

ORIGINAL RESEARCH PAPER

## Exploring the role of place attachment in shaping urban development meanings in peripheral settlements

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### ABSTRACT

**BACKGROUND AND OBJECTIVES:** This study investigates the intricate connections that exist between place attachment, urban development meanings, and acceptance in urban peripheral settlements. The research aims to gain a better understanding of how people perceive and respond to urban development scenarios in the periphery using the tripartite frameworks of place attachment and the disruption-response model.

**METHODS:** Utilizing a mixed-methods approach, this study examines people's perceptions and reactions to four hypothetical urban development scenarios by combining qualitative interviews with key participants and then quantitative surveys administered to 256 adult residents of selected peripheral settlements in the rapidly developing city of Malang, Indonesia.

**FINDINGS:** The findings from the qualitative phase, reveal diverse dimensions shaping the meaning of urban development, encompassing economic, social, cultural, livelihood, and environmental impacts. The survey results' exploratory factor analysis reveals latent factors that capture diverse perspectives on development scenarios, from societal and environmental harm to economic modernization and advancement. The structural equation model reveals that place attachment emerges as a significant predictor of urban development scenario meanings, although the relationship varies across different scenarios. Furthermore, the level of acceptance of urban development scenarios mediates the relationship between place attachment and interpretations, influencing perceptions of economic, social, and environmental impacts. Subsequently, the implications of these findings for existing literature were discussed.

**CONCLUSION:** This study fills a gap in the disruption-response model by illuminating the interpretation process and showcasing the interplay of place attachment, urban development meanings, and acceptance in peripheral city settlements. Limitations of the study were discussed, and future studies were proposed.

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## INTRODUCTION

In the contemporary context of urban development, the intricate interplay between communities and their evolving environments has assumed paramount importance (Gu, 2019). These transformations, though often viewed as positive, can also lead to solastalgia, contributing to a decline in overall well-being (Galway et al., 2019; Phillips and Murphy, 2021). Conversely, rapid urban development predominantly occurs in peripheral settlements of cities (Portnov and Pearlmutter, 1999), particularly evident in developing nations like Indonesia (Firman, 2002). As cities expand and urban development reshapes the landscapes of peripheral settlements, understanding how residents perceive these changes becomes increasingly imperative. Place attachment, characterized by the cognitive, emotional, and behavioral bond individuals form with their surroundings (Scannell and Gifford, 2010), emerges as a pivotal factor in understanding how residents perceive environmental changes (Devine-Wright, 2009; van der Star and Hochstenbach, 2022). The degree of neighborhood place attachment significantly shapes their perceptions, attitudes, and responses as environmental changes unfold (Lewicka, 2011). The significance of place attachment in confronting environmental changes stems from its capacity to serve as a safeguard for community identity, cultural heritage, and a shared sense of belonging (Junot et al., 2018). Conversely, a weak place attachment may fuel resistance, anxiety, and potentially even displacement in response to environmental changes (von Wirth et al., 2016). Disruption in place attachment occurs when environmental changes create enough power to make deep changes in place attachment dimensions (Brown and Perkins, 1992). Time spent, subjective perceptions, and objective physical characteristics of residential complexes are three key factors directly impacting place attachment (Motalebi et al., 2023). Changes in these factors are posited as potential disruptors of place attachment. Among these, time spent in a place has been identified as the most influential factor in developing place attachment (Lewicka, 2011), followed by changes in subjective physical characteristics (Reese et al., 2019), and objective physical attributes (Jacquet and Stedman, 2014). As urban development reshapes the landscapes of peripheral settlements, it holds significant potential to disrupt the place attachment of residents in these areas. Understanding the dynamics of place

attachment from a process-oriented perspective is essential for advancing scientific knowledge in this field (Lewicka, 2011). Studies related to disruption in place attachment have primarily been examined in various settings, including stable rural communities (Raymond et al., 2010), evolving urban neighborhoods (B. Brown et al., 2003; von Wirth et al., 2016), and shrinking rural regions (van der Star and Hochstenbach, 2022). Furthermore, research has predominantly focused on urban and rural areas. Additionally, much of the existing place attachment research has investigated environmental changes resulting from war (Boğaç, 2009; Lewicka, 2008), disasters (Clarke et al., 2018; Zheng et al., 2019), and climate change (Scannell and Gifford, 2013). As a concept rooted in the relationship between people and place, with a focus on place meaning (Stedman, 2003), place attachment has the potential to significantly influence the interpretation of changes in a place. However, the role of place attachment in shaping the interpretation of urban development in peripheral areas remains relatively understudied. This study aims to explore the influence of place attachment on the interpretation of urban development scenarios in peripheral settlements, offering insights into how urban peripheral communities respond to urban development as a disruptor of their place attachment. By elucidating how place attachment influences perceptions of and responses to urban development, this study endeavors to inform strategies and interventions aimed at fostering sustainable development practices that preserve community identity and well-being in peripheral urban areas.

### *Place attachment and interpretation of environmental change*

Place attachment is conceptualized through three dimensions of PPP (the person dimension, the psychological process dimension, and the place dimension) (Scannell and Gifford, 2010). Operationalizing place attachment typically involves psychological dimensions such as place affect, place identity, and place dependence, as outlined by Cole et al. (2021) and Scannell and Gifford (2013). These concepts are integral components within the disruption-response framework, serving as direct inputs into the interpretive processes of environmental changes (Mihaylov et al., 2020). Individuals' perceptions of urban development are



Fig. 1: Conceptual framework of the first hypothesis

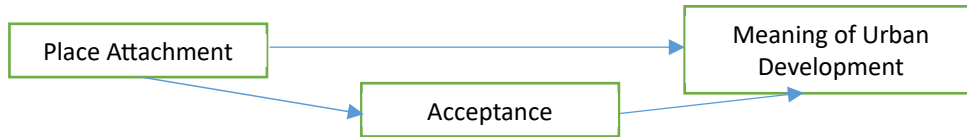


Fig. 2: Conceptual framework of the second hypothesis

not solely influenced by the objective nature of the occurrence; rather, they are also shaped by their place attachments, which can either foster local acceptance or opposition to urban development. Studies have indicated that place attachments play a significant role in the explanation of social acceptance of energy proposals (Devine-Wright, 2009; Vorkinn and Riese, 2001). Place attachments can even act as barriers to communication regarding environmental disruptions (Scannell and Gifford, 2013). The interpretive process often involves the analysis and interpretation of various sources of information, experiences, and contexts (Devine-Wright, 2009). The concept of place meaning holds central importance within the framework of place attachment (Stedman, 2003). It encompasses the socially constructed and negotiated boundaries of a place, along with the qualities and attributes that imbue it with a distinct meaning and identity in the perception of its inhabitants (Lewicka, 2011). However, it is contended that changes in environmental meaning possess the potential to intersect with place meaning, as the alignment of change with place meanings determines its acceptance or rejection (Mihaylov *et al.*, 2020). For example, responses opposing certain environmental projects (Devine-Wright and Howes, 2010) or supporting others (Devine-Wright, 2011) are heavily influenced by these meanings. Conversely, urban development endeavors typically adhere to sustainability objectives as their main meaning (Wei *et al.*, 2015), which commonly align with its fundamental pillars of development (Murphy, 2012; Sabatini, 2019). Consequently, it is argued that the acceptance or rejection of different urban development projects and the disruptions they entail depend not only on the projects themselves but also on their meaning to the local community.

Building upon this premise, the research aims to systematically evaluate two hypotheses. Hypothesis 1; the role of place attachment as a determining factor in shaping the distinctive meanings associated with urban development projects, particularly those implemented in peripheral urban areas (Fig. 1). It is envisaged that the dynamics of meaning generated by these projects will interact with place attachment in varied and possibly unpredictable ways. Consequently, the influence of place attachment on the meaning of urban development may be contingent upon specific project contexts. Hypothesis 2; it is posited that in cases where a significant association between place attachment and the meaning of urban development is not observed, there may exist a mediating variable influencing this relationship. Urban development acceptance, reflective of the community's acceptance of change and the compatibility of such change with place meanings (Mihaylov *et al.*, 2020), is proposed as a potential mediator (Fig. 2). This study endeavors to furnish empirical evidence to substantiate these hypotheses and shed light on the nuanced interplay between place attachment, urban development meanings, and acceptance.

## MATERIALS AND METHODS

This study mainly employs quantitative methods, utilizing hypothetical urban development scenarios in surveys. This cross-sectional approach is chosen to mitigate the potential influence of coping mechanisms on the role of place attachment in shaping the perception of urban development. However, recognizing that meaning inherently involves qualitative aspects (Rapoport, 1990), this study also integrates qualitative methodology. Therefore, as a whole, the research employed a mixed-methods

approach, integrating qualitative and quantitative techniques. The integration of both quantitative and qualitative methods enhances the richness and depth of the research findings, offering valuable insights for theory development and practical implications. The hypothetical urban development scenarios were selected based on several considerations: Firstly, they needed to concentrate on fixed features of the environment. Secondly, they were selected for their high likelihood of occurring in the research locus environment, yet they should not have transpired within the boundaries of the research settlements. Additionally, the scenarios were required to have a significant, widespread impact across settlements, affecting the entire population. They also needed to be easily comprehensible by the general public, making them potentially applicable to other similar settings. Importantly, the scenarios were devoid of any political or religious elements and were neutral towards any particular groups. To obtain a comprehensive understanding, multiple scenarios were employed to assess model consistency and validate the research framework. Thus, the study selected four distinct urban development scenarios that had not yet materialized in the study locations: 1) the emergence of formal housing (G. Brown *et al.*, 2004; Puspitasari, 2013); 2) the emergence of new city streets (Song *et al.*, 2016); 3) the loss of public open space (Harun *et al.*, 2015); and 4) the loss of trees or other vegetation (Fatma and Deguchi, 2016; Lavy and Zavar, 2023). The sampling strategies for each stage are distinct. During the qualitative phase, peripheral settlement leaders serve as primary participants and undergo in-depth interviews. These key participants are chosen to represent residents of the neighborhood, as they often recognize and represent public opinion on various occasions. In the quantitative phase, surveys are administered to the research sample, which comprises residents of the peripheral settlement. Criteria were set, including individuals aged 18 and above, residing in the study sites for a minimum of two years, to ensure that respondents' place attachment was sufficiently established (Clark *et al.*, 2015), facilitating a deeper understanding of their perceptions and responses to urban development scenarios. The sampling method involved a priori power analysis conducted using the *g\*power* program (Faul *et al.*, 2007), which calculated an *N* of 54 to detect a medium effect size of 0.5, deemed appropriate for the mean, with a

power of  $1-\beta = 0.95$ . To ensure an adequate number of respondents, it was recommended to recruit a minimum of 54 respondents for each hypothetical scenario as an independent variable condition. Hence, for the four urban development scenarios, a minimum of 216 respondents are required. Respondents completed the questionnaire in their homes under the observation of the researcher, who led them through the process of involvement. The respondents were also shielded by the researchers so that their answers were free of outside interference. A total of 256 adult residents (128 from each hamlet) were recruited for the study. Four of the 256 individuals in the study had to be eliminated because they completed the questionnaire in an evident way by answering the question trap incorrectly. This question is intended to confirm that respondents are reading the questions rather than simply marking off the answers. 53% of the 252 individuals who identified as female. Their age was 37.6 years old on average (SD = 12.65). Farmers made up the bulk of respondents (37.7%), followed by workers in the private sector (27.7%), and self-employed (21.8%). Others were civil servants who had retired, were looking for jobs, were in school, or were doing something else. The typical resident of the town stayed for 29.20 years (SD = 16.18). The study locus was urban periphery settlements situated within a rapidly developing city as its focal point. The chosen settlements were chosen with specific criteria: they should have historical roots predating the city's urban development, existing before the establishment of the city itself. If multiple settlements were considered, they needed to belong to the same subculture. The research site chosen for this study is Malang City, situated in East Java, Indonesia. Malang City is recognized as one of Indonesia's largest and fastest-growing cities, particularly on its outskirts (Mahendra and Pradoto, 2016). To ensure the effectiveness of the study, respondents were required to reside in peri-urban settlements that had experienced minimal influence from Malang City's urban development initiatives. From the 41 inner-city periphery settlements identified within Malang, two settlements were chosen as representative study sites: Baran Tempuran and Baran Tlogowaru ( Fig. 3). The decision to include two settlements was driven by the insufficient number of eligible research respondents from a single settlement. However, given that both settlements belong to the same subculture and share similar settings, their data

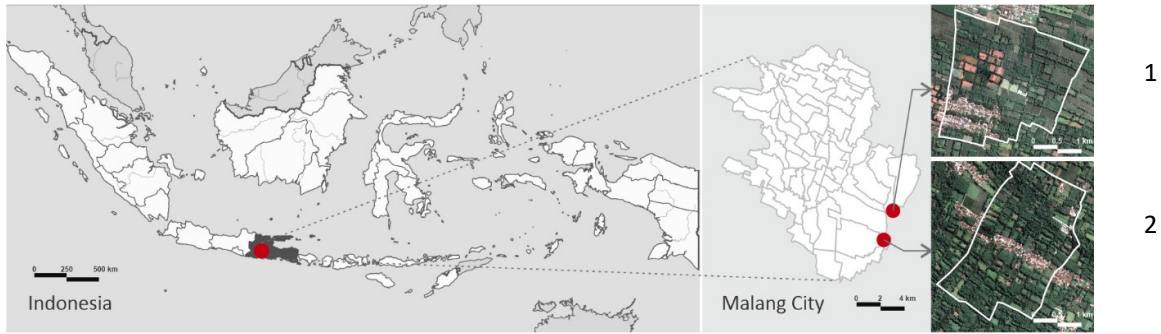


Fig. 3: Location and map of Baran Tempuran (1) and Baran Tlogowaru (2)

were amalgamated for analysis.

To assess the meaning of urban development scenarios, a qualitative stage was conducted through in-depth interviews. The main question posed during these interviews was, “What do you perceive as the meaning of urban development that will occur in your settlement?” The interview responses were subsequently subjected to exploratory coding, drawing upon categories of urban development (Basiago, 1999; Giddings *et al.*, 2002) and sustainable urban growth in peripheral areas (Portnov and Pearlmutter, 1999). The outcomes of this coding process were then utilized as indicators in the questionnaire. Utilizing the same question from the qualitative phase and incorporating it into the questionnaire, respondents were asked to provide answers by assessing these indicators on a 6-point Likert scale. To assess place attachment, a 19-item place attachment scale adapted from previous studies (Scannell and Gifford, 2013, 2017) was utilized. Respondents provided their responses on a 6-point Likert-type scale, with 1 indicating strong disagreement and 6 denoting strong agreement. Some indicators were adopted by incorporating the Indonesian local concept to address the concept of place attachment according to previous research suggestions (A. F. Nazaruddin, 2017; F. Nazaruddin *et al.*, 2023). The total place attachment was computed using the mean of the subscales. The scale demonstrated Cronbach’s alpha values of 0.86 indicating excellent reliability. The level of acceptance of urban development scenarios was assessed using a single indicator: “happy with the scenario.” Respondents rated their level of acceptance on a 6-point Likert scale. The statistical analysis employed in the research was Exploratory Factor Analysis (EFA), which delved into the meaning of urban development scenarios. EFA was chosen

for its ability to uncover latent factors capturing multifaceted views on development scenarios without bias. Before conducting Exploratory Factor Analysis, data underwent Parallel Analysis to detect patterns of variation. Items with weak or unclear relationships to any specific factor were removed to enhance focus on the underlying factors. The indicators were required to demonstrate significance with the Kaiser Meyer Olkin Measure of Sampling Adequacy (KMO-MSA) > 0.5 and Bartlett’s test significance  $p < 0.001$ , validating the appropriateness of exploratory factor analysis (Williams *et al.*, 2010). Subsequently, model testing was carried out using regression analysis and mediation in Structural Equation Modeling (SEM) with the JASP software, renowned for its reliability and open-source nature (Faulkenberry *et al.*, 2020). SEM was chosen as the most suitable analysis for model testing (Kline, 2016). All mediation analyses in this paper were performed 10,000 times using bootstrapping. The goodness-of-fit indexes for the model used were Comparative Fit Index (CFI) > 0.95, Tucker-Lewis Index (TLI) > 0.95, Root Mean Square Error of Approximation (RMSEA) < 0.5, and Goodness of Fit Index (GFI) > 0.95. These indexes and their scores are deemed as evidence for model suitability (Byrne, 2001).

## RESULTS AND DISCUSSION

The results of the qualitative phase and coding analysis unveiled themes encompassing the economic, social, cultural, livelihood, and environmental impacts of urban development. These themes resonate with the meaning of urban development found in previous research (Parris and Kates, 2003; Portnov and Pearlmutter, 1999), which align with the four pillars of sustainable development (Sabatini, 2019). To

Table 1: EFA of the meaning of urban development scenario #1

Factor Loadings Scenario #1	economic improvement and modernization
Increase the economy (economy)	0.759
Modernization (supporting culture)	0.756
Add social (social input)	0.612
Damage to the environment (environmental impact)	-0.48
Bad social influence (negative social impact)	-0.404
Add beauty (positive environmental impact)	0.361
The old culture is lost (culture transformation)	-0.35

Note: MSA: 0.712. Bartlett's test: P <.001. RMSEA 0.121 (RMSEA 90% Conf 0.044 – 0.195)

Table 2: EFA of the meaning of urban development scenario #2

Factor Loadings Scenario #2	social and environmental damage	social and cultural growth
Bad social influence (negative social impact)	0.723	
Add beauty (positive environmental impact)	-0.578	
Damage to the environment (environmental impact)	0.47	
Add new culture (cultural infusion)		0.627
Add social (social input)		0.55
Modernization (supporting culture)		0.449
The old culture is lost (culture transformation)		0.32

Note: MSA: 0.631. Bartlett's test: P <.001. RMSEA 0.0 (RMSEA 90% Conf 0.0 – 0.84)

elaborate, the themes are delineated as follows:

1. Social: Encompasses social inputs and effects.
2. Cultural: Involves cultural infusion, cultural transformation, and modernization.
3. Economy: Pertains to economic progress.
4. Environmental impact: Encompasses both positive and negative environmental effects.

The results of the quantitative phase of the research reveal the following regarding the meaning of urban development Scenario #1 (the emergence of formal housing): The indicator of cultural infusion has been removed, and the remaining indicators displayed a KMO-MSA of 0.712 and Bartlett's test indicated significance with  $p < 0.001$  from parallel analysis, indicating suitability for EFA. EFA unveiled a single latent factor, explaining 31% of the variance. The factor loading indicates that residents perceive formal housing developments as a means to economic improvement and modernization for their neighborhoods. This factor structure is perceived to have both advantages and disadvantages. Consequently, based on the indicators of scenario #1, the research interprets it as "Economic Improvement and Modernization". (Table 1).

The meaning of urban development Scenario

#2 (the emergence of new city streets) is as follows: After removing the indicator of economic progress for adjustments, the remaining indicators displayed a KMO-MSA of 0.631, with Bartlett's test indicating significance at  $p < 0.001$ . EFA uncovered two latent factors for the meaning of urban development scenario #2. The first factor reflects residents' concerns about the negative societal and environmental impacts caused by city street developments. The second factor pertains to the cultural and social infusion aspect. The first factor accounts for 19% of the variance, while both factors together explain 34.3% of the variance. Interpretively, scenario #2 signifies 'social and environmental damage' for the first factor and 'social and cultural growth' for the second, based on the constituent indicators (Table 2).

The meaning of urban development Scenario #3 (the loss of public open space) is as follows: After removing the indicator representing cultural transformation, the remaining questioned indicators displayed a KMO-MSA of 0.658, with Bartlett's test indicating significance at  $p < 0.001$ . Parallel analysis results suggest that EFA was valid for the remaining indicators. EFA identified two latent factors for scenario

Table 3: EFA of the meaning of urban development scenario #3

Factor Loadings Scenario #3	modernization and improvement of socio-economy	destroying the society and environment
Modernization (supporting culture)	0.728	
Add social (social input)	0.698	
Increase the economy (economy)	0.527	
Add beauty (positive environmental impact)	0.45	
Add new culture (cultural infusion)	0.318	
Bad social influence (negative social impact)		0.675
Damage to the environment (environmental impact)		0.572

Note: MSA: 0.658. Bartlett's test: P <.001. RMSEA 0.05 (RMSEA 90% Conf 0.0 – 0.16)

Table 4: EFA of the meaning of urban development scenario #4

Factor Loadings Scenario #4	modernization and economic development
Modernization (supporting culture)	0.854
Increase the economy (economy)	0.753
Add social (social input)	0.43
Add beauty (positive environmental impact)	0.411
Bad social influence (negative social impact)	-0.3
Damage to the environment (environmental impact)	-0.205
The old culture is lost (culture transformation)	-0.035

Note: MSA: 0.66. Bartlett's test: P <.001. RMSEA 0.0 (RMSEA 90% Conf 0.0 – 0.117)

#3. The first factor represents public open space loss as a symbol of modernization and socio-economic enhancement. Conversely, the second factor reflects the scenario's negative societal and environmental impact. The first factor accounts for 26% of the variance, with both factors combined explaining 39% of the variance. Interpreted as "Modernization and Socio-Economic Enhancement" for the first factor and "Societal and Environmental Damage" for the second, based on scenario indicators (Table 3).

The meaning of urban development Scenario #4 (the loss of trees or other vegetation) is as follows: The cultural infusion indicator was deleted, and the indicators in question have indicated exploratory factor analysis validity with KMO-MSA of 0.660 and Bartlett's test  $p < 0.001$ . EFA on observed indicators unveiled a single hidden factor. Various indicators highlight strong associations with modernization and economic improvement through loading factors. Conversely, negative components signify scenario #4's drawbacks. Interpreting scenario #4, considering its indicators and pros and cons, it can be labeled as 'Modernization and Economic Development.' This factor accounts for 25.6% of the variance (Table 4).

The place attachment scale indices were created by initially reverse-coding negatively phrased items.

The scale items had no missing data. To facilitate interpretation, the items on the scale were summed and averaged, ensuring that scores remained on a continuum spanning from 1 to 6. Residents in all four scenarios indicated relatively high degrees of place attachment, with mean scores ranging from 5.147 to 5.301 (Fig. 4).

In the correlation analysis of the sample's demographic characteristics with place attachment, several key findings emerge. Firstly, the length of stay exhibits a positive correlation with place attachment, indicating that longer stays are associated with higher levels of attachment to the place. Secondly, family status demonstrates a positive correlation with place attachment, suggesting that larger family sizes are linked to higher levels of attachment to the place. Thirdly, education level shows an inverse correlation with place attachment, indicating that individuals with lower levels of education tend to exhibit higher levels of attachment to the place. Lastly, the proximity of income source to the location exhibits a positive correlation with place attachment, indicating that individuals whose income sources are closer to their place of residence tend to have higher levels of attachment to the place. However, gender, age, and source of income do not show significant correlations

The role of place attachment in shaping urban development meanings

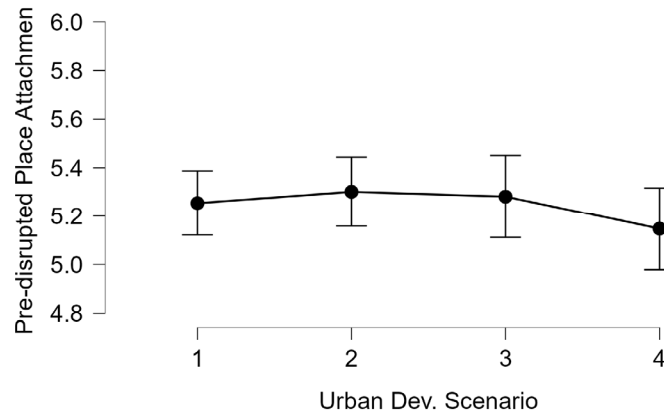


Fig. 4: Descriptive plot of place attachment in four scenario groups (source: ANOVA analysis)

Table 5: Pearson's correlations demographic data of the respondents with Place attachment

Variable	Place Attachment	
Age	0.123	
Length of Stay	0.347	***
Family Status	0.206	***
Gender	0.027	
Source of Income	0.101	
Education	-0.231	***
Location of Income	-0.169	**

\* p < .05, \*\* p < .01, \*\*\* p < .001

Table 6: Paired Samples T-Test place attachment in four scenario groups

Measure 1	Measure 2	t	df	p
Place Attachment Group Sc #1	- Place Attachment Group Sc #2	-0.338	58	0.737
Place Attachment Group Sc #1	- Place Attachment Group Sc #3	-0.577	58	0.566
Place Attachment Group Sc #1	- Place Attachment Group Sc #4	0.992	58	0.325
Place Attachment Group Sc #2	- Place Attachment Group Sc #3	0.202	66	0.840
Place Attachment Group Sc #2	- Place Attachment Group Sc #4	1.21	58	0.231
Place Attachment Group Sc #3	- Place Attachment Groop Sc #4	1.54	58	0.129

with place attachment in this context (Table 5).

The paired sample T-test analysis conducted on all four groups revealed no significant impact on group placement of the attachment scale. This uniformity of place attachment results across all groups, regardless of the scenario group that occurs, indicates that there is no significant difference. Therefore, the data results may be regarded as the same across all scenarios (Table 6).

The acceptance of urban development scenario #2 was shown to be the most favorable among the other situations, with a mean score of 4.97 and a standard deviation of 1.015 (Fig. 5).

Regression: First hypothesis

The results of the regression analysis using Structural Equation Modeling (SEM) following the conceptual framework of the first hypothesis are as follows:

For urban development scenario #1, the regression analysis indicated that place attachment did not significantly predict the meaning of urban development scenario #1, labeled "Economic Improvement and Modernization" (p = 0.578) (Table 7). This indicates that people who feel strongly about their community are more likely to support policies that encourage economic growth, however, because



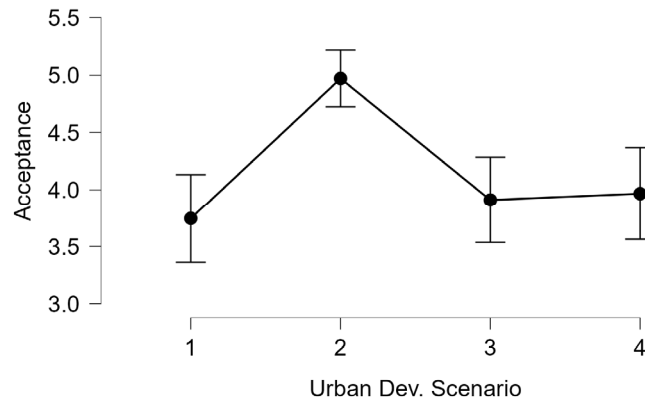


Fig. 5: Descriptive plot of Acceptance of the scenarios (source: ANOVA analysis)

Table 7: Regression coefficients of place attachment and the meaning of scenario #1

Scenario #1 Regression coefficients						95% CI		Std
Predictor	Outcome	Est.	Std. Error	z-value	p	Lower	Upper	All
Place Attachment	Economic Improvement and Modernization	0.023	0.041	0.556	0.578	-0.058	0.103	0.017

Note: CFI = 0.969, TLI = 0.966, RMSEA = 0.077, GFI = 0.93

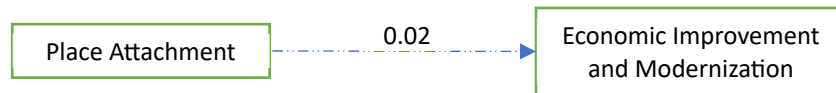


Fig. 6: The result of the path model in Scenario #1 for the first hypothesis

this is not statistically significant, the evidence for this is weak.

For urban development scenario #2, the results of the regression analysis are that place attachment did not significantly predict “Social and Environmental Damage” from the meaning of urban development scenario #2 ( $p = 0.085$ ). This suggests that individuals with a strong connection to their place are less likely to engage in actions that harm their communities. However, the evidence for this relationship is weak, as it is not statistically significant. On the other hand, place attachment did significantly predict “Social and Cultural Growth” ( $p = 0.001$ ) (Table 8). This implies that residents with a strong attachment to their place are more likely to experience favorable social and cultural growth.

For urban development scenario #3, the results of the regression analysis show that place attachment significantly predicted the latent factors “Modernization and Improvement of Socio-Economy” ( $p < 0.001$ ) and “Destroying Society and the Environment” ( $p < 0.001$ )

from the meaning of urban development scenario #3 (Table 9). This indicates that individuals with a strong place attachment are more likely to support policies that foster modernization and socio-economic growth. However, even if a change is advantageous to the community as a whole, individuals with high place attachment may be less open to it. Additionally, they might be more inclined to oppose laws that, in their opinion, threaten the environment or alter their way of life.

For urban development scenario #4, the results of the regression analysis indicate that place attachment was also a significant predictor of the significance of urban development scenario #4, labeled “Modernization and Economic Development” ( $p < 0.001$ ) (Table 10). Therefore, individuals who feel a stronger attachment to a place are more likely to favor modernization and economic growth. All regression analyses demonstrated favorable goodness-of-fit indexes, affirming the suitability of the model.

The regression analyses suggest that the

Table 8: Regression coefficients of place attachment and the meaning of scenario #2

Scenario #2 Regression coefficients		Est.	Std. Error	z-value	p	95% CI		Std All
Predictor	Outcome					Lower	Upper	
Place Attachment	Social and Environmental Damage	-0.062	0.036	-1.724	0.085	-0.132	0.008	-0.133
Place Attachment	Social and Cultural Growth	0.132	0.041	3.251	0.001	0.053	0.212	0.286

Note: CFI = 0.971, TLI = 0.968, RMSEA = 0.076, GFI = 0.941

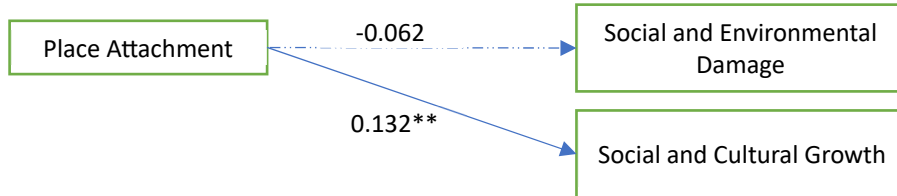


Fig. 7: The result of the path model in scenario #2 for the first hypothesis

Table 9: Regression coefficients of place attachment and the meaning of scenario #3

Scenario #3 Regression coefficients		Est	Std. Error	z-value	p	95% CI		Std All
Predictor	Outcome					Lower	Upper	
Place Attachment	Modernization and Improvement of Socio-Economy	0.093	0.021	4.505	< .001	0.052	0.133	0.189
Place Attachment	Destroying Society and the Environment	-0.307	0.044	-6.940	< .001	-0.394	-0.22	-0.398

Note: CFI = 0.991, TLI = 0.990, RMSEA = 0.077, GFI = 0.975

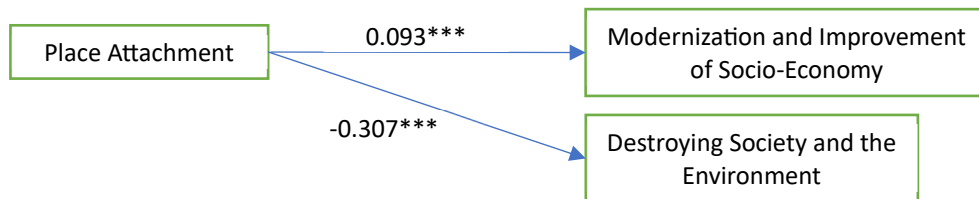


Fig. 8: The result of the path model in scenario #3 for the first hypothesis

relationship between place attachment and the meaning of urban development is mostly significant, but not always. Therefore, the results partially support the first hypothesis.

*Regression: Second hypothesis*

The results of the regression analysis using Structural Equation Modeling (SEM) following the conceptual framework of the second hypothesis are as follows:

A deeper examination of the non-significant relationship between Place Attachment and Economic Improvement and Modernization in scenario #1 was conducted, considering the possibility of a mediation

variable: acceptance of urban development scenarios ('happy with scenario #1'). Upon involving the acceptance variable, the regression coefficient for the direct effect of Place Attachment on Economic Improvement and Modernization was positive and statistically significant according to the data (Table 11). However, the regression coefficient was negative and statistically significant for the indirect effect of Place Attachment on Economic Improvement and Modernization via acceptance of scenario #1. This implies that, through acceptance of scenario #1, Place Attachment had an indirect negative impact on Economic Improvement and Modernization. The mediation effect was significant, as indicated by the

Table 10: Regression coefficients of place attachment and the meaning of scenario #4

Scenario #4 Regression coefficients							95% CI		Std
Predictor	Outcome	Est.	Std. Error	z-value	p	Lower	Upper	All	
Place Attachment	Modernization and Economic Development	0.313	0.053	5.915	< .001	0.209	0.417	0.298	

Note: CFI = 0.979, TLI = 0.976, RMSEA = 0.083, GFI = 0.950

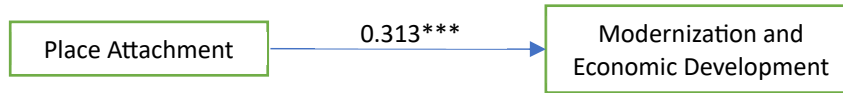


Fig. 9: The result of the path model in scenario #4 for the first hypothesis

Table 11: Regression coefficients of place attachment, acceptance, and the meaning of scenario #1

Scenario #1 Regression coefficients							95% CI		Std
Predictor	Outcome	path	Est.	SE	z-value	p	Lower	Upper	All
Place Attachment	Economic Improvement and Modernization	A	0.317	0.081	3.93	< .001	0.159	0.475	0.23
Happy with scenario #1	Economic Improvement and Modernization	B	0.625	0.068	9.13	< .001	0.491	0.759	0.77
Place Attachment	Happy with scenario #1	C	-0.476	0.092	-5.192	< .001	-0.656	-0.296	-0.281

Note: CFI = 0.97, TLI = 0.966, RMSEA = 0.75, GFI = 0.928



Fig. 10: The result of the path model scenario #1 for the second hypothesis

p-value of < 0.001, and the confidence interval values confirmed it (Table 12).

Based on the provided data, it can be inferred that there is a negative relationship between Place Attachment and acceptance of scenario #1 (Path C: -0.476,  $p < 0.001$ ). This means that individuals who report higher levels of Place Attachment tend to be less accepting of scenario #1. Additionally, both Place Attachment (Path A: 0.317,  $p < 0.001$ ) and acceptance of scenario #1 (Path B: 0.625,  $p < 0.001$ ) have significant positive relationships with Economic Improvement and Modernization. While both Place Attachment and acceptance of scenario #1 positively influence perceptions of economic improvement and modernization, the effect of acceptance of scenario #1 is notably stronger. This implies that an individual's acceptance of the scenario plays a significant role in shaping their perception of its benefits. However, the negative interaction effect between Place

Attachment and acceptance of scenario #1 suggests that the positive effect of acceptance of scenario #1 on economic improvement and modernization is reduced when Place Attachment is high. This suggests that their Place Attachment influences their perception of the scenario's positive impact on economic and cultural factors by negatively influencing the level of acceptance of scenario #1. Less accepting individuals perceiving scenario #1 will have a more positive impact on the factors. The mediation of acceptance of the urban development scenario was also applied in the non-significant relationship between Place Attachment and the urban development scenario #2's meaning; 'Social and Environmental Damage.' When considering the acceptance variable, the direct influence of Place Attachment on the definition becomes statistically non-significant ( $p = 0.165$ ) (Table 13). Scenario #2 acceptance exhibits a significant negative mediation effect, implying an indirect negative impact of Place

Table 12: Defined parameters from mediation analysis of regression coefficients in scenario #1

Defined parameters					95% CI		Std
Name	Estimate	Std. Error	z-value	p	Lower	Upper	All
Direct (A)	0.317	0.081	3.93	< .001	0.129	0.445	0.23
Indirect (B*C)	-0.298	0.066	-4.496	< .001	-0.393	-0.134	-0.216
Total	0.019	0.042	0.467	0.64	-0.058	0.105	0.014

Attachment on its interpretation as ‘Social and Environmental Damage’ through Scenario #2. A low p-value below 0.001 and confidence interval values highlight the substantial mediation effect (Table 14).

The data suggests a positive relationship between Place Attachment and acceptance of scenario #2 (Path C: 0.486,  $p < 0.001$ ). This suggests that people who report higher levels of Place Attachment are more accepting of scenario #2. Place attachment (Path A: 0.317,  $p < 0.001$ ) and acceptance of scenario #2 (Path B: -0.371,  $p < 0.001$ ) have insignificant positive relationships with the meaning of scenario #2 in terms of Social and Environmental Damage. This suggests that their Place Attachment influences their perception of the scenario’s negative impact on social and environmental factors by positively influencing the level of acceptance of Scenario #2. More accepting individuals perceiving scenario #2 will have less damage to the factors. In conclusion, the regression analysis supports the second hypothesis, indicating that Place Attachment plays a significant role in shaping individuals’ perceptions of urban development scenarios, with the level of acceptance acting as a mediator. The correlation analysis of demographic data with place attachment suggests that several factors serve as predictors of attachment to residential places. Specifically, residence length, education level, presence of children, and mobility, along with its range, demonstrate significant correlations with place attachment. The analysis indicates that newer residents, those with higher levels of education, and individuals with greater mobility tend to exhibit lower levels of concern or engagement with urban development scenarios. These findings align with previous notes by Lewicka (2011), which highlight the importance of these factors in shaping attachment to place. Interestingly, in this research context, age does not appear to be significantly correlated with place attachment. This finding suggests that, contrary to expectations based on previous literature, age may not play a significant role in determining attachment to residential places in this particular context. The

existing literature on the relationship between place attachment and the acceptance of environmental projects, highlighted by previous studies (Devine-Wright, 2009; Devine-Wright and Batel, 2017; Hou et al., 2019), has emphasized the role of place attachment in explaining local acceptance or opposition to environmental projects within communities. This research contributes to expanding upon these insights by demonstrating that place attachment influences the level of acceptance of urban development projects within peripheral communities. Furthermore, the level of acceptance acts as a mediator of the relationship between place attachment and interpretations of urban development scenarios. The findings also indicate that high levels of place attachment result in dynamic levels of acceptance or rejection depending on the type of urban development encountered, which in turn can shape perceptions of whether the urban development has a positive or negative impact. If environmental change is perceived as potentially disrupting place attachment (Devine-Wright and Howes, 2010), as previous research stated that objective physical characteristic have a direct impact on place attachment (Motalebi et al., 2023), then this research suggests that each urban development scenario may lead to varying degrees of disruption. The interpretation of environmental change, as highlighted in the disruption-response framework (Mihaylov et al., 2020), underscores the role of place attachment in shaping how individuals perceive and respond to changes in their environment. This research offers a deeper understanding of these interpretation mechanisms, particularly in the context of urban development in city peripheral settlements. The findings suggest that acceptance of urban development acts as a bridge between place attachment and the meanings attributed to urban development. In dealing with urban development in peripheral settlements, which is often seen as an inevitable part of progress, the research model reveals that environmental changes are indeed given certain meanings, but these meanings are not directly influenced by place

Table 13: Regression coefficients of place attachment, acceptance, and the meaning of scenario #2

Regression coefficients							95% CI		Std
Predictor	Outcome	path	Est.	Std. Error	z-value	p	Lower	Upper	All
Place Attachment	Social and Environmental Damage	A	0.07	0.05	1.389	0.165	-0.074	0.124	0.095
Happy with scenario #2	Social and Environmental Damage	B	-0.371	0.096	-3.869	< .001	-0.552	-0.176	-0.665
Place Attachment	Happy with scenario #2	C	0.486	0.062	7.862	< .001	0.348	0.59	0.369

Note: CFI = 0.994, TLI = 0.993, RMSEA = 0.40, GFI = 0.961

Table 14: Defined parameters from mediation analysis of regression coefficients in scenario #2

Defined parameters						95% CI		Std
Name	Estimate	Std. Error	z-value	p	Lower	Upper	All	
Direct (A)	0.07	0.05	1.389	0.165	-0.074	0.124	0.095	
Indirect (B*C)	-0.18	0.051	-3.531	< .001	-0.271	-0.071	-0.246	
Total	-0.11	0.037	-2.995	0.003	-0.218	-0.074	-0.15	

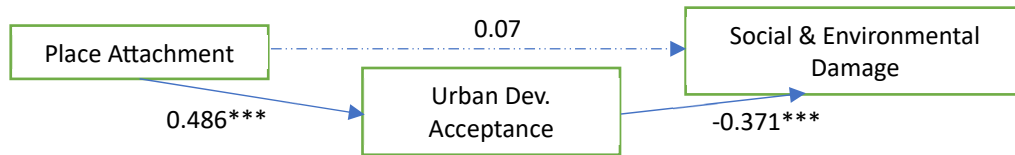


Fig. 11: The result of the path model in scenario #2 for the second hypothesis

attachment at the pre-disruption stage. Instead, this relationship is mediated by the level of acceptance of the urban development scenario, measured through feelings of enjoyment towards the scenario. Thus, the interpretation of environmental change not only relies on the level of place attachment but is also influenced by the level of acceptance of the urban development scenario. The awareness that environmental change is unavoidable and will eventually occur prompts residents of peripheral city settlements to make prior considerations. These considerations subsequently influence the meaning attributed to environmental changes. These findings suggest that making sense of environmental change is a dynamic process that can commence even before the change occurs.

**CONCLUSION**

The research draws several key conclusions from the findings. Firstly, the qualitative phase highlights diverse dimensions shaping the definition of urban development, emphasizing its inherent complexity and diversity. Variability emerges in the quantitative phase, where the interpretation of urban development

scenarios varies across different scenarios. Secondly, the precise relationship between place attachment and these interpretations also fluctuates. Nonetheless, it becomes evident that place attachment can significantly contribute to the interpretation of urban development scenarios, thereby aligning with the first hypothesis. Thirdly, the relationship between place attachment and these interpretations is mediated by the level of acceptance of the urban development scenarios, thereby confirming the second hypothesis. The research results further demonstrate that the level of acceptance and its impact on the interpretation of urban development scenarios vary. However, these findings confirm the mediation principle. The dynamics and influence of place attachment on the acceptance of urban development scenarios are plausible, possibly because respondents anticipate these scenarios and the developments that occur in the areas surrounding them. They are unavoidable changes that respondents who live in peripheral city settlements cannot deny. Recognizing the impact of place attachment and acceptance levels on the interpretation of urban development scenarios is critical for understanding

community reactions to such projects and the factors that shape them. In conclusion, place attachment plays an important role in how people perceive and accept the inevitable changes in their environment. This study offers a nuanced understanding of the interplay between place attachment and the interpretation of urban development in peripheral areas of cities. By acknowledging a variety of perspectives, stakeholders can ensure that urban development initiatives align with the diverse needs and aspirations of local communities. Furthermore, the research highlights the importance of variables urban planners and developers must recognize. By incorporating these attachments into the planning process, practitioners can create more inclusive and sustainable development strategies that resonate with local communities. Efforts to promote acceptance of development initiatives should prioritize engaging with communities, addressing concerns, and involving residents in decision-making processes. This proactive approach may involve strengthening place attachment through initiatives such as promoting community cohesion, preserving green spaces, and supporting local cultural activities. It can also foster receptivity to urban development initiatives perceived as enhancing rather than threatening residents' sense of belonging and identity. Investigating the effects of urban development on place attachment after it has occurred or during and after the disruption phase would indeed be a valuable extension of this research. With the premise that attachment at these stages can be predicted by the interpretation of environmental change. As a result, the relationship between place attachment and the meaning of urban development may be bidirectional. By examining how urban development influences place attachment over time, researchers can gain insights into the long-term impacts of development on individuals' emotional connections to their surroundings. Understanding this bidirectional relationship can provide valuable information for urban planners and policymakers, helping them anticipate and mitigate potential disruptions to place attachment caused by development projects. Several limitations to this study warrant acknowledgment. Firstly, the inclusion of hypothetical questions in the research design may limit the generalizability of the findings, as they may not fully capture real-world behaviors. Future studies could benefit from employing longitudinal approaches to validate the results and better understand how attitudes and perceptions evolve. Secondly, while efforts were

made to select representative settlements, the study's reliance on data from only two settlements may restrict the generalizability of the findings. Future research should aim to include a more diverse sample of peripheral communities to ensure the broader applicability and robustness of the insights gained. Thirdly, the scope of urban development meanings examined in the study could be expanded to include more dimensions. By including additional indicators, the variance percentage could potentially be increased, allowing for a more accurate representation of the various aspects of urban development meanings. Addressing these limitations in future research endeavors will be crucial for advancing our understanding of the relationship between place attachment and the interpretation of urban development scenarios, as well as for informing more effective and sustainable urban planning practices.

#### **AUTHOR CONTRIBUTIONS**

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The study was carried out by F. Nazaruddin as a component of his doctoral dissertation, under the guidance of A. Hayati and P. Setijanti. The study was designed by all of the authors, who also oversaw its general planning and direction.

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#### **CONFLICT OF INTEREST**

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Concerning the publication of this work, the authors declare that they have no potential conflicts of interest. Furthermore, the writers have direct knowledge of all ethical concerns, such as redundancy, plagiarism, misbehavior, double publication or submission, data fabrication or falsification, and informed consent.

#### **OPEN ACCESS**

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#### ABBREVIATIONS

Bartlett's test	Statistical test that is used to test for homogeneity of variances
CFI	Comparative Fit Index.
TLI	Tucker-Lewis Index.
RMSEA	Root Mean Square Error of Approximation.
GFI	Goodness of Fit Index
Z-Value	A measure of how many standard deviations a value is from the mean of a distribution.
p	Probability value
95% CI	95% Confidence Interval
Std	Standard
Std Error	Standard Error
Est	Estimate
n	Sample size
T-test	A statistical test that is used to compare the means of two independent groups
df	Degrees of Freedom
MSA	Mean Square due to the Anova Effect
SD	Standard Deviation
RMSEA 90% Conf	RMSEA 90% Confidence Interval

Cronbach's alpha	A measure of the internal consistency of a reliability scale.
M	Mean

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