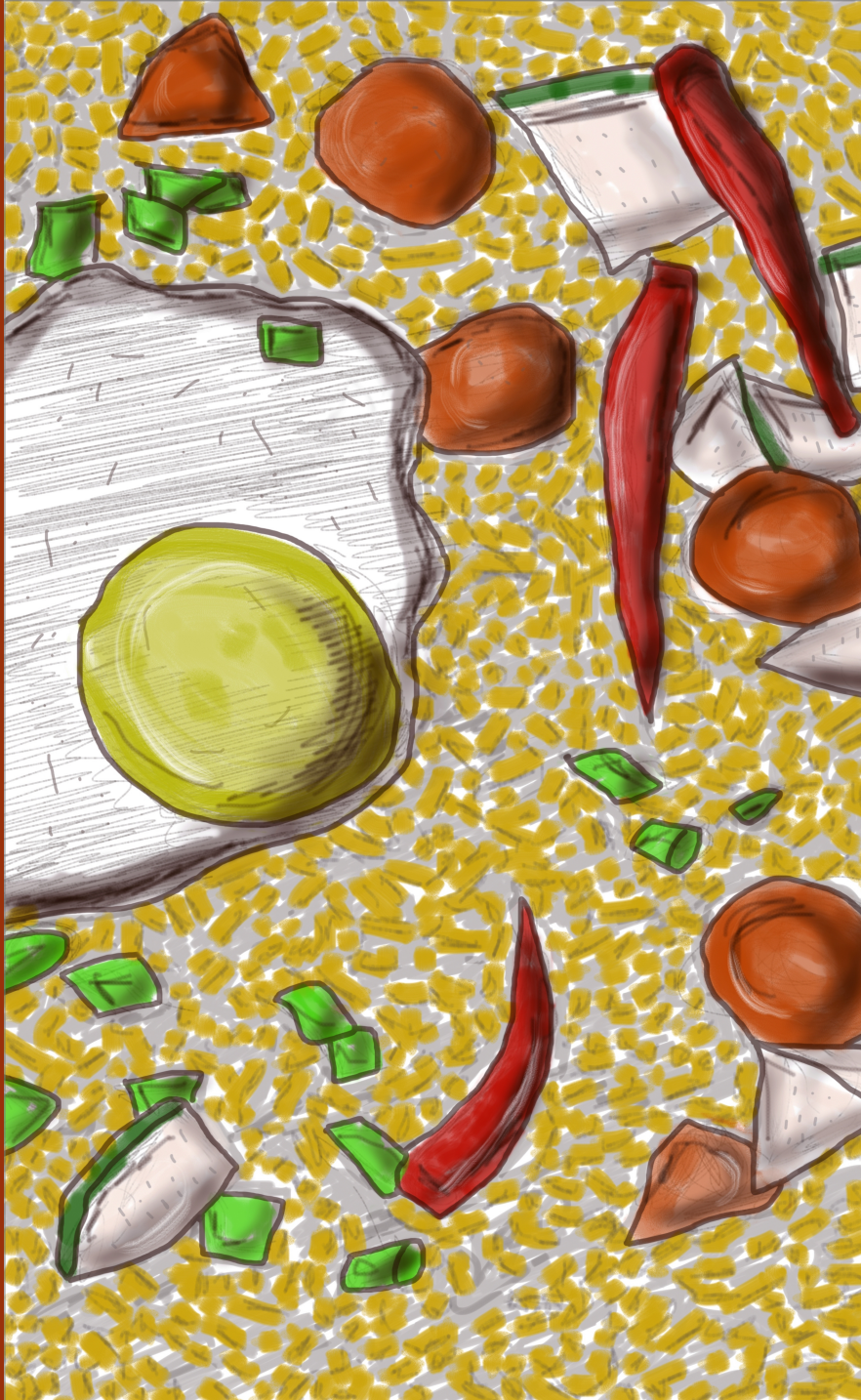


spatium

urban and

spatial planning, architecture, housing, building, geodesia, environment

June 2024 51



SCOPE AND AIMS

The review is concerned with a multi-disciplinary approach to spatial, regional and urban planning and architecture, as well as with various aspects of land use, including housing, environment and related themes and topics. It attempts to contribute to better theoretical understanding of a new spatial development processes and to improve the practice in the field.

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Printed in Serbia by

"PLANETA PRINT", Belgrade, Serbia

Number of copies: 200

Spatium is published half-yearly.

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EDITORIAL

Dear readers,

The international outreach of *Spatium* steadily grows over the years. This fact brings us a 'silent reward' while monitoring whether we've been on the right track with *Spatium* or not. When we were preparing this issue (No. 51), it came as a surprise that quite a few papers originated from Indonesia, but that their authors were not all from the same institution. This said, the statistics can confirm that out of 7 papers from issue No. 51, three refer to various studies related to the creative economy, sustainable tourism practice and the morphological dynamics of different cities in Indonesia. They are accompanied by an analysis of a conceptual framework of integrating urban identity into planning theory and practice and planning for disaster-prone cities. The internationalisation of *Spatium* is confirmed by the opening article from South Africa, which relates to decline in the usage of both public parks and sidewalks in a city suburb. Also, we are glad to support academics who publish articles which are the result of their PhD work, especially if they bring to the spotlight some key topics relating to the Serbian (and international) urban planning community! With that in view, this issue of *Spatium* covers the topic of the Belgrade Fair complex spatial and developmental paradigm.

Every four years, a new Editorial Board of *Spatium* is elected. Since 2024 is the beginning of its new mandate, it is now the proper time to thank to all the past members, who will eventually remain our associates as potential reviewers, but most of all it is the time to welcome all the new members of the Editorial Board of *Spatium* while wishing us all successful and productive work in the years to come.

Jasna Petrić
Editor-in-Chief

PEDESTRIAN CONNECTIVITY: A FOCUS ON RESIDENTIAL NEIGHBOURHOOD SIDEWALKS TO PROMOTE ACCESSIBILITY TO PUBLIC PARKS

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Public parks play a pivotal role in improving community life in residential neighbourhoods, with many individuals integrating a daily walk to a park near their home as part of their routine. A crucial element of the pedestrian infrastructure that promotes walkability is the use of sidewalks. However, a decline in the usage of both public parks and sidewalks has been reported in residential areas of South Africa due to the challenges discussed in this paper. Studies suggest that ample pedestrian pathways leading to public parks may enhance park usage. This study aims to analyse the functionality of sidewalks in a suburb in Bloemfontein city in South Africa as non-motorised transportation routes and to propose design guidelines for improvement to promote access to public parks in the suburb. The study employs the Conjoint analysis technique to identify factors deterring pedestrians from using sidewalks, thus hindering access to public parks. The results emphasise that the physical layout, and the perceived and actual safety of pedestrians are the primary factors impacting sidewalk usage. For instance, pedestrians frequently opt for roadways over sidewalks despite potential risks, mainly due to insufficient pedestrian-friendly infrastructure. The findings suggest that infrastructure upgrades, connected sidewalks and parks, safety measures, inclusive design, community awareness programs, and periodic reviews of pedestrian needs can lead to cities that promote active lifestyles and become more inclusive, sustainable, and conducive to holistic well-being. Furthermore, this study demonstrates that the Conjoint analysis technique is a powerful tool in urban planning, providing valuable insights into pedestrian preferences and their implications for infrastructure improvement decisions.

Key words: public parks, residential neighbourhood sidewalks, pedestrian connectivity, accessibility, urban planning.

INTRODUCTION

It is common knowledge that urban green spaces provide city dwellers with many physical and mental health benefits. Therefore, it is no surprise that green spaces are often included in spatial planning ideologies (LeGates *et al.*, 2020). For instance, Olmsted advocated for landscape gardening to improve the city's well-being and the health conditions, whereas Howard's garden city specified a specific amount of green space surrounding the city to promote social and community benefits (LeGates *et al.*, 2020). Beyond these

ideologies, research promotes access to green urban parks in local neighbourhoods within walking distance to promote mental health (Wood *et al.*, 2017). Furthermore, access to an expansive park network not only promotes the health and well-being of people but also their quality of life (Albers *et al.*, 2010; Larson *et al.*, 2016). Wilson and Xiao (2023) further demonstrate that urban parks improve population health and well-being and serve as a cost-saving mechanism for the medical system. Urban parks also provide spaces for social interactions, community events (e.g. 2024 national elections in South Africa), and recreational activities to promote social cohesion (Parker, 2018). Furthermore, parks contribute to placemaking in cities, which enhances the urban quality of life and promotes investment, job creation and leisure

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activities to transform public spaces into user-friendly and sustainable urban environments (Lastochkina, 2021).

The numerous benefits of urban parks (referred to as public parks in this paper) can only be fully realised through thoughtful urban planning that prioritises the development of accessibility to these places (Giles-Corti *et al.*, 2005). Sidewalks serve as mobility pathways for pedestrian traffic to increasing connectivity and promoting walking (National Association of City Transportation Officials, 2024). Therefore, pedestrian infrastructure in urban planning is critical to enhance public park accessibility (Krambeck, 2006). The vitality of public parks and open spaces is intrinsically linked to their accessibility, which is largely determined by pedestrian infrastructure such as sidewalks, adequate lighting, and well-maintained access roads (Das and Honiball, 2016). Paraskevopoulos *et al.* (2020) note that walkability features such as adequate sidewalks and pedestrian infrastructure enhance the connectivity of the area, whereas, Bartzokas-Tsiompras *et al.* (2021) highlight the lack of inclusivity of such features for people in wheelchairs. This underscores the potential of well-conceived pedestrian spaces to foster urban vibrancy and social engagement (Tong and Bode, 2022), since they are not merely a space for movement but also social space (Mehta, 2007). Despite general agreement on the importance of walkability, Gehl (2020) identifies a research gap in understanding the adaptation and perception of pedestrian infrastructures across different urban cultures and settings. Montgomery (2013) highlights the unique challenge faced by developing nations in balancing pedestrian-friendly urban development with rapid urbanisation, a challenge that is particularly pronounced in the South African context, due to its distinctive socio-political history and urban dynamics (Albers *et al.*, 2010). Central to this discussion is the concept that seamless and unobstructed pedestrian access to public parks promotes the associated benefits of these spaces, which align with the change in the perception of spatial planning to focus on sustainable, inclusive and liveable cities (Todes, 2011). Moreover, public parks were chosen because they significantly enhance community life by providing spaces for recreation, exercise, and social interaction, directly impacting public health and well-being. They are widely used and accessible, making them ideal for studying pedestrian connectivity and infrastructure effectiveness in urban planning (Sugiyama *et al.*, 2018). Effective pedestrian infrastructure is crucial for enhancing the connectivity and accessibility of pedestrian pathways and routes.

The proximity of pedestrian pathways or routes from residences to parks plays a pivotal role in park usage, which emphasises the necessity for uncomplicated access that considers the mobility needs of all urban residents (Sendi and Golicnik Marusic, 2012). Furthermore, inadequate pedestrian pathways can not only hinder access to public parks but also compromise the efficiency and quality of the broader transport network (Khanyile and Fatti, 2022). The nuances of pedestrian behaviour in South Africa, characterised by prevalent jaywalking and roadway walking (Bryśiewicz, 2001), signal a deeper issue with urban infrastructure that remains insufficiently explored. These behaviours indicate a potential disconnect between existing

pedestrian facilities and the needs or safety perceptions of the residents. Todes *et al.* (2010) affirm walking as a primary mode of transportation across South Africa, not just in business districts but extending into residential areas as well. Yet, pedestrian safety issues, including hazardous practices and the obstruction of sidewalks by vegetation and debris, persist (Dempsey, 2012; Bryśiewicz, 2001).

Beyond mere access, a pedestrian-friendly environment contributes to broader societal benefits including elevated property values, reduced environmental pollution, and enhanced social cohesion (Uysal *et al.*, 2016). This is particularly relevant for developing countries like South Africa, where improving walkability could yield substantial social and economic dividends to promote the economic growth of the country (Pretorius, 2018). The perceived and actual safety of pedestrians significantly influences their willingness to use sidewalks for transportation (Jacobs, 2020), suggesting that subpar pedestrian infrastructure and safety concerns may deter residents from accessing public parks on foot (Mendzina and Vugule, 2020). This study aims to delve into the intersection of the built environment and safety perceptions, exploring how they impact pedestrian decisions at a neighbourhood level in South African cities, with Bloemfontein serving as a case study. This detailed examination seeks to contribute to the broader discourse on urban planning and pedestrian infrastructure by addressing the identified gaps in research and highlighting the importance of inclusive, safe, and accessible pedestrian networks for enhancing urban liveability and park accessibility.

This study investigates the role of residential neighbourhood sidewalks in promoting pedestrian connectivity to public parks in a residential neighbourhood in the city of Bloemfontein in South Africa. The following sections are dedicated to describing the area of the study, and a detailed discussion on the methodology employed to collect, identify the attributes, and construct the conjoint profiles.

STUDY AREA

For this paper, out of the 35 neighbourhoods in the city of Bloemfontein in South Africa, Universitas was chosen as a representative example. The neighbourhood is distinguished by its varied trip-generating destinations and status as the city's largest neighbourhood, with many pedestrians bypassing sidewalks. Universitas aptly embodies other neighbourhoods in Bloemfontein and has student residences and guesthouses scattered among the 2,000 full-title houses (Realnet Properties, 2024). Universitas is located on the south-western side of Bloemfontein; it spans an area of 9.66 km² with a population of 9,076 (Stats SA, 2011). The suburb includes major sub-arterial roads connecting neighbouring areas and the business district, serving as an essential passage for both motorists and pedestrians. Universitas' residents primarily inhabit stand-alone houses, apartments, and townhouses. The neighbourhood houses the University of the Free State with 37,000 students, and the increasing student population has significantly augmented resident numbers in recent years, with many houses being transformed into student accommodation. Besides students, the overall income level in Universitas varies from medium



Figure 1. Map of South Africa pinning the location of the city of Bloemfontein and the neighbourhood of Universitas
(Source: Adapted from Google maps, 2024)

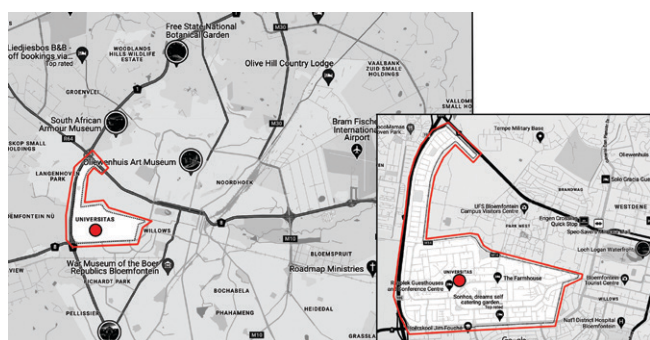


Figure 2. Close-up map of the city of Bloemfontein pinning the location of the neighbourhood of Universitas
(Source: Adapted from Google maps, 2024)

to high (Figures 1 and 2 for the geographical context of the study).

As seen in Figure 3, the neighbourhood includes two primary schools (Universitas primary school and Grey college primary) and three secondary schools (i.e. Grey college secondary school, Eunice secondary school and Dr. Bohmer secondary school). Additional trip-generating destinations such as two retirement villages, a hospital five churches and two shopping centres make Universitas rich in pedestrian activity. Although the residential area of the suburb is only indicated by a red outline in Figure 2, the University of the Free State and the school's zone in the grey areas in Figure 3 are included in the overall area of the neighbourhood. The variety of land uses in this neighbourhood, as well as the surrounding amenities such as the Loch Logan waterfront, Mimosa mall, Temple military base and the residential area of Langenhoven park to the west of the suburb also generate increased thoroughfare traffic through the area.

There are a significant number of public parks within South African cities' residential zones. There are about 202 public parks in Bloemfontein that cover an area of 167 km², which averages 1.2 public parks per square kilometre (Honiball, 2016). Of these public parks, thirteen are located in the suburb of Universitas (Figure 3). Despite most residential areas in Bloemfontein being within a walkable distance to public parks, with Universitas being no exception, we observed their usage is surprisingly low, often seeing deserted and neglected parks (Figure 4) (Honiball, 2016). McConnachie and Shackleton (2010) explain this phenomenon by pointing out a decline in the quality and maintenance of public green spaces and inadequate provisioning. This situation is attributed partly

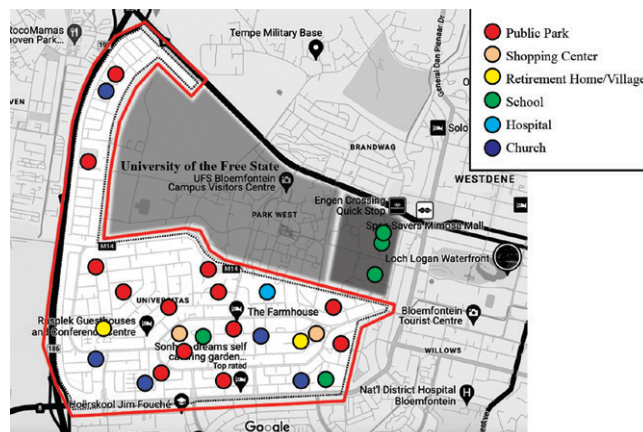


Figure 3. Mixed land use of the residential neighbourhood of Universitas
(Source: Adapted from Google maps, 2024)



Figure 4. Public parks in Universitas at 1) Wynand Mouton Drive, 2) Kwarts Street, 3) Francois Retief Street and 4) Wynand Mouton Drive
(Source: Google Maps, 2022)

to historical legacy issues and partly to municipal budget and resource limitations.

Universitas exemplifies the common problem of pedestrians opting for roadways over sidewalks. The authors' personal experience, field observations, and photo documentation of the neighbourhood show that pedestrians interrupt regular motorised traffic flow despite sidewalks being available, but not necessarily suitably pedestrian-friendly (Figure 5). Universitas is an ideal study area, due to its high representation of mixed land use, which includes residential homes, student accommodation, schools, and shopping centres. This diverse land use results in significant pedestrian activity, making it a representative example for examining the challenges of walkability and the common issue of pedestrians opting for roadways over sidewalks due to various obstructions (Görgün and Cubukcu, 2022). Mixed land use encompasses a variety of functional land uses, such as residential, commercial, industrial, institutional, and mobility-related purposes (Almansoub *et al.*, 2022). Roads leading to public parks in the area are lined with sidewalks. However, impediments affecting walkability pose a significant issue. Pedestrians ideally should utilise sidewalks instead of roads designated for vehicles, but various obstructions frequently push pedestrians onto the roadways. The average sidewalk width and road lane width were measured using GIS software. All road lane widths (between 3.6 m and 4.8 m) were deemed adequate for bidirectional vehicular movement, albeit hazardous

when shared with pedestrians. The widths of the sidewalks in the service areas are also suitable (ranging between 3.0 m and 3.5 m) for pedestrian use, provided they are clear of obstructions. Figure 6 depicts pedestrian-unfriendly sidewalks in the study area. Key observable features in these photographs include:

- A varying state of maintenance, from acceptable to poor;
- Gardens infringing on a portion or the entirety of the sidewalk; and
- Multiple obstacles affecting pedestrian visibility and sight distance, impacting both actual safety and perceptions of safety.

Observations carried out by the authors and their research assistants also identified a range of obstructions, including trees, signboards, street lighting posts, refuse bins, garden decorations, informal stalls and electrical junction boxes, which narrow the sidewalks, affecting their walkability.



Figure 5. Pedestrians interrupting regular motorised traffic flow at 1) Weitz Street, 2) Boersma Street, 3) President Paul Kruger Avenue and 4) Wekkie Saayman Street to avoid pedestrian-unfriendly sidewalks (Google Maps, 2022)



Figure 6. Pedestrian-unfriendly sidewalks in the study area at 1) President Paul Kruger Avenue, 2) Francois Retief Street, 3) President Paul Kruger Avenue and 4) DF Malherbe Avenue (Source: Google Maps, 2022)

METHODOLOGY

Every public park in the study area was pinpointed as a trip-generating destination. A thorough physical survey was undertaken to measure all sidewalk networks and evaluate their general maintenance condition. The service area of a public park was established by measuring the walking distance from residential homes to the park using

Geographic Information System (GIS) software. Typically, this was defined as a radius that can be covered within a 10 to 15-minute walk, ensuring that the park is accessible to the majority of residents within this proximity. The length of the pedestrian sidewalk network within each service area of the study area was also calculated using GIS software. The measured service area was the total length of continuous sidewalk on a stretch of road. This measurement was key in comparing the condition of the road network with that of the sidewalk network.

An approximation of the average time a pedestrian takes to reach a public park was calculated by determining the average travel distance from homes to the parks and then employing the standard walking speed for computation in Universitas. The average distance was measured by GIS taking into consideration the actual distance and shortest paths a pedestrian could take in the area. It was deduced that most inhabitants do not exceed 13 minutes in their commute from their houses to neighbourhood parks, with the shortest travel time being roughly 4 minutes. However, most of the travel times to public parks hover between 6 and 9 minutes.

Following the initial data collection phase, a household survey was conducted in residential zones across the city to further enrich the study's dataset. This survey employed a meticulously pre-tested questionnaire to ensure clarity and relevance of the questions posed. Systematic random sampling was chosen as the strategy to select participants, resulting in a total of 319 respondents. Of these, 284 responses from residents in the study areas were deemed usable and were subsequently included in the analysis. The data gathered from these surveys were processed and analysed utilising the SPSS software, specifically leveraging its Conjoint analysis capabilities. This sophisticated statistical technique enabled a deep dive into the preferences of pedestrians concerning various sidewalk attributes.

Figure 7 provides a comprehensive diagram depicting the methodology and structure used in the study. This diagram outlines the key steps, including data collection, Conjoint analysis, evaluation of sidewalk attributes, and policy recommendations, offering a clear visual representation of the research process and its systematic approach.

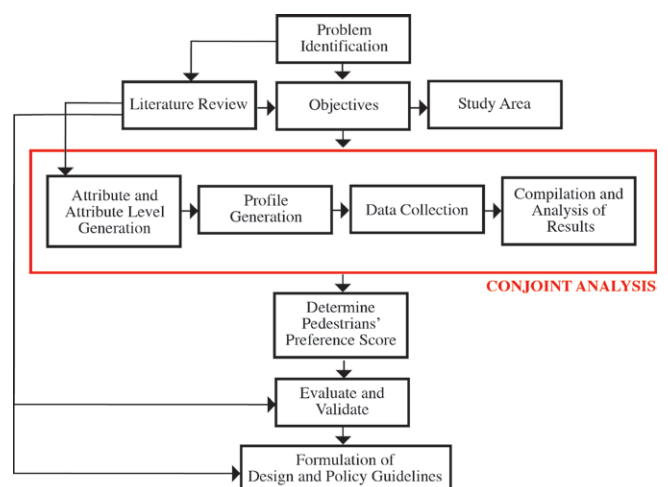


Figure 7. Diagram depicting methodology used in this study (Source: Authors, 2024)

Conjoint analysis technique

Utilising the Conjoint analysis technique provided insightful revelations about pedestrian preferences and helped in the meticulous crafting of Conjoint profiles. These profiles are essential for understanding the relative importance of different sidewalk attributes from a pedestrian's perspective, including aspects such as safety, maintenance, and the presence of obstacles. By analysing the trade-offs that pedestrians are willing to make among these attributes, the study offers valuable insights into how urban sidewalks can be optimised to enhance pedestrian satisfaction and safety. This approach not only underpins the study's empirical findings but also contributes significantly to the body of knowledge on urban planning and the development of pedestrian-friendly infrastructure.

This multivariate technique, initially developed for market research, aims to understand individual preferences (Green and Srinivasan, 1978). The Conjoint analysis technique operates based on the assumption that a person will weigh various attributes of a specific product before making a final decision.

In this research, pedestrian behaviour concerning sidewalk attributes was examined, supplying the inputs for the Conjoint analysis technique application. A recent study by Wicramasinghe and Dissanayake (2017), in which they used the Conjoint analysis technique as an unbiased method for assessing the attributes leading pedestrians to avoid sidewalks, served as a reference. This method was employed to assess sidewalk networks in residential areas, as opposed to central business districts.

The part-worth utility index was used to compute the Total utility value of selected sidewalk locations using equation (1). According to Conjoint analysis theory, a product (in this case, sidewalk profiles leading to public parks) with a higher Total utility value than others is considered more valuable (Green and Srinivasan, 1978).

$$\text{Total Utility Value } U(X_{ij}) = \text{Constant} + \sum_{i=1}^m \sum_{j=1}^{k_i} u_{ij} X_{ij} \quad (1)$$

$U(X_{ij})$ = Total utility of an alternative

m = Number of attributes

k_i = Number of levels in i th attribute

u_{ij} = Utility associated with j th level of the i th attribute

X_{ij} = Dummy variable that takes on the value 1 if the j th level of the i th attribute is present, otherwise it takes the value 0.

Generating sidewalk attributes

In developing the attribute set for the Conjoint analysis of sidewalk characteristics, a rigorous approach was taken to ensure the study's validity and integrity. The selection of attributes crucial for the analysis was guided by a comprehensive strategy that included a thorough literature review and insights gained from initial field surveys around public parks. Among the key attributes identified was the overall maintenance condition of sidewalks, highlighted in the field of urban planning for its significant impact on pedestrian choices (Wicramasinghe and Dissanayake, 2017) and pedestrian safety (Dempsey,

2012; Brysiewicz, 2001). Field observations in the study area also revealed that the presence of obstacles on sidewalks in the study area and the perception of safety among pedestrians are also attributes. The chosen attributes and their levels were designed to reflect a wide range of pedestrian experiences, aiming to cover diverse scenarios encountered by sidewalk users.

The evaluation of factors influencing pedestrian choices in sidewalk usage focused on identifying attributes critical to their preferences and safety perceptions. This process involved an in-depth analysis of existing methodologies and tools to accurately measure the impact of factors such as the state of maintenance, pedestrian safety, and the presence of obstacles on sidewalk accessibility. Special attention was given to the pedestrians' perceived safety, acknowledging its profound effect on sidewalk selection. This comprehensive approach ensures that the analysis accurately reflects the multifaceted nature of pedestrian preferences and the complexities involved in sidewalk utilisation.

Data collection

The data collection for this study was conducted using two principal methodologies: a detailed questionnaire distributed to residents in the targeted area, and a series of observational counts of park users conducted monthly. By combining these approaches with insights from existing research, the study gained a layered perspective on the reasons pedestrians might choose to avoid certain sidewalks. From this multifaceted analysis, four primary attributes emerged as significant: pedestrian safety, the presence of obstacles on sidewalks, the perception of safety among pedestrians, and the general condition of sidewalk maintenance. These attributes were categorised into three distinct levels of impact, as outlined in Table 1, allowing for a nuanced and structured evaluation.

Table 1. Selected sidewalk attributes and their different assigned levels of influence

Sidewalk attribute	Different Levels		
	Level 1	Level 2	Level 3
Pedestrian safety	Safe	Relatively Safe	Unsafe
Number of obstacles on sidewalks	0	1-5	>5
Perception of safety	Perceived safe	Perceived relatively safe	Perceived unsafe
Maintained condition of sidewalks	Good	Acceptable	Bad

This rigorous definition and classification of attributes underpin the study's commitment to producing reliable, unbiased results that can significantly inform urban planning and pedestrian infrastructure improvement efforts. By ensuring the comprehensiveness and clarity of each attribute, the research aims to contribute meaningful insights into how neighbourhood sidewalks can promote accessibility to public parks in a suburb of Bloemfontein in South Africa.

DATA ANALYSIS, INTERPRETATION AND FINDINGS

In the application of the Conjoint analysis technique, selected attributes must be combined into sets of hypothetical profiles. A total of 81 ($3 \times 3 \times 3 = 81$) attribute combinations are possible. However, these combinations can be reduced to a more manageable nine profiles through a statistical method known as orthogonal fractional design. This method is essential, since the Conjoint analysis technique employs a ranking response technique, which could become overly demanding for respondents if they were asked to rank 81 profiles rather than a simpler set of nine.

The orthogonal fractional design is a method used to diminish the number of profile configurations, while ensuring all attributes are represented equally and without correlation. This design was implemented using the

Table 2. Nine hypothetical profiles generated using orthogonal fractional design

Card	Pedestrian safety	Number of obstacles on sidewalks	Perception of safety	Maintained condition of sidewalks
1	Unsafe	1 - 5 obstacles	Perceived unsafe	Good
2	Unsafe	> 5 obstacles	Perceived safe	Acceptable
3	Relatively safe	No obstacles	Perceived unsafe	Acceptable
4	Relatively safe	> 5 obstacles	Perceived relatively safe	Good
5	Relatively safe	1 - 5 obstacles	Perceived safe	Bad
6	Safe	> 5 obstacles	Perceived unsafe	Bad
7	Safe	No obstacles	Perceived safe	Good
8	Unsafe	No obstacles	Perceived relatively safe	Bad
9	Safe	1 - 5 obstacles	Perceived relatively safe	Acceptable

Statistical Package for the Social Sciences (SPSS) software. Table 2 depicts the nine profiles generated by applying the orthogonal fractional design to the attribute profiles.

Each hypothetical profile was subsequently rendered into illustrative form for the respondents to rank. Great care was taken to maintain uniformity across each profile to minimise the impact of any factors beyond the attributes being evaluated. Once the nine representative profiles were illustrated, they were included in a portion of the questionnaire for respondents to rank from 1 (most preferred) to 9 (least preferred).

In conducting the Conjoint Analysis, a model that anticipates the relationship between attributes and ranking scores is required. For this analysis, a discrete relationship is assumed between factors and ranking scores. As depicted in Figure 8, a discrete model suggests that the attribute levels are categorical, with no assumption made regarding the relationship between the attributes and the ranks.

The Conjoint Analysis yields the relative importance of each attribute. Each attribute is assigned an importance value, indicating its significance relative to other attributes. The importance of an attribute is derived from the degree of difference that each attribute contributes to the total utility of a given profile. The utility values of the attributes arise from the range of level differences among the attributes. The Importance Level depends on the specific attribute levels chosen for the evaluation. For instance, the wider the range, the more significant the attribute. The importance measures are ratio-scaled, relative, and study-specific. Therefore, an attribute with an importance of 40% is twice as important as an attribute with an importance of 20%. Figure 8 illustrates how the importance of an attribute is determined.

The evaluation of the chosen attributes revealed that pedestrian safety has the highest importance value of 51.5%. The number of obstacles followed with an importance value of 33.5%. perception of safety achieved an importance value of 9.8%, while the maintained condition of sidewalks scored a 5.2% value of importance.

When it comes to the use of sidewalks leading to public parks, pedestrian safety was found to be the most critical

Attribute	Level	Part-worth utility	Attribute utility range	Attribute importance
1	A	Min	} Max-Min=Range 1	(Range/Utility Range) x 100 = Importance of 1
	B	Max		
	C	Mid		
2	A	Min	} Max-Min=Range 2	(Range/Utility Range) x 100 = Importance of 2
	B	Max		
	C	Mid		
3	A	Min	} Max-Min=Range 3	(Range/Utility Range) x 100 = Importance of 3
	B	Max		
	C	Mid		
Utility Range Total Range 1 + Range 2 + Range 3 = Utility Range				

Figure 8. Determination of attribute importance
(Source: Green and Srinivasan, 1978)

attribute. The second most important attribute was the number of obstacles on the sidewalks. The perception of safety was seen to be five times less significant than actual pedestrian safety, possibly due to residents' familiarity with their residential area. The maintained condition of the sidewalks turned out to be the least significant attribute.

However, the interpretation of part-worth utilities hinges on a clear understanding of the importance of each attribute. Part-worth utilities allow for a deeper understanding of the specific features within an attribute that influence a respondent's choice. They are numerical values assigned to each attribute level, reflecting the degree to which each attribute and level influenced the respondents' decisions. Preferred attribute levels receive higher scores, while less preferred ones receive lower scores. Nonetheless, it is vital to note that these part-worth values are relative. A negative utility value for an attribute level does not imply that the attribute level was undesirable. In fact, an attribute level with a negative value could have been accepted by all respondents. However, other things being equal, a more positive value is preferable.

Part-worth utilities in the Conjoint analysis technique are scaled to an arbitrary additive constant within each attribute and are interval data. Thus, utilities are scaled to sum to zero within each attribute. The results for the relative and individual part-worth utilities are summarised in Table 3.

Table 3. Conjoint analysis results: Part-worth utilities

Part-worth utilities		
Attributes	Attribute levels	Utility estimate
Pedestrian safety	Safe	1.400
	Relatively safe	-.008
	Unsafe	-1.352
Number of obstacles	No obstacles	1.204
	1 - 5 obstacles	-.434
	> 5 obstacles	-.780
Perception of safety	Perceived safe	-.200
	Perceived relatively safe	.345
	Perceived unsafe	-.165
Maintained condition	Good	.132
	Acceptable	-.123
	Bad	-.014
(Constant)		5.000

What is noticeable in Table 3 is the range of pedestrian safety. Sidewalks that are considered safe are much more preferred than sidewalks perceived as unsafe. This underscores the importance of this attribute, as mentioned before. Another observation is that the pedestrian safety attribute levels appear to have a logical and relative linear relationship. The number of obstacles on the sidewalk is the attribute with the second-highest importance. The attribute levels show a logical increase in importance, with more than five obstacles

being the least important, followed by one to five obstacles, and then no obstacles. In relation to the other attributes and their attribute levels, having no obstacles was found to be the second most important attribute level.

The results regarding the perception of safety may seem initially counterintuitive, with the "relatively safe" perception of safety receiving a higher preference score than the "safe" perception. Interestingly, the "unsafe" perception of safety also has a marginally higher value than the "safe" perception. The main reason for this can be traced back to the nature of the conjoint-generated profiles. These profiles are designed to represent all attribute levels equally and uncorrelated, leading to combinations of attribute levels that compel the respondent to prioritise the most preferred attributes, even at the expense of others deemed less important.

Similarly, a poorly maintained sidewalk has a lower preference score than a sidewalk in an acceptable state of maintenance. This too can be attributed to the combinations of attributes in the conjoint-generated profiles, as discussed earlier. The part-worth utilities for the maintenance conditions of the sidewalks leading to public parks are very low, therefore contributing little to the calculation of Total utility values (TUV).

Moreover, after assigning appropriate attribute levels at each location, the Total utility value of all eleven locations was calculated (Table 5). Table 4 provides an example of how the Total utility value is calculated at location 8.

The disparity between the TUV of different sidewalk locations highlights the significant role of safety and condition in pedestrian preference. Locations with higher TUV, indicating higher overall utility for pedestrians, possess key attributes such as safety, the absence of obstructions, and good maintenance, which are deemed most desirable by pedestrians. Conversely, those locations with lower TUV have unfavourable attributes, particularly pertaining to safety, making them less attractive to potential users.

By comparing the TUV with the actual usage data of each public park, policymakers can determine whether sidewalks' attributes align with their usage. If a park with high actual usage has a sidewalk with low TUV, this could indicate a pressing need for improvements to the sidewalk's safety, maintenance, and removal of obstructions. Conversely, if a park with low usage has a sidewalk with a high TUV, this might suggest that other factors, not related to the sidewalk, are affecting the park's usage, which warrants further investigation.

The insights from the Conjoint analysis and TUV can guide urban planners and local authorities in decision-making regarding urban infrastructure improvements. By understanding pedestrians' preferences, they can make informed decisions to enhance the sidewalks' conditions leading to public parks, promoting their use and contributing to more walkable streets, with active, and healthy communities.

Table 4. Example of calculating Total utility value at a location

Attribute	Applicable attribute level	Part-worth utility	Sum	Conjoint constant	Total utility value
Pedestrian safety	Safe	1.40	} 2.39	+ 5	= 7.39
Number of obstacles	None	1.20			
Perception of safety	Perceived relatively safe	-0.20			
Maintained condition	Good	-0.01			

Table 5. Attribute levels and Total utility value of each selected location

Location	Pedestrian safety		Number of obstacles		Perception of safety		Maintained condition		Constant	Total utility value
1	Relatively safe	-0.01	> 5	-0.78	Perceived unsafe	-0.16	Acceptable	-0.12	5	3.92
2	Relatively safe	-0.01	1 – 5	-0.43	Perceived unsafe	-0.16	Good	-0.01	5	4.38
3	Safe	1.40	> 5	-0.78	Perceived relatively safe	0.34	Acceptable	-0.12	5	5.84
4	Safe	1.40	1 – 5	-0.43	Perceived safe	-0.18	Acceptable	-0.12	5	5.64
5	Safe	1.40	> 5	-0.78	Perceived unsafe	-0.16	Acceptable	-0.12	5	5.33
6	Relatively safe	-0.01	> 5	-0.78	Perceived relatively safe	0.34	Acceptable	-0.12	5	4.43
7	Unsafe	-1.35	1 – 5	-0.43	30% Perceived relatively safe 70% Perceived unsafe	-0.02	Good	-0.01	5	3.19
8	Safe	1.40	None	1.20	Perceived safe	-0.20	Good	-0.01	5	7.39
9	Unsafe	-1.35	1 – 5	-0.43	Perceived relatively safe	0.34	Good	-0.01	5	3.55
10	Safe	1.40	1 – 5	-0.43	40% Perceived safe 60% Perceived relatively safe	0.13	Good	-0.01	5	6.08
11	Unsafe	-1.35	1 – 5	-0.43	Perceived unsafe	-0.16	Acceptable	-0.12	5	2.93

DISCUSSION

Interpretation of results in relation to existing literature

The findings from the Conjoint analysis provide significant insights into the attributes influencing pedestrian usage of sidewalks in residential neighbourhoods. The study revealed that pedestrian safety is the most critical factor, followed by the number of obstacles on the sidewalks. These findings align with existing literature which emphasises the importance of safety in pedestrian infrastructure. For instance, Das and Honiball (2016) highlight that safety concerns are a major deterrent for pedestrians, which is echoed by Mendzina and Vugule (2020), who state that perceived and actual safety significantly influence pedestrian behaviour.

The second most important attribute identified was the number of obstacles on sidewalks. This supports the findings of Brysiewicz (2001), who pointed out that obstructions such as vegetation, debris, and other obstacles can severely impede pedestrian movement and safety. This study adds to the body of literature by quantifying the impact of these obstacles and demonstrating their relative importance through Conjoint analysis.

Interestingly, the perception of safety was found to be less significant compared to actual safety and the number of obstacles. This result suggests that residents may have

adapted to their environment, relying more on tangible safety measures rather than their perceptions. This finding contrasts with some studies, such as those by Dempsey (2012), which argue that perceived safety is often as important as actual safety. However, the unique context of South African residential neighbourhoods, characterised by distinct socio-political and urban dynamics, may account for this discrepancy.

The least important attribute was the maintained condition of sidewalks, which, while still relevant, was not as critical as the other factors. This finding suggests that while maintenance is important, it is secondary to ensuring safety and removing obstacles. This is in line with studies by Wicramasinghe and Dissanayake (2017), which indicate that maintenance alone cannot significantly improve walkability without addressing safety and obstruction issues.

Policy recommendations

Based on the findings, several policy recommendations can be proposed to enhance pedestrian connectivity to public parks:

- **Infrastructure upgrades:** Prioritise the repair and maintenance of existing sidewalks, ensuring they are free from obstructions such as overgrown vegetation and construction debris. Well-maintained pathways are crucial to encourage walking as a mode of transportation.

- **Enhanced connectivity:** Urban planners should create a network of sidewalks that seamlessly connects residential areas to public parks. This involves identifying and bridging gaps in the current pedestrian network to ensure that residents have direct and uninterrupted pathways to parks and other essential amenities.
- **Safety measures:** Introduce well-lit sidewalks, crosswalks, pedestrian signals, and protective barriers to address safety concerns. Improved visibility during both day and night can significantly enhance the perceived sense of safety for pedestrians.
- **Accessibility for all:** Design sidewalks that cater to people of all ages and abilities. This includes the introduction of ramps for wheelchair users, tactile paving for the visually impaired, and safe crossings for children and older adults.
- **Public awareness:** Launch community awareness campaigns about the benefits of walking, both for health and the environment. Engaging with local communities can also provide insights into specific areas of concern and potential solutions.
- **Regular review:** Conduct periodic reviews using techniques like Conjoint Analysis to monitor and understand changing preferences and challenges faced by pedestrians. This adaptive approach ensures that urban planning remains responsive to the evolving needs of the city's residents.

CONCLUSION

This paper contributes to the growing body of literature highlighting the importance of accessible pedestrian infrastructure that is fit for purpose to improve community life in residential neighbourhoods, foster healthier and more active lifestyles, and create inclusive sustainable urban environments. Accessibility to such urban environments, including public parks, requires a connected pedestrian infrastructure (such as sidewalks) to promote walkability. This paper aimed to analyse the functionality of sidewalks in the residential suburb of Universitas in the city of Bloemfontein in South Africa as non-motorised transportation routes. This phenomenon was investigated using a Conjoint analysis technique which was found to be a powerful tool in urban planning to provide valuable insights into pedestrian preferences in the study area. The research method pinpointed the physical layout, as well as the perceived and actual safety of pedestrians, as the primary factors impacting sidewalk usage in the study area. Furthermore, this paper intended to illuminate factors to enhance the utility and attractiveness of public spaces in residential areas that urban planners and policymakers could consider. The findings suggested that infrastructure upgrades, connected sidewalks and public parks, safety measures, inclusive design, community awareness programmes, and periodic reviews of the needs of pedestrians could lead to cities that promote active lifestyles and become more inclusive, sustainable, and conducive to holistic well-being.

Future studies might consider other factors related to urban planning and infrastructure, such as the standard of public transportation, the presence of cycle lanes, and the proximity of amenities such as shops and schools. These

factors are likely to interact with the quality of sidewalks to shape the travel behaviour of urban residents, and a more comprehensive understanding of these relationships could contribute to more effective urban planning and policymaking. Furthermore, an integrated approach to urban design is essential for cities aiming to be sustainable and inclusive, by exploring how well-run public transportation systems may lessen dependency on personal automobiles, how cycle lanes encourage environmentally friendly transportation, and how the proximity of facilities affects people's mobility.

As with any research, there are limitations that need to be noted. A major limitation is the research scope, which focused on only one suburb in the city of Bloemfontein. This may counter the generalizability of the study's findings to other areas as well as the relevancy of the four primary attributes (pedestrian safety, the presence of obstacles on sidewalks, the perception of safety among pedestrians, and the general condition of sidewalk maintenance) that emerged. Lastly, the research design and methodology adopted in this paper offers a specific stance of investigating the phenomena, which may be enriched with other research approaches such as ethnography, phenomenology or participatory placemaking.

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Received April 2024; accepted in revised form June 2024.

URBAN IDENTITY AND PLANNING: CONCEPTUAL STUDY ON IDENTITY OF URBAN, IDENTITY IN URBAN, AND IDENTITY FOR URBAN

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Urban identity is gaining increasing attention across different research disciplines. However, there is no consensus as to how this concept can be integrated into planning theory, because every discipline has diverse concepts of urban identity, which are often included in planning theory without clarity. For example, environmental psychology literature and the social sciences have defined urban identity as human or social identity, while architecture and urban design characterize it as the urban/city or architectural identity. Therefore, this paper provides a conceptual framework for applying urban identity in planning theory and practice. This paper used the literature review method by synthesizing several relevant and reliable sources, particularly in planning, architecture, environmental psychology, social science, and geography. The result is an explanation of three concepts of urban identity, which are the 'identity of urban,' 'identity in urban,' and 'identity for urban'. The identity of urban helps planners to design functional and characteristic cities. Meanwhile, identity in urban helps planners to achieve the humanist aspect of a city and social justice; and identity for urban helps planners to advance a city's economy and attract investors and tourists. These concepts are interrelated and can be integrated to support the sustainability of cities and their citizens, by achieving harmony between the population's need for orientation and identification, the function and aesthetics of the city, and the city's attractiveness to visitors.

Key words: city branding, human identity, place identity, planning, urban identity.

INTRODUCTION

Studies have increasingly focused on urban identity in planning literature, along with the awareness of non-homogenizing cities in the wake of modernization and globalization. However, this concept remains unclear in planning literature (Bernardo *et al.*, 2016; Cheshmehzangi, 2020; Nientied, 2018). The concept of urban identity is relatively diverse, and often requires further clarification. For example, environmental psychology literature and the

social sciences have defined this concept as human or social identity, while architecture and urban design characterize it as the urban/city or architectural identity.

Accordingly, Lalli (1992) elucidated four theoretical traditions related to place and urban identity. The first provides a cognitive perspective, which is categorized into two representations: environmental orientation and meaning. Lynch's environmental orientation titled "The Image of the City" examined how humans recognize the urban environment by relying on cognitive maps. Meanwhile, the representation of meaning is traceable through Boulding's (1961) work, which evaluated environmental aspects of the city. The second covers the phenomenological perspective,

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which highlights the human experience of a place (Relph, 1976; Tuan, 1980). The third is the self-concept theory, which places identity as part of the self-concept and equates it with gender and ethnic identities (Proshansky *et al.*, 2014). The fourth is sociological influence, which examines the aspects of human social identity regarding existence in a place. This concept was developed in urban sociology, and it distinguishes cities from rural areas.

Hauge (2007) described three identity theories in the context of environmental behavior studies and architecture:

- place identity;
- social identity; and
- identity process.

The first is similar to Lalli's (1992) self-concept theory regarding the environment. According to Proshansky *et al.* (2014), place identity is a substructure of self-identity. Social Identity Theory describes a self-concept related to the existence of individuals in groups. This idea was popularized mainly by Tajfel (1982), but was separate from the physical environment of the place. Furthermore, identity process theory is primarily related to the formation principles of Breakwell (1986), later developed by Twigger-Ross and Uzzell (1996), namely, continuity, distinctiveness, self-efficacy, and self-esteem. According to this theory, place is a source of human identity.

Moreover, the accepted concept of urban identity in planning theory remains an issue that needs to be addressed. The descriptions by Lalli and Hauge are insufficient to place the conception of urban identity in planning theory and practice. These ideas describe only theoretical traditions and do not explain how planners can intervene in urban identity. The recent work by Mansour *et al.* (2023) acknowledged the lack of consensus on the definition of urban identity, noting differing perspectives among scholars and urbanists. They sought to offer a comprehensive, interdisciplinary understanding and definition of urban identity by examining perspectives from various disciplines, with a focus on temporal dimensions, spatial scale, and observer perspectives. While this approach aids in grasping the dynamic, temporal aspects of urban identity, it is crucial to distinguish among the three concepts of urban identity to advance this term in planning. This distinction enables planners to identify specific aspects of a city for targeted intervention to enhance its identity. The inclusion of the term urban identity in planning literature raises various questions, such as whether the identity problem of a city is its physical character or whether it is human. Are we discussing city branding as a way to attract tourists and investors? Understanding these three concepts will maximize the role of urban identity in the sustainability of cities and communities.

Therefore, this paper aims to construct a conceptual framework and elucidate three categories that can facilitate the application of urban identity concepts in planning theory and practice to ensure clarity and avoid ambiguity, namely the "identity of urban," "identity in urban," and "identity for urban". Identity of urban refers to the physical identity of a city, while identity in urban relates to the identity of the people in the city, and identity for urban concerns city branding.

METHODS

This paper utilized a literature review method by synthesizing several relevant and reliable studies published in English, particularly in planning, architecture, environmental psychology, social science, and geography. The literature review included preparation, categorization, and synthesis (Green *et al.*, 2006). In preparation, the search applied the keywords "urban identity" or "city identity" using literature from less recent to the most recent publications (until 2024), whether journal articles, proceedings, or books. The literature collection was conducted using various journal databases, such as Scopus, Science Direct, Sage Journals, Springer Link, and Google Scholar. The search also included the keywords "social identity", "personal identity", and "city branding" to enrich the analysis material; furthermore, items were selected based on their relevance to the study topic: urban identity and planning. The selected literature was categorized based on its use of terminology, comprising three major groups: literature that focused on the distinctive features of the city, literature oriented towards human identity related to the city, and literature that discussed city branding. Finally, a synthesis was performed to construct the conceptual framework of urban identity.

IDENTITY CONCEPT

Linguistically, identity comes from Latin, namely *identitas*, which means *sameness*, or *idem*, which also means same. In philosophy, questions regarding identity include "is it possible for something or an individual to be considered the same at different times?" and "is it a different object or individual when some of its elements change?" This definition was used by Martin and Barresi (2006) in personal identity theory describing why someone is the same as others at one time and different from others at other times.

The meaning of same further means that an entity has something in common with others but is also unique simultaneously. Identity is the character of the self that distinguishes individuals from others (Breakwell, 1986; Rummens, 2003).

Another opinion considers identity as a self-concept related to how people are visualized and recognized when interacting with others (Deng, 1995; Hogg and Abrams, 1988; Staley, 2008). Self-identity answers basic human questions regarding who people are, where they come from, and their dreams. It includes status, name, personality, goals, and a person's past and origins (Fearon, 1999; Klapp, 1969). Castells (2010) states that identity is a source of meaning and experience.

Identity is comprehensible through a relationship (Breakwell, 1986; Staley, 2008), which is consistent with Lalli's assertion that the self is the result of a social differentiation process. In addition, individuals often reflect on themselves when interacting with others, indicating that identity is obtained through self-identification in social relationships (Erikson, 1968). This means that meaningful identity is a social product formed from a social construction (Wendt, 1999). Social context and identity are inseparable, since individuals are part of the social and historical environment surrounding them (Breakwell, 1986). Identity

is a social construct formed from ongoing social processes and is intertwined with interpersonal networks, group membership, and intergroup relationships (Breakwell, 1986; Wendt, 1999). Each individual has a different identity; essentially, identity can be plural depending on the individual's role in social relationships (Castells, 2010; McCall and Simmons, 1982). Although social processes and networks determine identity, they are formed only when individuals internalize and construct meaning (Castells, 2010). Therefore, in social relationships, individual identity requires two aspects: recognition of others and awareness of oneself.

Breakwell (1986) highlighted the structure of self-identity as a biological, physical, and psychological characteristic. The first refers to a person's physical characteristics, such as skin color, hair type, and gender, which grow organically and have an identity charge for each character. Garrett (2002) classified the physical and biological characteristics as follows:

- the animal criterion, including lust and basic desire;
- the bodily criterion or physical condition; and
- the brain criterion or thoughts.

The contribution of biological and physical characteristics to identity formation is constant, but often exceeds an individual's knowledge and experience. Breakwell (1986) stated that psychological characteristics consist of:

- content that describes individuals and distinguishes them from the psychological characteristics of others; and
- values that guide people's evaluation.

Breakwell (1986) also believed that there are no constant values, leading to the conclusion that identity is always dynamic and subject to change.

Based on the aforementioned description, it can be concluded that identity is a concept of self-evaluation based on physical, biological, and psychological characteristics that distinguish individuals from others. Social interactions, social construction, and meaning can influence identity formation. Furthermore, identity is neither singular nor static, indicating that individuals can have multiple identities that are subject to change at any time.

In general, explanations about identity theory have different meanings for the three concepts of urban identity: identity of urban, identity in urban, and identity for urban. A comprehensive description of these three is as follows.

IDENTITY OF URBAN

Identity of urban refers to the characteristics of the city itself. These characteristics distinguish a city or place from other cities or places (Lynch, 1981). It emphasizes the physical aspects of a city, such as the urban fabric, which can easily be perceived visually. Lynch (1960) introduced five easily recognizable urban elements of the city image: paths, districts, nodes, edges, and landmarks. Lynch's theory describes a city's image, stating that each feature contains an identity that creates individuality in every place. Specifically, a city's image is essentially composed of its identity, but the

resulting "imageability" also determines its identity. It is concluded that Lynch's emphasis on individuality lies in the uniqueness of a location, such as the 99 Domes Mosque and Losari Beach at Makassar City, Indonesia (Figure 1).

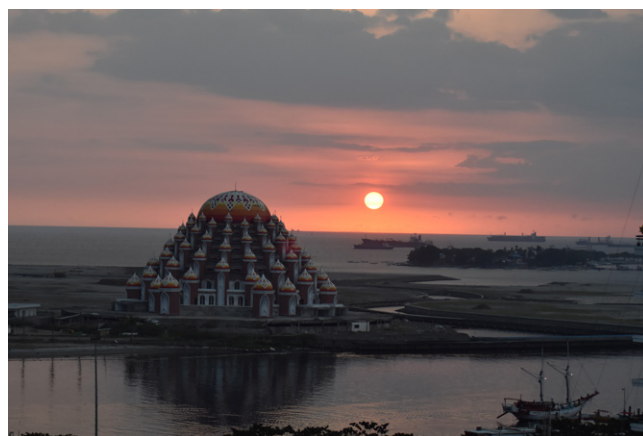


Figure 1. The 99 Domes Mosque and Losari Beach as an example of Identity of Urban in Makassar City, Indonesia
(Source: Authors)

The general concept of identity of urban is closer to planning theory (Kaymaz, 2013) and is often used in planning literature (Bernardo *et al.*, 2016; Boussaa, 2017; Farhad *et al.*, 2020). Furthermore, Kaymaz (2013, p. 745) stated that "...place identity in spatial planning and design is commonly linked to an area and its uniqueness is a result of the interaction between the physical features and its users." Meanwhile, in urban design, identity of urban is also employed to study the history of the city's form and patterns (Nguyen, 2023).

Only certain physical elements are directly recognized as urban identities, but they are achievable through visual, behavioral, and cerebral components (Cheshmehzangi, 2020; Relph, 1976). The visual component refers to physical settings such as architectural and non-architectural structures that someone inhabiting or visiting a city can perceive. Using this visual component, individuals can assess their experiences in an area. Furthermore, only certain places contain imageability, and these are areas that easily evoke mental images in the observer's mind (Lynch, 1960). Lynch further assumed that legibility or visibility determines the quality of a place. Therefore, certain places tend to be easily noticed and remembered. Based on this visual aspect, urban identity is termed as a mechanism for navigation (Cheshmehzangi, 2020) and spatial orientation (Lalli, 1992) guiding an observer to experience the city through clues, symbols, and directions.

The behavioral component is based on the concept that each location has a mutual relationship with social behavior (Cheshmehzangi and Heat, 2012). This implies that behavior can shape or design urban identity and vice versa. As a behavioral component, urban identity is not only intended to serve as a differentiator between places, but it also aims to develop better places for community activities (Cheshmehzangi, 2020). The notion of uniqueness is not highlighted, because the uniqueness of a place does not determine the development of behavior.

Perception is related to an individual's understanding of meaning in urban environments. According to Relph (1976), meaning is not dependent on a place, but is related to human experience. This finding implies that the same place is likely to mean different things to different people. Individuals can assign varying meanings to places at different times. The respective meanings are likely to form a general notion or identity through social interactions, because people experience the same object (Relph, 1976). This implies that people perceive their urban identities in a similar manner. Cheshmehzangi (2020) concluded that urban identity serves as a mechanism for regenerating the meaning and memory of people in a city through perception. The perception component confirms that urban identity is a product and a social construction. Internal and external city inhabitants have various meanings; however, there is a chance that a common understanding will be established. For example, when a researcher conducts a survey asking: what is the urban identity of Paris? The strong image of the Eiffel Tower makes most of the city's internal and external parties understand that this element is the identity of urban Paris. The compatibility between the recognition of outsiders and the awareness of internal parties indicates a strong urban identity. In addition, urban identity is realizable through a cosmological component that reflects a city's "genius loci." Cosmology reflects the social meaning of places and cities (Rapoport, 1990).

IDENTITY IN URBAN

The identity in urban idea describes how human identity relates to cities. This understanding is deduced from a review of anthropology or sociology and psychology. From anthropological and sociological perspectives, identity refers to a category that does not directly relate to physical elements. Instead, it refers to social phenomena associated with a city, such as violence, crime, diversity, and openness, as well as the social fabric that generally identifies people as city-dwellers (Haapala, 2003; Karpovets, 2014; Pol, 2002). The identity of residents in a city, such as New York, differs from those in Jakarta, London, and Paris. Every community, for example, immigrants, people of color, or those of a particular gender in the same city, differs in how they perceive themselves as city residents (Musiyezdov, 2020). According to Karpovets (2014), being a city resident does not necessarily mean accepting an urban identity. He explained that many people live in a city but do not identify themselves with the values and history of that city. Similarly, Blair (2011) used the idea that urban identity is a means of intercultural learning and tolerance for diversity. In addition, Bell and De-Shalit (2011) provided the term "Spirit of Cities," which describes the spirit and values that shape a community's character. Therefore, it is clear that the urban identity referred to here is human identity and not that of a city. History, collective memory, and culture play a role in shaping identity in this context (Kulsarieva *et al.*, 2018; Merck and Hirst, 2022).

Urban identity from the anthropological and sociological perspectives gives rise to a difference between city and non-city life, as stated by Burgess (1978) and Pol (2002) that a city is a social entity with its character of life, and each urban

area can have a different way of life from the others. These views can also be traced from Weber's (1958) theory of urban life and from Simmel (1950) on "the metropolis life."

There is a debate regarding defining cities in an urban identity context. For example, in the literature on early urban planners, Wirth (1938) defined a city as having a large-scale, dense, and heterogeneous population. However, based on Castells' ideas, especially regarding the "space of flows" and "the network society," the meaning of the city is no longer limited to territory but rather to the dominant concentration processes. This idea is in line with what Harvey (2001) and Lefebvre (1991) mean by "space as capital accumulation." The study of urban identity in this context, for example, proves beneficial in the examination of rural-urban migration, as demonstrated by Xie *et al.* (2023).

Furthermore, from a psychological perspective, particularly in environmental psychology, place identity is a personal/social identity that is psychologically influenced by place (Proshansky, 1978; Twigger-Ross and Uzzell, 1996). Proshansky *et al.* (2014) and Lalli (1992) explained that place is part of one's self-identity, including beliefs, interpretations, and self-evaluations. Identity emerges from the complex associations between humans and urban environments. Therefore, it is safe to conclude that identity helps create a sense of belonging to the urban environment (Buttimer, 1980; Relph, 1976; Tuan, 1980).

In psychology, there are personal, social, and place-identity concepts. Personal identity is the concept of self-knowledge based on the physical, biological, and psychological characteristics that distinguish an individual from others. Social identity is the self-concept of belonging to a social group (Tajfel, 1978). This theory assumes that collective behavior is not determined by individual actions, but by group values or behavioral patterns. Just as personal identity is discussed as being "within individuals," social identity concerns "an individual and others" (Turner and Onorato, 1999). Personal identity distinguishes individuals based on their uniqueness, while social identity highlights their characteristics as group members. Place identity is a self-concept related to one's presence in an area or physical environment (Proshansky, 1978; Proshansky *et al.*, 2014). When the physical environment is a city, it is known as urban identity (Lalli, 1992; Twigger-Ross and Uzzell, 1996). Hauge (2007) found that place identity is often another form of social identity. However, this view is only partially acceptable, because it ignores the physical characteristics that affect an individual's meaning and behavior. Hull IV *et al.* (1994) demonstrated the relationship between physical features and the formation of place-identity in society.

Some experts equate place-identity with a sense of place (SoP) (Cheshmehzangi, 2020). Place-identity emphasizes the ability of an individual to identify and highlight the differences between one place and another (Peng *et al.*, 2020), whereas SoP refers to the impressions and meanings that describe the relationship between people and places (Dameria *et al.*, 2020; Shamai, 1991).

Identity is formed within a person through processes such as:

- assimilation, which is the absorption of new elements into the identity structure;
- accommodation, which refers to the process of adapting to new elements; and
- evaluation, which is the process of meaning, assessment, and comparison with others (Breakwell, 1986). With regard to place, these processes occur under the principle of forming a place-identity.

Lalli (1992) and Twigger-Ross and Uzzell (1996) proposed the Identity Process Theory, which is the principle of forming place and urban identity in a person. According to Lalli, the principle of self-identity formation in an urban environment includes evaluation, continuity, attachment, familiarity, and commitment. Twigger-Ross and Uzzell suggested four aspects using the self-identity process model from Breakwell (1986; 1992): distinctiveness, continuity, self-esteem, and self-efficacy. Therefore, a synthesis of Lalli and Twigger-Ross and Uzzell was used to investigate the formation of an individual's self-identity with the urban environment. The explanation of each aspect that can shape identity in urban at the personal level is presented below.

First, evaluation is related to how individuals assess the city in which they reside, particularly concerning urban uniqueness. This aspect is represented by the statement, "There are many things here which are envied by other towns" (Jorgensen and Stedman, 2001, p. 236). Meanwhile, the distinctiveness of Twigger-Ross and Uzzell (1996) is considered part of this aspect, as it relates to an individual's desire to feel different or unique from others. This results from an awareness of the relationship between individuals and the supposedly unique places in which they reside (Dameria *et al.*, 2020). This is in line with Smaldone *et al.* (2005) who stated that evaluation refers to a person's assessment of the quality of a place.

The second is continuity, which relates to the significance of an urban environment in relation to an individual's past experiences (Lalli, 1992). Jorgensen and Stedman (2001, p. 236) explained, "Lots of things in the town remind me of my own past." The rationale for this aspect is that every individual desires to maintain the sustainability of the self-concept and divides continuity into two types: place-referent and place-congruent. Place-referent continuity is the conceptualization of place as a reference to past experiences. The place environment often reminds us of an individual's past actions. Place-referent continuity refers to specific places, whereas place-congruent continuity deals with the common characteristics of places (Twigger-Ross and Uzzell, 1996).

The third is attachment, which is a positive emotional relationship with the environment (Giuliani, 2003). This aspect relates to an individual's attachment to, and sense of belonging to a place in the city. Some experts have distinguished between place attachment and identity, especially within the Sense of Place framework, as they regard attachment as an emotional aspect, whereas identity is a cognitive aspect (Dameria *et al.*, 2020; Jorgensen and Stedman, 2006). However, Belanche *et al.* (2017)

demonstrated that urban identity also encompasses affective aspects. According to Twigger-Ross and Uzzell (1996), attachment to a place supports and builds aspects of identity. Indeed, identity creates a sense of belonging, a feeling of being at home or comfortable, and self-identification with the urban environment (Lalli, 1992; Proshansky *et al.*, 2014).

Fourth, familiarity relates to a person's acquaintance with a place based on their daily experiences. Essentially, it refers to an individual's conversance with physical elements based on their activities in a given place (Ujang, 2008). A sense of familiarity often arises when a person has an intense experience in a certain place. The fifth aspect is commitment, which refers to an individual's dedication to living in an urban environment (Lalli, 1992). Commitment to stay is closely related to other aspects, such as a sense of comfort and familiarity.

Self-esteem ranks sixth and relates to an individual's pride in several inherent identifications (Twigger-Ross and Uzzell, 1996). Korpela (1989) concluded that a favorable environment tends to support one's pride. The seventh is self-efficacy, which relates to people's beliefs in their ability to cope with their current situation. Finally, a relationship with the urban environment occurs when a person feels that it is easy to perform daily activities in an urban environment.

IDENTITY FOR URBAN

Identity for urban is a useful resource for marketing and city branding. This concept focuses on the city's image. This image is not the same as the one described by Lynch, but rather is somewhat related to reputation. Lynch deals with physical elements that differ from reputational images, such as nonphysical elements. This means that as images refer to objects, image reputation refers to attributes shaped and engineered for specific purposes.

According to Kotler *et al.* (1993), image reputation in urban areas consists of:

- positive;
- weak;
- negative;
- mixed;
- contradictory; and
- beautiful images.

Weak images are found in lesser-known cities, resulting from no advertisements or a lack of attractiveness. Negative images often originate from war or crime in a city. Avraham (2000) and Avraham and Ketter (2008) stated that mass media, including news and films, play a significant role in image formation.

Place/city branding literature departs from corporate branding theory. Place/city branding is the application of product branding to places and cities (Kavaratzis and Ashworth, 2006). Ashworth and Kavaratzis (2009) highlighted that branding aims to influence perceptions and images about a place, while Anholt (2010) explained that it helps to make a city famous, such as Hong Kong, which is branded by the slogan "Asia's World City" (Figure 2). City

branding positions cities on the lines of companies that offer diverse products. Just as companies deploy marketing and branding strategies to draw consumer interest for their products, cities must do the same for goods and services to be in demand.



Figure 2. Visitors in front of a billboard that promotes Hong Kong as Asia's World City
(Source: Authors)

It has been debated as to whether cities are similar to companies. Cities are considered more complex than companies, because cities are public property, where the government is not the sole owner and users are not mere consumers. However, in practice, city branding occurs when cities compete to attract the attention of investors, tourists, and others. Branding for image reputation involves efforts to create a positive association between the product and city (Kavaratzis and Ashworth, 2006). Some places have a positive image that enhances their products; this is known as the country of origin (COO) effect. For example, Japan and Germany have reliable technological associations. Therefore, consumers always consider the technological products of these two countries reliable. The same applies to Swiss watches, French perfumes, and others that perceive the COO effect.

Moilanen and Rainisto (2009) demonstrated that identity, image, and communication are the main concepts of branding. In this context, urban identity is the primary material used for branding. Kavaratzis (2004) demonstrated that the search for identity is the first step in shaping a city's image. This makes one city different from others. Therefore, this becomes a problem for cities

that require additional resources to make a difference. Kapferer (2008) recommended that the government's efforts should ultimately be directed toward building and creating resources that later become identities. Kavaratzis and Ashworth (2006) described the relationship between identity, positioning, and image, and found that brand identity is related to how a product owner wants the brand to be perceived. Brand positioning deals with the setting of a product over others to demonstrate competitive advantage, whereas brand image refers to its perception.

Measurements of success in city branding have been developed, including the Anholt Brand Index (IBA) (Anholt, 2006) and the Saffron European City Brand Barometer (SECBB) (Hildreth, 2008). The IBA indicators include:

- presence, which is the position of the city internationally;
- place or physical quality of the city;
- potential, regarded as the opportunities offered by the city;
- pulse or city passion;
- attitude of the people or population; and
- prerequisites or essential quality of life.

Moreover, SECBB indicators are the strength of city assets such as:

- city attractions and historical factors;
- restaurants and cuisine;
- ease of seeing the city on foot and transport availability;
- cost;
- pleasant weather;
- shopping malls;
- economic prosperity and the strength of the city's brand, known as the strength of the city's associations;
- image recognition;
- city value in discussions; and
- mention of the city's name in the media over a certain period.

Based on the description above, it was observed that the identity of urban areas is designed intentionally. This identity is top-down and outsider-oriented through urban policies and the media.

RESULTS AND DISCUSSION: CONCEPTUAL FRAMEWORK

These three concepts of urban identity have been used both in theory and planning practice, although they have different foundations. These concepts are interrelated and can be integrated to support the sustainability of cities and their citizens by achieving harmony between the orientation and identification needs of city residents, the function and aesthetics of the city, and attractiveness to visitors.

The primary function of identity of urban is to recognize cities' characteristics and physical qualities, while identity in urban serves to determine the residents' evaluation of their city. The identity of urban and identity in urban are interrelated, which Lynch describes as "I am here supports I am." Environmental characteristics affect human identity, and vice versa. Lefebvre (1991) stated that buildings and

monuments often represent ideology and power relations. For example, as shown in Figure 1, the 99 Domes Mosque is the identity of urban in Makassar City, while simultaneously representing Makassar as a religious society. It has been centuries since the people of Makassar, in general in South Sulawesi, called their area the Veranda of Medina (one of the holy cities in Islam). Another example is a study conducted by Manahasa and Manahasa (2023), which highlights the role of landmarks in the transition of the city of Tirana from a socialist to a post-socialist city.

The interrelation between the three concepts can also be seen from the framework that the identity of urban and identity in urban simultaneously become a resource for identity for urban, thereby making it function as city branding, especially for commercial purposes. The 99 Domes Mosque is now a tourist destination in Makassar.

An overview of these concepts is shown in Figure 3.

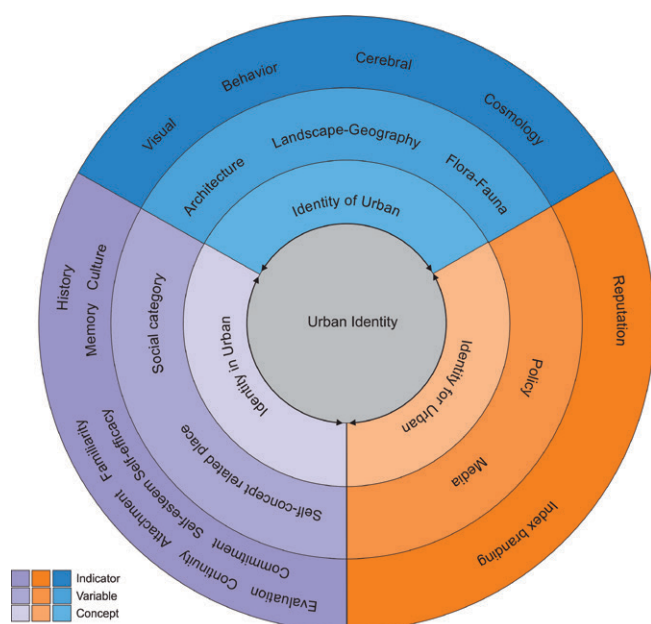


Figure 3. Conceptual framework of urban identity
(Source: Authors)

Identifying the identity of urban uses general variables such as architecture, landscape geography, and biotic factors or flora and fauna. The indicators for examining the strength of these components are visual, behavioral, cerebral, and cosmological. Umar *et al.* (2023) applied this concept to elucidate the role of bats in urban identity. Furthermore, the identification of identity in urban can be conducted through social categories in society that reflect history, memory, and culture. Umar *et al.* (2024) similarly employed this concept to unveil the community identity associated with bats. Additionally, identity in urban can be revealed through the self-concept related to place, reflecting aspects of evaluation, continuity, attachment, familiarity, commitment, self-esteem, and self-efficacy. Moreover, identity for urban is observed through policies and media that report on or discuss cities. The indicators include the city's reputation and branding index.

Compared to the works of Lalli (1992) and Hauge (2007), the conceptual framework of urban identity holds theoretical advantages, being simple and easily comprehensible across various segments, not confined to the field of urban planning. This framework demonstrates practicality in various situations and contexts, showcasing its flexibility for application across different disciplines and projects related to urban identity, and it can complement the assessment methodology proposed by Mansour *et al.* (2023). Specifically for planners, the conceptual framework of urban identity can be useful in formulating urban policies (see Figure 4) and guiding the application of identity concepts to shape the future of cities, not merely preserving the past, as envisioned by Mansour *et al.* (2023) in the "Future Studies" section of their paper.

Identity of urban helps planners design functional and characteristic cities. Meanwhile, identity in urban helps planners realize the humanist aspect of the city and social justice (referring to Harvey (1973)), creating an environment that is rooted in identity for all identities: migrant, color, gender, and others, thus achieving equality among urban communities (Walden, 2021). Identity for urban helps planners advance a city's economy and attract investors and tourists.

It is important to note that the three concepts of urban identity must be compatible with one another. If planners focus only on identity for urban, for example, it means that they only think about outsiders' interests and overlook citizens' welfare. In this case, planners must communicate with various stakeholders. Therefore, the above framework becomes vital in assessing which aspects of urban identity are weak or strong, so that planners can intervene in policies.

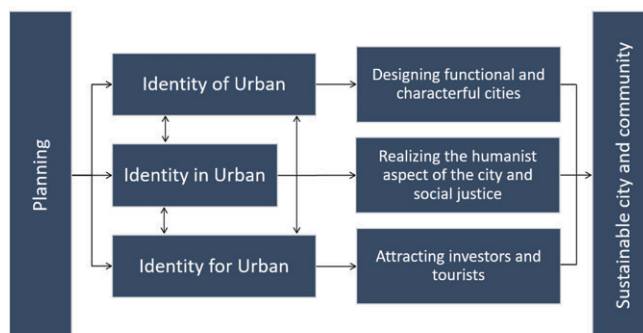


Figure 4. The use of urban identity frameworks in planning
(Source: Authors)

CONCLUSION

Discrepancies in the concept of urban identity are primarily based on multiple interpretations of the identity concept. However, many similarities can be summarized: Identity is a concept of understanding an entity based on specific characteristics attached to it. Therefore, urban identity is a concept used to understand a city and its characteristics, including those of its citizens. This paper carries theoretical implications by introducing three categories of urban identity concepts: identity of urban, identity in urban, and identity for urban. The conceptual framework based on

three categories aids in clearly explaining the urban identity concepts absorbed from various disciplines into planning theory. Future studies on urban identity in the field of urban planning should differentiate these three concepts to clearly define what is being examined, whether it is the physical character of the city, the human character of the city, or perhaps the branding of the city.

In planning practice, the conceptual framework in this paper can serve as planning tools to help understand and consider the aspect of urban identity to be addressed, whether it is identity of urban, identity in urban, or identity for urban. Planners have often struggled with incorporating studies on urban identity into the process of preparing planning documents. The three concepts of urban identity also assist planners in integrating the population's need for orientation and identification, the functions and aesthetics of the city, and the city's attractiveness to visitors.



As a suggestion for further research, the generalization of the above concepts may require various empirical studies in different urban contexts, which may not have been covered in this paper.

ACKNOWLEDGMENTS

We would like to thank the Indonesia Endowment Fund for Education (LPDP) from the Indonesian Ministry of Finance for the first author's full scholarship as a doctoral candidate at Institut Teknologi Bandung (ITB).

This work was supported by the Indonesia Endowment Fund for Education under grant number 20200821303208.

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Received August 2023; accepted in revised form April 2024.
First published: 3 June 2024.

CONCEPTUAL MODEL ON CREATIVE ECONOMY DEVELOPMENT OF WATERFRONT CITIES IN INDONESIA: LESSON LEARNED FROM PALEMBANG AND SURABAYA

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This article introduces a conceptual model aimed at nurturing the creative economy within waterfront cities, spotlighting Palembang and Surabaya in Indonesia as case studies. The model seeks to uncover underlying trends that fortify creative economic endeavors in these localities, presenting them within a conceptual framework diagram. The research underscores the significance of establishing a conceptual model for optimal practices in creative economy development, specifically tailored to fortify the waterfront areas of Palembang and Surabaya. This study utilized qualitative methods in a sequential approach to assess current field conditions, develop a conceptual model, and integrate diverse data sources, including literature, focus group discussions, and in-depth interviews. The article explores the crucial contributions of various stakeholders – academia, businesses, communities, government, and media – in driving the growth of the creative economy within waterfront cities. It also emphasizes essential dimensions such as human resources, technology, geography, policy, and sustainability as pivotal factors in strengthening programs that foster the creative economy in waterfront city areas in Indonesia.

Key words: conceptual model, creative economy, waterfront city, Palembang, Surabaya.

INTRODUCTION

The current economic changes of the 21st century are deeply intertwined with technological advancements that are crucial in addressing contemporary challenges. The creative economy emerges as a sector focusing on high-value product creation, production, and distribution

through expertise and creativity. It heavily relies on human ingenuity as the primary production factor (Brouillette, 2014; Florida and Adler, 2020) and thrives on novel, unique, and innovative ideas. Backed by creative industries, this sector progresses and flourishes, emphasizing human resource-based creativity, ideas, and knowledge (Fazlagić and Skikiewicz, 2019). The concept of development in the creative economy aligns with economic development goals, aiming to enhance community life quality through resource

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utilization and social participation principles (Chollisni *et al.*, 2022). Developing the creative economy plays a strategic role in fostering sustainable changes within the economic ecosystem. Empowering creativity promotes innovative, environmentally friendly solutions, bolstering national image and cultural identity. In Indonesia, the creative economy sector has experienced rapid growth, buoyed by the National Master Plan for Creative Economy Development 2018 - 2025 aimed at driving the national economy.

The presence of waterfront cities serves as a potential economic source for the local community within a region. Palembang, as the capital city of South Sumatra Province, holds significant potential in its waterfront areas for creative economic development. With a rich historical and cultural background, strategically located along the Musi River, Palembang boasts various attractions such as Pempek Palembang, Fort Kuto Besak, Lake Ranau, and traditional Palembang music. Several waterfront areas, including the Ampera and Musi River regions, have been actively developed. Recognizing its culinary excellence, the Creative Economy Agency honored Palembang as the 2019 Creative City, particularly in the culinary subsector.

Meanwhile, Surabaya, Indonesia's second-largest metropolitan city after Jakarta, has been a trade and transportation hub since the Dutch colonial era, prominently positioned in Java's eastern region. The Kalimas River serves as a vital water transportation access point, significantly contributing to Surabaya's economic growth. The Surabaya City Government envisions transforming the Kalimas River into a thriving waterfront city and creative economy center. This development aims to enhance environmental quality while maximizing the region's potential. Collaborating with the Creative Economy Agency in 2018, the Surabaya City Government has undertaken initiatives to bolster the city's creative economy.

However, the optimal development of the creative economy in Palembang and Surabaya's waterfront areas faces challenges. This is attributed to various factors, including the absence of a comprehensive conceptual model outlining best practices, inadequate supporting facilities, and low-quality products and services. Developing a conceptual model for the creative economy in waterfront areas serves as a governance compass, fostering national economic empowerment. This model is envisioned to guide policy formulation for creative economy development in Indonesian waterfront cities, facilitating better governance practices. This conceptual model differs from other common models by linking the penta helix, the degree of relationship (3C phases) between the actors, and the development of five dimensions based on the governance and characteristics of the creative economy in waterfront city locations.

This study's outcomes aim to offer valuable insights and recommendations to local governments and stakeholders involved in advancing the creative economy within waterfront city areas. Additionally, it endeavors to contribute to the broader research and development landscape of creative economy initiatives and waterfront city development in Indonesia.

LITERATURE REVIEW

Creative economy

In recent years, there has been a significant emphasis on fostering cities with a creative economy approach (Segovia and Hervé, 2022; Sonobe *et al.*, 2022; Arcos-Pumarola *et al.*, 2023). Particularly in developing countries, these efforts stem from an abundance of cultural resources, aimed at capitalizing on these assets for economic growth (Chollisni *et al.*, 2022; Sonobe *et al.*, 2022). Studies on the creative economy's development across various nations highlight differing models (Fahmi *et al.*, 2015), with developed countries, where the concept originated, differing notably from their developing counterparts (Rodríguez-Insuasti *et al.*, 2022). Perić and Maruna (2022) highlight some of the challenges in waterfront development that require specialized regulations. The findings by Pratomo *et al.* (2021) also emphasize the impact of geographical location on the creative economy's development model. Additionally, the local community is important in developing creative tourism (Souca, 2019).

For Indonesia, as the largest country in Southeast Asia, boasting a diverse cultural heritage, there is a vital need to formulate and coordinate policies that harness the extensive potential of the country's creative economy (Jewell, 2019). President Joko Widodo's establishment of the Indonesian Creative Economy Agency (BEKRAF) in 2015 underscores Indonesia's recognition of the creative economy's pivotal role in spurring economic growth and preserving cultural diversity.

Waterfront city

The concept of a waterfront city encompasses various spatial categories including riversides, lakesides, coastal areas, and wetlands. Isra *et al.* (2020) classify the waterfront city concept into two types: based on development (conservation, redevelopment, development) or function (mixed-use, recreational, residential, working). City waterfront areas hold promising potential for creative economy development due to their unique appeal and suitability for activities like culinary arts, fashion, crafts, and tourism. Almost half of Indonesia's 516 cities and districts are surrounded by water bodies, with several local governments implementing the waterfront city concept.

In Indonesia, the focus on developing waterfront city areas has grown, and they have been recognized for their economic potential and enhanced tourism allure (Woo *et al.*, 2017; Isra *et al.*, 2020; Nandana *et al.*, 2021; Ghareeb *et al.*, 2023). These areas, often situated near beaches, rivers, or lakes, feature a variety of amenities such as recreational spaces, dining establishments, and shopping centers (Evans *et al.*, 2022). Their economic development requires a tailored approach that aligns with their resources (Zaki and Hegazy, 2023). Alongside this, there is a growing need for a creative economy development model tailored for waterfront cities, considering their distinct identities (Manteiro and Kabu, 2019; Ayu *et al.*, 2022; Üzümcüoğlu and Polay, 2022). Research findings regarding Belgrade, Serbia, highlight how a city's waterfront identity profoundly influences its urban structure (Petrović Balubdžić, 2017).

Penta helix-based model

Multi-sector cooperation involves collaboration between the government, civil society, academia, media, international organizations, research institutions, and other stakeholders to exchange perspectives, information, financial resources, and technology in finding solutions (Rosyadi *et al.*, 2020). This cooperative concept synergizes to cultivate an entrepreneurial spirit known as the penta helix (Sukarno *et al.*, 2020). Initially an evolution from the triple helix introduced by Etzkowitz and Leydesdorff (1997), the penta helix, or quintuple helix, was further developed by Carayannis and Campbell (2010). Collaboration within the penta helix framework plays a pivotal role in nurturing the creative economy, addressing challenges related to innovation and promotion to enhance competitiveness. Therefore, the penta helix approach is highly recommended to provide external input for creative economy actors, improving the quality of innovative and creative products (Rosyadi *et al.*, 2020).

The penta helix comprises five primary groups: academia, business sector, community, government, and media (A, B, C, G, M). In a program or activity, these groups collaborate through the three phases of 3C - Connect, Collaborate, and Commerce/Celebrate to achieve shared objectives (Satari and As'ad, 2018). During the 'Connect' stage, the focus is on fostering networks among the penta helix groups. 'Collaborate' emphasizes their cooperation in developing innovative ideas or initiatives, while 'Commerce/Celebrate' highlights joint efforts in marketing or project implementation, and celebrating successes collectively. This research aims to delve deeper into the penta helix model previously introduced by Satari and As'ad (2018).

The creative economy model encompasses the development of creative industries, community empowerment through training and education, and enhanced market access for local products. Putra (2017) conducted research to explore the potential of creative economic development at the Sikayan Balumuik tourist attraction, aiming to boost its allure. Effective tourism management requires paying attention to meeting the needs of tourists, local communities, and the preservation of biodiversity. Utilizing the penta helix strategy, Sutrisno and Anitasari (2019) found that the community and business entities wield the most influence as economic drivers, with the government facilitating collaboration among stakeholders. Acting as regulators, governments aim to safeguard community activities and foster regional ecosystems (Papatheochari and Coccossis, 2019).

METHODOLOGY

In this study, we pursued an approach involving sequential stages. Initially, we collected preliminary data, encompassing an overview and assessment of the existing state of the creative economy in the waterfront city areas at Palembang and Surabaya along with the pertinent data, regulations, and technical documents related to waterfront city management. Subsequently, a qualitative descriptive analysis was undertaken. This involved conducting in-depth interviews and offline focus group discussions (FGDs)

with 14 key stakeholders in Palembang and Surabaya. In Palembang, we held an FGD with 1 representative from the central government, 2 from local governments, and 1 university involved in programs and activities related to the creative economy and waterfront city initiatives. Additionally, we conducted interviews with 3 creative economy entrepreneurs who also members of communities in the culinary, crafts, and fashion subsectors. In Surabaya, a similar FGD took place, involving 1 representative from an independent non-profit institution specializing in craft arts, 2 from local governments, and 1 university engaged in activities related to the creative economy and waterfront city development. We also interviewed 3 creative economy entrepreneurs leading communities in the culinary, crafts, and fashion subsectors. Our methodology involved utilizing a set of qualitative descriptive questions specifically tailored to the development of the creative economy at the waterfront city. Following data collection, it was interpreted based on discerned patterns and themes, thereby providing valuable insights into the creative economy dynamics within waterfront city areas.

In the next stage, we centered on conceptual model development, focusing on analyzing variable interactions within the system to identify distinct patterns using the role of the penta helix, degree of relationship (3C phases) between the actors, and employed the development of five dimensions (human resources, technology, geography, policy, and sustainability). This phase culminated in the creation of a comprehensive conceptual model that encapsulates the identified patterns and strengths within creative economic activities in waterfront city areas. The final stage involved integration and decision-making support. We integrated primary and secondary data findings into the conceptual model. This model was utilized as a pivotal tool for informed decision-making in governance practices, with the ultimate goal of fostering the ideal development of the creative economy within waterfront city areas. Figure 1 shows the framework used in this study.

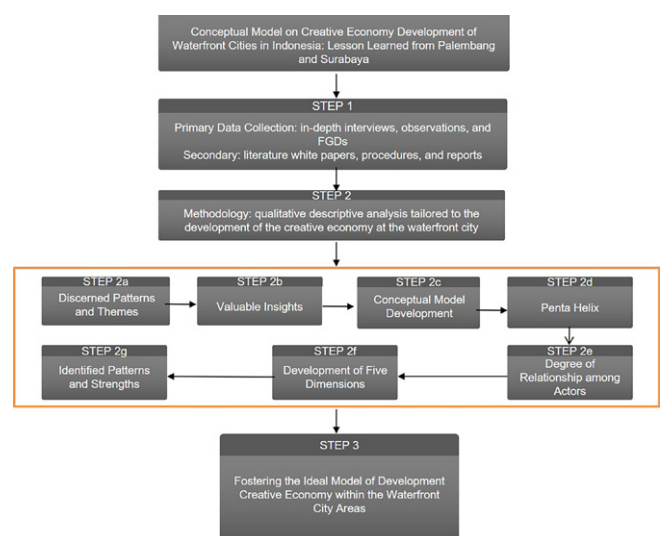


Figure 1. Conceptual framework model on the creative economy in waterfront city area
(Source: Authors, 2023)

RESULTS AND DISCUSSION

Identify the role of the penta helix in Palembang and Surabaya

In the field findings, the relationships between academics (A), business (B), community (C), government (G), and media (M) are elucidated as follows:

- Academics (A) act as catalysts and creators of concepts, employing a scientific approach derived from research and innovation. They also collaborate with MSMEs/industry in implementing creative programs.
- Business (B) serves as an enabler, transforming creative ideas into economically valuable products and offering policy input on product development. Additionally, it provides business mentoring and assesses product competitiveness.
- The Community (C) accelerates the marketing of creative economy products, fosters business entities through knowledge sharing, and strengthens cooperation, forming a creative economic community.
- The Government (G) functions as a regulator, formulating policies for creative economy development and enhancing the capacity of creative human resources. It also plans promotions and facilitates relationships between industry and investors for capital access.
- Media (M) acts as a facilitator, aiding MSMEs in business image building, fostering a favorable business climate, and supporting digital product development opportunities. It assists in digital innovation through publications, promoting products and their advantages.

The relationships between the actors are illustrated in Table 1.

Analyzing the growth of the creative economy in the Musi River in Palembang and Kalimas River in Surabaya areas, which synergistically work together, is highly intriguing and could serve as a model for driving the creative economy

in waterfront city areas. Through implementation and field research, there are discernible relationships between actors within the penta helix collaboration – academics (A), business (B), community (C), government (G), and media (M) – each playing a crucial role in fostering innovation, be it in the product, process, marketing, or organizational aspects, as well as establishing collaborations with each other. The interrelation of these sectors forms a vital linkage and synergy, contributing to the development of the creative economy across various sectors. This collaborative process, from upstream to downstream sectors, holds significant importance in achieving growth and impacting regional economic progress. Further analysis of the penta helix relationship involves describing the connectivity through business processes entwined within the 3C phases – connect, collaborate, and commerce/celebrate.

Identify the linkage of penta helix with 3C phases

In this stage, the 3C phase-based analysis aims to see the extent of linkage between the actors in both locations. In the case of Palembang, the connect phase can be interpreted as meaning that the implementation of creative economic development in the waterfront city area in the city of Palembang has been clearly described and refers to the local government program in the medium-term regional development plan, which has been carried out in the form of building relationships and networks between stakeholders within the penta helix. However, the positioning is still weak and does not even appear to be well-integrated between the actors within the penta helix. The collaborative phase can be interpreted as a relationship with creative economy actors through sustainable collaboration. This can be seen from the role of local governments in building cross-sector communications that are interrelated with planned programs. However, in its implementation, it cannot be said to have a strong relationship, where the assigned roles still appear to be running on their own and are not

Table 1. The role relationships between actors

Actor's Role	Palembang	Surabaya
Academic (A) – Business (B)	<ul style="list-style-type: none"> • Academics (A) are focusing on preparing experts and skilled personnel both in terms of skill development (vocational) and providing majors that suit needs in the creative economy. • Business (B) provides employment opportunities according to the skills (soft and hard skills) needed. Business is also a producer that commercializes innovative products as a pillar of driving a creative economy. 	<ul style="list-style-type: none"> • Academics (A) initiated the development of a creative millennial community at Kayoon. • Business (B) provides corporate social responsibility (CSR), offering support such as infrastructure assistance or training.
Academic (A) – Community (C)	<ul style="list-style-type: none"> • Academics (A) are exploring knowledge, fostering innovation to strengthen local products, provide solutions for community-related issues in creative economy development, education, and enhance community skills through necessary training. • The Community (C), comprising both civilians and community groups, identifies issues in creative economy development, actively engaging in marketing innovative products to bolster the local economy. 	<ul style="list-style-type: none"> • Academics (A) established a design center, serving as a collaborative and creative coworking space. • The Community (C), as creative millennials, actively participate, engaging in discussions, forming groups, and exchanging ideas to generate innovative concepts.

Academic (A) – Government (G)	<ul style="list-style-type: none"> Academics (A) offer scientific input for policies, innovative product development, and knowledge transfer, acting as catalysts in local creative economy development. Government (G) plays a strategic regulatory role by formulating policies, facilitating, and providing financial incentives to support R&D for innovative product development. 	<ul style="list-style-type: none"> Academics (A) contributed to the conceptualization of Kalimas River development and design of a tourist boat. The local government (G) initiated a revitalization and development program for Kalimas River to promote boat tourism.
Academic (A) – Media (M)	<ul style="list-style-type: none"> Academics (A) are creating innovations based on research and development (R&D), disseminating research results, and also publishing research findings. Media (M) publishes and disseminates spatial information through existing platforms, influencing public opinion based on current circumstances. 	<ul style="list-style-type: none"> Academics (A) have developed a branding center in Kayoon to support the creative economy. Media (M) disseminate information about the results of academic research and the facilitation provided by academics to the public.
Business (B) – Community (C)	<ul style="list-style-type: none"> Business (B) fosters an investment-friendly climate, innovative business prospects, and job creation, bolstering the local economy. The Community (C) supports the creative economy by engaging as business actors and participating in corporate social responsibility (CSR) initiatives to enhance skills, fostering greater involvement in the creative economy as SMEs and MSMEs. 	<ul style="list-style-type: none"> Business (B) such as state-owned enterprises/private companies provide corporate social responsibility (CSR) to support the facilitation of infrastructure to aid community activities. The Community (C) organizes engaging events and encourages community participation.
Business (B) – Government (G)	<ul style="list-style-type: none"> Business (B) undertakes the development of limited tourist destinations and recreational parks. Government (G) facilitates land preparation, permits, and creates an environment conducive to fostering creative economic growth. 	<ul style="list-style-type: none"> Businesses (B) leverage and utilize the location in Kalimas River for culinary activities, hosting festivals, and boat rentals. The local government (G) facilitates boat tourism activities, music performances, gift shops, and floating dining venues.
Business (B) – Media (M)	<ul style="list-style-type: none"> Businesses (B) foster competitiveness, contributing significantly to the growth of the creative economy through business, investments, and serving as the primary source of local business and creative economy news. Media (M) conducts promotions, enhances partnerships for product promotion, and explores opportunities for collaboration with various entities. 	<ul style="list-style-type: none"> Business (B) assists in facilitating infrastructure and supporting activities by incorporating branding and promotional elements. Media (M) cover and disseminate information about the activities of entrepreneurs and businesses involved in the development of the Kalimas River.
Community (C)– Government (G)	<ul style="list-style-type: none"> The Community (C) acts as the primary participant in government-led events, strengthening the creative economy with a focus on MSMEs. Government (G) is organizing community events and continually enhances the creative village area through ongoing facilitation. 	<ul style="list-style-type: none"> The Community (C) participates in diverse activities, gatherings, sports, and local economic empowerment initiatives. Government (G) is organizing and improving the surroundings of the Kalimas riverbanks and the adjacent parks, making them orderly and accessible for the community.
Community (C)– Media (M)	<ul style="list-style-type: none"> Community (C) actively participates in the preparation, production, and commercialization of local product. Media (M) disseminates information regarding local issues, amplifies awareness of local potential, advocates for and markets local products. 	<ul style="list-style-type: none"> The Community (C) is developing creative tourism to boost the local economy, along with its marketing initiatives. Media (M) shares community activities and news with the public.
Government (G) – Media (M)	<ul style="list-style-type: none"> Government (G) provides information on programs and potentials for enhancing the creative economy. Media (M) disseminates and promotes local programs and development potentials at both local and national levels. 	<ul style="list-style-type: none"> Government (G) offers information on the creative economy's development in the Kalimas area and its related activities. Media (M) produces regular content about Kalimas and conducts media blasts.

yet well-coordinated. Thus, synergy has not been created in developing the creative economy in the waterfront city area of Palembang. The commerce phase can be interpreted through follow-up cooperation activities in implementing the marketing process and developing superior products. This is closely related to the function of downstream products until they reach markets that have sales value and are competitive. In terms of implementation and findings in the field, this has not been fully coordinated, so creative MSMEs still operate independently. The lack of programs that MSMEs can participate in means that the product marketing process has not been developed that is expected to increase economic value in the city of Palembang. The overview of the linkage results for Palembang can be seen in Figure 2.

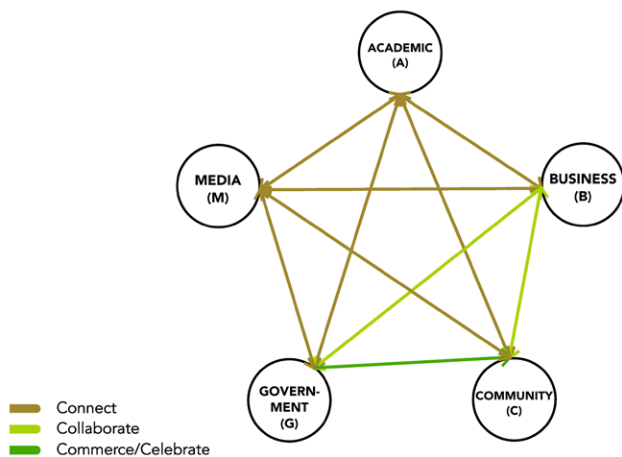


Figure 2. The linkage of the penta helix with 3C phases in Palembang
(Source: Authors, 2023)

The growth of the creative economy in Palembang, especially around the Musi and Sekanak rivers, iconic areas of the city, is still ongoing. Various collaborations between parties have been carried out. Infrastructure development and the maintenance of existing infrastructure are also carried out continuously. However, the presence of these facilities is still considered inadequate for strengthening the local creative economy. From a policy perspective, the implementation of the creative economy in various sectors has also been defined. Policy development and the determination of spatial and regional planning are also carried out in both the Ulu and Ilir areas. The determination of permits and tourist locations has also been made by the local government. However, the sustainability of this policy's implementation needs further attention, so that existing policies continue to be implemented even if there is a change in leadership.

Linkage between actors has generally been carried out well, although in certain stages it still needs to be developed. The connect phase is still dominant in current linkage. In this case, strengthening the linkage between actors is very important, due to the existence of the Musi and Sekanak rivers as strategic locations for strengthening tourist locations, which still need to be developed further. Other infrastructure support, for example the presence of the Ampera Bridge as an icon of Palembang, which is also integrated with the MRT transportation system, is still considered unable to increase local tourism competitiveness

(local wisdom). The main attraction that can be used as a commodity and has the potential to strengthen the local creative economy is the presence of creative villages that carry local products characteristic of Palembang City. This potential needs to be accommodated and developed so that the products can become better-known nationally. Existing promotions and mediation still need to be developed further to expand products awareness. The investment climate in strengthening local products and brands also needs to be considered more.

In Surabaya, the development of the creative economy specifically focuses on nurturing creative communities, particularly among millennials. Collaboration among stakeholders goes beyond physical infrastructure development to fostering an environment conducive to innovation and creativity. This is anticipated to generate more economic opportunities, including the creation of new jobs, fostering business development, and promoting economic empowerment in the region. Additionally, efforts in developing the Kalimas area concentrate on enhancing the tourism sector and public spaces. Clear initiatives aim to establish appealing tourist destinations and provide communal spaces for people to interact and engage in various activities. Each stakeholder contributes according to their role in ensuring the Kalimas River area becomes a comfortable hub for various activities. The overview of the linkage results for Surabaya can be seen in Figure 3.

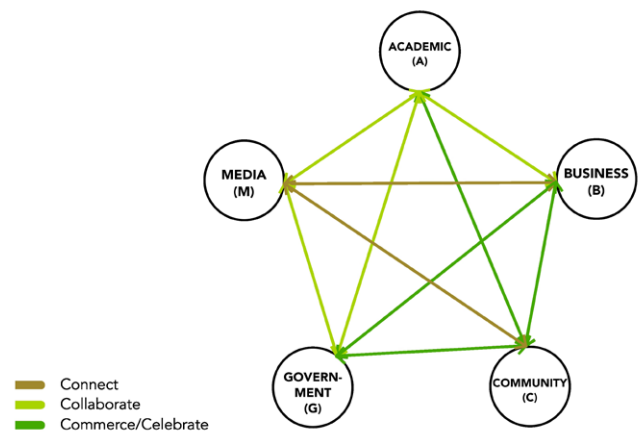


Figure 3. The linkage of the penta helix with 3C phases in Surabaya
(Source: Authors, 2023)

Furthermore, the synergy between the five actors, when viewed from the perspective of collaborative innovation, represents a concept of cooperation that is anticipated to yield significant impact, benefits, and added value to each entity involved. Collaborative innovation, from this standpoint, aims to discover solutions through various synergies encompassing perspectives, expertise, experience, research, and more across various disciplines (Stojčić, 2021; Torfing, 2019). This collaboration concept strengthens a wide network and provides opportunities for all entities to contribute. It emphasizes enhancing usability as a key driver, distinguishing it from competitive collaboration. Collaborative innovation is poised to foster value creation, albeit with a variable cost burden due to cross-sectoral relationships (Vivona *et al.*, 2023).

Empirical findings indicate that the synergy between actors in Palembang and Surabaya still shows limited connectivity, with relationships remaining one-sided. The development concept is primarily government-dominated through policy and implementation of the established roadmap. Input from academics is a crucial element in collaboration, particularly during the ideation phase. The concept of strengthening the creative economy in both regions remains largely coordinative, with limited collaborative principles (cooperative). A coordinative approach suggests that relationships are still in a low-intensity stage, with stimuli from several involved entities (Greco *et al.*, 2021). However, Palembang exhibits a different paradigm compared to Surabaya, primarily due to the reference to the river's function in waterfront city development. Achieving collaboration in waterfront city development and the strengthening of the creative economy in these regions requires active involvement from various entities. Additionally, factors such as demographics, culture, education (human resources), technology, policies, economic contributions, innovation, and other intangible variables affecting inclusive sustainability play significant roles (Üzümcüoğlu and Polay, 2022).

In Satari and As'ad's (2018) proposed model, this concept of relationships is differentiated based on the level of collaboration by each entity. Field findings suggest that collaboration in the case of Surabaya is slightly stronger than in Palembang. Surabaya exhibits a higher average collaboration rate in phases 2 and 3 compared to Palembang. However, this level of collaboration is inadequate to serve as a basis for developing strategies for the creative economy in both waterfront city areas. Cultural differences, limitations in human resources, limited utilization of technology, geographical conditions, and policies supporting inclusivity and sustainability in both areas vary. A comprehensive analysis of these five elements needs to be developed as a fundamental strategy for strengthening collaboration among existing entities in both regions. In this context, the focus is on waterfront cities where rivers serve as the primary source of city development.

Fundamental dimension of developing a waterfront city

Relevant aspects to consider in waterfront development include positioning and location, accessibility, and the provision of spaces and facilities conducive to the prolonged human enjoyment of urban rivers, whether directly or indirectly. Without these fundamental dimensions, integrated riverfront activities with urban community life cannot be effectively generated (Latip *et al.*, 2012). Hence, aspects such as human resources, technology, and sustainable policy are highly strategic functional dimensions.

This research identifies five fundamental dimensions crucial in shaping and advancing waterfront cities, namely: 1) Human Resources (Üzümcüoğlu and Polay, 2022; Korkut and Nalbantoğlu, 2023), 2) Technology (Üzümcüoğlu and Polay, 2022), 3) Geography (Latip *et al.*, 2012), 4) Policy (Perić and Maruna, 2022), and 5) Sustainability (Durán Vian *et al.*, 2021; Üzümcüoğlu and Polay, 2022).

Human resources dimension: This dimension involves enhancing the quality of human resources, particularly in community engagement through SMEs and MSMEs. The creative economy, as a concept in the new economic era, accentuates information and creativity, relying on human resources' ideas and knowledge as primary production factors. This dimension also intertwines with the region's cultural support for sustainable development (Borre *et al.*, 2023). The present challenge with human resources is the limited involvement of skilled individuals in the waterfront city areas. Despite numerous efforts, the scope of control remains extensive, and empowerment programs are not yet optimized. In the Palembang waterfront area, gradual shifts in mindset aim to reduce crime rates and boost employment opportunities. Similarly in the Surabaya waterfront area, enhancing collaboration and skills remains pivotal for creative economy stakeholders (Widiastuti *et al.*, 2017).

Technology dimension: In the creative era, a product or service's economic value no longer hinges solely on raw materials or production systems, but increasingly on creativity and innovation via advanced technological developments. Industries must compete based on innovation, creativity, and imagination rather than solely on price or product quality (Battistella *et al.*, 2023). The role of technology in Palembang and Surabaya is still perceived as inadequate in supporting planned programs by the local government and stakeholders. Despite the product's aesthetic appeal, technology's potential as an effective promotional tool for existing products remains underutilized.

Geography dimension: In designing waterfront areas, two essential aspects underlie decisions: geographical factors and the urban context (Wrenn *et al.*, 1983; Torre, 1989). Geographical factors, encompassing water conditions, land conditions, and the climate, influence the utilization of the area. Findings indicate the Kalimas River in Surabaya holds more potential than the Musi River in Palembang due to the Musi's unorganized river flows. Spatial planning needs refinement and alignment with economic potential. Geography also offers opportunities for raw material exploration in creative economic development, acting as an iconic branding feature.

Policy dimension: Regulations are fundamental in waterfront city development. They not only drive development but also safeguard community activities and foster a conducive ecosystem (Papatheochari and Coccossis, 2019). Policies span normative and practical aspects, from spatial planning to infrastructure development and investment facilitation. The local context, affordability, and livability should underscore policy formulation (Kashkouli *et al.*, 2018). The government must act as an initiator, facilitator, and mediator in waterfront city development. Palembang has established regulations, such as Mayor Regulation No. 6 of 2006 designating Palembang as a River Tourism City, and Regional Regulation No. 15 of 2012 focusing on regional spatial planning. Similarly, Surabaya's waterfront city development master plan for 2019-2024 emphasizes the Kalimas River area.

Sustainability dimension: Sustainability in the creative industry encompasses environmental, social, and economic considerations, emphasizing ethical practices, social impact, and positive values in creative works. Regional cultural adaptation is crucial for sustainable creative industry growth (Moore, 2014). In Palembang and Surabaya, sustainability issues in waterfront cities need to address economic, cultural, and geographical characteristics. However, prioritization and collaborative strategies involving all stakeholders are lacking, and the sustainability of existing programs may change with shifting leadership orientations.

Conceptualizing model

The concept of a creative economy linkage model in river-based waterfront city areas is intended to be a reference in analyzing the readiness of the creative economy based on connectivity and important aspects (in this case the Musi River in Palembang and the Kalimas River in Surabaya). The development of this model is based on theoretical discussion and elaboration based on field findings. A theoretical review was carried out of the general concept of creative economic development, referring to the subsector of the creative economy, which is viewed from the five main actor elements, namely academics, business, community, government, and media (A-B-C-G-M), often called the penta helix which is connected to 3C phases (connect, collaborate, and commerce/celebrate). In fact-finding, the penta helix model is not enough to describe the conditions of the development of the creative economy in the waterfront city area. Thus, in this conceptual model, an elaboration is proposed with five fundamental dimensions as previously explained. Those dimensions are considered and become strengthening factors in the development of a sustainable creative economy in a waterfront city area. Figure 4 shows a conceptual model that has been developed.

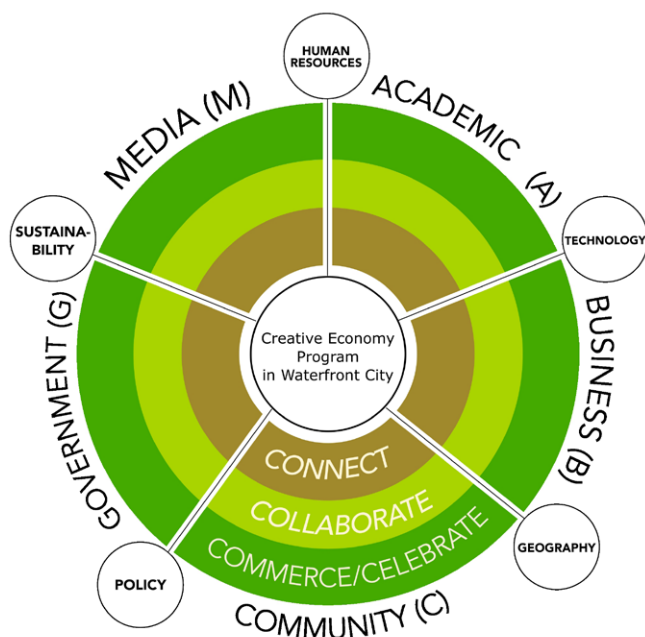


Figure 4. Conceptual Model of Linkage in Creative Economy at Waterfront City
(Source: Authors, 2023)

The model starts with 1) analyzing the relationships among penta helix actors (A-B-C-G-M); 2) identifying the linkages between penta helix actors and the 3C phases (connect – collaborate – commerce/celebrate), and 3) analyzing five dimensions (human resources, technology, geography, policy, and sustainability) to strengthen creative economy programs in the waterfront city area and enhance overall economic growth. In the previous sections, the analysis of roles between the actors and their linkage with the 3C phases has been discussed. The five-dimensional analysis aimed at bolstering synergy between the actors in various phases to strengthen the creative economy in the Musi and Kalimas river areas through various programs is described below.

Human resources dimension:

- Provision and management of human resources to maximize planned creative economic activities.
- Offering training and coaching to enhance skills and competitiveness among creative economy actors.
- Shifting mindsets to raise awareness for locally based creative economic development.
- Prioritizing resident empowerment, since they are key participants in the creative economy.
- Reinforcing the business resilience of creative economy actors through skill regeneration.
- Increasing job opportunities within the creative economy sector.

Technology dimension:

- Utilizing the latest technology for innovative product development.
- Collaborating in technological use with various stakeholders.
- Employing digital technology for promoting and marketing creative products.
- Forecasting future technological advancements.

Geography dimension:

- Tailoring creative economy programs according to the city's geographical conditions.
- Expanding investment opportunities by developing strategic creative economic zones.
- Utilizing geographical features as icons for creative economic development.
- Identifying Intellectual Property Rights as geographical identities for creative economy actors.
- Capitalizing on geographical and historical aspects to foster the creative industry.

Policy dimension:

- Establishing bidirectional communication (top-down and bottom-up).
- Strengthening synergy among local government bodies (collaborative government).
- Spatial planning policies for waterfront city areas.
- Formulating superior regions based on regional creative characteristics to drive the community's economy.

- Providing support in facilities, infrastructure, incentives, and licensing for creative economy actors.
- Ensuring consistency in creative economy program policies.
- Establishing collaboration schemes for creative economy actors with various entities.

Sustainability dimension:

- Maintaining infrastructure that supports the creative economy.
- Mediating, promoting, and reinforcing branding related to ongoing creative economy development (e.g., regular events).
- Ensuring availability of essential materials for creative economy products.
- Enhancing innovation and competitiveness for sustainable activities.

These programs aim to foster sustainable growth within the creative economy. Policies emphasizing two-way communication, spatial planning, infrastructure support, and policy consistency are vital in fostering sectoral synergy and maximizing regional potential for innovation. Furthermore, dimensions such as sustainability, technology utilization, geographical adaptation, and human resource empowerment serve as focal points in enhancing innovation, fostering the competitiveness of creative products, and broadening employment opportunities within the creative economy sector.

CONCLUSION

As an initial objective, this study presented an analysis of creative economy development in the waterfront city regions of Palembang and Surabaya in Indonesia. It assumed a conceptual model to identify patterns that strengthen creative economic activities and facilitate decision-making for ideal creative economy development in these areas. In addition, this research also highlighted the involvement of various parties in fostering creative economy growth in riverside cities, including academia, business, the community, government, and the media. The penta helix framework establishes key roles and relationships. The analysis reveals varying degrees of linkage across the connect, collaborate, and commerce/celebrate phases.

The study emphasizes the need for a conceptual model. In enhancing these efforts, five fundamental dimensions are considered: human resources, emphasizing skill development and mindset change; technology, promoting innovation and digital utilization; geographical considerations for strategic development; policy, emphasizing consistency and collaborative governance; and sustainability, ensuring ongoing support for infrastructure and product development. The dimensional analysis conducted in the discussion section of the conceptual model entails several programs that could also be recommended to the local government and associated stakeholders, considering their capacity and ability to establish relationships between the actors.

There is a need to strengthen collaboration between the stakeholders within the penta helix framework. Efforts should

focus on integrating actors more effectively throughout the phases of connect, collaborate, and commerce/celebrate. This can be achieved through coordinated efforts and communication channels that facilitate synergistic relationships. The local government needs to continue supporting the growth of the creative economy through supportive policies, including the development of adequate physical and digital infrastructure, as well as the provision of fiscal incentives to support innovative initiatives in the creative industry. Collaboration with academics, communities, and businesses aimed at enhancing the technical and soft skills necessary to improve the quality and involvement of human resources, particularly through community engagement with micro, small, and medium enterprises, is essential. Closer collaboration between media and other stakeholders is needed to ensure that stories about the creative economy and local achievements are heard more widely.

Policy recommendations based on fundamental dimensions include: strengthening the workforce capacity and skill development for maximizing planned creative economic activities; utilizing cutting-edge technology for innovative product development and digital marketing; tailoring creative economy programs to fit geographical conditions and leveraging geographic features for economic development; establishing bidirectional communication, strengthening collaboration between local government bodies, and formulating consistent policies to support creative economy development; and maintaining supportive infrastructure, promoting branding initiatives, ensuring resource availability, and fostering innovation for sustainable creative economic activities. The conceptual model can be adopted by other cities with similar natural resources. However, it is important to have proper measurement and evaluation mechanisms to assess the effectiveness of penta helix cooperation and its impact on the growth of the creative economy, helping to determine areas where collaborative efforts need to be enhanced or redirected.

Acknowledgements

This paper is part of a research project funded by the Research Organization for Governance, Economy, and Community Welfare, National Research and Innovation Agency, Indonesia, in 2023.

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Received December 2023; accepted in revised form May 2024.
First published: 26 June 2024.

ASSESSMENT OF SUSTAINABLE URBAN TOURISM PRACTICE IN KAMPOENG JAWI, SEMARANG CITY

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Currently, urban tourism is significantly growing due to better accessibility, information, and facilities. Several urban kampoengs (urban villages in Indonesia which generally have inadequate infrastructure and low-to-middle-income communities) have developed into tourist destinations, with their own challenges and problems that must be overcome. Improper development and organization of tourism may harm the environment and cause other negative effects, and therefore, urban tourism must prioritize sustainable development that enhances the community's quality of life without harming the environment or culture. This study aims to assess and evaluate the implementation of the Sustainable urban tourism (SUT) concept in Kampoeng Jawi, Sukorejo Village, Semarang City. The research used a quantitative approach with descriptive and scoring analyses, and data was collected through observation, interviews, surveys and studies on various secondary data. The paper assesses the four dimensions of sustainability, namely the destination management, economic, socio-cultural and environmental dimensions. The results show that Kampoeng Jawi only meets about 54% of the SUT criteria, and its sustainability level is classified as Intermediate. Development must focus on enhancing eco-friendly infrastructure, providing long-term capacity-building programs, integrating tourism, and establishing tourism crisis management.

Key words: community, cultural tourism, Sustainable urban tourism (SUT), urban kampoeng.

INTRODUCTION

Urban tourism is growing massively following the rapid increase in access, information, and facilities worldwide (Theng *et al.*, 2015), aiming not only to improve the regional economy, but also to preserve and protect local resources (Rusyidi and Fedryansyah, 2018). The World Tourism Organization (WTO) has established the tourism sector as a global issue that focuses on improving the economic, social, cultural, and environmental sectors (World Tourism Organization, 2013). With this in mind, urban tourism development should prioritize sustainable practices to enhance community well-being, while minimizing negative impacts on the economy, society, culture, and environment (Rezazadeh *et al.*, 2016). Wrong practices in tourism development will certainly have a major impact on environmental damage (Malik and Bhat, 2015). Sustainable urban tourism (SUT) has the same principles as sustainable development, which emphasizes social, economic, and

environmental balance, and it is suitable for application in urban tourism development. Applying the SUT concept is a major challenge for urban tourism development, especially for cities with massive growth in tourism, such as Semarang. Semarang City has become not only a transit city, but also a tourism city, considering that more than 60% of hotel guests stay there for at least 2 days and look for destinations to visit (Susanto, 2020). Semarang City has various community-based tourism projects initiated through the Thematic Village Program, one of which is Kampoeng Jawi, which is located in Sukorejo Village, Gunungpati District, in the suburbs of Semarang City.

Several tourism villages in Semarang City are not optimally developed, and therefore considered unsustainable. This condition is driven by several factors, including the incompatibility of the village theme with the local potential (Syarifa and Wijaya, 2019; Tamara and Rahdriawan, 2018), neglected long-term environmental management (Subekti and Putri, 2020), and the lack of residents' abilities to manage their area (Sukowati, 2022). Problems in the sustainability of urban tourism development are also

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present in Kampoeng Jawi, which implements community-based tourism development, meaning that it relies on community participation to ensure tourism sustainability. In fact, one of the issues currently being faced by Kampung Jawi is unoptimized community participation, which has not been optimal due to insufficient community knowledge and resources (Ridhwan and Wijaya, 2019). Another challenge is the increase in waste volume due to tourism activities, especially in Angkringan Pinggir Kali, a traditional culinary restaurant that attracts many visitors. The average number of visitors at Angkringan Pinggir Kali is 500-800 people a day. If Kampoeng Jawi does not have a good environmental management system, it could endanger the sustainability of the surrounding environment. Kampoeng Jawi's management has not yet achieved a balance between the three fundamental principles of sustainable tourism: socio-cultural, economic, and environmental sustainability, and the economic benefits of tourism have not been distributed evenly throughout the area, because the tourism activities are concentrated in only one block (Block 02). Based on data from Kampoeng Jawi's financial documents and direct information from the local community, the salary for culinary merchants ranges from \$191.92 (USD) to \$447.82 (USD) per month, while it stands between \$76.77 (USD) and \$115.15 (USD) per month for operational staff. Wages for operational staff are still below the minimum income standard in Semarang City (\$207.79 (USD)), which discourages most people from choosing this job as their main livelihood. In 2023, the daily turnover from tourism activities in Block 02 reached as high as \$640.56 (USD). Most of the profits are reinvested in improving the facilities and infrastructure around the tourist attractions, without significant impact on other blocks lacking attractions. Destination management often focuses solely on increasing financial resources, neglecting other aspects of sustainability. There are no strict regulations on tourist behavior or sustainable waste management systems for local MSMEs, neither are the challenges of climate change and Kampoeng security included in the planning process.

It is necessary to assess and evaluate the application of the SUT concept to determine the quality of Kampoeng Jawi as a sustainable tourist destination. In recent years, several studies have been conducted in Kampoeng Jawi: Putri and Pigawati (2019) discussed Kampoeng Jawi as a cultural tourism destination based on demand and supply; Sundaro and Yuliani (2021) discussed community readiness in fulfilling tourism needs; and Nurdiani and Felicia (2021) examined local community efforts in protecting cultural heritage. Not many studies have measured SUT practices in Kampoeng Jawi. Recent research by Kurniati and Shifa (2023) assessed specific aspects of socio-cultural sustainability in Kampoeng Jawi. More comprehensive research is needed in order to answer the complex problems mentioned earlier. The current research follows sustainable tourism indicators established by the Global Sustainable Tourism Council (GSTC) and the Ministry of Tourism and Creative Economy of the Republic of Indonesia. This study aims to assess and evaluate the implementation of the SUT concept in Kampoeng Jawi, which is represented by the degree of sustainability dimensions. The findings will prove valuable to tourism managers, local governments, and

policymakers in the development and improvement of SUT, as well as serving as an assessment for constructing a SUT framework in urban kampoengs.

LITERATURE REVIEW

The tourism potential of urban kampoengs

In Indonesia, the type of urban settlement that accommodates the majority of the population is often known as a "Kampoeng". The Kampoeng settlement type is generally considered a slum-like habitat (Shirleyana *et al.*, 2018). In general, a kampoeng is a part of the city characterized by a high population and inadequate infrastructure, with social change dynamics due to urban development (Suliyati *et al.*, 2019). In Indonesia, urban kampoengs are informal and unplanned settlements with a lack of infrastructure that are found in most cities (Devas, 1981). However, in recent decades, slum upgrading programs have been implemented through various strategies, including improving the physical quality of areas, thus facilitating housing for low-income individuals, creating proper housing, developing green cities, and empowering communities (Zubaidah *et al.*, 2023). Over the past decade, urban kampoengs in Indonesia, which used to be slum areas, have been transformed into villages with specific characters that represent the local identity and have become tourist destinations (Irwandi *et al.*, 2023). Tourism development is mostly accompanied by an improvement in the quality of the environment and the fulfillment of the basic needs of the local community. Integrated and holistic urban tourism development can improve the local economy and income (Wijayanti, 2022). An urban kampoeng could be the best choice for tourists who want to relax, learn, study culture, and find entertainment (Estelaji *et al.*, 2012). Each kampoeng has the potential for distinctiveness and uniqueness in social, cultural, and economic aspects that make the conditions of that particular kampoeng different from others (Sari *et al.*, 2017). The distinctive potentials owned by a kampoeng can be a source of attraction for urban tourism development.

Sustainable urban tourism (SUT) and approaches to sustainability assessment

SUT prioritizes sustainability through conservation and rehabilitation, interpretation, and local economic development, and it requires a balanced interaction between tourist destinations, local residents, tourists, and cultural heritage sites (Law, 1992). SUT prioritizes the preservation of cultural and historical heritage and the enhancement of societal welfare, rather than being a destructive force (Andari, 2019). The successful implementation of SUT entails minimizing negative impacts on the environment, conserving local resources, and meeting the needs of host communities and visitors (Scott and Cooper, 2010).

Several approaches for assessing the sustainability of tourist destinations have been devised, with the Global Sustainable Tourism Council (GSTC) being one of the organizations that produces a set of sustainable tourism evaluation criteria. The GSTC regulations provide guidelines on the minimum requirements for each tourist destination, in order to protect natural and cultural resources, as well as reducing poverty. The Ministry of Tourism and Creative Economy Regulation Number 9 of 2021 is being established by the Indonesian

government to develop guidelines for sustainable tourism development through the adoption of GSTC regulations. To achieve sustainable development goals, it is advised that the development of tourism villages must be guided by these two policies and integrate sustainable tourism values at every stage of development, especially in the planning process. This study employs indicators from the two policies and combines them with indicators from previous studies, such as Eckert (2020), who assessed the sustainability of urban tourism, and Gemintang *et al.* (2021), who assessed the sustainability of tourism villages. The purpose is to provide a point of reference for adapting assessment instruments to fit the local conditions in Kampoeng Jawi as an urban tourism destination. There are four dimensions which are pillars in the development of SUT, and which are crucial aspects of evaluation:

- Destination management, responsible for sustainable governance mechanisms and securing the legal framework (Eckert, 2020). Its role includes formulating strategies and strengthening synergy between stakeholders for sustainable tourism. The destination management dimension can identify potential interests and influential groups in the tourism sector, involve key groups and all other interested and influential groups in tourism, and enable their participation to ensure socio-economic prosperity for all (Miočić *et al.*, 2016);
- Economic, related to the impact of tourism on the economic growth of communities and regions (Eckert, 2020). In the context of tourism villages, the economic dimension emphasizes how tourism can support local entrepreneurship and provide decent work for host communities. The economic dimension indicates how a destination is trying to increase the competitiveness of tourism, build partnerships, provide financial resources, promote the local economy, and monitor the economic growth of the community;
- Socio-cultural, focuses on the advantages of tourism for local communities, visitor management, and cultural heritage (Eckert, 2020). The socio-cultural dimension indicates how a destination can preserve culture, enhance local identity, manage cultural resources, encourage community empowerment, and provide social welfare to the community (Asmelash and Kumar, 2019) participants were requested to evaluate the initial list of indicators based on 6 internationally accepted indicator selection criteria. The unidimensionality, multivariate normality, multicollinearity, construct reliability, convergent validity, discriminant validity and construct validity were assessed using different tests including Exploratory Factor Analysis (EFA); and
- Environmental, related to environmental conservation, natural resources, and asset protection against the influence of tourism activities (Eckert, 2020). This dimension integrates the issue of climate change and the principles of eco-tourism to minimize the risk of damage to natural resources and the environment. Governments at all levels and tourism development networks should collaborate to establish and implement environmentally friendly tourism practices, supported by strict law enforcement mechanisms.

STUDY AREA

The study was conducted in Kampoeng Jawi for several reasons: (1) Kampoeng Jawi is developing through community initiative and is projected to become one of the leading alternative tourism destinations; (2) This location has complex problems in establishing sustainable tourism, as identified through initial assessment; and (3) The study's results can serve as a pilot project for implementing the SUT concept in other urban villages. Kampoeng Jawi is an urban kampoeng located in Sukorejo Village, Gunungpati District, Semarang City. It covers an area of 24 hectares and consists of 7 neighborhood associations/blocks. Kampoeng Jawi is well known as a cultural village where various traditional Javanese cultures are still preserved, such as the arts of Rebana, Karawitan, Jathilan, Kethoprak, and others. The social values of togetherness, mutual cooperation, and harmony are embodied by the rural communities present in Kampoeng Jawi, even though it is located in a big city.

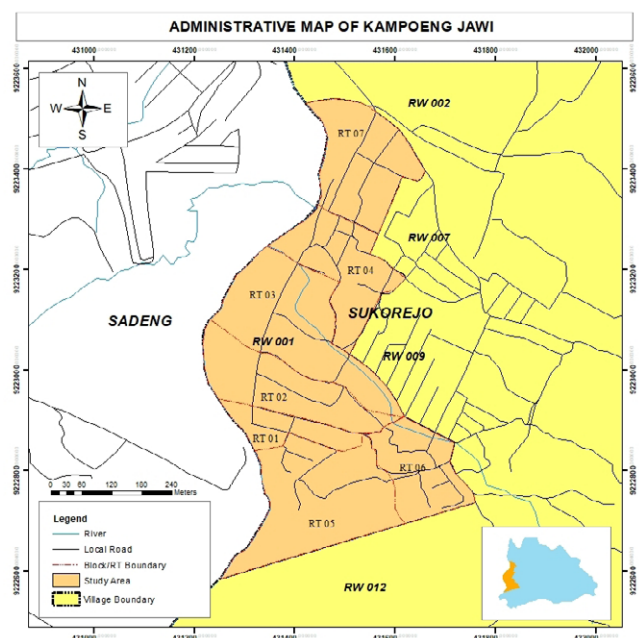


Figure 1. Study area
(Source: Analysis Result, 2023)

METHODS

This research collected secondary and primary data to obtain a comprehensive analysis. Secondary data was collected through literature studies of relevant research and policies. Primary data was collected through structured interviews, questionnaires, and observations. Structured interviews aimed to obtain in-depth information about the topic. The interview stage also facilitates the assessment process, in which researchers and resource persons rated Kampoeng Jawi sustainability's achievements on a scale of 0 to 2 based on predetermined indicators. The 11 resource persons consist of a representative of a Destination management organization/DMO (1 person), a Community figure (1 person), a Cultural Group (1 person), Merchants (1 person), Local government (1 person), Block chairpersons (5 persons), and a Local resident (1 person). The population

used in this research was the people of Kampung Jawi (1,628 people). The sample for this research was 94 respondents, which was determined based on calculating the Slovin formula, with an error tolerance of 10%. Questionnaires were distributed to the 94 respondents to assess several indicators in the Socio-cultural dimension. A Likert scale, ranging from strongly disagree (1) to strongly agree (4), was utilized to ensure precise evaluations. Observations were carried out to collect data related to activities and physical conditions.

The Kampoeng Jawi assessment applied national and global policies to accelerate sustainable development. It also identified the minimum requirements for dimensions and components that must be met to obtain sustainable tourism business certification. The World Tourism Organization (2013) emphasizes that there are at least 3 dimensions that must be considered in order to achieve a sustainable destination, namely Socio-cultural, Economic, and Environmental dimensions. This research added another one, namely Destination management, because the management group is the most important entity in organizing tourism development, based on GSTC regulations and the Ministry of Tourism and Creative Economy. Therefore, 4 dimensions and several criteria were used to assess SUT implementation in Kampoeng Jawi. These dimensions and criteria were modified from the Global Sustainable Tourism Council (2019), Ministry of Tourism and Creative Economy of the Republic of Indonesia (2021), and several previous studies on similar topics conducted by Eckert (2020) and Gemintang *et al.* (2021):

Sustainable management dimension

- Sustainable destination strategy (M1)
- Monitoring and reporting (M2)
- Enterprise engagement and sustainability standards (M3)
- Visitor engagement and feedback (M4)
- Promotion and information (M5)
- Managing visitor numbers and activities (M6)
- Planning regulations and development control (M7)
- Climate change adaptation (M8)
- Risk and crisis management (M9)

Economic dimension

- Economic monitoring (EC1)
- Local career opportunities (EC2)
- Supporting local entrepreneurs and fair trade (EC3)
- Tourism employment (EC4)
- Development control (EC5)
- Competitiveness and tourism distribution (EC6)

Socio-cultural dimension

- Protection of cultural heritage (SC1)
- Site interpretation (SC2)
- Visitor management (SC3)
- Support for the community (SC4)
- Local community opinion and access (SC5)

- Access for all (SC6)

Environmental dimension

- Environmental protection (EN1)
- Energy conservation (EN2)
- Water management (EN3)
- Solid waste management (EN4)
- Wastewater management (EN5)
- Greenhouse gas emissions (EN6)

This research used a quantitative approach with descriptive and scoring analysis. Data were processed quantitatively to evaluate the SUT implementation in Kampoeng Jawi. The analysis aimed to determine the degree of fulfillment for each dimension of sustainability. Ratings and weights were assigned to each indicator, based on primary and secondary data findings. The following are the considerations in determining the ratings and weights values according to Eckert (2020) and Gemintang *et al.* (2021), with the authors' modification:

Rating:

0 = Absolute need for action, the conditions do not support sustainability, and they contradict sustainable principles.

1 = Alarming limit, the conditions align with the sustainability principles but several factors must be addressed or improved.

2 = Safe condition, the conditions are very supportive or follow sustainability principles.

Weight:

1 = Basic indicator, refers to basic elements that are requirements for tourism development. Basic indicators are not related to current local or global issues.

2 = Core indicator, refers to the key factors or elements that become the means or efforts to achieve sustainability goals. Core indicators are related to current local and global issues.

Calculations were carried out to determine the degree of fulfillment of each dimension. Each indicator was rated and weighted according to the basic or core status, after which the degree of fulfillment for each dimension could be calculated using the formula:

$$\frac{\text{Total points}}{(\text{Sum of all quantifiers} \times 2)} \times 100 = \text{Compliance with the goal in \%}$$

Classification of the degree of fulfillment for each dimension represents the sustainability level. This study follows the class division proposed by Ko (2005), which has been used by many researchers to assess the level of sustainability. The degree of sustainability was divided into the three-point scale and the five point-scale as shown in Table 1. The five-point scale provides a more accurate evaluation of the dimensions' status and enhances communication with stakeholders.

Table 1. Degree of sustainability classification
(Source: Ko, 2005; Eckert, 2020; Gemintang et al., 2021; with the authors' modification)

The Three-Point Scale		The Five-Point Scale	
Evaluation	Degree of Sustainability	Evaluation	Degree of Sustainability
Sustainable (Green)	68–100%	Sustainable	81–100%
Intermediate (Yellow)	34–67%	Potentially Sustainable	61–80%
Unsustainable (Red)	1–33%	Intermediate	41–60%
		Potentially Unsustainable	21–40%
		Unsustainable	1–20%

RESULTS

This assessment aimed to determine the quality of SUT practices in Kampoeng Jawi, and it assigned a rating to each SUT indicator based on verified data provided by researchers, the local community, the DMO, and related stakeholders. The evaluation of SUT implementation is

based on the indicators suggested by the GSTC, the Ministry of Tourism and Creative Economy, and previous studies on the topic. The criteria and indicators were modified to suit the local conditions, so that they could be operationalized to measure sustainability in Kampoeng Jawi.

Destination management dimension

Destination management plays a crucial role in integrating diverse interests with the aim of creating sustainable urban tourist destinations (Miočić et al., 2016). Table 2 shows the results of the sustainability assessment for the Destination management dimension.

The assessment results show that the degree of fulfillment of the Destination management dimension is 47% or equivalent to the Intermediate level. This result indicates that actions are needed to achieve the criteria and improve the sustainability of the dimension. Out of the 9 criteria, M1 obtained the highest score of 0.15. As a DMO, Pokdarwis Kampoeng Jawi has a well-defined organizational structure and responsibilities. The integration of relevant stakeholders is needed to involve key and influential groups in tourism and enable their participation, in order to provide socio-economic prosperity (Miočić et al., 2016). DMOs are fully aware that they have limited resources. Therefore, they

Table 2. The sustainability assessment for the destination management dimension
(Source: Analysis Result, 2023)

Criteria	Indicator	R	W	Score	Criteria Degree
M1	Degree	2	2	4	0.15
	Integration of relevant stakeholder	2	1	2	
	Management guidelines based on sustainability principles	0	2	0	
	Multi-year strategy that includes a focus on sustainability	1	2	2	
	Multi-year strategy based on assets and risks assessment	1	2	2	
M2	Actively collecting data and reports on sustainable tourism and management issues	1	2	2	0.06
	Periodical review of monitoring system	2	1	2	
M3	Management supports sustainable business certification for tourism-related enterprises	0	2	0	0.00
	List of tourism-related certified enterprises available publicly and keep updated	0	1	0	
M4	Visitors’ feedback mechanism on sustainability issues	1	2	2	0.04
	Visitors’ feedback mechanism on tourist destination	1	1	1	
M5	Information and promotional material with appropriate content	2	1	2	0.04
	Utilizing multiple media to share information, promote, and facilitate reservations	1	1	1	
M6	Management strategy and action plans to address seasonality of tourism and spread of visitation	1	2	2	0.09
	Monitoring of visitor numbers, activities, and impacts	2	2	4	
M7	Public consultation when developing tourism	1	2	2	0.03
	Public participation in the development of policies/regulations/guidelines	0	1	0	
M8	Management strategy and action plans in addressing climate issues	1	2	2	0.03
	Information on climate change adaptation has been made publicly available	0	1	0	
M9	Risk reduction, crisis management and emergency response plans	1	2	2	0.03
	Risk and crisis management training programs	0	2	0	
SUM			34	32	0.47
Degree of fulfillment: Management dimension		0.47			
		47%			

collaborate with relevant stakeholders (cultural community and artists, institutions, the private sector, academics and the media) to encourage the acceleration of development through funding, education, facilities, promotions, etc. What needs to be prepared in this criterion are management guidelines and multi-year planning strategies, based on sustainability principles and referring to risk assessments. This will ensure efficient and effective management of the community's resources and help destinations in preventing, adapting, reducing, and overcoming crises (Ngo and Creutz, 2022).

The M3 criterion obtained the lowest score of 0.00. Accredited sustainable certification is needed to ensure that business do not have negative impacts on environmental and social dimensions. The two indicators in this criterion have not been met at all. Currently, the DMO is prioritizing the development of more diverse tourist attractions. Support for businesses is limited to training programs without assessment for sustainable business certification. The DMO hopes that in the future there will be guidance and assistance from related institutions to facilitate business certification. Other criteria that urgently need action are M7, M8, and M9. In practice, DMOs tend to still dominate village development initiatives. In community-based tourism, the guidelines and policies should be created with public participation and are widely communicated and enforced.

Medium-long term plans and strategies for overcoming climate change need to be developed, so that Kampoeng Jawi can survive if climate problems occur. On the other hand, there is still a lack of emergency response plans that address physical threats and security concerns at attraction sites. Crisis management training programs are urgently needed to strengthen the capacity of the communities with regard to managing various internal and external pressures (Ngo and Creutz, 2022). This effort contributes to maintaining security, comfort and conduciveness to the enjoyment of all activities in tourist destinations.

Economic dimension

The Economic dimension highlights tourism's positive contribution to the economic growth of society. It is crucial to consider the economic dimension because without economic stability, the socio-cultural or environmental dimensions may not be considered by tourism stakeholders due to lack of financial resources (Eckert, 2020). Table 3 shows the results of the sustainability assessment on the Economic dimension.

The assessment results show that the degree of fulfillment of the Economic dimension is 57% or equivalent to the Intermediate level. This result indicates that actions are needed to achieve the criteria and improve the sustainability of the dimension. Among the 6 criteria, EC3

Table 3. The sustainability assessment on the economic dimension
(Source: Analysis result, 2023)

Criteria	Indicator	R	W	Score	Criteria Degree
EC1	Programme of economic data gathering for measuring economic impact	2	2	4	0.10
	Regular monitoring and reporting of the direct and indirect contribution of tourism	2	1	2	
EC2	Policies supporting equal opportunities for local people (including women, young people, minorities, and the disabled)	2	2	4	0.10
	Existence of business group for small and medium enterprises	0	2	0	
	Programs to raise awareness of tourism's role and potential contribution	1	2	2	
EC3	Involvement of craftsmen, farmers, and MSMEs in the tourism value chain	2	2	4	0.14
	Support of MSMEs through business training programs or monetary resources	2	1	2	
	Encourage and assist local tourism enterprises to purchase goods and services locally and fairly	1	2	2	
	Programs that promote and develop local products	0	2	0	
EC4	Staff receive the legal minimum wage and understand its calculation	1	2	2	0.10
	Staff receive training to upgrade their skill and to get certified	1	2	2	
	Working hours comply with applicable laws and regulations on deviations are agreed by the staff in writing	2	1	2	
EC5	Funding for the development of attractions	2	1	2	0.07
	Programs to facilitate donations to community and infrastructure development	2	1	2	
	Integration of economic and tourism activities in all village areas	0	2	0	
EC6	Provision of accommodation operating at the destination	1	1	1	0.05
	Travel plans in the municipality (integrated tourism)	0	1	0	
	Optimizing websites and social media for promotions	1	2	2	
SUM			29	33	0.57
Degree of fulfillment: Economic dimension		0.57			
		57%			

obtained the highest score of 0.14. Empowering the local communities will stimulate financial independence, product development, and economic sustainability (Asmelash and Kumar, 2019). Kampoeng Jawi's development has involved local communities in the tourism supply chain. Figure 2 shows Kampoeng Jawi's tourism value chain and the local parties directly involved. Training has been provided for the community, such as: production, financial management, business permits, product packaging, and business management training. These training courses were mostly conducted by the Semarang City government.



Figure 2. Kampoeng Jawi's Tourism Value Chain
(Source: Analysis result, 2023)

Monitoring and reporting are carried out every year to determine the direct and indirect contribution of tourism to the community's economy. The evaluation results will be used as a basis for improving performance and initiating remedial actions for future programs (Gemintang *et al.*, 2021). This tourism development aims to create the widest possible employment opportunities for local communities, including women, youth, minorities and the disabled. There are 18 people who have opened culinary stalls and 28 people who are employed in the tourism business. The sellers' net income ranges from \$191,92 (USD) to \$447,82 (USD) per month, while employees receive wages between \$76,77 (USD) and \$115,15 (USD) per month. The wages are adjusted based on the employees' working hours of approximately 5-6 hours per day. Although still below standard, employees find this amount sufficient to meet their daily living expenses.

Criterion EC6 obtained the lowest score of 0.05. Kampoeng Jawi is located within the Gunungpati District, which offers various natural and cultural attractions, in line with its theme: Traditional Javanese cultural tourism. However, there is no integrated tourism that connects one destination with another in the same region. Integrating various destinations and districts is crucial for developing a new urban tourism model, which ultimately enhances local revenue and promotes the local destination (Ariani, 2018). To enhance competitiveness, local communities can offer accommodation in homes and appear as the basic creators of local culture (Miočić *et al.*, 2016). Nevertheless, Kampoeng Jawi currently lacks adequate lodging and food/beverage facilities. Homestay remains an unfinished task due to the lack of standard amenities in most households. Another criterion that urgently needs action is EC5. Currently, the economic and tourist activities are concentrated in Block 02. To achieve equal local prosperity, it is necessary to diversify products and create a conducive space for economic activity throughout the areas (Asmelash and Kumar, 2019). In

the future, every block should boast a distinctive tourist attraction that aligns with the Kampoeng Jawi theme. To achieve this vision, an integrated cultural tourism plan is needed that leverages the potential of each block.

Socio-cultural dimension

Social and cultural sustainability that is owned and managed by the community needs to be emphasized, especially in the development of community-based tourism (Putri *et al.*, 2018). Besides the preservation of cultural heritage, the Socio-cultural dimension concerns the well-being of local

communities, promoting community participation, and ensuring accessibility for all. Table 4 shows the results of the sustainability assessment on the Socio-cultural dimension.

The assessment results show that the degree of fulfillment of the Socio-cultural dimension is 63% or equivalent to the Intermediate level. This result indicates that actions are needed to achieve the criteria and improve the sustainability of the dimension. Out of the 6 criteria, SC1 obtained the highest score of 0.29. Tourism products in Kampoeng Jawi are related to the preservation of intangible cultural heritage. Traditional Javanese culture including dance, traditions, ceremonial procedures, traditional toys, cuisine, music and language are the main attractions of Kampoeng Jawi. Products around topics such as music, dance, theatre, rituals, celebrations and language can add value for the visitor and offer authenticity (Eckert, 2020). To provide adequate cultural preservation facilities, the management has collaborated with stakeholders through a clear, transparent and accountable funding mechanism, accompanied by the Sukorejo Village government.

The Socio-cultural dimension assessment includes finding out how local residents accept tourism. The authors conducted a survey of local residents' perceptions of tourism development in Kampoeng Jawi. 94 respondents were selected using sampling techniques, and questionnaires were distributed equally among the blocks. Local community perceptions influence their support and willingness to contribute to tourism development and cultural preservation (Adetola and Adediran, 2014). The majority of respondents believed that their cultural heritage was successfully represented through tourist attractions, and they perceived that tourism had no negative impact on their social life. This could be human resource capital for development. Table 5 shows the results of calculations from the questionnaires.

Aspects that need to be considered are the low involvement of the younger generation in cultural preservation and

Table 4. The Sustainability Assessment on the Socio-Cultural Dimension
(Source: Analysis result, 2023)

Criteria	Indicator	R	W	Score	Criteria Degree
SC1	Tourism products that respect intangible cultural heritage	2	2	4	0.29
	Destination's events focused on traditional culture or local wisdom	2	2	4	
	Involvement of local communities in developing and delivering visitor experiences	1	2	2	
	Involvement of the younger generation in preserving local culture (regeneration)	1	2	2	
	Adequate facilities to support cultural preservation	1	2	2	
	Funding mechanism to support preservation of cultural assets (maintenance, restoration, etc.)	2	2	4	
SC2	Story-telling about destination's cultural and historical values	1	2	2	0.05
	Professional multi-lingual interpreters and availability of interpretative material in various languages	1	1	1	
SC3	Guidelines on visitor behaviour at cultural events and attraction sites	1	2	2	0.06
	Provision of training for guides and tour operators	2	1	2	
SC4	Tourism Awareness Education/Training	1	2	2	0.06
	Human resource development	1	1	1	
	Management of community groups with different interests	1	1	1	
SC5	Reporting on resident expectations, concerns, and satisfaction with destination management	2	2	4	0.16
	Perception of representation of their own cultural heritage by residents.	2	1	2	
	Perception of negative impacts caused by tourism	2	1	2	
	Communities' involvement in tourism development stages (planning, implementing, monitoring and evaluating)	1	2	2	
SC6	Inclusive facilities for people with disabilities and specific access requirements	0	2	0	0.00
	Accessible infrastructures for people with disabilities and specific access requirements	0	1	0	
SUM			31	39	0.63
Degree of fulfillment: Socio-cultural dimension		0.63			
		63%			

the involvement of local communities in delivering visitor experiences. Intangible cultural tourism requires higher involvement of local communities to present local specifics, the way of life, activities, and traditions than tangible forms (Moric *et al.*, 2021). In the development process, most of the community is actively involved at the implementing stage. Meanwhile, at the planning, monitoring and evaluating stages the community is passively involved.

Out of all the criteria, SC6 obtained the lowest score of 0.00. There are no facilities and infrastructure for people with

disabilities or specific access requests. The inclusive and accessible development of tourism provides convenience for the entire community, because everyone has the right to enjoy recreation (United Nations, 2020). The provision of facilities and infrastructure aims to provide universal comfort and safety for visitors in tourist destinations. The DMO must consider disability-friendly facilities such as special parking, accommodation, toilets, ticket counters, and sign language interpreters. Creating inclusive infrastructure to enhance accessibility is a crucial element in making destinations truly accessible for all. Examples of

Table 5. Local community perception on Kampoeng Jawi tourism
(Source: Analysis Result, 2023)

	Strongly disagree 1	Disagree 2	Agree 3	Strongly agree 4
I feel like our own cultural heritage is well-represented in Semarang City concerning tourist attractions.	2	20	56	16
	Strongly disagree 1	Disagree 2	Agree 3	Strongly agree 4
Tourism in Kampoeng Jawi affects my living conditions in a negative way.	38	55	1	0

infrastructure that should be provided include a disabled lane, level walkways, wide sidewalks, and ramps.

Environmental dimension

The SUT concept emerged as a response to the impact of human activities (pollution and environmental degradation) and the influence of global warming (Andari, 2019). Environmental problems arise when urban tourism drives progressive economic growth, while ecological sustainability is neglected. Table 6 shows the results of the sustainability assessment for the Environmental dimension.

The assessment results show that the degree of fulfillment of the Environmental dimension is 50% or equivalent to the "Intermediate" level. This result indicates that actions are needed to achieve the criteria and improve the sustainability of the dimension. Out of 6 criteria, EN4 obtained the highest score of 0.14. Due to the high amount of solid waste produced from tourism, regular monitoring and a waste reduction campaign are necessary. The monitoring program should be implemented through periodic review of the waste volume resulting from enterprises and tourism activities. Many tourism businesses have found ways to limit plastic consumption, such as replacing disposable plastic products with eco-friendly ones (Tran *et al.*, 2020). DMO

enforces a policy that requires all merchants to use non-plastic materials to serve and package their products. This policy aims to reduce the volume of plastic waste which has become an environmental issue at local and global levels, but plastic waste production in Semarang City reached as much as 1,110 tons per day in 2022 (Semarang City government, 2022). This initiative also aims to preserve local wisdom, whereby food and drinks will be more delicious if served using natural materials (leaves, coconut shells, woven bamboo, etc.).

Kampoeng Jawi implements a sustainable solid waste management system based on community participation. In every block, a responsible group manages solid waste through the Waste Bank Program. The program comprises sorting, collecting, weighing, recording, and sharing results. Each household sets aside inorganic waste to be collected at the Waste Bank once a month. The waste is weighed and recorded then sold to collectors. Some of the proceeds from these sales go into the management's coffers while the rest is distributed among the participants. Besides the Waste Bank, the community recycles solid waste into handicrafts, such as bags and wallets. In terms of a wastewater management system, Kampoeng Jawi, located in Sukorejo Village, is part of Semarang City's On-Site WWM System. The system features

Table 6. The sustainability assessment on the environmental dimension
(Source: Analysis result, 2023)

Criteria	Indicator	R	W	Score	Criteria degree
EN1	Identification and assessment of environmental risks and impacts	1	2	2	0.09
	Policies to protect and manage the tourist environment	2	1	2	
	Guidelines on visitor behaviour at tourism sites	0	2	0	
	Monitoring of visitor flows, activities, and impact on natural sites	2	1	2	
EN2	Program for measuring and monitoring energy consumption	1	1	1	0.05
	Actions to increase energy efficiency	1	2	2	
	The application of renewable energy at the destination	0	2	0	
EN3	Program for measuring and monitoring water usage	2	1	2	0.12
	Actions to increase water usage efficiency	1	2	2	
	Program for measuring and monitoring water quality	2	1	2	
	Actions to improve water quality	1	2	2	
EN4	Waste monitoring program, with results and targets published	1	1	1	0.14
	Campaign to reduce/eliminate single use items, especially plastics	2	2	4	
	Sustainable solid waste management system	2	2	4	
EN5	Guidelines for local communities and enterprises on wastewater treatment	2	1	2	0.11
	Wastewater monitoring program, with results and targets published	1	1	1	
	Provision of sustainable wastewater treatment systems	2	2	4	
EN6	Program for measuring and monitoring greenhouse gas emissions	0	1	0	0
	Provision of green transportation development plan	0	2	0	
	Provision of sustainable transport modes	0	2	0	
	Provision of infrastructure for walking and cycling	0	2	0	
SUM			33	33	0.50
Degree of fulfillment: Socio-cultural dimension		0.50			
		50%			

a Communal IPAL, a large-scale domestic wastewater treatment facility used jointly by several household. However, the majority of residents refuse to participate in communal domestic waste management, due to their lack of knowledge regarding the dangers of improperly managed domestic wastewater. Further socialization and education are needed.

The criterion that urgently needs action is EN6, considering that this criterion obtained the lowest score of 0.00. There is no GHG emission monitoring system or any low-carbon facilities or infrastructure. Kampoeng Jawi should consider implementing regulations for conserving energy and exploring the possibility of using renewable energy. The energy and the carbon efficiency of the tourism industry should be constantly monitored and measured. GHG reduction can be achieved by reducing energy consumption and using renewable sources, especially in the transport sector and accommodation (Riojas-Díaz *et al.*, 2022). The tourism industry has to implement eco-efficient technologies and processes in all of its areas, including buildings, facilities, and infrastructure.

Assessment results of overall dimensions

In this section, the degree of fulfillment of the dimensions is visualized using a three-point scale and a five-point scale. Based on a three-point scale visualization, it can be clearly seen in Figure 3 that degree of fulfillment for all dimensions is 54%, falling within the Intermediate range. The yellow area indicates that the implementation of the SUT concept in Kampoeng Jawi is conditionally acceptable. It means that the development has managed to have a positive impact on economic growth, socio-cultural preservation, and ecological protection, however, numerous areas and aspects need improvement and consideration. Some indicators have not been achieved at all, or have not been achieved optimally.

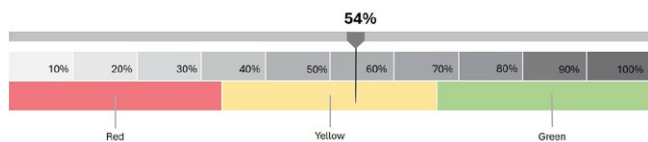


Figure 3. Degree of fulfillment for all dimensions of sustainability on a three-point scale
(Source: Analysis result, 2023)

Based on the five-point scale visualization, it can be clearly seen in Figure 4 that the Destination management dimension has the lowest degree of sustainability, namely 47%, which is classified as Intermediate. Meanwhile, the Socio-cultural dimension has the highest degree, namely 63%, which is classified as potentially sustainable. The gap degrees are quite significant if detailed based on the indicators and criteria. Similar to the Destination management dimension, the Economic dimension and Environmental dimension are also classified as Intermediate. The figure clearly demonstrates the low overall degree of fulfillment reached in Kampoeng Jawi. The findings establish that the Destination management dimension necessitates the most action. DMO acts as a central entity that manages all elements in the destination. It is necessary to have quality and systematic destination management, in order to create a competitive and sustainable urban tourism destination

(Miočić *et al.*, 2016). Therefore, Kampoeng Jawi's DMO needs to develop a systematic SUT plan and strategy. The development of crisis management and a DMO guidelines document based on sustainability principles must be included in the priority strategy. The implementation of sustainability principles by the management will promote greater fulfillment of other dimensions.

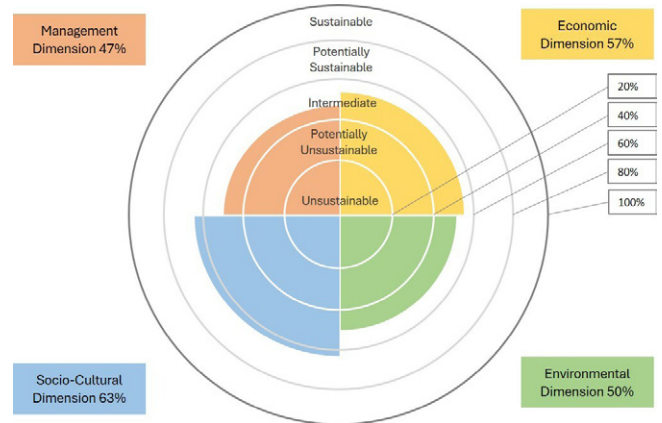


Figure 4. Degree of fulfillment for each dimension of sustainability on a five-point scale
(Source: Analysis result, 2023)

CONCLUSION

This research aimed to assess and evaluate the implementation of the SUT concept in Kampoeng Jawi. The results show that implementation of the SUT concept in Kampoeng Jawi has not met all the specified criteria. The degree of fulfillment of the dimensions is mostly in the Intermediate range, with 55% of all the indicators achieved, indicating that sustainable urban tourism has not been fully realized. Each dimension requires strategic plans, especially in the destination management area. This study found that the Destination management dimension obtained the lowest score, even though this dimension is a key factor in organizing sustainable tourism. These results do not necessarily ignore other dimensions; indeed, there are several urgent issues in other dimensions that need to be considered, such as providing inclusive infrastructure, increasing community participation, developing integrated cultural tourism, and providing eco-friendly facilities and infrastructure. This study presents an outline of priority areas that need enhancement and development. To ensure that tourism development is always aligned with sustainable principles, the DMO should create sustainable tourism management guidelines and establish disaster crisis management. To optimize tourism development, internal and external stakeholders need to develop an integrated, culturally valuable, and eco-oriented tourism development plan. A participatory planning approach should be applied so that all elements can play a role in the implementation of SUT. The findings provide valuable insights to generate sustainable tourism development, especially in the context of community-based urban tourism development. The findings indicate crucial aspects that need to be addressed to optimize the implementation of SUT in Kampoeng Jawi. It is possible that these conditions also occur in other villages, so these results can be used as evaluation material

at the local and national levels. Based on the findings of this study, future research should analyze how internal and external challenges and threats (such as natural disasters and the Covid-19 pandemic) affect the implementation of the SUT concept. Additionally, future research is expected to provide guidance on priority strategies for maintaining tourism sustainability during times of crisis. This research is urgently needed, particularly for community-based tourism, which typically has limited resources and knowledge.

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EXPLORING MORPHOLOGICAL DYNAMICS OF PONTIANAK THROUGH QUANTITATIVE STUDY AND CULTURAL INSIGHTS

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This study employs urban mapping techniques to explore the intricate relationship between the built environment and urban processes amidst rapid urbanization. The study area is located in Pontianak city, a city with integrating historical, geographical, and cultural perspectives in Borneo Island, Indonesia. This study unravels Pontianak's urban morphology, aiming to decipher the correlations between accessibility, built form, and cultural identity. Utilizing quantitative methodologies and the Spacematrix method, this research unveils the evolving relationship between accessibility and building density. Analyzing centrality through Space Syntax, it investigates the city's morphological development and cultural identity. The findings highlight Pontianak's adaptability to transportation shifts, emphasizing the impact on its urban evolution. Economic activities strongly shape building density, influencing architectural landscapes across zones. Nuanced correlations between integration, building attributes, and gross floor area underscore historical, cultural, and economic influences. Infrastructure development, notably roads and bridges, significantly enhances connectivity and catalyzes urban growth. This research illuminates the intricate tapestry of Pontianak's urban life, emphasizing its resilience and dynamic evolution amidst changing influences.

Key words: centrality, morphology, Pontianak, Space Syntax, waterfront city.

INTRODUCTION

Numerous historical cities struggle with a critical morphological and typological crisis, a consequence of the pervasive impact of mass production and the standardizing effects of international design (Liang and Cavaglion, 2022). This trend, observed globally, stems from the economic and industrial restructuring and reshaping of cities worldwide (Zhang and Zhang, 2021). Sun and Bao (2021) assert that intricate urban morphology is deeply influenced by political, economic, and social dynamics. In this complex web, advancements in transportation technology augment accessibility, while economic conditions drive the specialization of labor. The interplay of these factors not

only forges new urban forms, but also significantly reshapes existing cityscapes and lifestyles (Stojanovski, 2019).

The escalating pace of urbanization in our contemporary world underscores the urgent need to decipher the complex relationship between the built environment and urban processes. This comprehension is pivotal in steering urban development toward more sustainable trajectories (Berghauser Pont *et al.*, 2019). Among the distinctive urban landscapes, waterfront areas stand out, with their unique morphology centered around water bodies (Pekin, 2013). These areas possess a rich history marked by continual transformation owing to their relationship with water and consequential typological shifts (Zhang, 2021). The post-industrial era has introduced a new set of challenges, as many waterfront industrial zones are facing ecological

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and socio-economic crises, triggered by the relocation and transformation of industrial sites, often leading to abandonment (Zhang, 2021).

The core essence of urban morphology revolves around an understanding of geographical features and historical context (Sonne, 2022). An exemplar of such dynamics is Pontianak, a city representing power, and governing the West Kalimantan (West Borneo) Region in Indonesia (Andi *et al.*, 2023). Pontianak's unique geographical footprint is demarcated by the Kapuas River, spanning 150 to 200 meters in width, significantly shaping the city's development (Gunawan *et al.*, 2022). The city's evolution is intricately tied to the Kapuas River and its tributaries, as evidenced by the initial stages of its development. Notably, Pontianak's history is marked by a significant transition from reliance on water-based transportation to favoring land transport, eventually leading to the abandonment of its riverside areas (Gunawan *et al.*, 2022). Prior research by Gunawan *et al.* (2022) has focused on understanding the typology of settlement development in Pontianak's riverside communities, predominantly employing qualitative approaches and investigating the city's urban historical evolution.

Driven by the intricate observations of Pontianak's urban dynamics, this study seeks to delve deeper into the city's morphology using urban mapping techniques, quantitative methodologies, and an in-depth exploration of cultural identity. The primary objective is to unravel the correlations between accessibility, built form, and cultural identity. Employing a quantitative approach is essential to generate reliable and precise datasets, fostering a more profound understanding of the city's morphology and its potential for urban transformation (Erin *et al.*, 2017). The research endeavors to adopt a focused approach, conducting a synchronic study within a specific timeframe in Pontianak. The study's variation will primarily concentrate on exploring three distinct land areas within the city. By juxtaposing these areas shaped by diverse political powers, cultures, and historical influences, the research aims to uncover and elucidate the differences in urban fabric. This comparative analysis intends to contribute significantly to comprehending the multifaceted development of Pontianak.

UNDERSTANDING URBAN MORPHOLOGICAL DYNAMICS

Urban morphology stands as an ever-expanding interdisciplinary realm, drawing global attention from scholars in architecture, geography, and planning (Kristjánsdóttir, 2019; Stojanovski, 2019). At its core, this field encompasses the analysis, interpretation, and evolution of a city's physical form (Sonne, 2022). Employing innovative urban mapping techniques, it unearths intricate connections between how cities are perceived, conceived, and inhabited, shedding light on the intricate tapestry of urban life (Dovey and Ristic, 2017). By integrating historical, geographical, and cultural perspectives, urban morphology unravels the various constraints shaping urban environments and how these influences evolve over time, providing invaluable insights into the city's development (Berghauser Pont and Haupt, 2009).

The practical applications of morphological analysis are wide-ranging and impactful. For instance, within the realm of architectural and urban conservation, it serves as a guiding beacon, informing interventions in historic urban settings and buildings (Daher, 2023). Understanding the nuances of type design and the clustering of urban areas facilitates informed decision-making in urban development, management, and regulation (Potapenko and Moor, 2020). Moreover, this approach serves as a potent tool for prescribing strategies aimed at restoring identity in historical districts threatened by market-driven urban development, ensuring the preservation of cultural heritage (Liang and Cavaglion, 2022). Recognizing the multifaceted significance of urban morphology spans diverse areas, encompassing urban conservation, development, assessment of climate impact, and the restoration of identity in historical areas (Kevin, 2023; Li *et al.*, 2021).

Delving into the fundamental elements of urban morphological studies, the examination revolves around two pivotal units: streets and buildings, which serve as essential components of analysis (Berghauser Pont *et al.*, 2019). In 2009, Berghauser Pont and Haupt redefined how we measure density by quantifying built form as urban density. This measurement of built and unbuilt space has become an essential urban design tool, helping us understand urban performance. Earlier, in 1984, Hillier and Hanson created Space Syntax using a configurational approach to understand urban performance. While the Spacematrix focuses on the building element, Space Syntax focuses on the street element. These two methods were later adopted and combined by Nes *et al.* (2012) as an effective means to encapsulate urban space within its broader context, aiding in predicting pedestrian movement and spatial understanding of the built form. The same idea of combining Space Syntax and the Spacematrix was also explored by Berghauser Pont *et al.* (2019), in order to understand pedestrian movement. Methodologically, spatial analysis plays a central role, indispensable in calculating street centrality and built density, providing crucial insights into urban configurations. This approach opens up opportunities for further exploration of understanding urban performance and its relationships to political powers, cultures, and historical influences.

METHODS

This research employed a quantitative approach to unveil hidden patterns in the relationship between built forms and accessibility within a city's study area, particularly emerging from its riverside. The method utilized was the Spacematrix method, chosen for its ability to connect density to urban form and other performance metrics (Nes *et al.*, 2012). In this context, the additional performance metric examined was accessibility, analyzed through centrality analysis using the Space Syntax method. Space Syntax was chosen due to its robust theoretical foundation and practical applications in analyzing spatial configurations and their impact on social and economic activities within urban environments (Lamprecht, 2022). Furthermore, this research explores cultural identity to gain a deeper understanding of morphological development, akin to the study conducted by Kevin (2023).

The required data for this research involves modeling 2D urban elements and observing building height, and the urban elements considered here are confined to street networks and building blocks, excluding plot elements. These urban elements are pivotal for morphological studies, focusing primarily on shapes and structures that exist physically but might not be directly visible, such as the city's footprint, represented through maps or plans like black plans (illustrating building footprints) (Sonne, 2022). This aligns with Conzen's assertion (2004) regarding the three fundamental elements in urban morphology studies: streets, lots, and buildings, with buildings being depicted only in general footprints without floor plans. Data for modeling was sourced from OpenStreetMap, while the building height observation necessitated field surveys to ascertain the number of stories for each building in the study area.

This study revolves around three key variables: building height (L), building gross floor area (F), and integration (I) of the street network. Building height data was obtained through direct collection, while the other variables required analytical processes. These variables were chosen based on the manner in which morphological structure describes the physical features of cities, encompassing building stories (L), building area (F), and urban elements like buildings, streets, and routes (Stojanovski and Östen, 2018).

The study employed several analyses, including quantification using GIS, centrality analysis, and correlation analysis. In GIS quantification, the building footprints were calculated using QGIS software, because this software offers tools to count the area function (\$area) instantly. The software also allowed us to manage and store other data, such as building height and year established. The gross floor area (F) of a building is derived from the product of its footprint (G) and height (L) within the GIS environment. The GIS method helped us to map out and understand how the built form is distributed throughout the study area.

Centrality analysis is analysis from the Space Syntax method. Centrality analysis measures how likely it is for a road to be part of the shortest route between any two roads in a neighborhood. It helps identify the most accessible roads where most activities are concentrated. The analysis is a resulting integration (I) value obtained by utilizing centrality analysis street network data. This analysis allows us to understand the accessibility of the study area.

Drawing inspiration from the common practice of Space Syntax in analyzing built spaces and correlating them with social uses, this study examined the correlation between accessibility and morphology (Sonne, 2022). Once all variables were compiled, correlation analysis was conducted to assess the relationships between building height (L) and integration (I), as well as between the gross floor area (F) and integration (I). Correlation analysis helped us to find the correlation between accessibility and the built form.

STUDY AREA

The study area is situated within Pontianak city, West Kalimantan province, Indonesia. It encompasses a 1 km radius centered around the tributary of the Kapuas river (Figure 1). Many urban phenomena, such as walkability and accessibility, are better understood at the neighborhood scale, which is defined as an area within a 1 km radius, making it a suitable unit for analyzing urban morphology and integration (Spielman and Yoo, 2009). This particular area, believed to be the site of the city's initial settlement, holds historical significance. A previous study conducted by Sun and Bao (2021) similarly focused on an area encompassing cultural and historical significance. This detailed urban morphology study aims to enhance the existing dataset (Li *et al.*, 2021). The study area is categorized into three distinct zones: Zone A, Zone B, and Zone C. Zone A marks the genesis of the Chinese settlement, originating from a marketplace that also served as the residential area for the Chinese community. Zone B stands as the pioneer of the entire settlement. It is where the First Sultan initiated the establishment of a palace and mosque. Zone C comprises the Dutch Colony settlement, featuring a fort, administrative office, and residences for Dutch settlers.

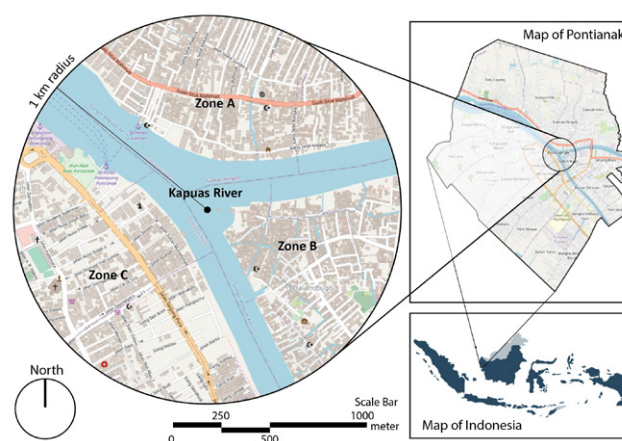


Figure 1. Location of the study area
(Source: Authors, 2023)

Founded in 1771 by Sultan Syarif Abdurrahman, Pontianak city evolved through a sequential emergence of distinct zones, with Zone B as the initial locus housing the king's palace, succeeded by Zone C and culminating in Zone A (referenced in Figure 2). This chronological development unfolded as the sultan established a regal precinct comprising a palace and mosque in Zone B, around which his followers constructed settlements. Subsequently, the Dutch colonial presence in Zone C led to negotiations for land acquisition, marking the inception of their settlement and the beckoning of Chinese merchants to establish a thriving market in this zone. Eventually, the growing Chinese community's expansion extended to Zone A, creating a central settlement hub. Figure 2 illustrates this expansion from the riverside in Zones A, B, and C, portraying a linear pattern of settlement growth along the riverbanks before radiating inland. The documented timeline draws from maps delineating Pontianak's evolution, spanning from 1771 to 1983, acquired from national archives and

administrative maps, further complemented by online maps from 2023, although newly constructed buildings in 2023 are out of range of the study area.

A comparative exploration of building development and the evolution of road networks reveals intriguing similarities and distinct differences. Initially, both building infrastructure and road networks emerged along the riverside, yet their developmental paths diverged significantly. Building development exhibited a remarkable surge, experiencing exponential growth that surpassed the study area's boundaries, notably peaking between 1855 and 1895. Conversely, the evolution of the road network unfolded at a more gradual pace, reflecting the city's reliance on waterways for transportation during its inception. The city's urban landscape expanded initially along the riverside, with buildings gradually extending inland via canal connections. Roads were a secondary feature, with limited development during this phase (Figure 2). However, a pivotal transformation occurred with the establishment of bridges connecting Zones A, B, and C, marking a significant turning point. This transition spurred substantial growth in the road network from 2003 to 2023, indicating a shift towards road-based transportation infrastructure, as the bridges facilitated enhanced connectivity across the zones (see Figure 2). Pontianak's initial dependence on water-based transportation networks accounts for the slower development of its road network compared to the rapid urbanization and expansion of building infrastructure.

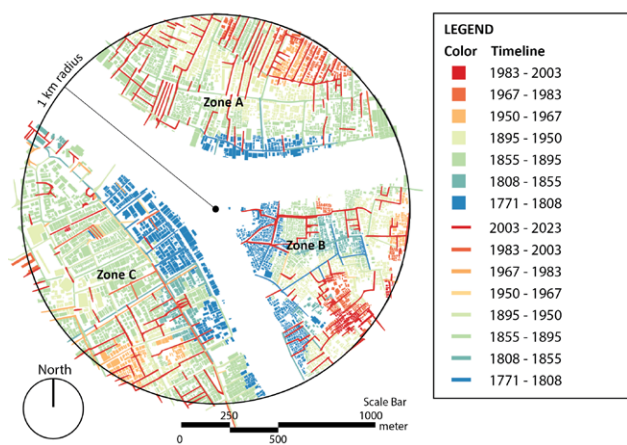


Figure 2. Age of buildings and streets in the study area
(Source: Authors, 2023)

RESULTS

Accessibility of Pontianak city

This research employed a larger model of Pontianak city for integration data analysis, deviating from the commonly used segmented model in Space Syntax studies (Atakara and Allahmoradi, 2021). Contrary to the limitations observed in smaller study areas, especially in excluding essential bridge connections, this study adopted a broader perspective, encompassing a radius of 8 km, deliberately incorporating three vital bridges (see the Pontianak city map in Figure 3). These bridges serve as crucial connectors in a city divided by rivers, acting as primary access points between the three zones. Figure 3 demonstrates concentrated high integration values and centrality within Zone C, with Zone

B also displaying significant integration due to its bridge connections with Zones A and C. Conversely, Zone A records the lowest integration value, positioned in the outskirts relative to central Zone C. High integration rates signify the potential for increased activity density, such as movement and economic endeavors (Berghauer Pont *et al.*, 2019). The integration analysis, as depicted in Figure 3, identifies Zone C as the economic hub, with major roads predominantly concentrated in this area, subsequently extending integration to Zone B and eventually to Zone A.

Narrowing the focus to the study area, a 1 km radius, the integration analysis (depicted in Figure 3) underscores significant integration rates across the three zones. Zone C boasts the highest integration rate on average, followed by Zone B with a moderate rate, and Zone A displaying the lowest integration. Zhang and Zhang (2021) discovered a correlation between accessibility and built form, noting that industries often locate themselves in areas with low integration, often rural or distant from urban centers. In this context, Zone A emerges as the city center, Zone B as the urban area, and Zone C as the suburban region, delineated by varying levels of integration. Pontianak's street network differs notably from cities organized in a grid pattern. Its irregular shape stems from organic growth rather than planned development, as Sonne (2022) notes. Marshall and Gong's (2005) ABCD typology categorizes this irregular street network as Type A, characteristic of old city cores with irregular, meandering streets. Conversely, Type B typifies regular grid-shaped networks. This irregularity impacts connectivity, contributing to Zone B's significantly lower integration. In contrast, Zone C's integration is higher, influenced by the Dutch and European urban planning styles, instilling a grid layout. However, Zone A, despite inheriting the grid pattern from Zone C, records the lowest integration, primarily due to its distance from Zone C, highlighting that street network shape alone may not significantly affect integration levels.

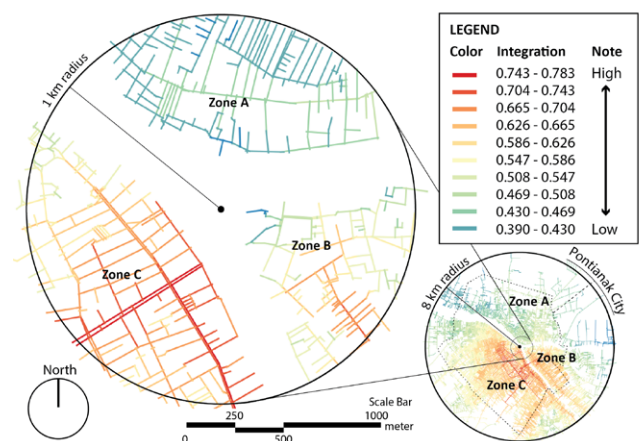


Figure 3. Integration analysis of the study area
(Source: Authors, 2023)

Accessibility, crucial in urban planning and design, serves as a fundamental indicator of a city's functionality and socio-economic dynamics. In the context of Pontianak, the investigation extends beyond traditional methodologies, employing a comprehensive approach to evaluating spatial connectivity and its correlation with urban morphology.

This multifaceted analysis, blending spatial connectivity, urban morphology, and historical context, enriches the understanding of Pontianak's development dynamics. It emphasizes the interplay between accessibility, spatial structure, and urban planning influences, offering valuable insights for future urban design interventions and planning strategies.

Built form and building density of Pontianak city

The mapping of buildings in the study area, using stories as the units, revealed distinct patterns through a figure-ground technique, showcasing the extent of built and open areas. Figure 4 illustrates building heights across the zones, notably with Zone A dominated by single-story structures, while a few areas exhibit two-story buildings. Notably, three-story buildings cluster along major roads, the central market in Zone A, and the port area connecting to Zone C, correlating with higher stories accompanying major streets (Figure 4). The maximum height in Zone A peaks at four stories, primarily within factories. In contrast, Zone B predominantly comprises single-story buildings, with very few exceptions like the Keraton Kadariyah (the palace), Masjid Jami (the royal mosque), and a school. Zone C predominantly houses three-story buildings, complemented by some single-story structures within internal blocks accessible via alleys. Moreover, Zone C's major roads feature primarily three-story buildings, with a newly constructed hospital rising to 13 stories, highlighting the zone's diverse range, from three to nine-story buildings. This map effectively delineates density distribution across the study area, emphasizing Zone C's prominence, followed by Zone A and then Zone B.

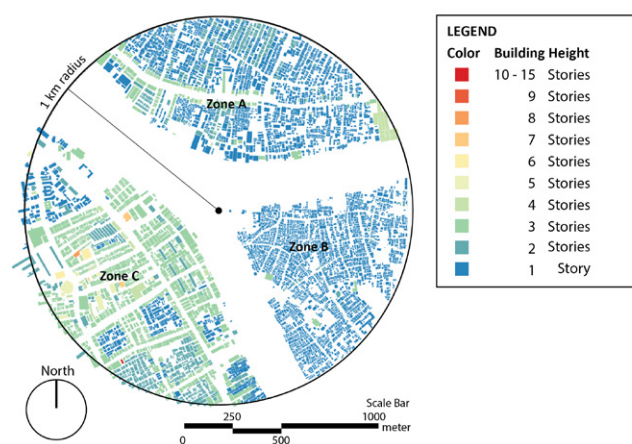


Figure 4. Building height (L) in the study area
(Source: Authors, 2023)

A different perspective on built form variation emerges when examining the gross floor area (GFA), calculated by multiplying building footprints by the number of stories. Figure 5 illustrates a GFA range from 7 to 33 square meters as the smallest category and 552 to 18,855 square meters as the largest. Unlike an equal interval classification, the equal count quantile classification method divides data ranges into equal counts, providing a more balanced categorization despite exceptionally high values. Consequently, the GFA map reiterates Zone C's highest building density, trailed by Zone A and then Zone B. In Zone A, the majority falls within the 552 to 18,855 square meter range, while Zone B features predominantly lower mid-range GFAs, characterized by numerous small single-building footprints.

Zone B stands out as a repository for a local architectural marvel known as the "House on stilts," born from Pontianak's flood-prone and swampy terrain (Nurhidayati and Fariz, 2020). This style predominates in the area due to its adaptation to the environment, featuring raised structures supported by stilts, generally limited to one story in height. Additionally, Zones B and C, close to riverbanks, host several traditional Malay dwellings, with approximately 20 and 10 such houses, respectively. These structures, characterized by single-story construction and various sloping roof shapes, typically employ wooden materials (Ciptadi *et al.*, 2021). They encapsulate the architectural DNA of the surroundings, exhibiting pavilion-style, single-story structures, which, although material composition may evolve, retain their historical shapes.

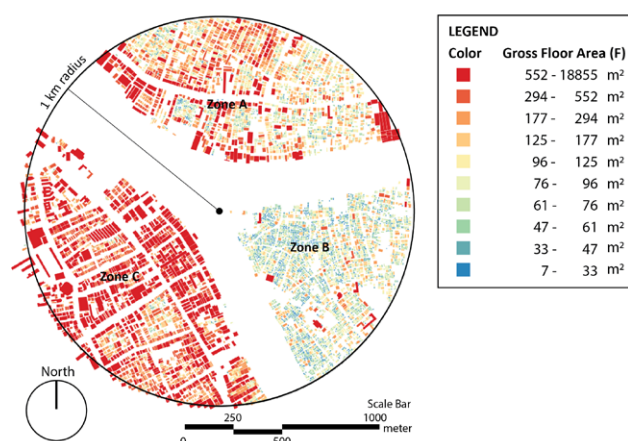


Figure 5. Gross floor area (F) of the study area
(Source: Authors, 2023)

Zone A predominantly comprises market areas, reflecting a landscape where residential housing, known as "shop houses," displays a distinct blend of commercial and living spaces (Figure 6). This architectural style, influenced by the predominant Chinese community, primarily engages in mercantile activities. These shop houses commonly feature ground-level stores complemented by upper-story living quarters, aligning with Berghauser Pont's typology of pavilion, street, and cluster types (Berghauser Pont, 2018; Berghauser Pont and Haupt, 2009). In contrast, Zone B encompasses residential neighborhoods characterized by narrow streets and single-story dwellings (Figure 7). These pavilion-style residences, prevalent among the Malay ethnic group, often lack shared walls, fostering a distinct architectural landscape with smaller open spaces. The varied cultural backgrounds between Zone A's predominantly Chinese population and Zone B's mix of Sultanate descendants contribute to marked differences in architectural styles and spatial organization. Zone C emerges as the most developed sector, hosting a network of major roads and functioning as the city's bustling business district since Pontianak's inception (Figure 8). The area's historical significance, underscored by the presence of the Dutch colonial supervisor buildings and fortifications surrounding the Sultanate palace, reflects a power dynamic aimed at securing territorial boundaries against external threats (Andi *et al.*, 2023).

Economic activities are integral in shaping building density across the zones. The concentration of economic hubs and market centers drives higher building density, particularly evident in Zone C's commercial and industrial areas. This economic influence directs the spatial distribution and typology of buildings, influencing the heights, functions, and styles seen throughout Pontianak's urban fabric. This interplay between economic activities and built form underscores the pivotal role played by commerce, industry, and societal needs in shaping the physical landscape and architectural characteristics of Pontianak. This diverse urban morphology aligns with the theories of Stojanovski and Östen (2018), elucidating how cultural events and physical spaces intricately shape the unique morphological characteristics of buildings, neighborhoods, and towns. The interplay between cultural influences, historical legacies, and urban planning decisions underscores the distinctive architectural fabric that defines each zone within Pontianak.



Figure 6. A view of the built environment in Zone A
(Source: The photos are retrieved from Google Earth Street View, 2023)



Figure 7. A view of the built environment in Zone B
(Source: The photos are retrieved from Google Earth Street View, 2023)



Figure 8. A view of the built environment in Zone C
(Source: The photos are retrieved from Google Earth Street View, 2023)

Correlation between accessibility and built form

The correlation between integration and building height reflects the relationship between characteristics of the built environment and the street network. Initially, there appears to be a weak overall correlation of 36.2% within the entire study area (Figure 9). Upon closer examination per zone, all zones exhibit a weak correlation between integration and building height. In Zone A, the correlation is 20.5%, while in Zone B, it stands at 18.0% (Figure 9). Notably, Zones A and B display lower correlations, primarily due to the prevalence of single-story buildings. Zone B, in particular, contains a majority of single-story structures, leading to reduced data variance and consequently, and it has the lowest correlation among all zones. Conversely, Zone C showcases a higher correlation because of the frequent occurrence of double-story buildings in the market area situated along the main road. Meanwhile, Zone C demonstrates the highest correlation, owing to the presence of multiple-story structures and greater variability within this zone. Multiple-story buildings are most prevalent in areas with high accessibility, such as main roads. This observation aligns with the higher land value in strategic areas (high integration streets), encouraging maximal land and floor utilization, thus emphasizing the significance of the correlation between building height and integration.

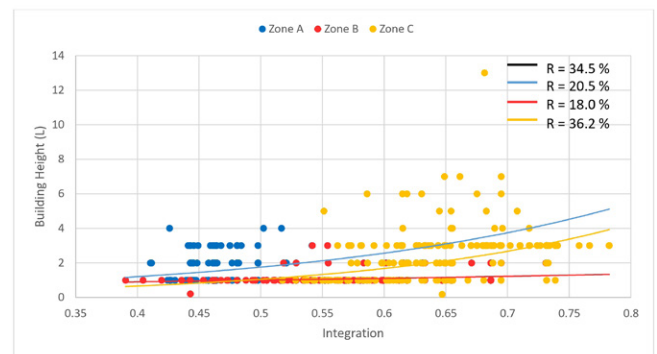


Figure 9. Correlation between integration (x) and building height (y)
(Source: Authors, 2023)

The correlation between integration and gross floor area reflects the relationship between built form and the street network. Initially, it seems that there is a weak overall correlation of 21.6% within the entire system (Figure 10). However, upon closer examination of correlations within specific zones, there is no discernible relationship between these variables. Zone A shows a correlation of 3.2%, Zone B exhibits -0.9%, and Zone C displays -7.6% (Figure 10). None of these values are strong enough to indicate a significant correlation. Additionally, in comparison to the correlation with building height, integration demonstrates a lower correlation with gross floor area (F). Despite the average accessibility in Zone A being lower than Zone B, in term of building density, Zone A has higher value than Zone B. This is because Zone A originally emerged for commercial purposes, while Zone B is for residential purposes, where the king and his loyal followers reside.

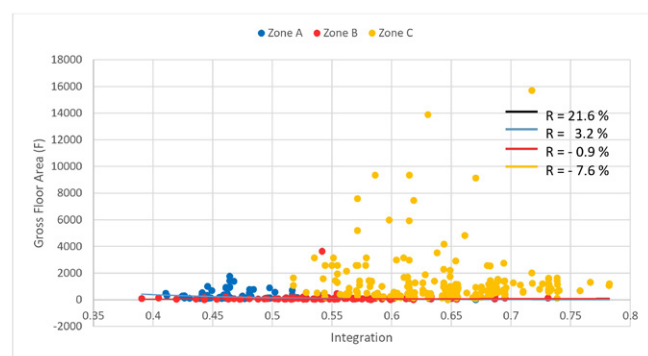


Figure 10. Correlation between integration (x) and gross floor area (y)
(Source: Authors, 2023)

DISCUSSION

The evolution of Pontianak city, shaped by the geographical influence of Kapuas River and Landak River, exemplifies a dendritic settlement pattern. This pattern, characterized by branched river streams resembling a tree, and it underscores the organic development of settlements along riverbanks, forming the backbone of the city's transportation network (Nurhidayati, 2015; Sari, 2014; SIRRULLAH, 2019). The river-centric settlement expansion, observed in Zones A, B, and C, is a hallmark of organic city development, influenced by historical factors and community activities.

The alignment of houses along the river in Pontianak, following dendritic patterns, reflects the reliance on rivers as vital life elements, as elucidated in cultural and geographical studies (Nurhidayati, 2015; Zain and Andi, 2020). Settlement centers, initially developing along the riverbanks, expanded into the mainland, showcasing transportation infrastructure development, such as dirt and bluff roads parallel to the river bank. This dual expansion, both on land and water, contributed to the distinctive layout of Pontianak's settlements, influencing the city's morphological characteristics (Nurhidayati, 2015).

The subsequent chronological evolution of Pontianak saw Zone B as the initial locus, housing the king's palace, followed by Dutch colonial presence in Zone C and the emergence of a thriving Chinese community in Zone A. The construction of bridges connecting these zones marked a pivotal turning point, leading to substantial road network growth from 2003 to 2023. This transition indicates a shift from water-based to road-based transportation, reflecting the city's adaptability to changing needs and influences. The architectural landscape, viewed through building heights and gross floor area, illustrates the interplay between accessibility, economic activities, and cultural identities in shaping each zone. Zones A, B, and C showcase distinct building styles influenced by the Chinese community, Malay ethnicity, and historical legacies. Economic activities, notably in Zone C's commercial and industrial centers, significantly dictate the building density. The correlation analyses between integration, building height, and gross floor area provide nuanced insights into the relationships within Pontianak's zones. Zone-specific correlations emphasize the impact of historical and cultural factors, with higher land values and commercial purposes in Zone A contributing to its unique building density despite lower accessibility.

This study builds on previous research that combines Space Syntax and Spacematrix methods, such as the works of Nes *et al.* (2012) and Berghauser Pont *et al.* (2019). Their studies demonstrate the effectiveness of these methods in urban analysis. Similar studies have shown that Space Syntax can predict pedestrian movement and provide a spatial understanding of urban forms, reinforcing the findings of this research. The work of Stojanovski (2019) and Sonne (2022) highlights the impact of political, economic, and social dynamics on urban morphology, aligning with this study's exploration of these factors in Pontianak. By connecting with these studies, this research validates its methodology and provides a broader context for its findings, contributing to the ongoing discourse on urban morphology and accessibility.

In conclusion, Pontianak's urban development intricately intertwines geographical features, historical legacies, and cultural influences, shaping dendritic settlement patterns and organic city growth. The evolving relationship between accessibility and building density underscores the adaptability of Pontianak to changing transportation modes and economic needs, creating a diverse urban fabric reflective of its rich history and dynamic cultural identity.

CONCLUSION

This research employs mapping techniques and a quantitative approach to studying the morphology of a crucial area in Pontianak city, where its civilization began. The primary objective is to uncover correlations between accessibility, built form, and cultural identity. Pontianak's urban landscape has undergone a remarkable evolution, transitioning from its early beginnings to the multifaceted cityscape it embodies today. Geographical features, notably the Kapuas River and Landak River, played a pivotal role in shaping the city's settlement patterns and transportation networks. These natural elements delineated the spatial organization of Pontianak, guiding the emergence of settlements along their banks and influencing the city's transportation infrastructure. Moreover, the interplay of cultural influences has not only shaped the physical landscape but has also contributed significantly to the socio-cultural identity of each zone within the city.

The evolution of transportation modes, transitioning from water-based to road-based systems, stands as a testament to Pontianak's adaptability and resilience. This shift has significantly impacted the city's development and accessibility, marking crucial turning points in its urban evolution. Furthermore, the correlation between building density and economic activities highlights the strong influence of commerce and industry in shaping the architectural landscape of each zone, emphasizing the economic pulse that beats within the city's heart. An intriguing revelation arises from the nuanced relationships between integration, building attributes, and gross floor area across the different zones. These correlations underscore the complex interplay of historical, cultural, and economic influences on Pontianak's urban morphology. Additionally, the role of infrastructure development, particularly the construction of roads and bridges, has been instrumental in fostering connectivity between zones, catalyzing urban growth, and enhancing accessibility.

The insights gleaned from studying Pontianak's development carry profound implications for urban planning strategies. Understanding the city's historical evolution and its interdependent factors can inform future urban planning initiatives, guiding efforts toward sustainable growth, infrastructure development, and the preservation of cultural heritage. Pontianak stands as a testament to the intricate interconnections between history, culture, economics, and geography in shaping urban landscapes, offering valuable lessons for urban planners and policymakers striving to create vibrant and sustainable cities.

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BELGRADE FAIR COMPLEX: THE COLLAPSE OF YUGOSLAV PURISM

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In the wake of accelerated development in the vicinity of the Belgrade Fair and further plans for construction in this part of the city, the events that have unfolded during the past decade of Belgrade's urban development have situated Belgrade Fair as a key topic in the spotlight of the Serbian urban planning community. The objective of this paper is, first and foremost, the formulation of a methodologically broader critical matrix regarding the formation of an approach to the future adoption of strategies for the urban renewal of the Belgrade Fair (Sajam) complex. This complex, in addition to basic research on its architectural and urban qualities, also includes numerous current and temporal aspects from which it is possible to draw conclusions about the issue at hand. These analyses of the architectural and urban value of the fair complex observe the key themes and concepts that define the Sajam's spatial and developmental paradigm. They also accentuate current questions regarding the defragmentation of the heritage of modern architecture in architectural practice. Also highlighted, in addition to the architectural and urban planning composition of the first construction phase between 1953 and 1957, are the today less-known architectural and engineering aspects of the exhibition halls that lack heritage status, along with an exploration of the renewal or transformation of this space through an analysis of recent conceptual design proposals. This study, through synthesis, seeks to establish a comprehensive picture and the broader critical framework needed to pass judgement before the ideological and constructive breakdown of Belgrade's exhibition complex as a paradigm of Yugoslav purism. The conclusions leave space for the appreciation of different approaches, opening up new questions that clearly require social consensus and which have not yet been answered in the public or professional space.

Key words: fair, purism, urban renewal, land use, monument.

INTRODUCTION

The Belgrade Fair (locally more commonly known simply as the *Sajam* (trade fair)) has for years been a spatial, architectural, and urban complex built for a new Yugoslav society, as efficient as an automobile (or machine) in Le Corbusier's concept of *Maison Citrohan* (Gresleri, 2021). The Sajam contains all of the social processes appropriate to its status, as a phenomenon from an epoch signifying the emergence of the city's development (Ilić, 2010). The dialectical matrix formed between the Sajam and a fairground (Serbian: *sajmište*) is no longer examined; and its broader significance was not expressed through programmes, characteristics, organisational forms, or meaning at the time of its construction. Instead, the Sajam is viewed as a paradigmatic phenomenon that will be replaced

by elements that will be constructed for the one-off EXPO 2027 exhibition. At the time of its initial development, in the early 1950s, the concept of an exhibition space was viewed as a spatial concept and as a universal organisational form, that possessed and was defined by its own architectural narrative, while the concept of the Sajam simultaneously contained the meanings of ephemerality, changeability, and the concept of an institution for public events (Mandić, 1954). At that time, the decision to form new trade fair complexes (Ilić, 2013) shifted the focal point away from urban centres, which was of great significance for the urban development of Yugoslav cities. The Belgrade Fair, as the paradigm of Yugoslav modernism and purism, a place containing the memories of all the events that have taken place there since its construction in 1957, came to represent the material heritage of socialist Yugoslavia. In response to the construction of exhibition spaces in Yugoslavia, the Zagreb Fair – a near contemporary of the Belgrade Fair – developed as a sort of informal reflection of global

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architectural trends, accepting international pavilions as part of its complex. The Belgrade Fair, on the other hand, was handed a different task: to become the overarching site for constructing the identity of the state and its society, with an anatomy, form, and content given over to this paradigm. It was a paradigm in which, beyond the Sajam, the central motif of urban development was also a design brief for the development of Yugoslav cities – new urban spaces in the central zones of cities, the like of which Yugoslavia had not yet seen. Following years of searching for the appropriate style, the development of the Sajam's form and composition was founded on the late purist approach of Milorad Pantović and on prestressed concrete as an artefact: creating a new identity for the modern Yugoslav state, built on home-grown knowhow and technology (Žeželj, 1956). Following a public call for design concepts and numerous variations, the Sajam was shaped by rather unique forms that had until then been more familiar in bridge building and the industrial complexes constructed under the First Five-Year Plan (*Perspektivni petogodišnji plan investicija Ministarstva građevina FNRJ*, 1946). Purism – the architectural movement Pantović strove for, and in which Le Corbusier emphasised the simple aesthetics of the machines that had come to symbolise the modern age – takes shape through the perfect logic of machines, whose beauty stems from natural laws.

The post-war cultural template for Belgrade's urban renewal was fatal for the Old Exhibition Grounds (Bajford, 2011), in a not dissimilar manner to what is now reoccurring with the Belgrade Fair. With little heed being paid to the fact that it was at times so significant, spreading its influence, even in interaction between East and West at a time when the world had become polarised, or the importance of trade fairs and many other events that had taken place in Belgrade. The new wave of cultural shifts is today reflected in the expansion of developments that are rapidly encroaching on the Sajam from all sides: initially, in the form of the Ada Mall shopping centre, then the Skyline residential and business centre, and finally the Galerija shopping centre. In developing countries, there is a significance in that which has a global appeal, or rather that which is “nothing but the unfortunate enchantment of a Western glamour”, according to Clowney (2011), who saw contemporary art as being more global than simply Western. In the immediate vicinity of the Sajam, there are examples of the successful revitalisation of industrial heritage, such as the Old Mill Hotel, the BIGZ building (Conić, 2023), and the Old Roundhouse (Serbian: *Ložionica*) (Gojkov, 2021). Conversely, other heritage has been treated with insufficient care, such as the demolished building of the Federal Ministry of Internal Affairs (Ćirić, 2011) – or the only remaining trace of an even more distant past, Milan Vapa's old paper mill (Mihajlov, 2010). The built environment of the city's central core has come to be enveloped on all sides by a series of self-enclosed cycles of hasty decision-making on divestment, a fate that Belgrade's Sajam also shares of late. As early as the first decade of this century, in his polemic with Nouvel, Baudrillard raised the fundamental question of the identity of cities, asking whether through its transformation a city ‘becomes’ something, bearing in mind that cities acquire their uniqueness over time, but have now begun to change at pace before our very eyes, leading to a state of confusion (Baudrillard and Nouvel, 2008). This is a

fundamental question also for the Sajam, which may have already reached the stage that Nouvel defined as a fatal, automatic, and unavoidable change demanded by decision-makers as a sign of vitality and a harbinger of growth, and which can be used to justify many absurdities (Baudrillard and Nouvel, 2008). The participation of the public – that is, the population – is absent, and the construction industry and the real estate market have expanded, along with simultaneous transformations of the institutional structure of urban planning in recent decades (Maruna *et al.*, 2023). The main reason for the denial of the generally accepted status of the entire Sajam complex is its essence as an engine for growth in the capital city of a society that no longer exists, manifested as an architectural work of art and as a monument.

Research on this subject synthesises the spatial-sociological, the micro-urban, and the architectural, which is worth bearing in mind given the fact that Halls 2 and 3 of the Belgrade Fair, which have not been designated as protected heritage sites, are particularly threatened. In addition to Žeželj's central hall, the two other exhibition halls, which exemplify exceptional architectural and engineering value, along with the smaller halls and a footbridge, form a unified architectural and urban longitudinal composition.

Following the presentation of the main analytical body of the work, the principal conclusions will be provided by forming a critical matrix within a discussion that includes additional actualized topics of cultural revival, public involvement, global trends such as gentrification and transnational investment in real estate, management and planning, politics, public relations and private interest, the dying out of the technological epoch of concrete shells, architectural theory, and the classification of complexes as monuments or their treatment according to contemporary theories of urban space. The goal of the paper is to create a broad platform that will enable all participants from the critical public to position themselves more objectively in making judgments and decisions on this important topic.

THE BELGRADE FAIR AS A DESIGNED “ORGANISM”

The spatial concept of the Belgrade Fair was conceived and designed in 1953 as an attractive urban zone – a new centre of the city, which left a deep mark on the history of Belgrade. Through various transformations and devastations, the complex as a whole gradually lost its original significance and its authenticity as the first example of a comprehensive synthesis of architecture, engineering, and urban planning. With its role as a new urban centre and its more southerly location in relation to the old city centre, the Sajam contributed to the notion of creating regional centres and the expansion of Belgrade along the thoroughfares on the right bank of the Sava. This process continued through to the late 1970s, following the unique development of a socialist society (Kušić and Djokić, 2021). A very significant topic here is the role of the constructive artefacts of the main exhibition halls, situated in space as the integral motifs of the Sajam's architectural discourse, with its deeply rooted yet veiled theoretical signifiers that would subsequently, through the dynamism of its spherical forms, come to be constituted in public life as new social values (Ignjatović,

2013a). In this sense, worthy of particular appreciation today are the domes by engineer Milan Krstić (1972) and architect Milorad Pantović that, by forging a path for other engineers to explore numerous previously unimagined future interpretations, forever transformed Yugoslav cities. To that point, buildings of such scale, in the form of a membrane, or rather a shell, had not existed in Yugoslavia, or further afield. Today, the technological period in which the complex was created is dismissed, as is the fact that these buildings were prototypes of engineering-based architecture. These elements of the Sajam, and the changes they gave rise to, ought to be viewed in a broader cultural context – that is, as the bearers of all contemporary ideas about the relationship between individuals and architecture. The first intended user is the self-managed worker, who is granted access to the foremost industrial achievements of his homeland. Milan Krstić moved the boundaries of what was possible, at least in this part of the world, by enclosing the sky in a thin membrane that – with its simple structure and the astonishing proportions of its area and cross-section, as well as the slender columns that support it – still leaves breathless every observer who finds themselves beneath it. In Žeželj's central hall, the same effect is achieved through the formation of a hybrid system of linear supports in a radial pattern (Figures 1 and 2).

According to its creator, Pantović, the Sajam was conceived as a single architectural composition of buildings connected by a walkway raised above street level, giving observers the opportunity to take in a continuous architectural form. His idea was to bring into being an unenclosed area that would function as a large exhibition space during trade fairs, and which could, at times when such events were not being held, serve as a park that could be used by local residents from surrounding neighbourhoods. This concept called for the construction of a smaller number of larger buildings, rather than a larger number of smaller exhibition halls (Pantović, 1957). This is, today, not immediately evident, primarily because the part that was once intended as a universal focus for social activities became neglected and was transformed into a large, under-utilised, parking lot. The main axis of the exhibition space was laid out along two longitudinal zones for events, in accordance with the established concept of a multifunctional urban zone or park (Figure 3). Pantović's transformation was spurred on by the newly acquired freedoms and cultural fabric of socialism with a "human face", which was developed through an interpretative model of contrasts – both in relation to the construction of exhibition spaces across Europe, and in opposition to the local historical context (Ignjatović, 2013b). In the composition as a whole, an important space was occupied



Figure 1. Belgrade Fair – A view of Halls 2 and 1 from the main promenade
(Source: Author's archive)



Figure 2. Belgrade Fair – A view of Hall 3 from the main promenade
(Source: Author's archive)

by the three shell-like forms of Halls 2 and 3. Like Hall 1, these spaces were leading achievements of the engineering prowess and architecture of the day, even in global terms, as is evidenced by the contemporary appearance of similar buildings such as the auditorium of the Massachusetts Institute of Technology, USA (Figure 4), and Lambert Airport in St. Louis, USA (Pickens, 1956) (Figure 5), which are still in use today and are – with their spans and unique conception, their synthesis of interior and exterior spaces, and the general impression they leave on observers – considered significant sites of architectural heritage.



Figure 3. Construction of the Belgrade Fair – a view of Halls 2 and 1 and the park

(Source: <https://sajam.rs/en/sanu-exhibition-dedicated-to-the-belgrade-fair-phenomenon-on-local-and-global-scale/#>)



Figure 4. Auditorium of the Massachusetts Institute of Technology in Cambridge (USA), 1954-1956. Eero Saarinen, calotte-shaped shell on three supports

(Source: *One hundred years of significant building (1956)*. 6: Public Assembly, *Architectural Record*, November 1956, Vol. 120, No. 5, pp. 197-200)

With Hall 2, Pantović and Krstić created a symmetrical composition in its exterior form and a unified building framed by the longitudinal ensemble of exhibition halls reminiscent of the artistic elements of Le Corbusier's *Still Life* (Guedes, 2015). The relationships of symmetry between all of the halls are, in this case, manifold. Viewed from without, the seemingly separate twin buildings of Hall 2 are essentially, in a functional sense, a single complex containing three segregated tiers. These relationships merge from the point of view of the observer who perceives the architectural composition from the imaginary plane of symmetry (Nikolić *et al.*, 2015). Even though the Sajam is constituted of three large halls, the perception and experience of it as a levitated space becomes supplanted by the possibility of passing through four different environments, two of which are the concrete shells of Hall 2, with interruptions that appear as one passes through conventionally constructed spaces and customary visual perceptions, creating a unique experience without leaving the internal space. In addition to the innovative nature of their doubly curved forms, Halls 2 and 3 contributed to the development of a completely new system of construction (Figures 6 and 7). The application of prestressing in the construction of Halls 2 and 3 by forming bundles of steel cables was one of the first uses of this technique in the world. The significance of these buildings is made ever greater because Milan Krstić was the custodian of the apparently anonymous school of doubly curved surfaces (Lazarević, 1975).

The geometric setting is such that the relationship between the height of a structure and the height of its separation from the surface perception is one of the most important parameters, as is the relationship between the massing of a building and its total volume. In the cases of Halls 2 and 3, these relationships are brought to the edges of theoretical perfection, given the thickness of their shells, edge elements, and columns. At the time, they gave off the sense of the 'structures from space' or the architecture 'on paper' of Buckminster Fuller and Ron Herron, respectively; such ideas were to take shape several years later elsewhere in the world. The genius of Eduard Torroja and Pier Luigi Nervi has long been recognised worldwide, but Serbia has its own equally worthy examples: Milan Krstić and Branko Žeželj. At the time, they stood shoulder to shoulder with world-leading constructors and, through the Sajam, brought to life the theoretical postulates of Max Bill, who popularised the concrete art of Theo van Doesburg (Bill, 1952). This was especially so, given Bill's love of Mailart who, through elements of composition, space, geometry,



Figure 5. Terminal building of Lambert Airport, St. Louis (USA), 1953-1956, Minoru Yamasaki
(Source: Pickens, 1956)

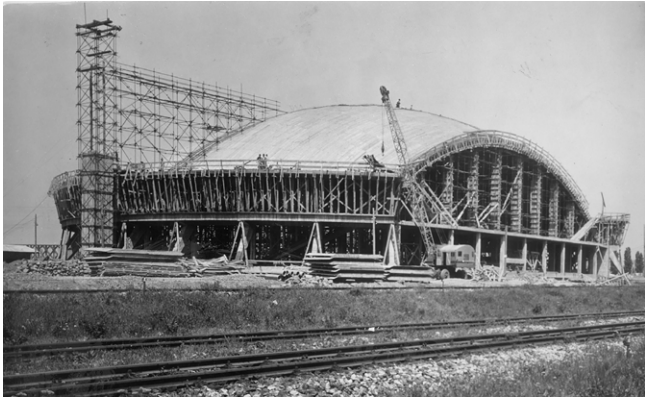


Figure 6. Construction of Hall 3 of the Belgrade Fair
(Source: <https://sajam.rs/en/sanu-exhibition-dedicated-to-the-belgrade-fair-phenomenon-on-local-and-global-scale/#>)



Figure 7. Construction of Hall 2 of the Belgrade Fair – assembly of the rebar for the edge arches and the structure of the shell
(Source: <https://sajam.rs/en/sanu-exhibition-dedicated-to-the-belgrade-fair-phenomenon-on-local-and-global-scale/#>)

and mathematics, linked Mondriaan's compositions with the logic of construction – that is to say, he thought that the form of a building or structure must be the coming together of the rationalism of engineers and a naturally occurring beauty – as defined by van de Velde (Pereira, 2013). In that sense, the spatial composition of the Sajam is part of the world's architectural heritage.

URBAN RENEWAL OR TRANSFORMATION OF THE BELGRADE FAIR

As the city's flagship space for numerous large-scale events, the Belgrade Fair complex retained its universal character for a very long time – that is, until in 2007, when it was almost entirely surpassed in this role by the Belgrade Arena. Still, it has preserved until today some of its significance in terms of representing Serbia internationally through the organisation of many international trade fairs, in which it is a regional front-runner, with close to 40 events annually (Stambolić, 2017). Successful trade fairs in Europe have undergone permanent transformations, such as reconstructions or expansions (Frankfurt), the construction of entirely new exhibition spaces at a different location

(Milan), or consolidation and the formation of clusters or similar (Rimini and Vincenza). In the 20th century, the Sajam expanded its capacities through the building of additional temporary exhibition spaces. Some of these, interventions by Pantović himself, represented self-destructive changes to the original project – primarily through the removal of the restaurant adjoining Hall 1 and the construction of Hall 14, today known as Hall 4. With the exception of a failed privatisation attempt in 2009, since the opening of the Sajam no systematic remodelling or paradigmatic transformation of the space has been undertaken. All that remains of this idea and this initiative are the concept designs of the eminent studio *GMP Architekten* from Hamburg, conceived in collaboration with *Mijic Architects* from Rimini. Although the designs did not address the whole monumental worth of the Sajam complex, it can be said that, to a large extent, they at least respected the spatial value of the complex, even though it was not a protected heritage site at the time, and neither were its more significant buildings, as is the case today. *GMP Architekten* and *Mijic Architects* created a pleasant concept of a modern exhibition centre dominated by interior spaces. Along with the preservation of the larger buildings, they also presented a unique narrative through the faces and façades of the same geometric forms and different construction elements and materials, as well as a refined reflection and cohabitation of two technological and historical epochs. The new concepts made use of the geometries of the concrete shells, along with construction elements such as intersecting glulam arches, drawing inspiration from the design of the new exhibition space in Rimini. This architectural narrative was not chosen by chance; on the contrary, the same recognisable concept was repeated in Belgrade. As was noted in the preamble of the project, the contours of the site and the unmistakable typological elements that grant the complex its unique and coherent identity were retained. The old vaulted square pavilions became the basic building blocks of the new compositions. The project was intended to be implemented across two phases, as part of which the first phase would involve the formation of a series of six pavilions similar to Hall 2 along the Sava promenade, following which a pavilion would face Živojin Mišić Boulevard with two towers serving as landmarks for the entrance to the complex. A long central avenue would be formed by the rows of pavilions, across several levels, which would lead to Hall 1, the main hallmark of the exhibition complex. A zone for hotels and commercial and office space was planned between the Sava River and the exhibition space (Figures 8 and 9).

Unfortunately, this approach never materialised. In the miscomprehension of a mix of private-sector capital and public-sector management, the greatest harm was caused to the public interest – not an uncommon turn of events in this part of the world. This concept design was a very successful example of a possible approach to revitalising, preserving, and expanding the spatial complex of the Sajam within a new programmatic framework worthy of a modern society entering a new millennium. This approach could have been an effective transformation of the Sajam in line with the needs of the 21st century, whilst also retaining its identity by preserving the most significant elements of its architectural composition.

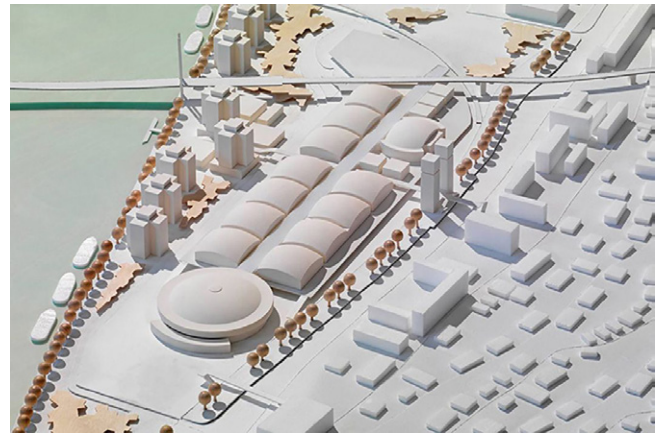
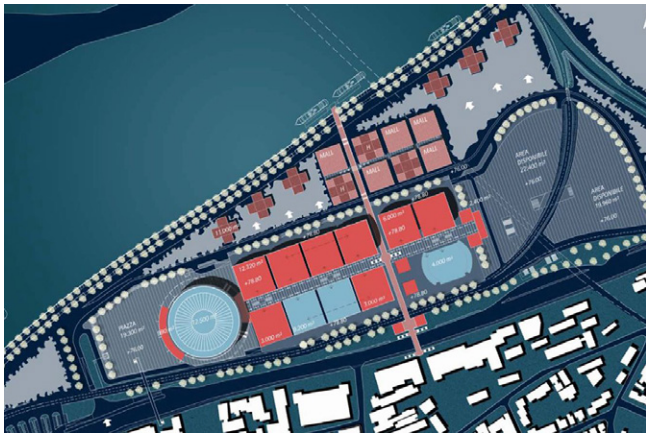


Figure 8 and 9. GMP Architekten (Hamburg) and Mijic Architects (Rimini), Belgrade Fair, expansion project – plan view and 3D view
(Source: <http://www.mijicarchitects.com/exhibition-event/new-fair-complex-belgrad>)

The Belgrade Fair, according to the announcements of the city authorities and based on the presented urban plans, is set to soon undergo a transformation that will include its relocation and the construction of a new EXPO centre, near the planned national stadium in the suburb of Surčin (Gradnja, 2022). The plans for the site of the Belgrade Fair and the construction of the complete infrastructure for an exhibition centre have already been openly presented to the public and are an architectural deletion of the identity and remaining traces of an historical centre of an urban epoch. Nothing remains of the Sajam in the new concept design, by *Niall Montgomery + Partners (NMP)* from Dublin, that has been touted in the media, neither in an urban sense, nor as a memory on the map – except the central hall (Nicović, 2023) (Figure 10). The plans for the renewal of Hall 1, which is a listed building, use the language of the creative industries, but take no account of the original and acquired values of the space, nor its universal function, which was once a paradigm for altering a nation's consciousness. In Serbia, the same scenario has already played out for the Leskovac Fair and its

symbolic space – the round pavilion by Edmund Balgač (Lj. F., 2020). Both examples rely on the concept of the incomplete as a dialectical process (Stamatović Vučković, 2016), as part of which the Sajam, as a built environment within the broader context of the city's development, has always been open to further development and urban renewal through the incorporation of new elements inside the boundaries of its immediate environment.

The development of Belgrade is an insufficiently controlled process because it is largely centralised through the increased participation of the higher levels of government in urban development processes at the local level (Maruna *et al.*, 2023). These central authorities have recently declaratively supported urban renewal with the simultaneous development of suburban settlements – mainly through the acquisition of land on the periphery for residential purposes (Zeković *et al.*, 2015). In the meantime, the area of agricultural land has been significantly reduced, while the Belgrade Waterfront has emerged as the most prominent example of financialization (Zeković *et al.*, 2023). With the most recent legislative changes at the state level and rapid changes of plans, this trend has accelerated further still, both in the city's outskirts and its urban core. Today, the Belgrade Fair is under attack from policies that advocate the principles of efficiency and economic growth above all, which includes, principally, the creation of new privatised spaces for the elites, the construction of megaprojects intended to attract investment, and the reconfiguration of local land use patterns (Milojević *et al.*, 2019).

As a fundamental precondition that would give a chance to the selection of the right choice for the urban recycling of the Belgrade Fair, it is first necessary to highlight its specific *genius loci*, followed by applying the best practices pertaining to the scope of planning in better-ordered societies. Vienna, where decisions are made at the local level according to clear procedures and without sudden shifts, could serve as a model here. Intensive development of parts of the city is conditioned upon the preservation of identity along with the protection of natural qualities and the optimal land management in terms of the necessary supporting infrastructure and the leaving of space to be developed by future generations (Dillinger, 2014).



Figure 10. Niall Montgomery + Partners (Dublin), the Belgrade Fair, a project that envisages the demolition of the Sajam (apart from Hall 1) – 3D view
(Source: Gojkov, 2024)

DISCUSSION

The moment the Belgrade Fair stops being recognised as a place in need of its own cultural renaissance, with all of its valuable spatial elements, which are, after all, its genesis, will be a challenge thrown down before all of Serbian society. Given that certain measures and initiatives have already been implemented in the immediate vicinity of the Sajam, taking in buildings that have value in terms of architectural heritage, this process must also be possible for the complex of the Sajam and the adjoining riverbank. Making hasty and poorly thought-through decisions that threaten the preservation of architectural heritage, often justified as the gentrification of authentically maintained urban areas from earlier eras, has become common practice in Belgrade. Such episodes have become commonplace as a pattern of post-industrial revitalisation, supported by transnational real estate investment. In contrast to the successfully revitalised buildings in its immediate vicinity, which according to the Riegl's theory can be categorised as historical monuments, the Belgrade Fair has as an urban entity been a deliberate monument since its very inception (Riegl, 2006), as is the case with the contemporary complexes built around it over the past decade. Due to its dual scope, the Belgrade Fair has a recognisably polyvalent urban nature, which is often overlooked by critics. Pantović himself described it as an "organism", and this perhaps determines the structuralism of the Sajam, in the proper sense of that term (Stojiljković and Ignjatović, 2019), bearing in mind that its original urban conception had an integrative role of architectural artefacts and the social relationships yet to develop. In it, urbanism is present at various scales, as are the transformations that have taken place both inside the complex and without, that can today be traced only through photo archives, and which is itself a historically under-researched field of study. Presently, the phenomenon of the Sajam has been completely erased, and not only from the space it inhabits. It has also been erased, as a consequence of biological analogies in architecture (Šijaković and Perić, 2018), from the city's memory; above all, through observation of the permanent architectural recycling of the Sajam as a process of changing the existing complex by using all available and useable material for new purposes. Alois Riegl believes that the violation of natural laws, the interweaving of creation with disappearance, and vice versa, the restraint of nature by human hands, and the premature destruction of human creations through natural forces are all strictly to be avoided (Riegl, 2006). By losing the strongest aspects of its identity to megalomaniacal spatial forms, it will lose the last traces of that which makes it a monument to a given era – regardless of its significance as an urban centre. There are multiple issues in terms of confirming the Belgrade Fair as a cultural monument – i.e., as a work of art. As criteria, Riegl cites, above all, *commemorative and current values*. The commemorative values of the Sajam that are recognised to their full extent, declaratively if nothing else – its history and its age – make it a symbol of the city. What is insufficiently highlighted is its *deliberate commemorative value*, which remains under-researched, precisely because of a lack of historical distance. Meanwhile, it should be borne in mind that its evaluation was carried out in 2005 (Mišić, 2006). In 2008, the Belgrade Fair was not granted listed status as an urban complex –

above all so that the privatisation intended to regenerate it could be successful – because the Government of Serbia overturned its original decision, according to which the whole site would be protected (Službeni glasnik RS, br. 4/2009). At that time, the Institute for the Protection of Cultural Monuments of Serbia proposed to the Ministry of Culture that Halls 1, 2, 3, and 4, and the space around them, would be classified as a cultural monument, which would prevent any intervention that sought to alter the visual identity of the complex (B92, 2009). Alas, the privatisation fell through, and the well-deserved listed status for the complex did not come to pass, with the small exception of the decision to grant protected status to Hall 1 (Službeni glasnik RS, br. 16/2009). Even today, that status is used to ease quick and efficient decision-making about the Sajam's fate, even though the final decision was accompanied by numerous controversies. The exposition of more in-depth research takes in a much broader picture, including ideological and political evaluation of the past. Above all, the construction of the Sajam took place in anticipation of what would take place on the country's urban planning and architectural landscape, as a rationalist and progressivist approach to the architecture of the period, a turning point in architecture seen as a "period of intensive Europeanisation" which overlapped with a wave of the post-war Yugoslav industrial revolution (Mišić, 2006); that is, the emergence of a new wave in architecture known as socialist aestheticism (Denegri, 2016). These critical practices are placed in the foreground because they complete the picture of the Sajam. Pantović's unfinished competition submission for the Belgrade Fair was a reflection of purism, more than it was of structuralism. The winning design was, above all, a well-thought-out concept of a contemporary urban public space shaped by cubic forms. It is political decisions and a volte-face in the way this topic has been handled that have made it what it is today.

The proposed listed status of 2009 adequately defined the spatial and architectural worth of the complex, and the significance of the Sajam as testimony to the domestic technical, technological, scientific, and creative rise of Yugoslav society in the late 1950s and early 1960s. In the last two or three decades, most significant urban locations that have not been completely devastated have come under, more or less, a certain influence by the aforementioned activities, giving legitimacy to private and individual interests (Milojević *et al.*, 2019). This has altered the physiognomy of the city in an undesirable way, with little regard for ideas of the valuation, treatment, and protection of valuable urban and architectural examples of modern architecture as part of the general plan of 2003 (Macura *et al.*, 2019). For spatial and historical entities of such importance, the timely application of best practices, which assumes institutional action and public participation, is imperative (Dimitrijević-Marković, 2010), as is the strengthening of the awareness of heritage and a sustainable built environment in higher education in the fields of architecture and urban planning (Đokić *et al.*, 2021).

Beyond the 1970s, the construction of concrete shells became rare, due to changes in the fashions of the time, the price of materials, and the appearance of new technologies,

as well as construction regulations, the non-transparency of such surfaces, the complexity of their static analysis, and so forth (Tang, 2015). Concrete shells are insufficiently flexible constructions and, considering their potential for a new lifecycle of the building, are often very demanding in terms of reconstruction. Additionally, they fail to meet modern standards when it comes to building maintenance and thermal, air, and acoustic comfort, in addition to other socially accepted requirements that have come to be imposed over time (Nenadović and Milošević, 2022). Thus, today, all of the technological achievements of Halls 2 and 3 have been left behind by later technological revolutions and, though rare, they remain insufficiently anachronistic and have been publicly declared to be out of step with modernity and contemporary architecture. The artistic value of all of the Sajam's buildings, which are first-class engineering accomplishments, has been recognised (Ivković, 1975). A special symbolic connection is created by the domes as the basic building shapes – the bearers of certain messages and new paradigms. The vague or ambiguous measures currently prescribed for the protection of the Sajam include the mandatory preservation of the appearance of Hall 1, along with the promotion to primacy of its function as an exhibition centre and the introduction of complementary, secondary content into the existing facility. Architecture today often has no answers regarding Belgrade's legacy, instead developing mature ideas of and social consensus around novelty. Rafael Moneo sees architecture as an instrument that should perform the much-needed mediation between the future and the recent past (Moneo, 2018). The most enduring elements of the Sajam persist as spatial artefacts, dominating through their dimensions, transparency, and inscribed memories, every consumer or incidental observer of this space. Architects will surely welcome critics willing to explain to them why the world of forms has become what it is. If contemporary architecture is viewed as a medium of consumption and production, in search of answers to Di Maggio's artistic classification of society, it oscillates along four dimensions: differentiation, hierarchy, universality, and boundary strength. What we can particularly highlight in his theory are the dynamics of ritual classification, which he claims is mediated according to whether artistic production is carried out by commercial, professional, or bureaucratic means (Di Maggio, 1987). The domes of the Sajam are today a remainder of the apotheosis of the society of liberal socialism and, as such, have become a disturbance in the space needed for contemporary social structures and internal relationships between cultural dimensions. The fundamental counterpoint of the polemic on the fate of the Sajam lies in two competing views on the path toward future development. One view is conservative, or better yet primordial, and is presented insufficiently coherently in the context of the free flow of capital. According to this view, the Sajam should be viewed as a preserved exhibit on the market economy of the 20th century, but with no adequate answers to questions regarding the further development of the Sajam as a paradigmatic element of Belgrade – which is at the heart of the unresolved problem, and it reflects the lack of social consensus on this topic. The other view is outlined by ever more present plans to knock down the anachronistic Sajam, which is the shortest possible route to

exchanging the concept of the Belgrade Fair for something more universal – primarily by building exhibition facilities at a new location, using the EXPO 2027 event as justification. In this complex urban planning and socio-political landscape, where architecture and free capital lock horns, a key question has been left by the wayside: the dialectical framework of the Sajam and exhibition space, which answers questions about the status of the Belgrade Fair as a generator of continued development and the treatment of old exhibition grounds as the “used up” infrastructure of the same fair. The exhibition space on the right bank of the Sava, as the telos of Yugoslav purism and the development of the self-management order in Yugoslav society, a symbol of continuity, in a sense monopolises its own status in the face of 21st century progress.

CONCLUSIONS

This interdisciplinary analysis and the synthesis of results reduces gaps in the available research between the key areas important for understanding the valorization of the status of the Belgrade Fair and developmental strategies for its future. Through the discussion and synthesis of the research results, this paper reveals that the Belgrade Fair has already been anointed as a unique place in the city, regardless of the final outcome.

In the foreground is Pantović's primordial developmental concept of the “organism” – i.e., what remains after numerous spatial and organisational transformations. It is clearly defined, in the public and media spheres, above all by the unique spatial conception of three halls linked by a walkway and some smaller buildings, with all of its architectural and engineering characteristics and the narrative of the past. These, based on the conclusions of this research, should be preserved in any case, but in concert with the achievement of a general social consensus on the method of their urban renewal.

The central hall of the Sajam itself is also threatened by the proposed design concepts. In the construction of its significant purist buildings, which still remain, we recognise that its framework makes the Sajam essential in the historical development of the teleological and metaphysical in architecture – the heavenly firmament as a contemporary allegory of the Pantheon. This study concludes with the formation of the sky as the main specificity of the technological epoch of shells, which has been inviolably preserved in other similarly important objects in the world, although today it is more easily achieved on newer objects by other means.

The urban transformations of the Sajam in this text are merely touched upon as generators of the identity of public spaces. Through two potential proposed scenarios for the Sajam, two opposing rival attitudes in the architectural, public, and media spaces have emerged, which communicate with one another with no clear strategies for reaching a compromise. In the analysis of a possible concept of urban renewal, particular significance is given over to contemporary theories on the establishment and redefinition of the variable scope of the Sajam's gravitational field and the elements that it is composed of: from individual buildings with various levels of institutional protection, to its compositional basics, the

complete composition of the complex itself, and the broader environment including a riverside and unique morphological and infrastructural characteristics.

Ultimately, this research has pointed out that each historical event is, by its very nature, irreplaceable for us, which makes the current Sajam and fair, in the broader sense, a significant historical monument. This reflects a conglomeration of values from the apotheosis of Yugoslavia's 20th-century society, its never-completed modernisation, its technology, and its media environment, actualizing topics of cultural revival, public involvement, and the classification of the complex as monument according to contemporary theorists of urban space. Apparent political or market expansions are an ever-present narrative, as is unending urban transformation – from a Bolshevik city, to a socialist one, to today's ideas about multi-family housing replacing a trade fair, founded on notions about breathing life into the EXPO 2027 project. Bearing in mind global trends of real estate investment, politics, public relations, and private interest, as well as the Sajam's genesis as a deliberate monument, it can be concluded that, due to the impossibility of its convergence with the Belgrade Waterfront project, it has, as the dominant trace of a previous age and a foreign micro-entity in a space intended for the reception of a new epoch, become a kind of disturbance.

Finally, in creating a broader platform (critical matrix) enabling all participants of the critical public to position themselves more objectively in making judgments and decisions on such an important topic, it was determined that erasing the analysed elements of the architectural and urban composition of the signature space of a medial and superior socialist Yugoslavia would mean erasing an incredibly important segment of the current values of this urban space, as well as Belgrade's own history. However, these conclusions and the critical matrix from which they stem anticipate further opportunities for deeper analyses toward the formulation of more serious urban renewal strategies for this complex.

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A REVIEW OF RESILIENCE IN URBAN FORM FOR NATURAL DISASTER-PRONE AREAS

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Considering resilience within the components of urban form can aid in the planning of disaster-prone cities and enable them to become more resilient. Although prior research has explored resilience and urban form, the aspects of urban form that can enhance natural disaster resilience remain relatively underexplored. Thus, this study aims to identify these aspects and explore research opportunities in the development of resilience concepts in urban form that have been previously studied by researchers. This study employs the systematic review method, which includes bibliometric analysis and a full-text review of the identified literature. The results show that plots, open spaces, buildings, and streets are the main variables in developing a resilient urban form. Additionally, the street network within the urban form is emphasized in emergency disaster planning. Most current research describes resilience in terms of the ability to withstand and adapt by restoring and operating systems as they were before the disaster occurred. Recommendations for future research include focusing on long-term resilience in urban form by implementing new operational methods in cities to achieve transformative adaptation. Another opportunity is to conduct research in locations with unique characteristics in developing countries, especially areas that have previously experienced significant natural disasters. This study contributes to the understanding of how urban form can be enhanced for resilience through the planning of its components.

Key words: systematic review, disaster resilience, resilience, urban form.

INTRODUCTION

Cities that have previously experienced disasters, especially natural disasters, are not exempt from the possibility of their recurrence in the future. As urban centres continue to grow, urbanization in disaster prone-areas will inevitably increase. The global urbanization process continues to accelerate and is predicted to be most significant in urban areas (Feng *et al.*, 2020a). Urbanization influences the formation of a city both physically and non-physically. Therefore, disaster-prone cities have a vested interest in enhancing their resilience to disasters, which can potentially be achieved through urban forms that are capable of withstanding and adapting over time.

Cities exhibit changes in urban form over time. According to Cowan (2005), "urban form" refers to the physical manifestation of a city, which he also describes as synonymous with the urban

fabric. Additionally, he explains that the investigation and analysis of the physical structure and organization of urban areas is known as urban morphology. Živković (2019) clarifies that urban form is a term used to describe the physical characteristics of a city in terms of size, shape, and the configuration of the city or its parts, in order to understand its composition depending on the scale, also including non-physical aspects of urban form, such as density. The urban morphology approach is a method for analyzing the physical composition and layout of a city, focusing on buildings, streets, and plots that shape the overall appearance and structure (Oliveira, 2016). Yunus (2015) also suggests using the urban morphology approach to observe the physical development of a city and to understand urban morphology from two perspectives, namely:

- the urban form from spatial expression, which is formed by the expansion of the city; and
- the urban form from the pattern of the city's physical appearance; including the road system, buildings, and blocks.

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Northam (1975) and Pontoh and Kustiawan (2009) also propose that there are other ways to classify urban form besides spatial patterns, which are based on the arrangement of a city's components. In classifying urban form, the typo-morphological approach can be used, which involves grouping based on the structural characteristics of urban components (Kropf, 2017; Oliveira, 2016).

The urban form influences how resilient a city is in facing future disasters. Therefore, understanding an urban form that can withstand disasters is crucial for improving a city's resilience. The importance of incorporating resilience concepts into urban form planning cannot be overlooked, as it is essential to enhance resilience in preparation for future uncertainties (Jabareen, 2013). The concept of resilience is the capability of an urban system to evolve and implement effective short-term and long-term adaptation strategies aimed at reducing hazards, enduring and absorbing shocks, rapidly recovering basic functionality, and enhancing the system's ability to adapt more efficiently to disruptive events by evolving into a more advanced and robust system (Chelleri *et al.*, 2015; Desouza and Flanery, 2013; Sharifi and Yamagata, 2018a).

Resilience in urban form is demonstrated through the ability of its components to adapt, remain intact, and maintain functionality in the face of disasters across social, physical, institutional, environmental, and other systems (Felicetti and Romice, 2016; Sharifi and Yamagata, 2018b). Dhar and Khirfan (2017) propose the use of spatial, physical, functional, and ecological dimensions to assess resilience in urban form components. On the other hand, at a micro-scale, urban resilience can be observed in physical, environmental, social, and economic dimensions (Davis and Uffer, 2013). Previous studies indicate that there has been limited specific research on the concept of resilience to natural disasters and urban form. Natural disasters are often unexpected events that cause damage to cities and the people living in them, including meteorological, hydrological, geophysical, climatological, and biological disasters (Jha *et al.*, 2013).

This study addresses the need for resilient cities against natural disasters by clarifying the opportunities for future research through the aspects of resilience and urban form. Therefore, the aim of this research is to analyze the development of studies on urban form resilience and identify further research opportunities that need to be undertaken. The results of this review are beneficial for researchers studying urban morphology in order to delve deeper into the need for resilience against natural disasters, thereby assisting planners in developing strategies for resilient urban planning.

METHODS

This study employed systematic review and snowballing methods to select publications on the use of urban form for disaster resilience (Cooper, 2017; Thomé *et al.*, 2016). This method was considered most suitable for addressing the research objectives because it provides guidance for filtering the most relevant articles systematically. Articles were screened step by step using keywords, titles, and abstracts until a full-text review could be conducted. Figure 1 illustrates the

research stages. The first stage involved searching reputable international literature using various keyword combinations to maximize the relevance of search results to the topic, namely "urban form resilience", "urban form" AND "resilience", "urban form" AND "disaster resilience", and "urban form" AND "disaster". We attempted specific keyword combinations, however increasing the specificity of the keywords resulted in significantly fewer relevant results, often yielding minimal or no pertinent outcomes. Furthermore, the keywords included pertain to disasters in general, due to the broad nature of the resilience aspects in urban form being investigated. The primary search engines used were Scopus and Google Scholar, as both connect to a vast number of journal sources and align with the access available to the authors. To ensure the most recent developments were covered, the literature reviewed was limited to publications from the last ten years, specifically from 2013 to 2024. The literature was then selected based on its focus on urban studies and use of the English language. Additionally, related literature was identified through citation searches using Connected Paper to expand the literature search. This search engine was utilized due to its ability to filter articles that are most cited and relevant to the entered keywords, thereby beneficially enhancing the most relevant sources of search. Through online access, the most relevant articles appeared by entering the keywords "urban form resilience". Subsequently, the diagram and list displayed the analysis results of other articles based on keyword similarity, as well as presenting the most cited articles. Only literature that had undergone the peer review process was included to ensure that grey literature was excluded.

A total of 632 articles were found. First, articles were screened based on their title and abstract (n=184), followed by a full article review (n=45). The most relevant articles were then entered into VOSviewer to analyze any trends from bibliometric analysis: topic clusters and timeframe based on co-occurring terms, and the most contributing authors. Trend of journals with the most reputable contributions and reliability were visualized and used as the main publication sources for this topic, as well as the most frequently researched locations. Additionally, a full-text manual review was necessary to confirm the results from VOSviewer, highlighting the topic groups addressed and the limitations and future recommendations identified by the authors. These steps were undertaken to address the various aspects arising from the study of urban form resilience and to identify opportunities for urban researchers to further enhance knowledge in support of developing resilient cities.

RESULTS

The results of the bibliometric analysis are presented in the section Publication trends, while the findings from the full text review are displayed in the section Aspects of resilience and urban form. The final section is Limitations and recommendations from previous research.

Publication trends

The visualization from VOSviewer in Figure 2 shows the clustering of related keywords that are most frequently used together, revealing five topic clusters that emerge through these keywords. The first cluster is "resilience", which focuses on the robust characteristics of physical components. The most frequently appearing keyword

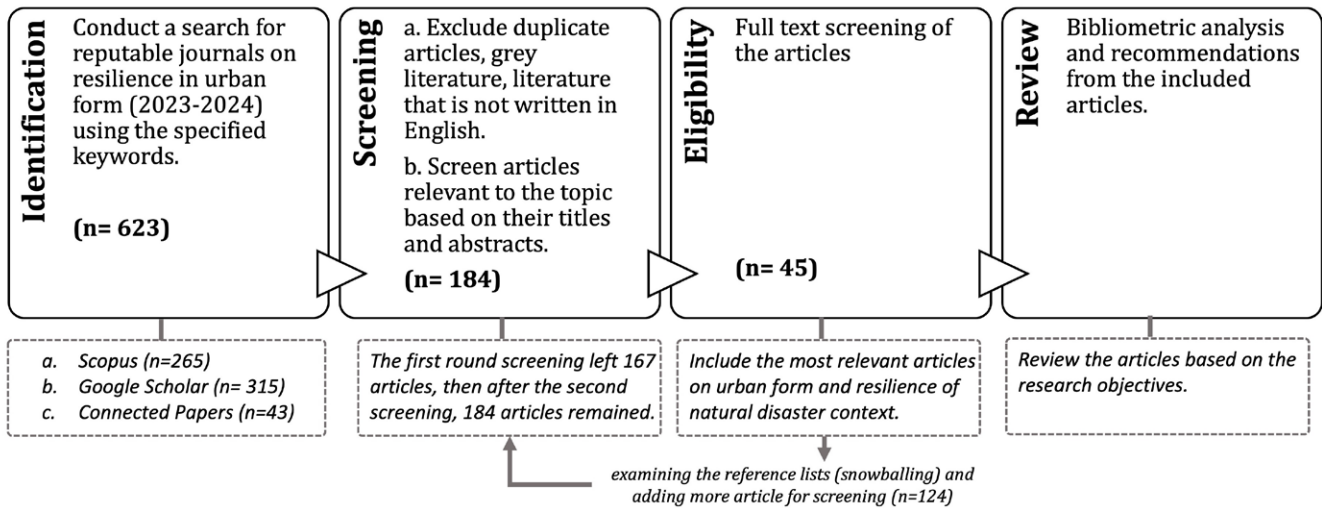


Figure 1. Research Stages
(Source: Authors, 2024)

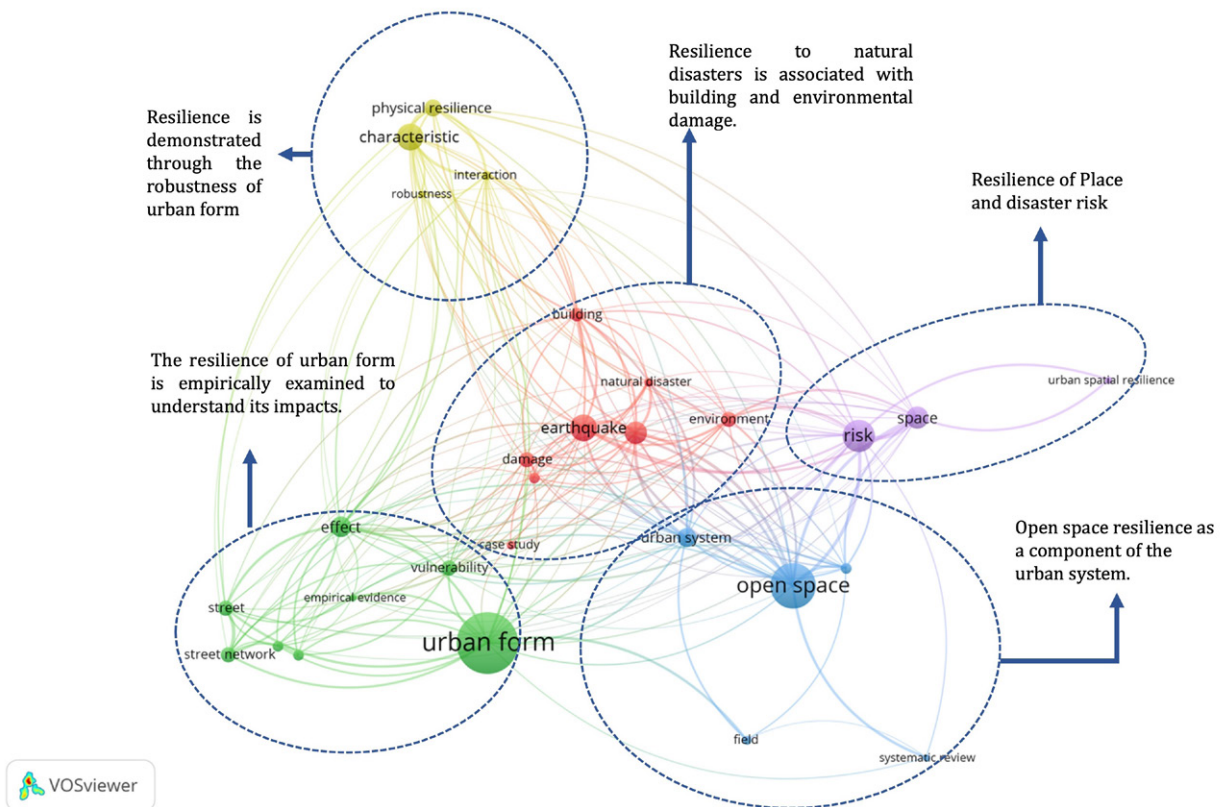


Figure 2. Most used terms in urban form resilience articles
(Source: Authors, 2024)

is “character”, indicating the need for a full text review to determine what characteristics, besides robustness, are part of the resilience character. The second cluster is “resilience to natural disaster”, which relates to resilience against potential damage to buildings and the environment. The main keyword here is “earthquake”, highlighting that buildings and the environment are aspects of the urban form being studied. The third cluster addresses the resilience of urban form, with some studies already evaluating aspects of roads and their networks empirically. The main keyword in this cluster is “urban form”. The next cluster is “resilience of

place”, relating to disaster risk at specific locations, which has the fewest keywords in this group. The final cluster is the resilience of open spaces as part of the urban system. The most prominently used keyword is “open space”. This clustering provides guidance for further clarifying these clusters through the text review stages.

Figure 3 illustrates the timeframe of the most frequently occurring keywords from 2013-2024, revealing the latest trends in usage and discussion. All these keyword trends emerged after 2015, with the most prominent in the last five years being “physical resilience” and its characteristics,

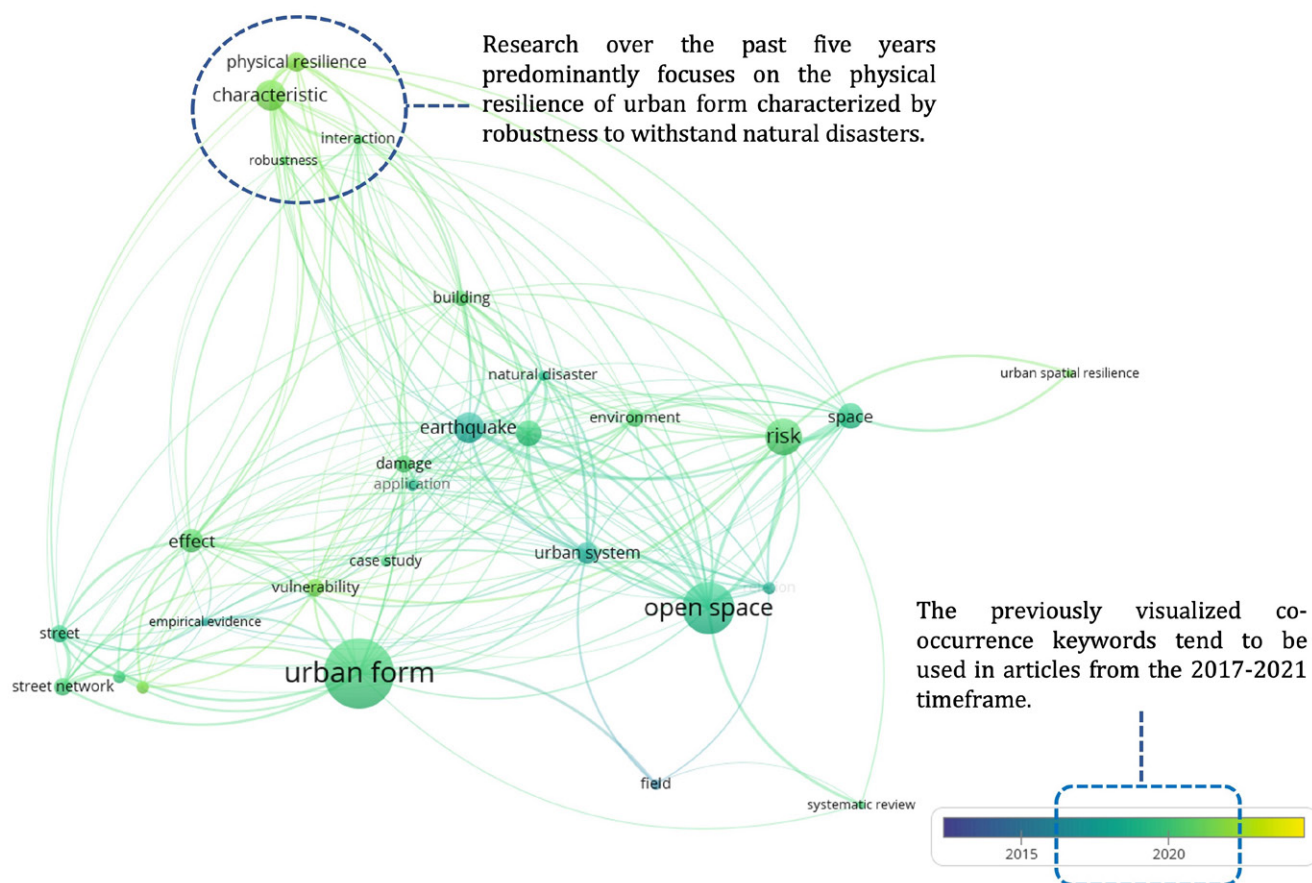


Figure 3. Timeframe of the co-occurrence keywords
(Source: Authors, 2024)

as well as “interaction” and “robustness”. Figure 4 depicts the trend of the most researched locations, which tend to be in the Global South, indicating developing countries. The developmental status of each country may have different characteristics. However, the trend shows that the most researched locations are China and Iran. Not all studies reviewed provided location context, so the visualization presented represents trends from empirical studies. The analysis results also indicate, in Figures 5 and 6, the

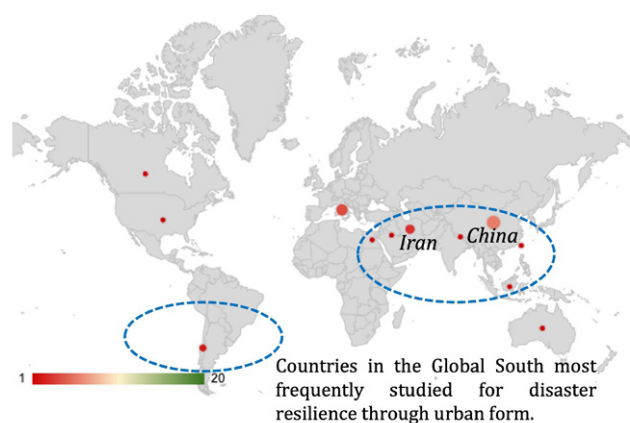


Figure 4. The most researched locations regarding urban form resilience to natural disasters
(Source: Authors, 2024)

authors and journals that have contributed the most to the publication of articles on resilience in urban form. For example, Ayyoob Sharifi is documented to have seven articles reviewed in this study and has collaborated with other researchers. Additionally, the journals that have contributed the most to research on urban form resilience are Urban Climate, Sustainability, and Cities.

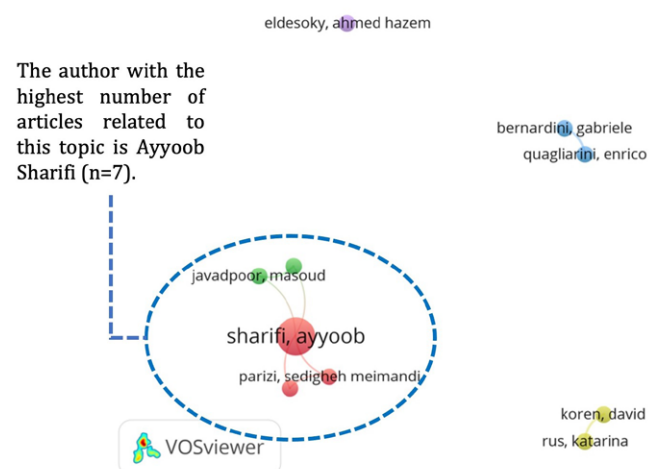


Figure 5. Authors who are most frequently recorded and belong to clusters that often collaborate in research
(Source: Authors, 2024)

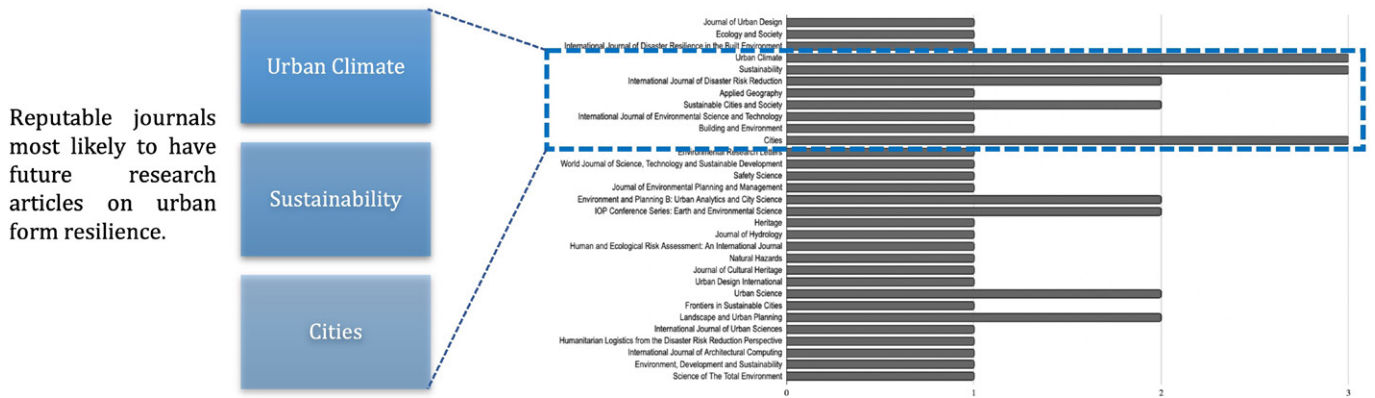


Figure 6. The journals with the highest number of publications on the reviewed topic
(Source: Authors, 2024)

Table 1. Group of topics in urban form resilience to disaster

Group of Topics	References
Characteristics of Resilience in Urban Form	Marcus and Colding, 2014; Rus <i>et al.</i> , 2018; Sharifi and Yamagata, 2018b; French <i>et al.</i> , 2019; Masnavi <i>et al.</i> , 2019; Sharifi, 2019a, 2019b, 2019c; Lu <i>et al.</i> , 2021; Parizi <i>et al.</i> , 2021; Alawneh and Rashid, 2022; Parizi <i>et al.</i> , 2022; Eldesoky and Abdeldayem, 2023
Performance of Recovery and Adaptation of Urban Form in Disaster-Prone Areas	Irajifar <i>et al.</i> , 2016; Xu <i>et al.</i> , 2019; Feng <i>et al.</i> , 2020b; Sharifi <i>et al.</i> , 2021; Vicuña <i>et al.</i> , 2022; Ricafort & Makki, 2023; Xie <i>et al.</i> , 2023
Urban Form for Emergency and Evacuation Systems	Shrestha <i>et al.</i> , 2018; Koren and Rus, 2019; Giuliani <i>et al.</i> , 2020; Quagliarini <i>et al.</i> , 2021; Russo <i>et al.</i> , 2021; Roosta <i>et al.</i> , 2022; Li and Yan, 2024
Physical Strength of Urban Form	Fischer <i>et al.</i> , 2018; Wang, 2020; Li <i>et al.</i> , 2021; Liu <i>et al.</i> , 2024
Urban Design Strategy for Enhancing Urban Form Resilience	Allan <i>et al.</i> , 2013; Dhar and Khirfan, 2017; Hachem-Vermette, 2019; Abdulkareem <i>et al.</i> , 2020; Lak <i>et al.</i> , 2020; Gherri <i>et al.</i> , 2021a, 2021b; Sartorio <i>et al.</i> , 2021; Eldesoky <i>et al.</i> , 2022; Hao and Wang, 2022; Singh and Sharston, 2022; Ugalde <i>et al.</i> , 2022; Shukla and Makki, 2023; Xi <i>et al.</i> , 2023

Aspects of resilience and urban form

Based on a full text review of 45 articles, there are five topic groups that share similarities in research focus (Table 1). These topics are:

- Characteristics of Resilience in Urban Form;
- Performance of Recovery and Adaptation of Urban Form in Disaster-Prone Areas;
- Urban Form for Emergency and Evacuation System;
- Physical Strength of Urban Form; and
- Urban Design Strategy for Enhancing Urban Form Resilience.

In the timeframe of the development of group topics, all of them emerged as topics of research in the last five years (Figure 7), especially those addressing the use of urban design strategies.

Most of the research of urban form elements include streets, plots, and buildings. Apart from the research context, urban form is also associated with non-physical data, such as density, scale hierarchy, and diversity, while research in the context of landscapes uses forest, water, green open space, or green network variables. Specific research addresses specific infrastructure related to disasters, such as shelters and emergency routes. Most assessments of

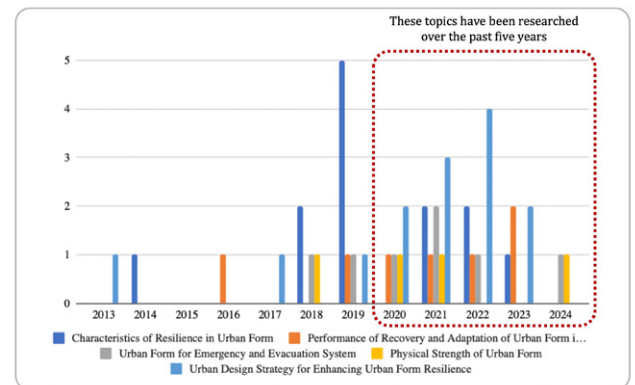
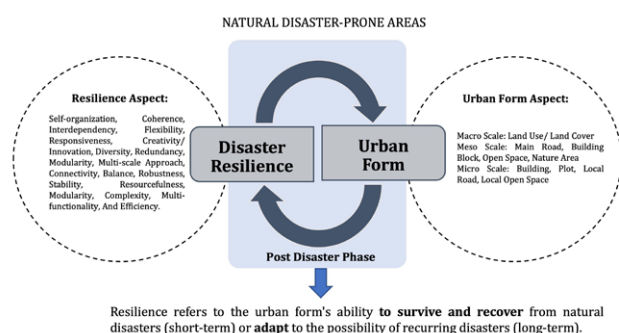


Figure 7. Timeframe of the research topic
(Source: Authors, 2024)

the urban form led to connectivity, centrality, robustness, accessibility and efficiency. If viewed based on scale, the macro-scale component is land use/land cover; at the meso-scale it includes main roads, building blocks, open spaces, and nature areas, while at the smallest scale, it consists of buildings, plots, local roads, and local-scale open spaces. Figure 8 illustrates the resilience aspects that can emerge in urban form components, including: self-organization, coherence, interdependency, flexibility, responsiveness, creativity/innovation, diversity, redundancy, modularity,



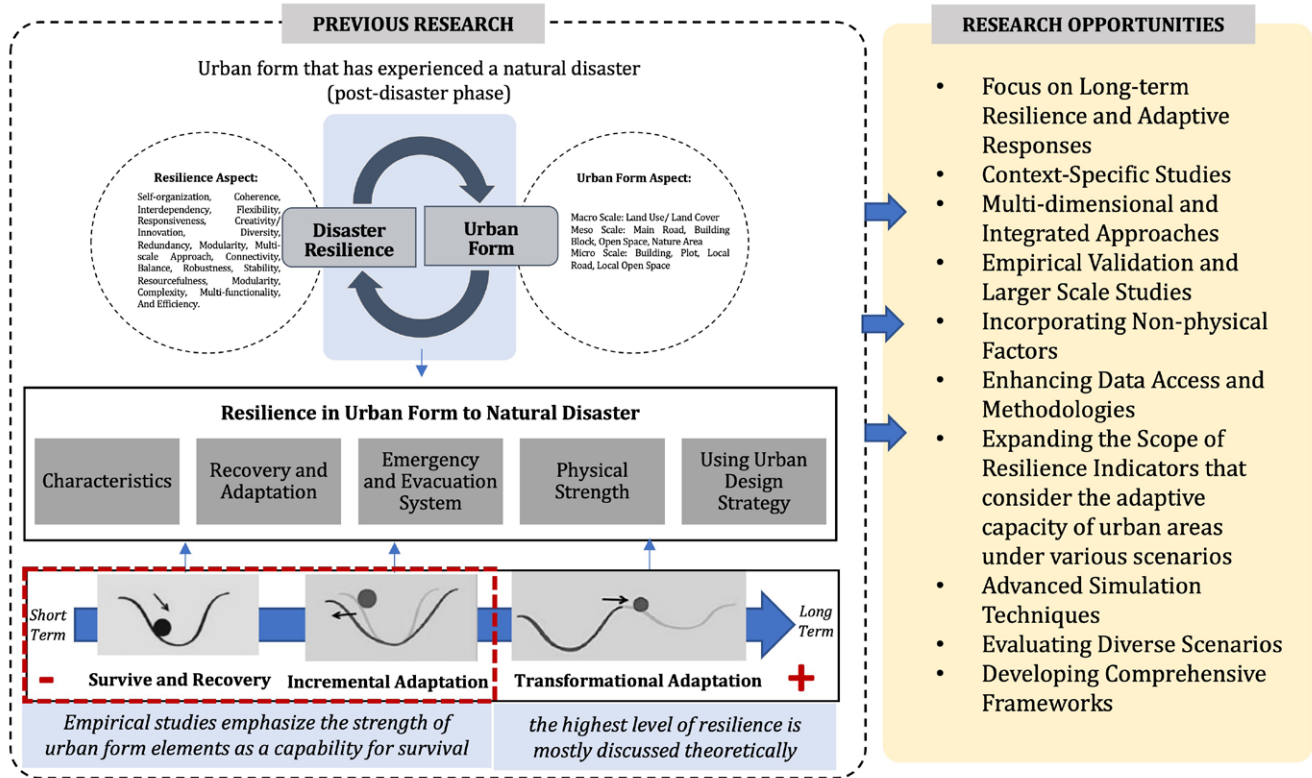


Figure 10. Research directives based on aspects of resilience in urban form
(Source: Authors, 2024)

sustain independent functionality across all dimensions (Felicetti *et al.*, 2016). The lowest level of resilience is indicated by the system's ability to survive and recover. The second is incremental adaptation, which represents a higher resilience level through adjustments using familiar methods in that place. The most theoretically distinguished is transformational adaptation, understood as the ability to adapt to disasters by innovatively changing the system using new, unfamiliar measures (Masnavi *et al.*, 2019).

Increasing urbanization, which affects city formation, cannot be avoided, so the urban form will continue to experience dynamics over time (Senjana *et al.*, 2023). Unpredictable disasters can reduce a city's resilience, causing losses to the humans and ecosystems that inhabit the city. Relocating urban residents to a new environment does not necessarily reduce their vulnerability; instead, it creates new problems as they will be exposed to other disturbances. Therefore, another research opportunity is that urban form resilience needs to consider other dimensions besides physical ones, as they will be affected when natural disasters occur, such as social, economic, institutional, and environmental dimensions. The impact on health also ultimately affects public health, for example, the health impact of mud-related disasters (WHO, 2010a; 2010b). Therefore, adequate city planning to enhance resilience is positively correlated with public health benefits (WHO, 2022). The impact on health is not only physical but also psychological, as evidenced by the level of happiness among local residents (Salama *et al.*, 2024; World Health Organization. Regional Office for Europe (2018), WHO EHCN, 2019; Wright *et al.*, 2019).

The recommendations emerging from this review are expected to provide new knowledge to guide the resilience of urban form components to the highest level. Another aspect mentioned is collaboration with the community regarding their assessment of the city's development where they live, especially in Global South as the most researched area. Numerous countries around the world are situated in disaster-prone locations, particularly facing natural disasters in coastal cities. Therefore, regardless of the current developmental status of an area, the concept of resilience in urban planning and spatial design is crucial and should be integrated into the operational process. Additionally, the integration of components across various scales is also urgent for research. Long-term thinking on transformational adaptation drives the need for more empirical studies, not just theoretical ones.

CONCLUSION

This study is a literature review that has investigated resilience in urban form in the context of facing natural disasters, encompassing both theoretical and empirical studies. The aim of the research is to analyze which aspects of resilience and urban form can enhance resilience and to identify opportunities or gaps in these studies that can be addressed in future research. The review reveals that the most recently studied trend relates to physical resilience and the strength characteristics of urban form components. The development of the reviewed studies has evolved from discussing urban morphology and resilience concepts in various forms, such as surviving and recovery, incremental adaptation, and transformational adaptation.

The emerging topics in the last five years include:

- characteristics of resilience in urban form;
- performance of recovery and adaptation of urban form in disaster-prone areas;
- urban form for emergency and evacuation systems,
- physical strength of urban form; and
- urban design strategies for enhancing urban form resilience.

However, despite the increase in studies, there are still limited opportunities for other researchers to continue exploring these topics, especially in the effort to create resilient cities against future natural disasters. Cities that have already achieved resilience demonstrate the capability of their systems' functions to continue operating even if disasters recur.

There are limitations in this review process, specifically the keywords, which are a recommendation for future research to use specific keywords related to types of natural disasters and components of urban form that can be analyzed according to the context of the location and disaster. Combining methods when reviewing literature can also enrich the research findings. Additional investigations are necessary to test the concept of urban form resilience in empirical research, particularly in disaster-prone developing countries, through targeted location-based studies. On the other hand, this study is the initial phase of a bigger research map that we intend to pursue. Nevertheless, this study is expected not only to assist us in progressing to the next research stages, but also to aid stakeholders as a consideration in the process of planning and developing disaster-resilient cities.

Acknowledgements

Authors express their deepest gratitude to the Indonesia Endowment Fund for Education (LPDP) which has supported and provided funding for this research.

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Received January 2024; accepted in revised form June 2024.

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SPATIUM : urban and spatial planning,
architecture, housing, building, geodesia,
environment / editor in chief Jasna Petrić. - 1997,
no. 1 (sep.)- . - Belgrade : Institute of Architecture
and Urban & Spatial Planning of Serbia, IAUS,
1997- (Belgrade : Planeta print). - 30 cm

Polugodišnje. - Drugo izdanje na drugom medijumu:
Spatium (Online) = ISSN 2217-8066
ISSN 1450-569X = Spatium (Belgrade)
COBISS.SR-ID 150289159



Institute of Architecture and Urban & Spatial Planning of Serbia
11000 Belgrade, Bulevar kralja Aleksandra 73/II * www.spatium.rs

ISSN 1450-569X * **spatium** 51/2024 * International Review
ISSN 2217-8066 (Online)