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Examining the Influence of Locus of Control on Citizenship Behavior: The Mediating Role of Naturalistic Intelligence in Urban Sustainability

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ABSTRACT: This study aims to examine the relationship between Locus of Control (LOC), Naturalistic Intelligence (NI), and Behavioral Citizenship (BC) in the context of sustainable cities in Indonesia. The primary objective is to investigate how LOC influences BC and the mediating role of NI in this relationship. The research was conducted in Tanjung Priok, North Jakarta, with a sample of 200 participants. Data were collected using a questionnaire with a 5-point Likert scale, and analysis was performed using Path Analysis with SmartPLS software. The key findings demonstrate that LOC positively impacts both NI and BC, with NI serving as a significant mediator between LOC and BC. Individuals with a high sense of control over their lives and strong naturalistic intelligence are more likely to engage in pro-environmental and community-oriented behaviors. These findings underscore the importance of psychological factors in promoting sustainable citizenship behaviors. The study contributes to the literature by highlighting the role of naturalistic intelligence as a crucial mediator in the relationship between personal control and active citizenship. It also offers practical insights for urban policymakers and community leaders, emphasizing the need to incorporate environmental education and psychological empowerment into urban sustainability programs to foster greater community engagement and responsibility.

KEYWORDS: Citizenship Behavior, Locus of Control, Naturalistic Intelligence.

1. INTRODUCTION

Urban management in sustainable cities relies heavily on understanding and influencing citizen behavior (Li et al., 2019). One critical aspect that has been explored in various studies is the role of Locus of Control (LOC) in shaping individuals' behavior towards their environment and community (Zakiy et al., 2024). Locus of Control refers to the extent to which individuals believe they have control over the outcomes of events in their lives (L. Wang & Lv, 2020). Those with an internal Locus of Control feel they are the masters of their fate, taking responsibility for their actions and consequences. In contrast, those with an external Locus of Control attribute outcomes to external forces like luck or fate. Understanding how LOC influences citizen behavior is key to empowering urban management for sustainable development (Huttunen et al., 2022).

The concept of Naturalistic Intelligence, as part of Howard Gardner's theory of multiple intelligences, adds another layer to the discussion on sustainable behavior (Ningrum et al., 2018). People with high naturalistic intelligence have a strong affinity for nature and the environment, showing awareness and sensitivity towards ecological systems (Beery & Jørgensen, 2018). They can categorize, recognize, and engage with elements of the natural world effectively. This intelligence plays a significant role in determining how individuals interact with their surroundings, potentially enhancing pro-environmental behavior. Naturalistic Intelligence could serve as a bridge between Locus of Control and citizenship behavior, fostering more sustainable practices among urban populations (Aziz et al., 2021; Kim et al., 2024).

In sustainable cities, citizenship behavior is a crucial factor in achieving long-term ecological balance and social harmony (Zhao et al., 2021). Citizenship behavior refers to voluntary, constructive actions individuals take to contribute to their communities (Hsu & Yen, 2016). This can range from environmentally conscious actions, such as recycling and energy conservation, to broader social responsibilities like active participation in local governance. A sustainable city thrives when its citizens take proactive roles in maintaining both social and environmental well-being (Bruzzone et al., 2021). The intersection of Locus of Control and Naturalistic Intelligence may offer valuable insights into how urban residents engage in citizenship behavior, especially in the context of sustainability (Dreyer et al., 2022).

Exploring the connection between Locus of Control and Naturalistic Intelligence can provide urban managers and policymakers with tools to design interventions that foster responsible citizenship (Camboim et al., 2019). Those with an internal

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Locus of Control are more likely to engage in behaviors that positively impact their surroundings, as they believe their actions make a difference. On the other hand, those with high naturalistic intelligence may be more sensitive to environmental issues and, therefore, more likely to adopt behaviors that protect nature. If these two psychological traits are aligned, they could create a powerful foundation for encouraging sustainable urban behavior (Scott et al., 2021).

The mediation role of Naturalistic Intelligence in the relationship between Locus of Control and citizenship behavior is worth investigating in the context of sustainable cities. Understanding whether Naturalistic Intelligence can enhance the effect of internal LOC on pro-environmental citizenship behavior would help urban planners tailor programs to different segments of the population (Yuriev et al., 2020). Such findings could be instrumental in shaping educational and community programs that emphasize both personal responsibility and environmental awareness, thus promoting a stronger sense of environmental stewardship among urban citizens (Gutberlet et al., 2021).

Moreover, sustainable urban management depends not only on top-down policies but also on the active participation of citizens (Semeraro et al., 2020). Empowering individuals with an internal Locus of Control and fostering Naturalistic Intelligence may lead to more sustainable lifestyles and behaviors. These behaviors include reducing waste, conserving energy, and participating in local environmental initiatives. By understanding the psychological foundations of citizenship behavior, urban managers can create more targeted interventions that resonate with the values and beliefs of city dwellers, ultimately leading to greater sustainability (Topal et al., 2021).

The aim of this study is to analyze the influence of Locus of Control on Citizenship Behavior in the context of urban sustainability, and to explore the role of Naturalistic Intelligence as a mediating variable in this relationship. This research seeks to understand whether individuals with an internal Locus of Control are more likely to engage in citizenship behaviors that support environmental sustainability, and whether Naturalistic Intelligence strengthens or mediates this relationship. By doing so, this study aims to provide new insights into the psychological factors that drive citizen participation in more sustainable urban management.

2. LITERATURE REVIEW

2.1 The Relationship between Locus of Control, Naturalistic Intelligence, and Citizenship Behavior

According to Sherman et al. (1997), Locus of Control (LoC) is a psychological construct that reflects an individual's belief about the degree of control they have over events affecting their lives. Those with an internal locus of control believe that their efforts and decisions directly influence outcomes, while individuals with an external locus of control tend to attribute their fate to external forces, such as luck or other people's actions. This concept is particularly relevant in the realm of citizenship behavior, as individuals with a strong internal locus of control are more inclined to engage in proactive behaviors that positively impact their communities. They tend to see themselves as agents of change, driving social initiatives and participating in civic activities (Stephan et al., 2016).

Naturalistic Intelligence**, a**s defined by Howard Gardner in his theory of multiple intelligences, is characterized by an individual's ability to recognize, classify, and interact with the natural world (Anderson, 2017). Those with high levels of naturalistic intelligence often exhibit a keen understanding of ecological systems and a profound respect for the environment. This intelligence enables them to identify environmental issues and understand their implications for society. Consequently, individuals with strong naturalistic intelligence are often motivated to advocate for environmental sustainability and engage in activities that promote the well-being of their communities, thereby enhancing their citizenship behavior (Tuan, 2018).

Boiral (2009) define Citizenship behavior refers to the voluntary actions and contributions of individuals toward the welfare of their community and society as a whole. It encompasses a range of activities that promote social cohesion, environmental sustainability, and civic responsibility. Examples of citizenship behavior include volunteering for community service, participating in local governance, advocating for social justice, and engaging in environmentally sustainable practices (Woosnam et al., 2019). This concept highlights the role of individuals as active participants in their communities, reflecting a commitment to the collective good beyond personal interests.

The interplay between locus of control, naturalistic intelligence, and citizenship behavior reveals a dynamic relationship that fosters community engagement (Delpechitre et al., 2018; Shagirbasha et al., 2024; Sutiyoso & Faedlulloh, 2024). Individuals who possess a robust internal locus of control are more likely to act upon their beliefs and values, feeling empowered to contribute to society. Meanwhile, those with high naturalistic intelligence are equipped with the awareness and understanding necessary to

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recognize the importance of their actions in addressing social and environmental challenges. This combination of personal agency and ecological awareness encourages individuals to take on active roles in their communities, whether through volunteering, participating in local initiatives, or advocating for sustainable practices. Therefore, the hypotheses we propose are as follows:
H1: Locus of Control has positive impact on Naturalistic Intelligence
H2: Locus of Control has positive impact on Behavioral Citizenship
H3: Naturalistic Intelligence has positive impact on Behavioral Citizenship

2.2 Naturalistic Intelligence as mediator

Naturalistic intelligence plays a critical role in bridging the relationship between locus of control and citizenship behavior (Azzopardi et al., 2015; Green, 2019; Miao et al., 2016). When individuals possess an internal locus of control, they believe they have the power to influence outcomes in their lives and environments. This belief can lead to greater engagement in activities that promote the common good, as they feel responsible for making a difference. Naturalistic intelligence enhances this engagement by providing the knowledge and awareness necessary to understand the implications of their actions on the environment and society. For example, individuals with high naturalistic intelligence may be more inclined to engage in environmental conservation efforts, participate in community initiatives, or advocate for sustainable practices, as they recognize the interconnectedness of their behaviors and the health of their communities (Ibáñez-Rueda et al., 2020).

Furthermore, naturalistic intelligence fosters a sense of empathy and responsibility towards others and the environment. This heightened awareness encourages individuals to consider the impact of their actions on future generations and the broader ecosystem. In this context, naturalistic intelligence acts as a catalyst, motivating individuals to translate their internal beliefs into proactive citizenship behaviors. By understanding the consequences of their actions, individuals with strong naturalistic intelligence are likely to exhibit higher levels of civic engagement, whether through volunteering, participating in community governance, or promoting environmental sustainability (Schild, 2018). Thus, the hypotheses we put forward are as follows:
H4: Naturalistic Intelligence mediates the relationship between Locus of Control and Behavioral Citizenship

Drawing upon previous literature, we have formulated hypotheses within the conceptual framework illustrated in Figure 1. This framework highlights the relationships between locus of control, naturalistic intelligence, and citizenship behavior, with naturalistic intelligence acting as a mediating variable. By grounding our hypotheses in established theories and empirical studies, we aim to explore how individuals' sense of control over their environment influences their intelligence related to nature, and how both factors collectively drive their active participation in community-oriented and environmental behaviors, particularly in the context of sustainable urban management.

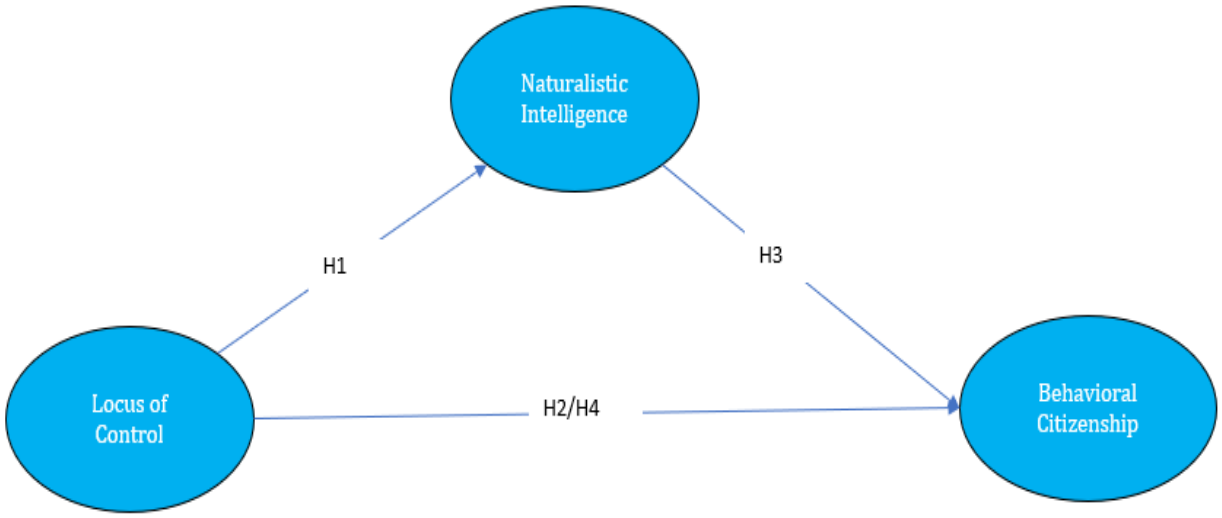

Figure 1. Research Framework

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3. METHODOLOGY

3.1 Research Design

This study employed a quantitative research design to explore the relationship between locus of control, naturalistic intelligence, and citizenship behavior among residents of Tanjung Priuk, North Jakarta, Indonesia. A correlational approach was utilized to examine how these variables interacted and the extent to which naturalistic intelligence mediated the relationship between locus of control and citizenship behavior. Structured questionnaires were administered to gather data from participants, allowing for statistical analysis of the relationships between the variables.

3.2 Population and Sample

The target population for this research consisted of residents in Tanjung Priuk, a densely populated sub-district in North Jakarta. The sample included 200 individuals selected through a stratified random sampling method to ensure representation across various demographics, such as age, gender, education level, and socioeconomic status. This sampling technique helped to obtain a diverse perspective on the relationship between the study variables, providing a comprehensive understanding of the impact of locus of control and naturalistic intelligence on citizenship behavior.

3.3 Research Instruments

Data were collected using a structured questionnaire comprising three sections. The first section assessed the locus of control, utilizing the Locus of Control Scale developed by Rotter (1966), which measures individuals' beliefs about their ability to control outcomes in their lives. The second section evaluated naturalistic intelligence using an adapted version of the Naturalistic Intelligence Scale based on Gardner's framework (Agarwal et al., 2022). The final section measured citizenship behavior through a scale designed to assess participants' engagement in community activities and pro-environmental behaviors (S. Wang et al., 2020). Each item in the questionnaire was rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), allowing for nuanced responses. The questionnaire was pre-tested for reliability and validity before administration to ensure its effectiveness in measuring the intended constructs.

3.4 Data Analysis

Data analysis was conducted using the SmartPLS statistical software to evaluate the relationships between locus of control, naturalistic intelligence, and citizenship behavior. Descriptive statistics were calculated to summarize demographic information and the characteristics of the variables. Path analysis was employed to test the hypothesized relationships, including both direct and indirect effects. Additionally, mediation analysis was conducted to assess the role of naturalistic intelligence in the relationship between locus of control and citizenship behavior. The results were interpreted in the context of the study's objectives, and conclusions were drawn based on the findings.

4. RESULTS AND DISCUSSION

4.1. Validity and Reliability

The Confirmatory Factor Analysis (CFA) results in Table 1 indicate that all constructs—Locus of Control, Naturalistic Intelligence, and Behavioral Citizenship—are well represented by their respective indicators. For the Locus of Control construct, all outer loadings exceed the acceptable threshold of 0.60, with most above 0.70, demonstrating strong indicator reliability. The construct shows high internal consistency, with Cronbach's Alpha (α) of 0.926, Composite Reliability (CR) of 0.936, and an Average Variance Extracted (AVE) of 0.596. Similarly, Naturalistic Intelligence has strong loadings, with a Cronbach's Alpha of 0.933, CR of 0.943, and an AVE of 0.626, indicating good reliability and validity. Behavioral Citizenship exhibits the highest indicator reliability, with loadings as high as 0.957, a Cronbach's Alpha of 0.955, CR of 0.963, and an AVE of 0.726, confirming strong internal consistency and convergent validity across all constructs. This suggests that the measurement model is robust and well-suited for further structural analysis.

Table 1. Confirmatory Factor Analysis

Construct	Item	Indicators	Outer Loading	α	rho_A	CR	AVE

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Locus of Control	LOC1	I believe that my success is determined by my own actions	0.837	0.926	0.935	0.936	0.596
	LOC2	I feel in control of the outcomes in my life	0.842				
	LOC3	I can solve most problems if I invest the necessary effort	0.835				
	LOC4	I think my decisions shape my future	0.856				
	LOC5	I believe that luck or fate rarely influences my achievements	0.824				
	LOC6	I am confident that I can overcome challenges on my own	0.679				
	LOC7	I feel responsible for the results of my actions	0.712				
	LOC8	I take accountability for my personal failures	0.711				
	LOC9	I believe my efforts directly affect my work performance	0.797				
	LOC10	I think I control my own success at work and in life	0.696				
Naturalistic Intelligence	NI1	I enjoy observing plants, animals, and nature	0.714	0.933	0.936	0.943	0.626
	NI2	I can easily recognize patterns in the natural world	0.763				
	NI3	I am interested in environmental issues and solutions	0.854				
	NI4	I feel a strong connection to nature and the environment	0.813				
	NI5	I prefer spending time outdoors to understand nature better	0.863				
	NI6	I am sensitive to changes in the environment around me	0.737				
	NI7	I can classify and understand different species of animals or plants	0.784				
	NI8	I enjoy learning about ecosystems and biodiversity	0.811				
	NI9	I am passionate about protecting nature and natural resources	0.753				
	NI10	I can predict environmental patterns, such as weather changes	0.805				
Behavioral Citizenship	BC1	I actively participate in community service or volunteer activities	0.954	0.955	0.958	0.963	0.726
	BC2	I often help others without expecting anything in return	0.715				
	BC3	I contribute to making my neighborhood a better place	0.778				
	BC4	I take part in initiatives that improve the environment	0.757				

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BC5	I am involved in community meetings or decision-making processes	0.951
BC6	I encourage others to engage in civic activities	0.946
BC7	I follow rules and regulations to benefit the community	0.783
BC8	I take responsibility for maintaining public spaces	0.927
BC9	I participate in campaigns to raise awareness about social issues	0.874
BC10	I assist my neighbors in times of need	0.957

4.2 Hypothesis Result

The analysis of the hypothesis results in Table 2 and Figure 2 reveals significant relationships between the constructs under study. Firstly, Locus of Control (LOC) has a strong and positive influence on Naturalistic Intelligence (NI), with a path coefficient of 0.627. This relationship is statistically significant, as indicated by a high T-Statistic of 7.312 and a p-value of 0.000, suggesting that individuals with a stronger sense of control over their life outcomes tend to have higher naturalistic intelligence. This finding supports Hypothesis 1, emphasizing the connection between personal agency and environmental awareness or intelligence.

In terms of the direct relationship between LOC and Behavioral Citizenship (BC), the path coefficient is smaller at 0.090. However, this relationship remains statistically significant, with a T-Statistic of 4.092 and a p-value of 0.000, supporting Hypothesis 2. This suggests that while LOC does contribute to BC, the effect size is relatively modest, indicating that LOC alone may not be a dominant predictor of citizenship behavior.

The strongest relationship is found between Naturalistic Intelligence and Behavioral Citizenship, with a substantial path coefficient of 1.024, a T-Statistic of 58.602, and a p-value of 0.000. This robust result supports Hypothesis 3 and highlights the critical role of NI in influencing BC. It suggests that individuals with higher naturalistic intelligence are much more likely to engage in citizenship behaviors, particularly those related to environmental or community participation.

Finally, the mediation analysis (Hypothesis 4) demonstrates that Naturalistic Intelligence significantly mediates the relationship between LOC and BC. The indirect effect has a path coefficient of 0.641, with a T-Statistic of 6.767 and a p-value of 0.000, indicating strong mediation. This result shows that Naturalistic Intelligence enhances the influence of LOC on BC, reinforcing the idea that personal control over life outcomes positively affects citizenship behavior, but this effect is largely amplified through naturalistic intelligence. Overall, the findings emphasize the importance of Naturalistic Intelligence as a key mediator in the relationship between Locus of Control and Behavioral Citizenship.

Table 2. Hypothesis Result

Hypothesis	Construct*)	Original Sample	STDEV	T Statistics	P Values	Result
H1	LOC -> NI	0.627	0.086	7.312	0.000	Supported
H2	LOC -> BC	0.090	0.022	4.092	0.000	Supported
H3	NI -> BC	1.024	0.017	58.602	0.000	Supported
H4	LOC -> NI -> BC	0.641	0.095	6.767	0.000	Supported

*) LOC= Locus of Control; NI= Naturalistic Intelligence; BC=Behavioral Citizenship

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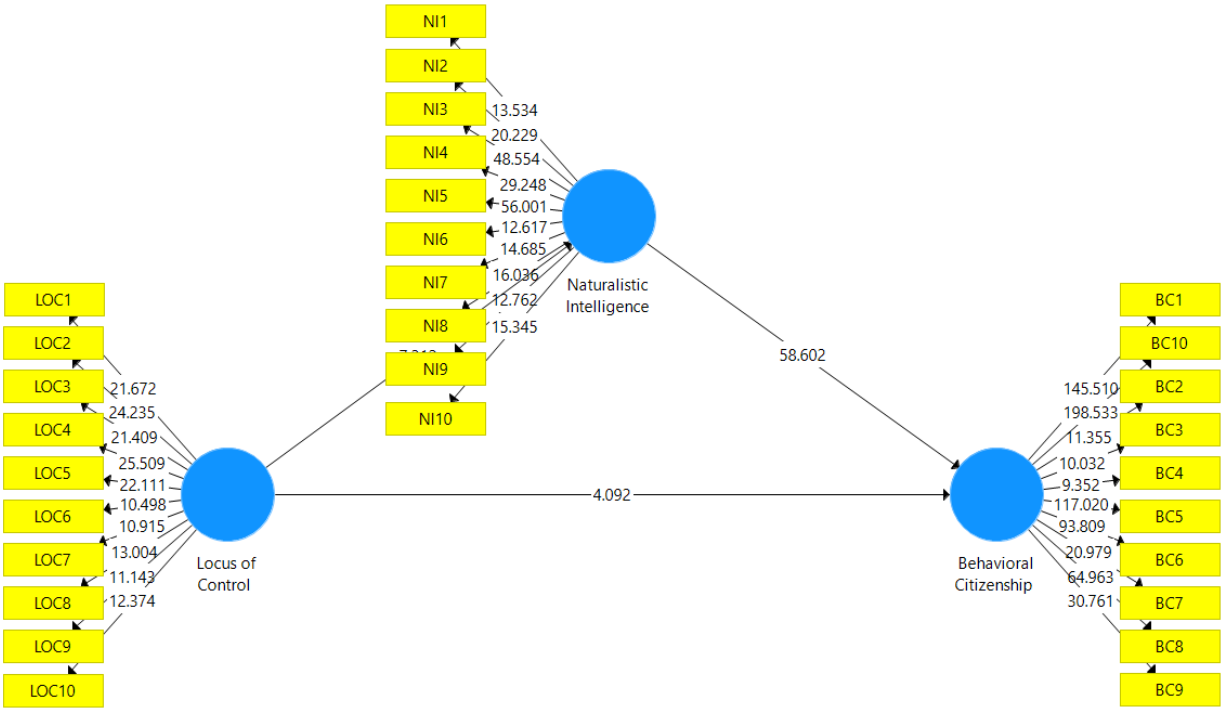

Figure 2. Bootstrapping Result

The results from the hypothesis testing in this study confirm that all four hypotheses (H1-H4) are supported, indicating significant relationships between the constructs of Locus of Control (LOC), Naturalistic Intelligence (NI), and Behavioral Citizenship (BC). Hypothesis 1 (H1) demonstrates that LOC positively influences NI, with a strong and significant effect. This aligns with previous research suggesting that individuals who believe they have control over their lives are more likely to develop a deeper awareness of and connection with the natural environment. The findings are consistent with studies such as those by Rotter (1966) and (Stern, 2000), which emphasize that a higher locus of control can lead to more proactive attitudes toward environmental engagement.

Hypothesis 2 (H2), which posits a direct relationship between LOC and BC, is also supported, albeit with a smaller effect size. This suggests that while having a strong sense of personal control can lead to positive citizenship behaviors, such as community involvement or environmental stewardship, the direct influence is relatively modest. The results align with previous research that highlights the importance of internal motivation in shaping civic participation, as discussed by authors like Sze-Yeung Lai & Chi-leung Hui (2021), but also suggest that other factors, such as environmental awareness or naturalistic intelligence, may play a larger role in shaping behaviors beneficial to society.

Hypothesis 3 (H3) confirms that NI has a significant and robust influence on BC, indicating that individuals with high naturalistic intelligence are much more likely to engage in citizenship behaviors. This supports previous findings that those who are more connected to nature and possess a greater understanding of environmental systems are more inclined to take part in community initiatives that promote sustainability and well-being (Ives et al., 2018). The relationship between NI and BC is particularly important in the context of sustainable cities, where environmental awareness is key to fostering responsible citizenship.

Lastly, Hypothesis 4 (H4) shows that NI mediates the relationship between LOC and BC, reinforcing the notion that individuals with a high locus of control are more likely to engage in citizenship behaviors when their naturalistic intelligence is well-developed. This mediation effect highlights the role of environmental awareness and nature-related knowledge in translating personal control into community-focused actions (Petricli et al., 2024). In the context of sustainable cities in Indonesia, such as Jakarta, the findings emphasize the importance of fostering both personal agency and environmental intelligence to encourage citizen participation in sustainability efforts. The results underscore the need for urban management strategies that promote

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environmental education and empower citizens to take an active role in the sustainable development of their communities, in line with global sustainability goals and local challenges.

5. CONCLUSION

This study investigated the relationships between Locus of Control (LOC), Naturalistic Intelligence (NI), and Behavioral Citizenship (BC) within the context of sustainable cities in Indonesia. The findings confirmed that LOC positively influences both NI and BC, while NI significantly mediates the relationship between LOC and BC. These results indicate that individuals with a strong sense of personal control and heightened naturalistic intelligence are more likely to engage in behaviors that contribute to the betterment of their communities. The mediation role of naturalistic intelligence suggests that environmental awareness and nature-related competencies are crucial in transforming personal control into responsible citizenship behaviors. These conclusions highlight the importance of fostering both personal agency and environmental intelligence to promote sustainable urban management.

The study's implications extend to urban policy makers and community leaders, particularly in the development of sustainable cities. The results suggest that efforts to promote sustainability should not only focus on structural and technological innovations but also prioritize individual psychological factors, such as locus of control and environmental awareness. Enhancing naturalistic intelligence through environmental education and community programs can serve as a catalyst for encouraging active citizenship behavior. By integrating these psychological aspects into urban planning, governments and organizations can foster a more engaged and responsible citizenry, contributing to the long-term sustainability of urban environments in Indonesia.

While the study provides valuable insights, there are certain limitations that should be acknowledged. First, the research was conducted using a sample from a single urban area, Tanjung Priok, Jakarta Utara, which may limit the generalizability of the findings to other regions. Second, the study's reliance on self-reported questionnaires may introduce biases related to social desirability or individual perception. Third, the cross-sectional design limits the ability to draw causal inferences between the variables. Additionally, the study focused on a limited number of psychological constructs, leaving other relevant factors, such as cultural influences or socio-economic conditions, unexplored.

Future research should consider expanding the sample to include a broader range of urban areas across Indonesia to enhance the generalizability of the findings. Longitudinal studies could also be employed to better understand the causal relationships between locus of control, naturalistic intelligence, and citizenship behavior over time. Moreover, incorporating qualitative methods, such as interviews or focus groups, could provide deeper insights into how individuals interpret their roles within sustainable cities. Finally, urban management strategies should be designed to integrate psychological factors like locus of control and environmental intelligence into sustainability programs, emphasizing both education and active participation to achieve long-term urban sustainability goals.

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