlovičová, 2020; Mocák et al. 2022). Additionally, when 15-minutes cities are discussed, it is important noting the relevance and adequacy of chronourbanism, which focuses on proximities of basic services and travel times of residents, reflecting on the quality of life in the city (Moreno et al. 2021; Mocák et al. 2022).

Mixed-use developments and sustainability

Building upon the ideas of Jane Jacobs, NU and SG emerged as prominent advocates against urban sprawl, which has been facilitated by transportation development (Gurwitz, 2019) and further enabled by long-standing federal government policies (Glaeser, 2012) partially manifested in exclusionary zoning (Duany et al. 2000; Whittemore, 2021). With the support of NU and SG, mixed-use developments have gained prominence in the United States as a solution for the concept of 15-minute cities. These developments are seen as a quasi-alternative to the unsustainable urban sprawl and are perceived as a key factor in creating vibrant, pedestrian-friendly urban centers (Knaap and Talen, 2005). A mixed-use development (1) is a real estate project with planned integration of some combination of retail, office, residential, hotel, recreation, or other functions, including mixed apartment types and prices supporting social diversity; (2) is pedestrian-orientated and contains elements of a live-work-play environment; (3) maximizes space usage (Niemira 2007).

However, the definition of sustainable development presented in the 'Brundtland Report' 36 years ago (United Nations, 1987). Debates still presented on the relevance and adequacy of such definition, as well on the performance of linked indicators including Sustainable Development Goals (Moyer and Hedden,

2020; Ruggerio, 2021). During the last decades, three 'pillars' of sustainability have become acknowledged in policies and academic literature, namely environmental, social, and economic (Purvis et al. 2019; Clune and Zehnder, 2020). Based on Munasinghe (1993), Ruggerio (2021) described the possible concerns and topics of sustainability (Tab. 1). The different topics highlighted by Ruggerio (2021) are also supported by several academic articles (Hansmann et al. 2012; Purvis et al. 2019; Gomes Silva et al. 2022). Still, it seems debatable whether the aspirations linked to these pillars could be achieved simultaneously (Boussemart et al. 2020; Dalampira and Nastis, 2020; Gomes Silva et al. 2022).

Like sustainability, the meaning and the manifestation of sustainable urban development are still debatable (Næss, 2001). However, sustainability and the three pillars of it have become a fundamental principle of European urban planning, integrating them in policies and strategic documents (Kagan et al. 2018; Fioretti et al. 2020).

Taking into account the highly debatable nature of sustainability (Wilkinson et al. 2001; Owens, 2003; Johnston et al. 2007; Behrends et al. 2008; White, 2013; Moore et al. 2017; Ruggerio, 2021), as well as the concept of 'three pillars'(Boussemart et al. 2020; Dalampira and Nastis, 2020; Gomes Silva et al. 2022), it can be stated that the principles previously mentioned of New Urbanism, Smart Grow overlap with the understandings of environmental, social, and economic sustainability to some extent (Tab. 1).

As can be seen in Tab. 1, the principles of NU and SG can be related to the concerns of the three pillars of sustainability. Nevertheless, the experienced impacts of mixed-use developments, which are one of the common elements of NU and SG, are highly varied, concerning the environment, society and economy, and the related sustainability.

Mixed Use Developments Affecting Environmental Sustainability

The environmental consequences of neglecting infill and mixed-use developments and urban sprawl seem obvious; monofunctional, horizontally extensive suburban developments increase auto-dependency, and energy consumption thus elevating pollution and environmental impact (Kahn M. E. 2000; García-Palomares, 2010; Kovács et al. 2020; Hajilou et al. 2022). Additionally, greenfield developments generally contribute to the decrease of agricultural and natural areas (Frenkel A. 2004; Zhou X.-Wang Y. 2011).

Although, it is important to remark on other environmental implications related to mixed-use developments. It is indisputable that the development of mixed-use urban districts consequently creates higher densities, which is also inherent in Transit Oriented Developments on a neighborhood-scale (Renne, 2009; Nasri and Zhang, 2014; Yildirim and Arefi, 2021). It can be argued that the increased density of mixed-use areas contributes to the decrease in energy consumption and

Tab. 1 Principles of sustainability, New Urbanism, and Smart Growth

Concerns of sustainability [Ruggerio (2021) adapted from Munasinghe (1993)]		
Environmental sustainability	**Social sustainability**	**Economic sustainability**
• Biodiversity/Resilience • Natural Resources • Pollution	• Poverty • Empowerment • Culture	• Efficiency • Growth • Stability
Principles of New Urbanism (Congress for The New Urbanism, n.d.)		
• preservation of agrarian hinterland and natural landscapes near metropolitan regions, • encourage infill developments, • minimize auto dependency with a wide range of transportation alternatives, • encourage compact, pedestrian-friendly, and mixed-use neighborhoods, • embed civic, institutional, and commercial activity in neighborhoods, • encourage the creation of community gardens, • encourage natural methods of cooling and heating.	• encourage compact, safe, interesting, pedestrian-friendly, and mixed-use neighborhoods, • broad range of housing types and price levels to encourage affordable housing, • embed civic, institutional, and commercial activity in neighborhoods, • encourage the creation of community gardens, • encourage community and culture of democracy with appropriate civic buildings.	• metropolitan region referred to as a 'fundamental economic unit of the contemporary world, • share of revenues and resources more cooperatively among municipalities, • ration coordination of services, development, and infrastructure, • support economic development with adequate urban design codes, • encourage the creation of community gardens.
Principles of Smart Growth (Shrivastava and Sharma, 2012)		
• Mix land uses and provide a variety of transportation choices to minimize car dependency, • encourage compact design and infill development, • encourage walkable neighborhoods, • preserve open spaces and farmlands.	• mix land uses to improve public safety and vibrance, • create a broad range of housing for different social and financial status, • encourage walkable neighborhoods, • encourage attractive communities, • Provide a variety of transportation choices, • Support predictable, fair, and cost-effective development decisions, • Encourage collaboration between stakeholders and residents.	• Mix land uses to improve business, • Development within existing communities to save infrastructural expenditure and strengthen local tax bases, • Support predictable, fair, and cost-effective development decisions.

Source: Ruggerio, 2021; Munasinghe 1993; Congress for The New Urbanism, n.d.; Shrivastava and Sharma, 2012

environmental impact of infrastructural developments per household (Glaeser, 2012; Siemiatycki, 2015; Mualam et al. 2019).

Increased density occasionally increases local noise (Yildirim and Arefi, 2021), as well as air pollution (Frank and Engelke, 2005). However, services and functions selected wisely (Talen and Koschinsky, 2014; Tian et al. 2020), also convenient and abundant public transport options, contribute to decreasing car dependency and commute times (Boarnet and Crane, 1997; Tian et al. 2020). Hence, overall urban air pollution is likely to decrease (Frank and Engelke, 2005).

Mixed-Use Developments Affecting Social Sustainability

Compact, walkable, diverse neighborhoods containing mixed-use developments have a positive effect on urban residents concerning social relationships, health, crime, and safety. However, it is important to note that few studies have shown the negative effects of TOD developments on crime, access to employment, and school quality (Talen and Koschinsky, 2014).

Nonetheless, mixed-use developments have an indisputable role in forging urban districts more human, walkable, and vibrant (Jacobs, 1961; Gehl, 2010; Talen and Koschinsky, 2014), these are privileges that cannot be afforded by just anyone (Grant and Bohdanow, 2008; Moos et al. 2018). In several contexts, mixed-use developments are referred to as not just a mixture of retail and residential functions, but also as an integration of apartments for a broader range of residents with differentiated financial and social backgrounds (Coupland, 1996; Wardner, 2014). Hence, transit-oriented and mixed-use developments are intended to create diverse urban communities which support residential mobility, participation, and governance (Chaskin et al. 2012; Sennett and Sendra, 2020). It is important to point out that this is an aspiration which is achieved in some cases. Mixed-use or TOD neighborhoods with an abundant selection of services, stores, and recreational units close to residential areas emerging in downtowns generally stimulate gentrification, thus providing less affordable and less heterogeneous districts, thus encouraging segregation (Sander, 2002; Kenny and Zimmerman, 2004; Walks and Maaranen, 2008; Hanlon, 2010; Markley, 2018). Meanwhile, less well-off residents are usually excluded from redeveloped downtowns into older suburbs (Siemiatycki, 2015; Lee et al. 2017).

Higher densities within infill developments bear inevitable benefits compared to greenfield developments when it comes to environmental sustainability (Glaeser, 2012; Mualam et al. 2019). In contrast, academic literature agrees that higher densities generally undermine residential well-being, as well as a sense of security, considering especially children, for the reason of overcrowding, as well as increased traffic congestion, and air, also noise pollution (Jackson, 2003; Frank and Engelke, 2005; Talen and Koschinsky, 2014). However, referring to the

previous chapters, these effects could be mitigated by cautious planning (Talen and Koschinsky, 2014; Tian et al. 2020).

Mixed-Use Developments Affecting Economical Sustainability

Vertically allocated mixed-use developments built in infill sites are generally linked to cost efficiency due to decreased infrastructural costs (Glaeser, 2012; Mualam et al. 2019). For this reason, higher aggregated but decreased infrastructural expenses per unit could be expected in terms of higher exploitation, as well as the occupancy ratio, including parking, enforcement, and security (Siemiatycki, 2015). Furthermore, less traffic reduces pressure on road infrastructure (Tian et al. 2020; Whittemore, 2021). Consequently, infill mixed-use developments in downtown have a positive impact on land prices, as well as the economic vitality of the neighborhood (Malizia and Song, 2016; Van Leuven, 2022); still the economic sustainability of mixed-use developments during operation is nuanced by a significant number of factors. Specifically, authorization and planning of mixed-use developments generally require greater expenditure and time consumption than their single-use counterparts, which is compounded by the fact that mixing functions demand broader and longer cooperation between stakeholders (Siemiatycki, 2015; Jackson, 2018; Trudeau, 2013).

Smaller-scale mixed-use developments concerning retail and services possess modest economic performance compared to auto-dependent big-box retail centers; to such an extent that the latter even endanger the vitality of smaller-scale retail (Gyourko and Rybczynski, 2000; Bartlett, 2003; Grant and Perrott, 2011). Although a smaller retail store requires fewer consumers to operate sustainably, the selection of goods offered is also smaller and the prices are unavoidably higher (Bartlett, 2003). Consequently, the typical American customer chooses large box retail centers instead of smaller stores due to the broader selection, the atmosphere, as well as the 'recreational' function of shopping, which is supported by the high car ownership rates and relatively cheap fuel (Handy and Clifton, 2001).

The debates and contradictions concerning the three pillars of sustainability are reflected in the advantages and drawbacks of mixed-use developments related to environmental, social, and economic aspects. However, the major advantages of mixed-use developments seem to culminate with regards their environmental consequences. However, these assets also have their shortcomings, including increased density and gentrification, which may cause social issues.

RESEARCH METHODS

The research was implemented between February and May 2023 in the PMA, Arizona, United States, supported by the facilities offered by the Arizona State University at Tempe. As the research question indicates that the work focused on two particular cities of the Metropolitan Region, namely Phoenix as the primate

city, and Tempe, as a significant subcenter of the Metro Area. The research relied mainly on qualitative tools; however, GIS data visualization and analysis were also utilized. The applied method consists of the following five steps: (1) review of general plans and other strategies, including environmental and transportation plans of Phoenix and Tempe, focusing on the context and main purpose of mixed use developments; (2) assessment of zoning ordinance of the cities, centering on zoning districts related to mixed use developments, as well as on their characteristics; (3) mapping of zoning districts related to mixed use developments using GIS data achieved from municipal websites to explore the patterns of emergence, as well as their relations to other elements of urban fabric; (4) site visits implemented to explore the manifestation, nature, and characteristics of mixed use developments; (5) a sum of 10 interviews conducted with city representatives and planners working in the PMA. An interview section was strictly devoted to the topic discussed currently. The interviewees were recruited through email, public and non-public institutional databases. As a supplement to the interviews, a community meeting was held in a downtown district of Phoenix. The main topic of the meeting was mixed-use developments; therefore, different perceptions and opinions of residents were observed about the developments discussed, as well as the attitudes of city planners.

RESEARCH AREA

The PMA is one of the fastest-growing metropolitan areas in the United States. Several cities in the region, including Gilbert, Glendale, Scottsdale, Mesa, and Tempe, grew at a double-digit rate between 1970 and 2020 (Lang and LeFurgy, 2007). To provide an area for incoming residents, PMA annexed land of 82,6 km2 between 1990 and 1997 (Hostetler and Knowles-Yanez, 2003). As was discussed earlier, these high volumes possess a significant environmental impact, which, in the case of the PMA, culminated in natural land loss and increasing auto dependency. Furthermore, due to the geographical reasons, other environmental issues arise, including extreme heat during the late spring and summer months. Furthermore, as the effects of climate change are amplifying, water conservation problems may increase (Gammage, 2016). These problems, especially concerns regarding heat mitigation and water conservancy, are frequently discussed not only in academic literature, but also in municipal planning and strategic documents of Phoenix and Tempe (Wentz et al. 2014; Crewe et al. 2016; Sen et al. 2019; Wang et al. 2019; Meerow et al. 2021). Consequently, a significant proportion of municipal policies and projects are dedicated to these problems.

In contrast to the City of Phoenix, The City of Tempe is built out. Hence, there is no more annexable land available for the municipality, where new greenfield developments could emerge. Consequently, its General Plan focuses on the

improve of the already-built urban area, implementing infill developments mainly in Downtown, supported by public transport services and convenient land use classification.

RESULTS AND DISCUSSION

Strategies of Tempe and Phoenix regarding sustainability and mixed-use developments

The General Plan represents the bedrock of the municipal planning, formulating visions for the economic, social, and environmental dimensions of the cities for the next 25 years. The most important instrument of planning is the Zoning Plan, which sets the legal and physical framework for the development patterns of the cities, in consistency with the General Plan (Cullingworth and Caves, 2014). Consequently, public hearings organized either by the Planning Department or the local neighbourhood councilmember of the municipality often have a strong influence on rezoning processes in the PMA.

In the case of the City of Phoenix, mixed-use developments in the General Plan are generally discussed within Transit Oriented Developments. The plan gives us the impression that the aspirations toward these developments are more restricted than in Tempe, as the term 'mixed use' is significantly rarer. Additionally, as in the case of Tempe, mixed-use developments often emerge as a potential increase in amenities, rather than a tool that aims to increase sustainability in both strategic documents and zoning ordinances.

The Zoning Ordinance of Tempe and Phoenix Mapped

A zoning ordinance is one of the main tools to control urban development and land use patterns, as it strictly regulates the physical and functional aspects of particular blocks. In the following table, codes, and ordinances of Tempe and Phoenix related to mixed-use developments are listed, highlighting their most important aspects (Tab. 2).

To shed light on Tempe and Phoenix's advance in the development of mixed-use blocks, as well as their forthcoming plans, it is important to map these zoning districts. Using GIS data, the manifestation of strategic plans and zoning codes can be traced and visualized.

Four types of mixed-use development codes are present in the zoning ordinance, which can be seen as mapped in Fig. 1. Mixed-Use Educational Districts are the most extensive in their area, which provide space for the properties of Arizona State University.

Tab. 2 Zoning ordinance of Tempe and Phoenix regarding mixed-use developments.

<table>
<tr><th>TEMPE</th><th>PHOENIX</th></tr>
<tr><th>City Center Code</th><th>Downtown Code</th></tr>
<tr><td colspan="2">Purpose
(1) Permit higher densities;
(2) Support walkability and vibrance with appropriate urban design and mixed-use developments with regulations sentenced in the zoning ordinance.</td></tr>
<tr><th>Transportation Overlay District</th><th>Transit-Oriented Development District</th></tr>
<tr><td colspan="2">Purpose
(1) Promote and develop livable and sustainable neighborhoods;
(2) promote and increase the use of alternative modes of transportation;
(3) encourage a mix of uses;
(4) provide facilities that create a safe, accessible, comfortable, and pleasant environment for people encourage walkability;
(5) mitigate pollution</td></tr>
<tr><td colspan="2">Tools</td></tr>
<tr><td>Regulations sentenced in the zoning ordinance:
(1) influence the underlying zoning districts;
(2) prohibit functions;
(3) regulate ground floor uses;
(4) decrease in parking lots;
(5) regulate street-facing façades;
(6) provide sitting spaces;
(7) require increased shading along pavements</td><td>Strategic incentives according to goals</td></tr>
<tr><td rowspan="2"></td><th>Planned Unit Development (PUD)</th></tr>
<tr><td>Purpose
To create an innovative and compatible built environment, in compliance with the character of the neighborhood, responding to environmental and urban challenges.</td></tr>
<tr><td></td><td>Tools
Regulations sentenced in the zoning ordinance. Any permitted use can be proposed; site plan required which approved by public hearing process.</td></tr>
<tr><th>Mixed-use codes</th><th>Walkable Urban Code</th></tr>
<tr><td>(1) Medium Density;
(2) Medium-High Density;
(3) High Density;
(4) Educational</td><td>(1) Low Intensity Residential District;
(2) Low Intensity Mixed Use District;
(3) Medium Intensity District;
(4) High Intensity District</td></tr>
<tr><td colspan="2">Tools
Regulations sentenced in the zoning ordinance
Regulate
(1) functions; (2) ground floor uses; (3) density;
(4) setbacks; (5) building height; (6) number of parking lots</td></tr>
</table>

Source: City of Tempe, 2022; City of Phoenix 2022a

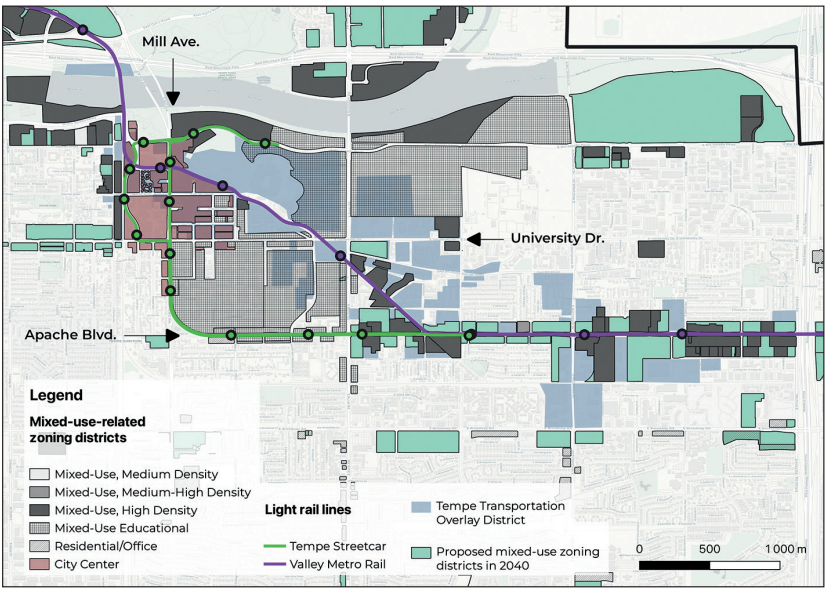

Fig. 1 Zoning districts, and other elements of the urban fabric-related mixed-use developments in downtown Tempe

Source: Own editing according to the data sets of City of Tempe, 2020; 2023a; b; Howard, 2021

The Valley Metro Rail, as well as Tempe Streetcar, represent the main public transport lines of Tempe, in addition to the city bus lines. Valley Metro Rail opened in 2008 and operates in an east-west direction between Phoenix and Mesa connected through Tempe. The Tempe Streetcar was opened in 2022, and circulates in Tempe Downtown, with a more restrained number of passengers compared to Valley Metro Rail. It can be stated that existing mixed-use developments, as well as the Transportation Overlay District, and main transportation lines, are followed by each other. For the future, proposed mixed-use developments until 2040 are also mapped, which also follow the already laid strategic and regulative paths. As Downtown Tempe is already exciting, being the heart of local business and nightlife, the current processes show the increasing role of Apache Boulevard in studentification and gentrification, which are supported by the aspirations of vibrant mixed-use developments and public transport services (Fig. 2). Although, achieving related goals could be made difficult by the relatively fragmented light rail stations and lower densities.

As mentioned above, Walkable Urban Code of Phoenix, which regulates the mixed-use development districts in the city, can be implemented solely in TOD districts. However, TOD districts continue towards the southern and eastern directions from Downtown, and mixed-use development lots are zoned in the northern and western TOD districts so far (Fig. 3).

Fig. 2 Mixed-use developments in Tempe.
(1) Medium-rise apartments with a supermarket on the ground floor in Downtown Tempe; (2) Mixed-use building in Downtown Tempe; (3) ASU student dorm on Apache Boulevard; (4) Medium-rise apartment with services on the ground floor on Apache Boulevard
Source: Own photographs

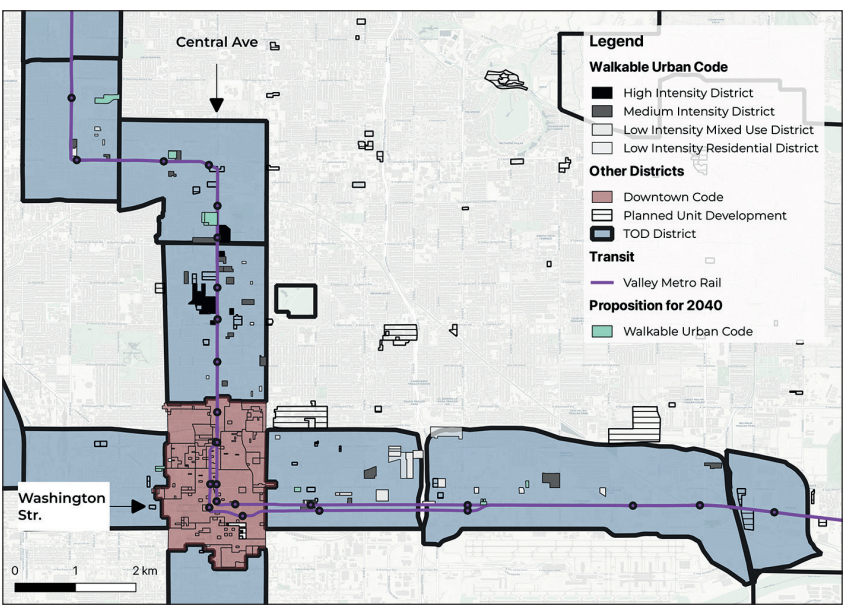

Fig. 3 Zoning districts and other elements of the urban fabric-related mixed-use developments in Downtown Phoenix
Source: Own editing according to the datasets of City of Phoenix, 2022b; c; d; Howard, 2021

Fig. 4 Mixed-use developments in Phoenix.
(1;2;3) Pubs in Downtown Phoenix, Roosevelt Street; (4) Empty lot zoned for mixed use on East Washington Street near a Valley Metro Rail station.
Source: Own photographs

Still, the developments in these districts are lagging due to the scarcity of light rail stations and low densities. Consequently, a considerable number of mixed-use developments are being implemented on Roosevelt Street in Downtown Phoenix, which local city representatives are the proudest of. However, the popularity of pubs and restaurants in Downtown Phoenix is less competitive than in Downtown Tempe until now (Fig. 4).

Concerns of Environmental Sustainability Attached to Mixed-Use Developments

The planners who participated in the interviews agree that the cities of PMA, including the primate city and Tempe, usually avoid the terms 'environmental sustainability' and 'sustainability' in the sections of General Plans that discuss mixed use developments. In fact, both Tempe and Phoenix have recently updated climate action plans, and the term 'mixed use developments' rarely appears. Although, slightly more emphasis could be observed on public transport, as well as on transit-oriented developments. These are, according to the reviewed plans, intended to reduce auto dependency and pollution. Nevertheless, in general, when

it comes to environmental sustainability, the focus is on heat mitigation and water conservancy; on problems, which may have a more direct impact on residents.

Municipal General Plans are inevitable to 'sell' mixed-use developments and TODs as amenities with the provision of services within walking distance, as well as vibrant and vibrant urban neighborhoods. As some interviewees noted, it may be attributed to the fact that these might be the least debatable merits of mixed-use developments, which reflect the highly controversial nature of these projects in the context of the three pillars of sustainability discussed previously. As a planner commented, 'walkability and vibrance; this is what it does, right?' Consequently, when they hear 'environmental sustainability' a certain extent of the residents suggests the limitation of freedom as its supporters '*want to close them in a 15-minute bubble*'; '*they call them woke, which is kind of odd*' (a planner).

This is supported by the observations made at the community meeting: planners alongside city representatives argue on the side of mixed-use developments with the promise of elevated well-being and vibrant downtowns, not with a reduced environmental impact or stopping climate change. The experiences from the interviews supported the fact that planners must wrap mixed-use developments in these promises to make them popular because environmental sustainability still seems to be out of the spotlight of the average resident. As an interviewee noted '*there are just bigger things going on that people worried about when it comes to mixed-use developments*'. '*I do not think Tempe and other cities do a good job of wrapping it around a solution for sustainability*' (a planner). According to the interviewees, it is not just due to capacity problems of municipalities, but also due to political reasons: City representatives and councilors are usually under pressure from their voters who oppose mixed-use developments or have the concern that sustainability measures are meant to control human rights and freedom: '*Yeah, put more parks in the suburbs, just don't tell them it is good for the environment*' (a planner).

General and Unique Tendencies of Mixed-Use Developments in Phoenix and Tempe

It should be noted that the implementation of mixed-use developments and its pace are primarily driven by residential demand, concerns, and perceptions in Phoenix and Tempe, which ultimately influence the behavior of municipalities and real estate developers. In Downtown Tempe, where mixed-use developments are mature, residential aversion is not considered a major problem at present, as local communities already replaced by young professionals and the students of Arizona State University. Traced in Downtown Phoenix, residential opposition against mixed-use developments arises: by a significant part of the population, gentrification facilitated by downtown mixed-use developments is seen as the destruction of still, long-standing downtown communities; higher densities and

public transport developments are quasi-equaled not just to noise and traffic, but also to the emergence of homeless people, drug addicts, and criminals. Furthermore, NIMBY-ism emerges when the municipality proposes the adjacent development of affordable housing, or when customers from other districts visit local restaurants, which are not adapted to the needs of the local population. Aforementioned are aggravated by funding issues and administrative burdens affecting both municipalities and real estate developers.

It is a commonly accepted statement that the PMA consists of development-friendly cities. This is because land is abundant and relatively cheap; additionally, cities generally seek new residents partially because a significant portion of their budget comes from land sales tax. Also, it shall be highlighted that zoning districts possess relatively flexible zoning codes, which indeed, provide advantages for real estate developers during municipal revision of compliance with design principles. The zoning ordinance seems flexible when rezoning is not needed, especially since in this case, there is little residents can do to impede a project. However, when a proposal cannot be implemented within the framework of the existing zoning district, rezone is needed. As mentioned previously, this is when difficulties start to accumulate. If rezoning is required, real estate developers must go through community meetings, residential hearings, and generally long-lasting consultations with the municipality's review board, which is often strict with their design requirements. To pass the rezoning process successfully, real estate developers must negotiate with residents and make concessions regarding design and functions to get approval, which also applies to the local government. However, mixed-use developments are well promoted in Downtown Phoenix by the municipality, administration, and real estate developers will continue to avoid single-family neighborhoods for political and administrative reasons.

Mixed-use developments are considered a highly controversial topic in Downtown Phoenix, where long-standing communities reside. Although the Municipality of Phoenix represented by councilors have great hope for mixed-use developments in downtown districts, they work relentlessly to persuade the public alongside planners. Consequently, as an interviewee noted, Phoenix is going to be '*the big one*' that is '*pushing hard*'. Furthermore, increasing gentrification processes can facilitate the implementation of mixed-use developments as young urban professionals arrive at PMA and require a vibrant downtown full of services, shops and restaurants, as well as reliable public transport services, placing increasing political pressure on the municipality.

CONCLUSIONS

According to the findings of the existing literature (Gyourko and Rybczynski, 2000; Bartlett, 2003; Grant and Perrott, 2011; Siemiatycki, 2015; Jackson, 2018; Mualam et al. 2019; Fischel, 2004; Lang and LeFurgy, 2007; Whittemore, 2021; Homsy and Warner, 2015; Boarnet and Crane, 1997; Handy and Clifton, 2001), residential

resistance and lack of demand seem to remain as a main barrier implementing mixed-use development projects; these findings also reflect the controversial and obscure nature of mixed-use and transit oriented projects regarding the three pillars of sustainability. Consequently, the perceptions, fear, and controversial assessments of residents toward mixed-use developments make sustainability concerns so irrelevant that even strategic or environmental plans do not address mixed-use developments in the context of environmental sustainability. In line with that, planners, real estate developers, and city representatives rarely try to persuade residents with arguments that highlight mixed-use developments may decrease environmental impact, contributing to the fight against climate change. Consequently, mixed-use developments are 'sold' as an amenity for an elevated, modern, more interesting lifestyle regardless of whether municipalities and planners might have underlying motivations to act against climate change with the promotion of mixed-use developments. Slightly in contrast to the results of Grant and Perrot (2011), avoiding the term 'sustainability' appears to be the right strategy to convince doubting residents as significant public skepticism about climate change can still be observed. Among these residents, any measure, act or practice done for the sake of environmental sustainability is considered as the infringement of individual freedom, perceptions which are also highlighted by Capstick et al. (2015) and some aspects were mentioned in the theoretical framework of the 'conservative white male effect' by McCright and Dunlap (2013).

Nevertheless, the fact that mixed-use developments are not attached to sustainability concerns does not mean they will not materialize. Single-family neighborhoods seem to remain as no-go zones for mixed-use developments due to political reasons and significant residential opposition. However, planners of the PMA are becoming more optimistic, as Phoenix and Tempe municipalities have already started to encourage mixed-use developments in their downtown areas, although Phoenix is only at the beginning of this process. The promotion of mixed-use developments as amenities seems to work that is reinforced by the fact that PMA continues to face a heavy population influx, including young urban professionals who require vibrant downtowns and reliable public transport services. Nonetheless, gentrification is likely to stimulate mixed-use developments and may reinforce public tension, especially in the Phoenix downtown areas. Additionally, it is important to remark on external policy influences, of which the most notable is the Arizona State Groundwater Management Act of 1980, under which legislation residential developers are required to demonstrate that homeowners will have access to water in the next hundred years within the boundaries of designated Active Management Areas (Megdal, 2012).

As for the future, PMA will continue to face a significant population influx that may stimulate the implementation of mixed-use developments in the future. Although it contributes to gentrification and increased density, crowd and

traffic. Since Downtown Tempe is already highly gentrified, this process is likely to exacerbate social tensions especially in Phoenix, where local communities with strong ties still reside.

The organically developed inner cities of historic European cities are relatively more conducive to improve walkability and vibrance than in the so-called auto-dependent cities of United States (Mocák et al. 2022). However, the change and recreation of intra-urban structures in order to fulfill such aspirations, could be problematic also in Europe. Specifically, some districts of inner-city cores shall be reconstructed and rehabilitated before making them viable (Kocsis, 2015b; Mocák et al. 2022). Additionally, one of the most prominent spatial consequences of post-socialist transition for cities in CEE countries were the decline of industrial areas, which is manifested in the emergence of brownfields in the urban fabric (Kocsis, 2015b). Policymakers and city leaders in Europe are dedicating significant resources to revitalizing brownfield areas with the creation of new local neighborhoods. However, developments are usually lagged by the possible presence residual contamination and by the lack of demand (Squires and Hutchison, 2021).

As in the U.S., the process of making suburbs walkable and vibrant can be lagging in case of CEE cities (Mocák et al. 2022), which highlights the problematic nature of recreate both social and physical realm of neighborhoods. Consequently, it is important to note that, as in the case of downtown Phoenix, the replacement of population in the suburbs of Budapest or Wroclaw causing many issues. This often culminates in conflicts between "indigenous" and "newcomer" residents over matters of governance, community development, identity, or varying service requirements (Kajdanek, 2014; Kocsis, 2015a; Kocsis, 2015b; Kocsis, 2023).

Nevertheless, strategies for creating, or recreating and restructuring intra-urban structures discussed in CEE context, could be adapted in the cities of the United States. Klimovský et al. (2016) are emphasizing the role of external assistance and broad involvement of stakeholders in order to solve internal social conflicts or problems. Additionally, smart city elements could have important role in making districts walkable, vibrant and viable, noted by Neumannová (2022). Consequently, smart city developments could build upon high quality local knowledge provided by Arizona State University.

Matlovičová et al. (2016) highlights the importance of place marketing as a vital element of urban planning, contributed by the wide cooperation of public and private sector. Related efforts shall be supported by the adequate provision of privacy, and information towards residents, highlighting the potential benefits. Specifically, as discussed earlier, in Phoenix, municipalities in cooperation with planners and real estate developers tend to use the same strategy for making mixed-use developments popular, which is often manifesting during public hearings.

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