Converting Green into Good: Pathways from Green Building Practices to Social Well-Being

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Abstract:
Green building is crucial to social well-being amid rising urbanization and environmental degradation. To explore the complex relationships between green building practices such as energy efficiency, water efficiency, waste management, environmental quality, sustainable materials, transformative management capacity (TMC), and social well-being (SWb), a conceptual model is designed based on environmental psychology theory. To achieve research goals, partial least squares structural equation modeling (PLS-SEM) is employed on a dataset of 585 observations from residential buildings. Results reveal that TMC exerts a substantial direct effect on SWb, affirming its critical role in enhancing well-being outcomes. Mediation analysis further reveals that TMC partially mediates the relationships between green practices, such as water efficiency, waste management, and environmental quality, and SWb. The current investigation directly contributes to the Sustainable Development Goals (SDGs) SDG 3, Good Health and Well-Being, and SDG 11, Sustainable Cities and Communities, by examining the relationship between sustainable building practices and human well-being. Finally, this study offers policy guidelines and practical implications for decision-makers and managers that sustainable features alone are insufficient unless supported by managerial systems that can lead, adapt, and coordinate sustainability practices.
Keywords*:* Green building; social well-being; sustainable development; environmental degradation; green cities and communities; transformative management capacity

1. Introduction

In recent years, the scope of sustainable practices has gained increasing attention among researchers, with a focus on reducing environmental deterioration and improving living conditions (Demir and Guzel, 2024; Olawumi et al., 2023). Today, global initiatives

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to prevent environmental and health problems require green construction (Akin and Akin, 2025). Green construction has emerged as a key strategy to address climate change, resource depletion, and urban health challenges (Goubran et al., 2023). However, despite these developments, social well-being has received little consideration in building development. Particularly, how sustainable buildings influence the psychological well-being, comfort, and satisfaction of residents is missing from the literature. In literature, technical aspects are assumed to contribute to the effectiveness of green buildings. A substantial body of research has examined the technical, economic, and ecological benefits of green buildings, with a particular focus on energy efficiency, water conservation, and material selection. However, the current investigation contributes to the literature by developing and empirically testing a model that integrates sustainable practices and transformative management to assess their combined influence on social well-being.

Notably, the proposed distinction is significant in underdeveloped economies, where limited institutional capabilities and resources for environmentally friendly design influence residents. Environmental psychology theory (EPT) posits that the design and management of the physical environment profoundly impact human resilience (Aviste and Niemiec, 2023; Sundstrom et al., 1996). This study emphasizes the importance of assessing an organization's adaptive capacity for physical sustainability, particularly with respect to human desires. In this context, transformative management capacity (TMC) is a significant construct that demonstrates an organization's or administration's ability to enhance human psychological and social well-being (Danso and Opoku, 2025). TMC is defined as an organization’s ability or capacity to adapt, innovate, and coordinate change (Nohrstedt, 2015; Nursey-Bray et al., 2018), and it plays a pivotal role in construction and building features (Armitage, 2005; Nursey-Bray et al., 2018). Literary works show that TMC encompasses leadership, coordination, creativity, and adaptation, enabling the transformation of technical sustainability measures into tangible outcomes in sustainable development and the built environment (Armitage, 2005; Suryawan and Lee, 2023). Anyhow, TMC requires strategic planning, effective resource management, stakeholder engagement, diversified interest alignment, and corporate cultures that foster continual improvement (Falk and Hagsten, 2023; Lin and Lee, 2025). A recent systematic review identifies a portfolio of 40 competencies that support the green-digital (twin) transition, grouped into resilience, digital technologies, and specialized/technical skills. Within this competency mix, data management/analytics and programming are singled out as core enablers that translate circular intents into evidence-based, operational decisions (Trevisan et al., 2024), aligning with the essence of TMC to guide green buildings.

Green buildings reduce utility costs and enhance operational efficiency, benefiting the environment while also saving money. Beyond sustainable practices, institutions must adapt to change, collaborate across departments, engage stakeholders, and invest in physical infrastructure (Demir and Guzel, 2024; Xie et al., 2024). Notably, Sustainable building practices (SBP) offer a critical path to addressing environmental issues, which reduces the environmental impacts of construction (Awwad and Thabet, 2024). According to the United Nations' Sustainable Development Goals (SDGs), SBP plays a vital social role by enhancing occupant health, comfort, and productivity (Maji and Haloi, 2025). In this investigation, SDG (11) for sustainable cities and communities (Nogueira et al., 2024) and SDG (3) for good health and well-being (Del Bene et al., 2025), aim to examine the mediating role of TMC for social well-being. Green building practices alone do not guarantee improved well-being; their success depends on transformative management capacity that aligns design, operation, and user experience. This study presents TMC concept as a systematic mediating mechanism that clarifies the transformation of green practices into social well-being, in contrast to previous research that emphasizes green building certification, indoor environmental quality, or occupant pleasure. To this end, three research questions are proposed to make a substantial contribution to the literature on sustainable construction.

RQ1: How does transformative management capacity function as a mediating mechanism in the relationship between green building features and social well-being?

RQ2: Does transformative management capacity have a direct impact on social well-being?

RQ3: What is the role of transformative management capacity in modulating the impact of sustainable building initiatives on social well-being?

To achieve the aims, the current investigation incorporates SWb, TMC, and five green building principles (sustainable materials, water efficiency, energy efficiency, environmental quality, and waste management) by following environmental psychology theory (EPT). EPT is a multidisciplinary framework that emphasizes individuals' perceptions, which interpret and shape environments through psychological mechanisms such as cognitive appraisal, perceived control, and opportunities for social interaction. The EPT mechanism explains how residents respond to green buildings and features. Rooted in mindset, architecture, urban planning, and sociology, EPT examines how environmental factors impact human behavior, emotions, health, and overall well-being (Inauen et al., 2021; Pelletier et al., 2008). EPT is essential for bridging the technical aspects of sustainability with human-centered outcomes (Inauen et al., 2021), offering a theoretical foundation for evaluating the social and psychological impacts of green buildings.

Next, the remaining structure presents a detailed literature review that supports the theoretical and hypothetical development of this study. In total, 10 hypotheses are developed to answer the research questions. Furthermore, a detailed methodology section is presented, including the data collection tool and process, factor analysis, and the data analysis employed to test all proposed hypotheses. In a subsequent section, the results are discussed in detail for policymakers and scholars. Lastly, the conclusions are presented along with the study's limitations.

2. Literature review:

2.1. Theoretical development

Current work is applying environmental psychology theory (EPT) to explain how green building practices influence social well-being (SWb), both directly and indirectly through transformative management capacity (TMC). Regarding green buildings, EPT explains how residents experience green facilities by psychological pathways such as perceived control, social interaction, and environmental stress (Baumard and André, 2025; Çop et al., 2021; Stokols et al., 2013). A deep foundation of EPT is used to study how users respond to systems (e.g., smart meters) and to elicit feedback that explains environmental stress (e.g., poor ventilation, noise, or unmanaged waste), which can be reduced by ecological quality and waste management practices, thereby improving psychological comfort. Next, perceived control shapes residents' responses to energy- and water-efficient systems, particularly when considering building features (Pluess, 2015; Zacher et al., 2023). EPT emphasizes that ecological conditions, such as air quality, noise control, access to natural light, and material choices, can either enhance or diminish an individual's well-being through their perceived experience (Inauen et al., 2021). While EPT is often applied in architecture and urban planning, its scope extends well beyond the built environment. According to Godinho et al. (2024), EPT facilitates the investigation of human attitudes and behaviors toward green practices across sectors such as transportation, energy, agriculture, waste management, and corporate sustainability. Fundamentally, EPT's focus on cognitive, emotional, and social responses to the environment makes it highly relevant for shaping effective sustainability interventions across sectors (Pelletier et al., 2008). A holistic skills framework for CE education shows that current curricula are overweight in technical design while underserving digital and soft skills, creating a mismatch with labor-market needs. The scholars recommend integrating AR/digital twin modules and data maturity models to help learners acquire the data-centric capabilities required for circular implementation (Trevisan et al., 2025).

Transformative Management Capacity (TMC) refers to the managerial capabilities within an organization that enable building operators to interpret, communicate, and operationalize technical features. TMC has been demonstrated in areas such as solid interaction, quick responses to residents' demands, coordinated service delivery, proactive participation, and dependable upkeep of green technologies. It doesn't include a wide range of governance skills, general leadership qualities, or full change management methods. Instead, TMC is a beneficial degree of management skill that affects how inhabitants see, use, and benefit from green building characteristics. So, the recommended model's premise is that the psychological benefits of sustainability stem from how design components are perceived, discussed, and handled within organizations. In the proposed conceptual framework, transformative management capacity (TMC) is conceptualized as a social-cognitive mechanism, green building characteristics serve as environmental stimuli, and SWb represents users' psychological and social reactions. Classical EPT posits that physical environmental stimuli influence well-being through cognitive appraisal, perceived control, and social interpretation. The TMC concept enables organizations to manage change, engage residents, and create adaptive, user-centered environments. For instance, when informed, participation in decision-making for environmentally friendly technologies can benefit residents' health. Thus, by integrating EPT, this study offers a theoretical lens for understanding how green design, when effectively managed, can enhance social well-being (see Figure 1).

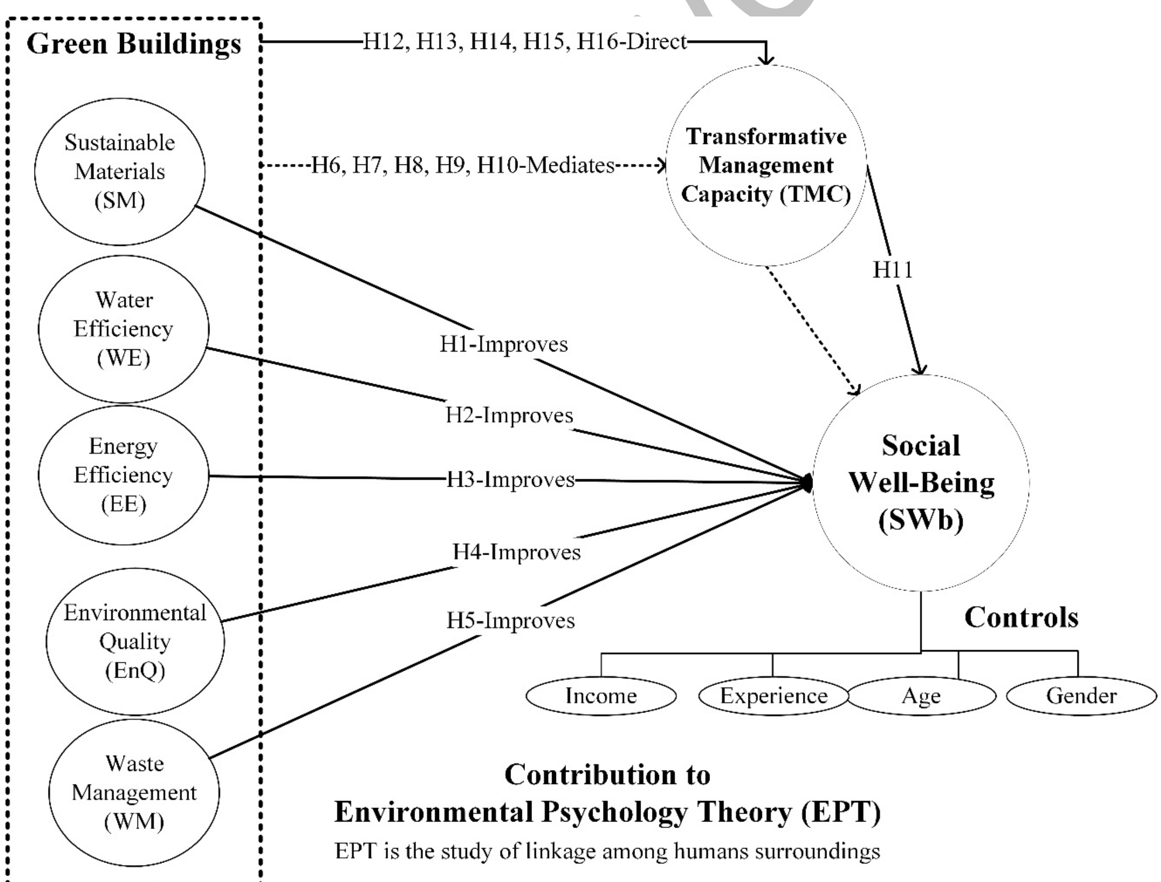

Figure 1*:* Conceptual model (illustrating the hypothesized relationships between constructs. Solid arrows indicate direct effects, while the mediating role of TMC reflects the proposed psychological and managerial translation mechanism.

2.2. Hypothetical development:

EPT supports the notion that the physical environment plays a central role in shaping human behavior, perception, and well-being (El-Didy et al., 2024; Robichaud and Anantatmula, 2011). For example, better indoor air quality and thermal regulation from energy-efficient systems can reduce stress and enhance productivity, while efficient water use may improve hygiene and user satisfaction (D'Adamo et al., 2025). First, measures for EE (energy efficiency) include improved insulation, smart lighting systems, and HVAC technologies, all of which are significantly related to indoor environmental quality in buildings (Lewandowski, 2025). Residents respond positively to environments that offer thermal comfort, adequate lighting, and reduced environmental stress, which EPT justifies (Jussila et al., 2024). Hodorog et al. (2021) found that EE systems provide stability in temperature control, reduce equipment noise, and improve air quality, resulting in reduced fatigue and psychological comfort. Thus, from the EPT perspective, EE systems in buildings affect residents' well-being through psychological pathways (Godinho et al., 2024; Hodorog et al., 2021; Lewandowski, 2025), which may lead to improvements in SWb.

Second, for WE (water efficiency) practice, the EPT lens supported the idea that resource responsibility and well-maintained practices reduce user stress and foster a sense of control and environmental stewardship (Li et al., 2022). Reliable, clean water systems reduce environmental stress by reducing people's concerns about hygiene, safety, and access to water in their daily lives. WE practices include low-flow fixtures, rainwater harvesting, and innovative irrigation systems, which contribute not only to environmental sustainability but also to an enhanced user experience and psychological well-being (Erdenekhuu et al., 2022; Li et al., 2022). Efficient water practices enhance residents' perceived control, which reduces frustration. When occupants have steady water pressure, clean water, and working infrastructure, it is safer and comfortable. WE systems are not just technical features; water systems are perceived and experienced by individuals in ways that influence their sense of safety, comfort, and dignity (Dlamini and Yessoufou, 2022). Therefore, it is proposed that WE may have a positive impact on SWb.

Third, EnQ (environmental quality) encompasses factors such as indoor air quality, ventilation, daylight access, thermal comfort, noise control, and the presence of greenery, which are crucial for maintaining the physiological well-being of building occupants (Chen et al., 2010; Dlamini and Yessoufou, 2022). High-quality environments align environmental stimuli with human needs to reduce cognitive load and stress (Wang and Liu, 2024), EnQ affects psychological feedback by core mechanisms of EPT. In residential environments, natural lighting and air circulation minimize environmental stress, which improves mental health, reduces absenteeism, and increases contentment (Dlamini and Yessoufou, 2022; Jussila et al., 2024). Attention restoration theory (a subset of EPT) suggests that green areas or nature-inspired design help relax and reduce mental fatigue (Baumard and André, 2025).

Fourth, WM includes recycling programs, proper disposal systems, and clean public spaces activities linked with communities (Suryawan and Lee, 2023), which play a crucial role in shaping a healthy environment. Individuals are psychologically affected by the cleanliness, orderliness, and perceived safety of their surroundings, as explained by EPT's mechanisms (Robichaud and Anantatmula, 2011). A clean and maintained waste system in the living area reduces environmental stress, and strengthens social interactions. Visible and accessible recycling stations or composting facilities can stimulate pro-environmental behavior and social cohesion within communities (D'Adamo, 2025). To address this, WM practices support environmental goals; however, poor management may lead to discomfort and stress for residents. EPT also supports this connection by considering the cleanliness and safety of residents.

Lastly, the effect of sustainable materials (such as non-toxic paints, recycled building components, low-VOC finishes, and locally sourced products) contributes to healthier indoor environments and reduces ecological footprints (Demir and Guzel, 2024; Fischer and Losacker, 2025). According to Akin & AkinClick or tap here to enter text. (2025), the materials used in the built environment influence users' emotions and cognitive appraisal, leading them to perceive a green environment as supportive of daily life. The use of natural, renewable, or visibly eco-friendly materials can foster a sense of ecological responsibility and promote green human behavior (Goubran et al., 2023; Hunter and Jordan, 2022). Natural textures, warm colors, and eco-friendly finishes minimize the environmental impact on residents. On the other hand, materials that improve acoustics, temperature regulation, or visual appeal can enhance users' sensory experience, contributing to psychological comfort and social interaction. Therefore, it is expected that sustainable materials (SusM) will enhance social well-being by creating healthier, more pleasant, and emotionally supportive surroundings. Based on the psychological pathways of EPT, the following hypotheses are proposed and are expected to influence social well-being positively.

H1: SusM practice positively influences SWb.

H2: WE practice positively influences SWb.

H3: EE practice positively influences SWb.

H4: EnQ practice positively influences SWb.

H5: WM practice positively influences SWb.

Transformative management capacity (TMC) facilitates green practices, but also for overcoming the prevalent obstacles that impede the successful implementation of sustainability features (Erdenekhuu et al., 2022; Robichaud and Anantatmula, 2011). Sustainability features in communities often face resistance due to user unfamiliarity, lack of engagement, or poor integration into daily routines (Akin and Akin, 2025; Demir and Guzel, 2024). Management support addresses these issues by fostering adaptive leadership, promoting environmental awareness, coordinating stakeholder involvement, and implementing responsive feedback systems (Bhutto and Shaikh, 2024). Building users may not profit from EE systems unless they are trained on their use and feel they meet their comfort and control needs (Jussila et al., 2024). According to Li et al. (2022), solar panels and smart meters alone are not sufficient; management must educate users on energy-saving techniques, establish maintenance schedules, and leverage real-time feedback to improve energy performance. Because an organization's ability to lead, coordinate, and adapt in the face of change is crucial for sustainability measures (Lewandowski, 2025). Buschka et al. (2021) found that the management team plays a proactive role in educating users on proper use, monitoring system performance, and continuously improving water-saving strategies to become more efficient in water management in buildings. WE initiatives enhance an organization's ability to drive change, coordinate departments, and respond to user feedback (Çop et al., 2021; Falk and Hagsten, 2023). Furthermore, Nogueira et al. (2024) justified that it is not possible to alter residents' behavior solely through infrastructure; education, clear signs, easy-to-follow processes, and responsive management are also necessary for effective waste management (WM). Therefore, the building waste systems are equipped with an adaptive feature that relies on the TMC planning. Without effective coordination and user engagement, waste systems can break down, leading to contamination of recyclables, health hazards, and user dissatisfaction (Pluess, 2015; Zacher et al., 2023). However, effective management practices enhance perceived control (a mechanism of EPT) by providing clear instructions and accessible support for navigating building systems. TMC helps individuals interact positively with one another through participatory decision-making, feedback mechanisms, and community engagement activities in community areas. Thus, all hypotheses about green building practices are grounded in the reality that sustainable systems challenge the organization to evolve.

H6: SusM practice has a positive effect on TMC.

H7: WE practice has a positive effect on TMC.

H8: EE practice has a positive effect on TMC.

H9: EnQ practice has a positive effect on TMC.

H10: WM practice has a positive effect on TMC.

Next, the mediating position of TMC represents a capability that translates green building practices into social well-being (SWb). Mediation implies that the influence of sustainable features is not only direct but also operates indirectly through an enabling organizational mechanism. TMC refers to the mechanism that enables an organization to sustain leadership, coordination, and adaptation (Bhutto and Shaikh, 2024; Dlamini and Yessoufou, 2022). Residents fully appreciate the comfort and safety of sustainable materials when management communicates clearly and provides helpful information. For instance, the implementation of advanced energy-saving technologies in a building exemplifies strong managerial support. It improves individuals' cognitive evaluation (a mechanism of EPT) of the quality of the materials and the safety of the surroundings. Residents may experience stress or unhappiness due to confusion, ineffectiveness, or discomfort if they do not receive adequate orientation, feedback, or ongoing support (Chen et al., 2010). TMC helps people feel more in charge by showing how residents' material choices affect comfort, health, and the environment. However, when an organization has strong TMC, it can ensure user-centered implementation by engaging residents in the process, training staff, adapting systems to feedback, and monitoring performance over time. Through this managerial mediation, the technical feature becomes a socially and psychologically beneficial experience. Empirically, the mediating effect of TMC is observed when green building features exhibit weak or non-significant direct effects on SWb. To achieve this, current studies will show that TMC is not just another activity; it is the means by which sustainability becomes relevant and impactful for inhabitants. The current work proposes a mediating hypothesis for TMC.

H11: TMC has a positive effect on SWb.

H12: TMC has a positive mediating role among SusM and SWb.

H13: TMC has a positive mediating role among WE and SWb.

H14: TMC has a positive mediating role among EE and SWb.

H15: TMC has a positive mediating role between EnQ and SWb.

H16: TMC has a positive mediating role among WM and SWb.

The conceptual linkage among green building practices, TMC, and SWb is depicted to clarify the proposed temporal and managerial relationships (see Figure 2). Further, empirical prepositions are revealed for H1-H5 by equation 1, H1-H5 by equation 2, and H11-H16 by equation 3, which are given as follows:

$$\begin{aligned} SWb_{it} &= a_0 + b_1(SM_{it}) + b_2(WE_{it}) + b_3(EE_{it}) \\ &+ b_4(WM_{it}) + b_5(EnQ_{it}) + \sum_{it} controls + e_{it} \end{aligned} \tag{1}$$

In equation 1, EE=energy efficiency, WE=water efficiency, EnQ=environmental quality, WM=waste management, SWb=social well-being, α_0= intercepts, b_1-b_5=coefficients, and e_{it} = error term.

$$\begin{aligned} TMC_{it} &= a_0 + b_1(SM_{it}) + b_2(WE_{it}) + b_3(EE_{it}) \\ &+ b_4(WM_{it}) + b_5(EnQ_{it}) + \sum_{it} controls + e_{it} \end{aligned} \tag{2}$$

In equation 2, EE=energy efficiency, WE=water efficiency, EnQ=environmental quality, WM=waste management, SWb=social well-being, TMC=transformative management capacity, α_0= intercepts, b_1-b_5=coefficients, and e_{it} = error term.

$$\begin{aligned} SWb_{it} &= a_0 + b_1(TMC_{it}) + \sum_{it} controls + e_{it} + 2[a_0 + b_1(SM_{it}) \\ &+ b_2(WE_{it}) + b_3(EE_{it}) + b_4(WM_{it}) + b_5(EnQ_{it}) + \sum_{it} controls + e_{it}] \end{aligned} \tag{3}$$

In equation 3, EE=energy efficiency, WE=water efficiency, EnQ=environmental quality, WM=waste management, SWb=social well-being, TMC=transformative management capacity, α_0= intercepts, b_1-b_5=coefficients, and e_{it} = error term.

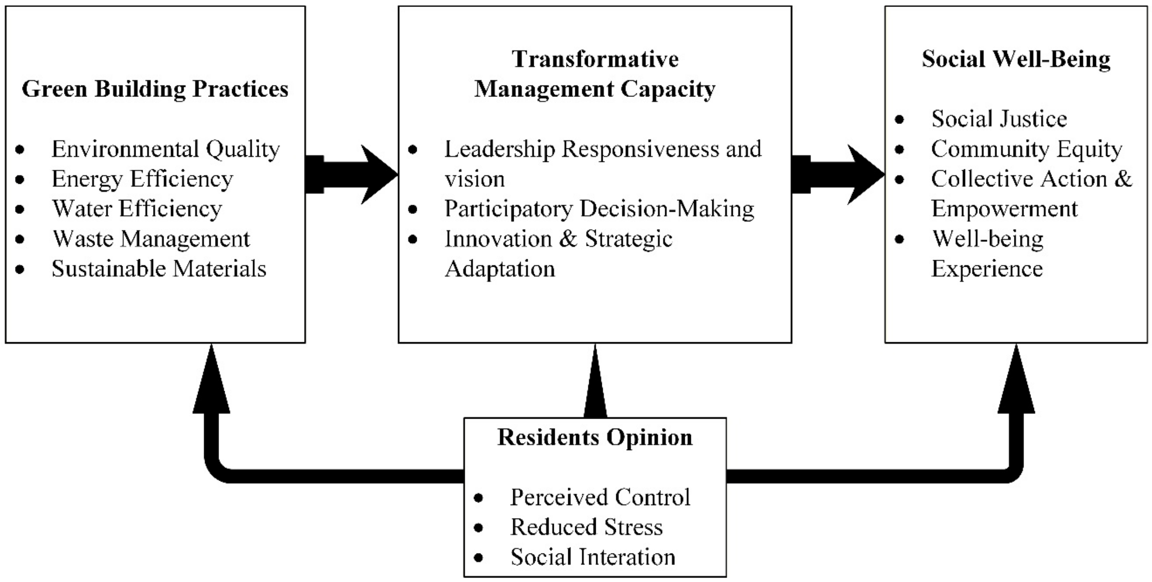

Figure 2: Conceptual pathway illustrating the translation of Green Practices into Social Well-Being

3. Methodology:

The current work adopts a quantitative approach to examine the mediating and direct relationships among TMC, green building practices, and SWb. Due to the complex and multi-dimensional nature of the constructs under investigation and the need to assess both observed and latent variables, partial least squares structural equation modeling (PLS-SEM) is employed as the primary analytical technique. PLS-SEM is a variance-based structural equation modeling method that is particularly suited for exploratory or theory-building research involving complex relationships. For this study, PLS-SEM was executed using SmartPLS 4.0 software. Bootstrapping with 5000 resamples was performed to determine the statistical significance of the hypothesized relationships. To complete the analysis, a structured questionnaire was cast-off to collect primary data, ensuring the adequacy of sample size and data quality (attached in Appendix A3). The final questionnaire comprised 25 items across seven constructs. Out of 25 items, six items for TM were adapted from (Borrás et al., 2024; Kump et al., 2019), six items for SWb (An et al., 2024; van Zanden et al., 2020), three items for SM (Darko & Chan, 2016; Florez et al., 2013), WE's three items adapted (Darko & Chan, 2016), four items for EE (Asman et al., 2019), three items for EnQ (Asman et al., 2019; Darko & Chan, 2016), and three items for WM (Florez et al., 2013).

3.1.Data collection:

Data were collected from community professionals and residents of residential towers in China. The target population of green-labeled buildings was chosen to investigate operational and utilization perspectives, as well as green features management and implementation, which impact daily life, comfort, and well-being. Targeted buildings were located in Shenzhen, Guangzhou, Shanghai, and Beijing, and were constructed by Chinese contractors holding the GBL (green building label) badge. According to the National Bureau of Statistics of China (NBSC, 2024), there are a total of 6,691 construction organizations, including state-owned enterprises, construction enterprises invested in by Hong Kong, Macao, and Taiwan, and foreign-invested construction companies. Data were collected through an online survey, with all measurement items adapted from the established literature (see Appendix A1 in the supplementary materials for the construct measurement scales).

However, after the survey, 585 observations were finalized using purposive and convenience sampling (see Figure 2). Demographical information reflects a diverse sample of individuals involved in the construction and building management sectors (see Appendix A2 for construct measurement scales in the supplementary materials). The data show that the majority of respondents were between 26 and 30 years old (n = 439), followed by those aged 21-25 years (n = 56) and 31-35 years (n = 52). A smaller proportion were in the 36-

40 years age group (n = 31), while only seven respondents were above 40 years old, indicating a relatively young and professionally active population. Regarding gender, the sample comprised 196 males and 389 females, indicating a higher participation rate among female respondents. The work experience distribution shows that the largest group of respondents had 8-10 years of professional experience (n = 363), suggesting a well-established base of professionals. The inclusion of senior and experienced individuals is also verified by observation for more than 12 years of experience (n = 106). Lastly, the respondents' income indicates that the data reflect a moderate-to-upper-middle income, with reported earnings ranging from 8,000 RMB to 12,000 RMB; 204 respondents earned 10,000 RMB.

According to the collected data, the distribution of participant responses across individual indicators for each construct is examined (see Figure 3). The visualization shows that the plots reveal a strong tendency toward agreement or strong agreement across most dimensions, especially for SWb, TMC, and EE, indicating positive perceptions among respondents toward these aspects of green building. Notably, the indicators for WE and EnQ also show consistently favorable ratings, underscoring the practical value and visibility of these sustainability features in daily life. However, WM and SM exhibit slightly more dispersed patterns, with several indicators clustering closer to neutral responses, which suggests that either their impacts are less directly felt by users or their implementation is perceived as less effective.

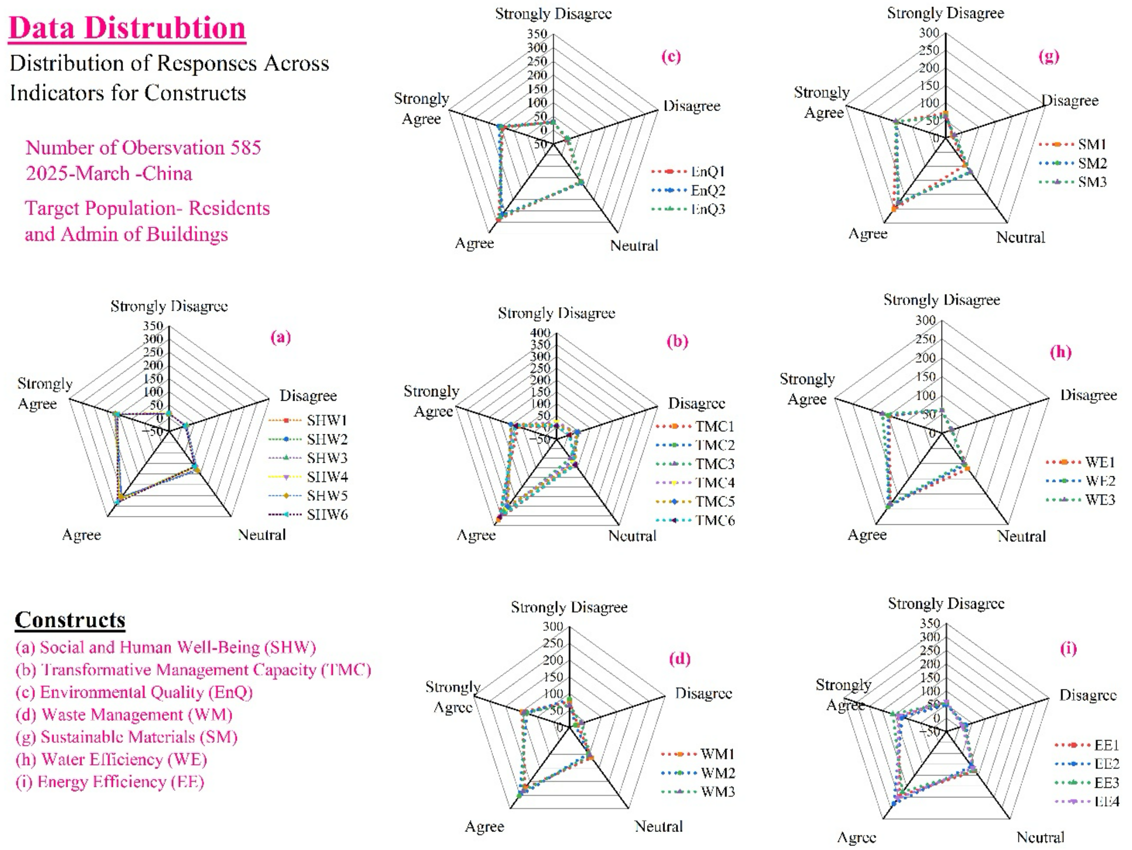

Figure 3: Data visualization (n=585)

3.2.Factor analysis:

Factor analysis is crucial to ensure that the data accurately measures the social well-being, transformative management capacity (TMC), and green practices in buildings. The current study proposes a hypothesized structure to test relationships among factors. To examine the research model of this work, confirmatory factor analysis (CFA) is suitable for verifying the reliability and validity of the collected data with the proposed measurable model. However, CFA was employed to validate the measurement model, particularly for the execution of structural equation modeling (SEM).

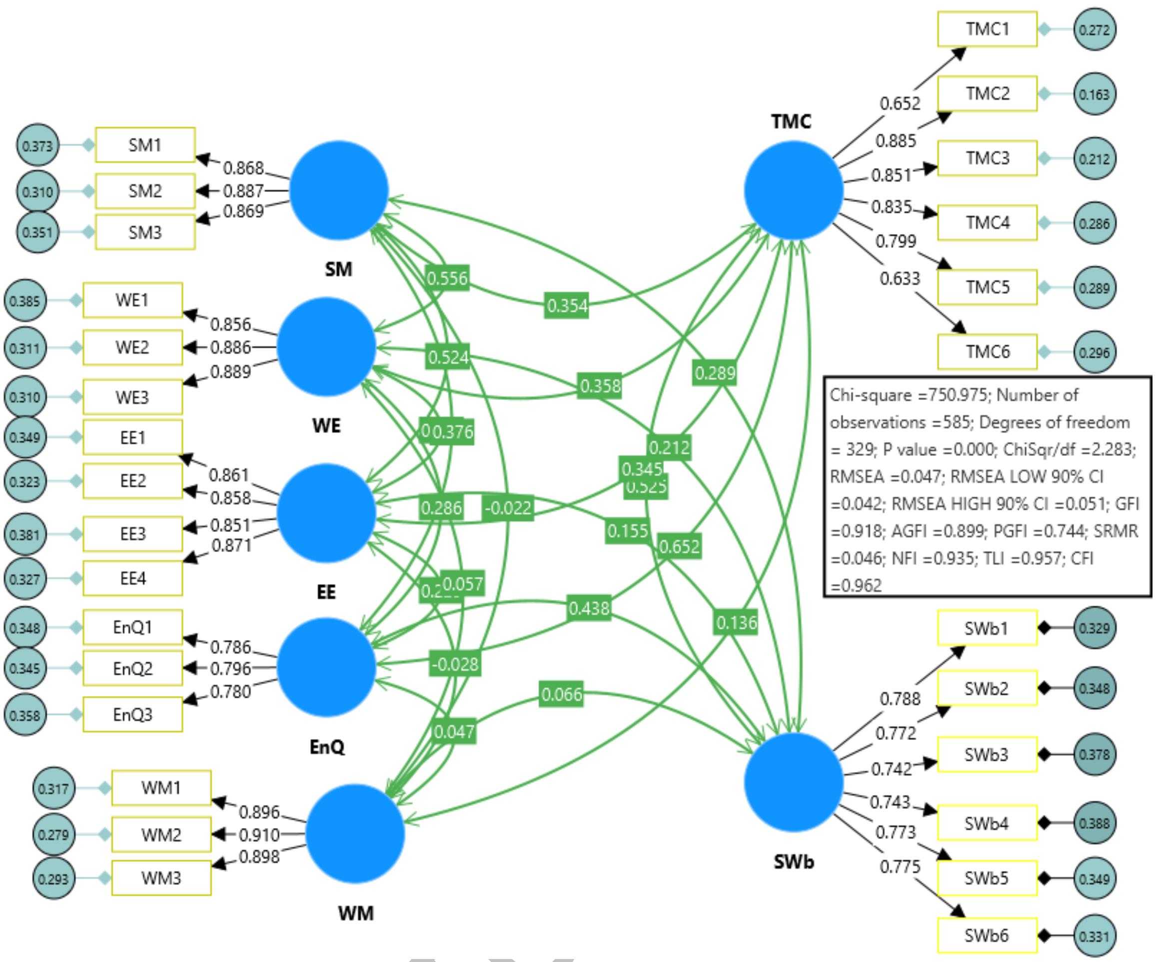

Figure 4: Factor analysis (EE=energy efficiency, WE= water efficiency, EnQ= environmental quality, WM= waste management, TMC= transformative management capacity, SWb=social well-being)

First, the model fitness of the structural model was examined, which includes fit indices for Chi-square (χ^2), Chi-square/df (CMIN/df), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Residual (SRMR). For data analysis, the final dataset consisted of 584 observations, which were used to estimate the parameters in the structural model. The results show that the CFA model is both statistically and theoretically sound (see Figure 4). Factor analysis shows that the values are 0.047 (RESEA), 0.046 (SRMR), 0.93 (NFI), 2.283 (CMIN/df), and 750.975 (χ^2). Secondly, to verify the validity and reliability (see Table 1 and Figure 3), all standardized values were calculated and verified, including loadings, Cronbach's alpha, average variance extracted (AVE), and composite reliability (CR). Loadings for all items exceed the minimum acceptable threshold of 0.60 (Dang and Maestrini, 2022; Henseler et al., 2015), with most surpassing the ideal benchmark of 0.70 (Monecke and Leisch, 2012). Two of the items have slightly lower than the standard, but remain within the acceptable limit by the given strong CRs and AVEs. Next, constructs report Cronbach's alpha and CR values above 0.70, confirming high internal consistency. Furthermore, AVE values for all constructs exceed 0.50, supporting convergent validity across the model. Finding for factor analysis suggest that measurement items reliably reflect their underlying constructs and the model is suitable for structural equation model (SEM) analysis.

Table 1: **Convergent reliability, convergent validity, and loadings (Factor analysis)**

Items	EE	EnQ	SWb	SM	TMC	WE	WM
EE1 <- EE	0.861						
EE2 <- EE	0.858						
EE3 <- EE	0.851						
EE4 <- EE	0.871						
EnQ1 <- EnQ		0.786					
EnQ2 <- EnQ		0.796					
EnQ3 <- EnQ		0.780					
SWb1 <- SWb			0.788				
SWb2 <- SWb			0.772				
SWb3 <- SWb			0.742				
SWb4 <- SWb			0.743				
SWb5 <- SWb			0.773				
SWb6 <- SWb			0.775				
SM1 <- SM				0.868			

SM2 <- SM				0.887			
SM3 <- SM				0.869			
TMC1 <- TMC					0.652		
TMC2 <- TMC					0.885		
TMC3 <- TMC					0.851		
TMC4 <- TMC					0.835		
TMC5 <- TMC					0.799		
TMC6 <- TMC					0.633		
WE1 <- WE						0.856	
WE2 <- WE						0.886	
WE3 <- WE						0.889	
WM1 <- WM							0.896
WM2 <- WM							0.910
WM3 <- WM							0.898
Cronbach's alpha	0.919	0.830	0.895	0.907	0.900	0.909	0.928
Composite reliability (rho_c)	0.919	0.830	0.895	0.907	0.911	0.909	0.929
Average variance extracted (AVE)	0.740	0.620	0.586	0.765	0.611	0.769	0.812

Note: EE=energy efficiency, WE= water efficiency, EnQ= environmental quality, WM= waste management, TMC= transformative management capacity, SWb=social well-being

To assess discriminant validity (DV), the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio (HTMT) were employed (see Table 2). the HTMT values, which are considered a more sensitive test of discriminant validity. HTMT values should be below 0.85 (conservative threshold) or 0.90 (liberal threshold) to confirm DV. According to results, HTMT values in this model fall below the threshold for example, EE–EnQ = 0.231, EnQ–TMC = 0.647, SWb–TMC = 0.565, and SM–WE = 0.560 which demonstrating substantial evidence of DV (Henseler et al., 2015). Next, Fornell-Larcker criterion indicates DV when the square root of the AVE for each construct (diagonal values) is greater than the correlation values between that construct and others (off-diagonal values). As shown in the results, the diagonal values (e.g., EE = 0.860, EnQ = 0.787, SWb = 0.766, SM = 0.875, TMC = 0.782, WE = 0.877, WM = 0.901) are consistently higher than their corresponding inter-construct correlations, satisfying the Fornell-Larcker criterion for all constructs.

Table 2: Discriminant validity (factor analysis)

Heterotrait-monotrait ratio (HTMT)							
	EE	EnQ	SWb	SM	TMC	WE	WM
EE	1.000						
EnQ	0.231	1.000					
SWb	0.156	0.438	1.000				
SM	0.525	0.377	0.290	1.000			
TMC	0.370	0.647	0.565	0.366	1.000		
WE	0.431	0.288	0.210	0.560	0.375	1.000	
WM	0.035	0.048	0.071	0.026	0.160	0.056	1.000
Fornell-Larcker criterion							
EE	0.860						
EnQ	0.229	0.787					
SWb	0.155	0.438	0.766				
SM	0.524	0.376	0.289	0.875			
TMC	0.345	0.652	0.525	0.354	0.782		
WE	0.429	0.286	0.212	0.556	0.358	0.877	
WM	-0.028	0.047	0.066	-0.022	0.136	0.057	0.901

Note: EE=energy efficiency, WE= water efficiency, EnQ= environmental quality, WM= waste management, TMC= transformative management capacity, SWb=social well-being

3.3. Structural Equation Modeling (SEM) analysis:

In SEM, hypothesis testing results reveal several significant relationships among the variables in the proposed structural model (see Figures 5; Table 3). Transformative management capacity (TMC) shows a strong and statistically significant positive influence on social well-being (SWb) ($\beta = 0.445$, $p < 0.001$), confirming its critical mediating role. Mediation analysis confirms the pivotal role of TMC in linking green building practices to improved SWb. Notably, environmental quality (EnQ) exhibits the strongest and most significant indirect effect on SWb through TMC ($\beta = 0.213$, $p < 0.001$), highlighting the importance of environmental systems in shaping managerial capabilities that drive well-being outcomes. energy efficiency (EE) also demonstrates a significant positive mediated effect ($\beta = 0.077$, $p < 0.001$), as do water efficiency (WE) ($\beta = 0.059$, $p < 0.001$) and waste management (WM) ($\beta = 0.053$, $p < 0.001$), suggesting that operational sustainability measures indirectly enhance well-being when channeled through competent management practices. In contrast, the mediated effect of sustainable materials (SM) is not statistically significant ($\beta = 0.014$, $p = 0.337$), indicating that its influence on well-being does not operate meaningfully through TMC. These results reinforce the significance of TMC as a key mechanism by which green construction and operational features translate into human-centric outcomes. Among the predictors of TMC, EnQ exerts the most substantial effect ($\beta = 0.478$, $p < 0.001$), followed by EE ($\beta = 0.174$, $p < 0.001$), WE ($\beta = 0.132$, $p < 0.001$), and WM ($\beta = 0.119$, $p < 0.001$). Interestingly, SM does not significantly influence TMC ($\beta = 0.032$, $p = 0.335$). Succeeding, in terms of direct effects on SWb, SM ($\beta = 0.130$, $p < 0.001$) and EnQ ($\beta = 0.107$, $p = 0.017$) both contribute positively and significantly. However, EE has a surprising adverse effect on SWb ($\beta = -0.081$, $p = 0.009$), while WE ($\beta = -0.021$, $p = 0.533$) and WM ($\beta = -0.001$, $p = 0.980$) show no significant direct impact. These findings underscore the pivotal role of TMC in translating environmental and efficiency measures into tangible well-being outcomes, highlighting the importance of organizational capacity and leadership in sustainable development initiatives. Moreover, according to significant patterns in the direct and indirect coefficients, WE and WM show full mediation, EnQ and EE show partial mediation, and SM shows no mediation. For the explanatory power of endogenous constructs (TMC and SWB), the structural model accounts for a substantial proportion of variance. Specifically, the model explains $R^2 = 0.400$ of the variance in TMC and $R^2 = 0.288$ of the variance in SWb which indicating that proposed framework demonstrates strong explanatory capability for both managerial capacity and resident well-being outcomes.

Table 3: Structural equation modeling analysis

Hypothesis	Effects	St. Dev.	T-value	S/NS
SusM -> SWb	0.130***	0.036	3.564	S
SusM -> TMC	0.032	0.033	0.963	NS
WE -> SWb	-0.021	0.034	0.623	NS
WE -> TMC	0.132***	0.025	5.298	S
EE -> SWb	-0.081**	0.031	2.627	S
EE -> TMC	0.174***	0.023	7.422	S
EnQ -> SWb	0.107*	0.045	2.392	S
EnQ -> TMC	0.478***	0.029	16.435	S
WM -> SWb	-0.001	0.036	0.026	NS
WM -> TMC	0.119***	0.020	6.073	S
TMC -> SWb	0.445***	0.044	10.027	S

SusM-> TMC -> SWb (no mediation)	0.014	0.015	0.959	NS
WE -> TMC -> SWb (Full mediation)	0.059***	0.013	4.675	S
WM -> TMC -> SWb (Full mediation)	0.053***	0.010	5.442	S
EE -> TMC -> SWb (Partial mediation)	0.077***	0.013	6.153	S
EnQ -> TMC -> SWb (Partial mediation)	0.213***	0.024	8.813	S

Note: EE=energy efficiency, WE= water efficiency, EnQ= environmental quality, WM= waste management, TMC= transformative management capacity, SWb=social well-being, $p<0.05$*, $p<0.010$**, $p<0.001$***

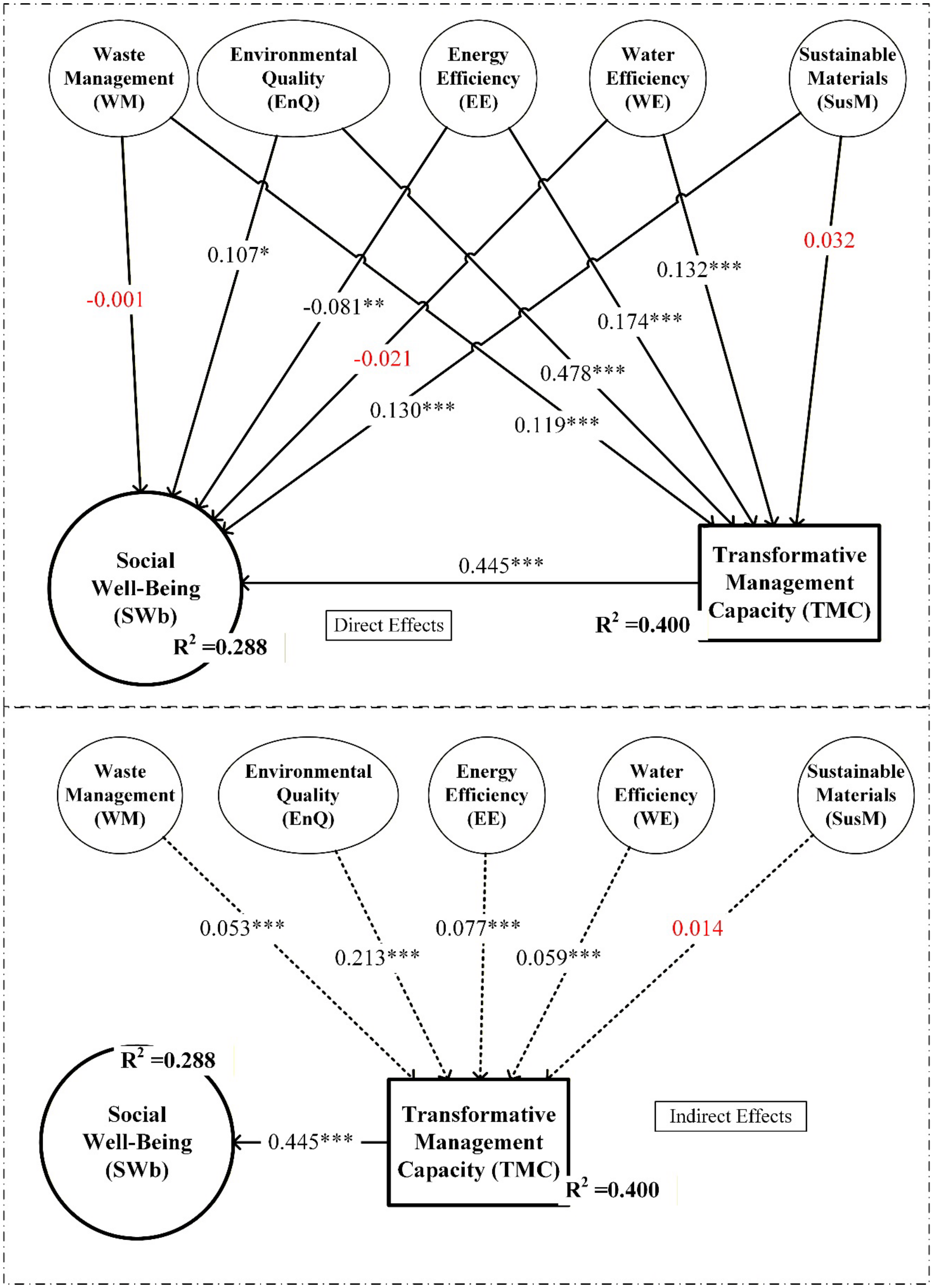

***Figure 5**:* SEM results using PLS-SEM. Red values indicate an insignificant effect.

4. Discussions

The conceptual model is based on the theory of environmental psychology (EPT), which comprises proposed hypotheses. Findings suggest a strong connection between green building practices, transformative management capacity, and psychological well-being. For example, EnQ (a green practice) was identified as an important insight from the structural model, which has a significant positive effect on TMC, suggesting that clean, aesthetically pleasing, and health-conscious environments reduce stress and promote mental well-being. It suggests a causal narrative in which higher environmental standards not only improve residents' well-being directly but also demand green practices. The results of 0.478*** reinforce the argument that sustainability outcomes are not achieved through materials or technologies alone; instead, sustainable issues depend on the managerial capacity required to operate, explain, and stabilize high-quality environments in everyday use." The positive impacts of energy efficiency, water efficiency, and waste management on well-being are significantly mediated by TMC. This is consistent with environmental psychology's focus on perceived control, coherence, and participatory management as pathways to improved satisfaction and quality of life (Bottoni and Addeo, 2024). While energy efficiency had a significant adverse direct effect on well-being, this may reflect trade-offs such as reduced.

This work provides a sustainable contribution, with a particularly notable finding that the adverse direct effect of energy efficiency (EE) on social well-being contrasts with its positive indirect effect through TMC. It exemplifies the green discomfort paradox, wherein environmentally efficient attributes impose sensory that energy-saving measures lead to discomfort, inconvenience, or compromises, such as reduced airflow, illumination, or access to technology. This result suggests a gap between technical energy solutions and residents' lived experiences, which is similar to findings from a literary work indicating lower satisfaction with energy-efficient buildings (Altomonte and Schiavon, 2013). The positive relationship between EE and TMC is consistent with prior research indicating that energy efficiency initiatives often require comprehensive organizational change. Fischer & Losacker (2025) suggested that energy consumption aligns closely with the characteristics of TMC, such as adaptive leadership, learning capacity, and systemic integration. As a green discomfort paradox, current findings affirm that EE fosters the conditions necessary for transformational leadership and institutional capacity-building, consistent with the theoretical framework of TMC employed. For environmental quality (EnQ), the results reveal that EnQ has a substantial and significant impact on both SWb and TMC, which justifies the association between clean air, reduced noise, and access to natural spaces with reduced stress, enhanced mood, and better overall mental and physical health. According to the findings, EnQ makes a significant contribution to TMC, underscoring that maintaining high environmental standards requires effective organizational practices. Thus, EnQ is not only a determinant of individual well-being but also a catalyst for organizational innovation and strategic management transformation. The results showed a substantial direct positive effect on well-being ($\beta = 0.445$, $p < 0.001$), indicating that organizations with greater capacity to manage change, foster innovation, and coordinate effectively are better positioned to create environments that promote health, comfort, and satisfaction. It happened because when organizations are adaptive, meaning they can respond quickly to changing infrastructure needs. TMC encompasses strong planning, leadership, cross-departmental coordination, and data-driven decision-making, resulting in faster system repairs, cleaner environments, and more pleasant communal spaces. For data-driven circular manufacturing, a five-level maturity model spanning four decision dimensions (product, process, management, tools) provides a structured pathway from compliance-driven data use to systematic, multi-stakeholder data sharing (Trevisan et al., 2025). Expert-verified levels enable diagnosis and targeted progress toward evidence-based circular choices, aligning with TMC's focus on regulated, data-enabled transformation (Acerbi et al., 2025). Without TMC, even the best sustainability plans fail. But with TMC, energy efficiency, waste systems, and environmental quality improvements are better maintained, communicated, and adapted. Overall, the current analysis verified that TMC positively impacts well-being by ensuring that green infrastructure is not only implemented but also managed in a responsive, inclusive, and human-centered manner. In addition, another critical nuance concerns the role of SM; unlike known energy- or system-intensive interventions, SM exhibits a significant direct effect on social well-being without a corresponding influence on TMC. It means that residents' experience with sustainable materials does not rely on managerial coordination.

Collectively, the results underscore the importance of managerial transformation, rather than simple technical interventions, in achieving socially responsive and user-oriented sustainability in the built environment (See Table 6). For example, direct effects of green building practices on social well-being (SWb) in this study reveal a nuanced relationship that highlights both the strengths and limitations of physical sustainability interventions. By following Baron & Kenny (1986), current analysis grounds a comparison to evaluate the full and partial mediating effects of TMC (see Table 4). The findings reveal that the path coefficients in both models for green building practices, such as environmental quality, water efficiency, and waste management, exert a more substantial or newly significant influence on SWb when mediated through TMC, indicating partial or complete mediation. Curiously, neither model finds a statistically significant influence of green materials on SWb, underscoring the possibility that material choice, without user awareness, might not directly affect felt well-being. This aligns with real-world observations in green-certified buildings, where users often remain unaware of or indifferent to material-related sustainability features unless they are part of a broader, well-managed occupant engagement strategy.

Supplementary, non-significant effects are also informative and constructive. For example, the absence of direct effects for SM reflects residents' interest in construction materials. It means that many of the features are embedded in construction and have not created a sensory response from residents. Likewise, water efficiency and waste management may be background systems that attract attention only when they break. The absence of direct influence suggests that these traits do not, in themselves, affect social well-being unless they are interpreted and communicated through managerial practices. These non-effects highlight that certain sustainability features remain psychologically 'silent' for residents and rely more heavily on management translation or experiential visibility.

Table 4: Mediation results of the construct

Paths	Direct Effects Model (Figure 3)	Mediating Effects Model (Figure 4)	Mediation Interpretation
WM-> TMC -> SWb	-0.001 (ns)	0.053***	partial mediation. Direct effect is insignificant; indirect effect is significant.

EnQ-> TMC -> SWb	0.107*	0.213***	Full mediation. Both direct and indirect effects are significant.
EE-> TMC -> SWb	-0.081**	0.077***	Suppressor mediation: (Negative direct, and positive indirect)
WE-> TMC -> SWb	0.174***	0.059***	Full mediation. Both direct and indirect effects are significant.
SusM-> TMC -> SWb	0.032 (ns)	0.014 (ns)	No mediation: Neither direct nor indirect effect is significant.

Note: EE=energy efficiency, WE= water efficiency, EnQ= environmental quality, WM= waste management, TMC= transformative management capacity, SWb=social well-being

For the first research question, findings demonstrate that TMC functions as a significant mediating mechanism for several green building features. When TMC is introduced into the model, previously weak or non-significant direct relationships (e.g., for waste management and environmental quality) become more substantial and statistically significant through indirect paths. For instance, energy efficiency, which has a direct adverse effect on SWb, exhibits a positive indirect effect through TMC, indicating a suppression effect. This reveals the latent benefits of sustainability features through TMC. The above findings strengthen the theoretical framework of Environmental Psychology Theory by demonstrating that the advantages of green building techniques are not inherently achieved through design characteristics solely. This effect on social well-being manifests through the interpretative and experiential processes influenced by management techniques. The robust mediating function of TMC offers empirical validation for the assertion that resident perceptions, sense of control, and social interactions are influenced by the management environment, aligning with the processes suggested by the theoretical framework.

Thus, TMC aids in bridging the gap between technical sustainability practices and human-centered outcomes, serving as a critical translational force shaping how sustainability is perceived and experienced by occupants. For the second research question, TMC has a substantial and statistically significant direct impact on SWb ($\beta = 0.445$, $p < 0.001$). Current work suggests that the direct effect of TMC is not just a supportive element, but a core driver of well-being in green buildings. Regardless of green building practices, organizations with a higher capacity to manage change, foster innovation, and effectively coordinate among stakeholders are more likely to create environments that promote well-being, satisfaction, and health. For the last question, the results show that Green building initiatives and SWB are modulated and amplified by TMC. In the mediated model, the inclusion of TMC increases explanatory power (R^2 for SWb increases to 0.288). TMC enhances the effectiveness of green initiatives by enabling better implementation, user engagement, and operational adaptation. If this remains true in execution, it could imply that eco-materials and energy-saving technology can only improve people's lives when implemented and overseen by creative, open, and responsive businesses. Overall, TMC not only mediates but also modulates and contextualizes the effectiveness of sustainable practices.

5. Research implications

5.1. Theoretical implications:

This investigation makes a significant contribution to Environmental Psychology Theory (EPT) regarding green building design and management, emphasizing the psychological and social processes through which physical environments influence human well-being. There are three key contributions to EPT: bridging physical and organizational dimensions, introducing TMC as a psychological-enabling construct, and validating EPT in real-world building settings. Firstly, EPT posits that the built environment affects individual behavior, perceptions, emotions, and health through cognitive appraisal and behavioral adaptation mechanisms. Current findings provide strong empirical support for EPT by demonstrating that sustainable environmental features alone are insufficient to ensure positive outcomes for social well-being; somewhat, the perceived and experienced quality of these environments is shaped by managerial capacities. Secondly, TMC mediates how occupants understand, engage with, and benefit from green building features, supporting EPT's claim that subjective perception and psychological interpretation of space are key to environmental impact. For example, in energy efficiency (EE), when poorly managed, EE may be experienced as discomfort (e.g., restrictive heating/cooling systems); however, under effective transformative management (e.g., adaptive systems, user education), it can contribute positively to well-being. This validates the transactional nature of EPT, which views individuals as active participants in shaping their environmental experience. Thirdly, by empirically linking environmental design, management capacity, and well-being outcomes, this study demonstrates that progress toward SDG 3 and SDG 11 can be advanced jointly through integrated building design and management strategies. Where social well-being represents the outcome-level SDG indicator (SDG 3.4), TMC represents the governance mechanism through which SDG 11 objectives are achieved, providing a mapping for urban planners and policymakers with a more actionable framework for aligning green building initiatives with global sustainability targets. Lastly, the analysis extends EPT by introducing management capacity as a psychological and organizational moderator, showing that the impact of physical design is filtered through institutional processes for adoption or administration. This extension enriches EPT by connecting the macro-level-built environment with micro-level well-being outcomes through the meso-level of organizational behavior, an underexplored relationship in the EPT literature.

5.2. Practical Implications

This study offers several practical implications for green construction practitioners, policymakers, and managers seeking to enhance residents' social well-being through green environmental design. At the first stage, current work suggests that policymakers' priority should be to secure environmental quality, including maintaining indoor air quality, controlling noise, ensuring adequate ventilation, and maintaining cleanliness. the physical environment consistently meets basic comfort and health standards, which depends on training/classes on adaptive management strategies to bridge the gap between green infrastructure and residents' satisfaction, as findings indicate the presence of TMC. Results recommend that without reliable environmental quality, even well-designed management practices are unlikely to translate into improved well-being of residents. In the second stage, once environmental quality is established in buildings, policymakers/managers should focus on TMC's strengths. Because TMC involves embedding management capacity and presents a clear opportunity for policymakers to reshape sustainability standards and incentive structures, current building regulations and certification schemes tend to prioritize technical compliance. By institutionalizing TMC practices, building managers create an operational culture that supports trust, transparency, and resident empowerment, key drivers of social well-being in sustainable living environments. The final stage involves establishing systems to collect residents' feedback and improve building management procedures. Findings suggested that policymakers should implement mechanisms such as digital reporting tools, periodic surveys, community meetings, and real-time communication channels. Public funding programs and performance-based incentives can be designed to reward not only the physical attributes of green buildings but also the effectiveness of management practices that translate these features into tangible well-being outcomes. This stage reinforces a learning-oriented approach where building operations evolve based on lived experience, strengthening both the performance of green features and residents' sense of inclusion and satisfaction. Inclusively, this study underscores the need for a policy shift from a purely infrastructural focus to one that actively supports transformative and participatory management as a pathway to sustainable human development.

6. Conclusions

Recognizing the growing demand for human-centered sustainable development, the current investigation explored the mediating role of transformative management capacity (TMC) in decoding green building practices into meaningful well-being. Findings offer practical insights for policymakers and building authorities: green practices are insufficient to improve social well-being. Results suggest that investments in green building technologies must be complemented by investments in managerial capability, particularly in communication, responsiveness, coordination, and maintenance practices. It concludes that the effectiveness of practices depends significantly on the presence of TMC, which helps organizations improve residents' living standards. Thus, policymakers ought to incorporate management quality, user involvement, and leadership competency in sustainable policies, building certification schemes, and public incentive programs. TMC in policy frameworks can help governments and regulatory authorities ensure that green buildings decrease environmental impact and improve residents' lives, health, and satisfaction.

The current analysis sheds light on TMC's mediation role in green construction and human well-being, though it has limitations that should be acknowledged. First, current work focuses on subjective self-reports of social well-being. This method is helpful, but still limited because it does not collect objective indicators, such as health records, absenteeism, or building performance factors, to triangulate and validate the findings. Second, the findings reflect the cultural and contextual characteristics of the study setting and may not fully generalize to other regions, policy environments, or building management systems. Third, the current design is cross-sectional, which is limited. For the future, research could investigate a longitudinal design to track the TMC's role in social well-being over a specific period. Fourth, a cross-sectional design was employed for the current work, which limits the ability to draw strong causal inferences. Theoretical position of TMC as a predictor of SWb; there could be reverse causality for management practices. So, future research employed a longitudinal design to evaluate the proposed relationships rigorously. Fifth, the study relied on residents' subjective evaluations of green building features and management capacity; future research should use objective performance measures, such as energy use, air quality data, and building certifications, to triangulate and strengthen conclusions. Lastly, building on the findings of the current work, several research directions emerge. For example, in the future, intervention-based studies could evaluate the effectiveness of targeted management training programs designed to strengthen TMC and assess their downstream impact on resident well-being. In addition, a cross-country comparative analysis could reveal how cultural, institutional, or policy differences shape the relationships among green practices, TMC, and SWb. Specifically, managed and unmanaged green features could be investigated to determine how "managed vs unmanaged" affects the residents' behavior.

Funding: This study has not received any funding.

Data availability: All data analyzed during this study are available from the authors on reasonable request.

Declarations:

Disclosure: The authors reported no potential conflict of interest.

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Appendix A1: Scale Items for constructs

Constructs	Item Name	Scale Items for Constructs	Source
Transformative Management Capacity (TMC)	TMC1	Our leadership responds effectively to sustainability challenges and changing environmental/social conditions.	(Borrás et al., 2024; Kump et al., 2019)
	TMC2	Employees at all levels are actively involved in sustainability-related decisions.	
	TMC3	Innovation and adaptability are encouraged to address sustainability goals.	
	TMC4	Stakeholder perspectives, especially those affected by sustainability issues, are integrated into strategic planning.	
	TMC5	Leadership promotes a culture of continuous learning about sustainable development.	
	TMC6	Decision-making processes are inclusive and emphasize long-term social and environmental responsibility.	
Social Well-being (SWb)	SWb1	I feel that the living environment supports my physical, mental, and social well-being in a sustainable way.	(An et al., 2024; van Zanden et al., 2020)
	SWb2	Members of my community/organization have fair access to sustainable resources and opportunities.	
	SWb3	We have strong social support and cooperation to manage long-term environmental and social challenges.	
	SWb4	I feel empowered to contribute to decisions that affect community sustainability and well-being.	
	SWb5	Our community and organization value equity and inclusion in our sustainability initiatives.	
	SWb6	Efforts to promote well-being here consider both present and future generations.	
Sustainable Material (SM)	SM1	We installed/use recycled, reclaimed, or locally sourced materials in all buildings.	(Darko & Chan, 2016; Florez et al., 2013)
	SM2	We prioritize low-impact, non-toxic, and biodegradable building materials.	

	SM3	Construction practices focus on minimizing waste through reuse or recycling in all buildings.	
Water Efficiency (WE)	WE1	We install the rainwater harvesting and greywater recycling systems in all buildings.	(Darko & Chan, 2016)
	WE2	Water-efficient appliances/plumbing fixtures are active and work in all buildings.	
	WE3	Landscaping includes the use of native or drought-resistant plants in all buildings.	
Energy Efficiency (EE)	EE1	Renewable energy sources, such as solar and wind, are utilized to produce energy in all buildings.	(Asman et al., 2019)
	EE2	The building utilizes high-performance insulation and an airtight envelope.	
	EE3	Energy-efficient systems (e.g., LED lighting, HVAC) are integrated and operationalized in all buildings.	
	EE4	An optimized passive solar design (orientation, natural light, shading) has been installed in all buildings.	
Environmental Quality (EnQ)	EnQ1	Low-VOC paints, adhesives, and finishes are used.	(Asman et al., 2019; Darko & Chan, 2016)
	EnQ2	Ventilation and air filtration systems enhance indoor air quality.	
	EnQ3	Natural lighting and outdoor views are incorporated in the design.	
Waste Management (WM)	WM1	Construction waste is managed using recycling or recovery methods.	(Florez et al., 2013)
	WM2	We designed all buildings with durability and future adaptability in mind.	
	WM3	Demolition waste is minimized through detailed planning.	

Appendix A2: Demographic data

Profile Indicators		Frequency
Age	<25 years	56
	26-30 years	52
	31-35 years	439
	36-40 years	31
	>40 years	7
Gender	Male	196
	Female	389
Experience	<2 years	18
	2-4 years	61
	4-6 years	106
	6-8 years	363
	8-10 years	25
	10-12 years	9
	>12 years	3
Earnings	<6000 RMB	63
	8000 RMB	198
	10000 RMB	204
	12000 RMB	93
	>14000 RMB	27

Appendix A3: Study questionnaire (Data collection tool)

Demographical questions:
1. Age
2. Gender
3. Experience
4. Income level

Scale Items for constructs:

Code	Items	SD	D	N	A	SA

TMC1	Our leadership responds effectively to sustainability challenges and changing environmental/social conditions.	☐	☐	☐	☐	☐
TMC2	Employees at all levels are actively involved in sustainability-related decisions.	☐	☐	☐	☐	☐
TMC3	Innovation and adaptability are encouraged to address sustainability goals.	☐	☐	☐	☐	☐
TMC4	Stakeholder perspectives, especially those affected by sustainability issues, are integrated into strategic planning.	☐	☐	☐	☐	☐
TMC5	Leadership promotes a culture of continuous learning about sustainable development.	☐	☐	☐	☐	☐
TMC6	Decision-making processes are inclusive and emphasize long-term social and environmental responsibility.	☐	☐	☐	☐	☐
SHW1	I feel that living environment supports my physical, mental, and social well-being in a sustainable way.	☐	☐	☐	☐	☐
SHW2	Members of my community/organization has fair access to sustainable resources and opportunities.	☐	☐	☐	☐	☐
SHW3	We has strong social support and cooperation to manage long-term environmental and social challenges.	☐	☐	☐	☐	☐
SHW4	I feel empowered to contribute to decisions that affect community sustainability and well-being.	☐	☐	☐	☐	☐
SHW5	Our community and organization value equity and inclusion in our sustainability initiatives.	☐	☐	☐	☐	☐
SHW6	Efforts to promote well-being here consider both present and future generations.	☐	☐	☐	☐	☐
SM1	We installed/use recycled, reclaimed, or locally sourced materials in all buildings.	☐	☐	☐	☐	☐
SM2	We prioritize low-impact, non-toxic, and biodegradable building materials.	☐	☐	☐	☐	☐
SM3	Construction practices focus on minimizing waste through reuse or recycling in all buildings.	☐	☐	☐	☐	☐
WE1	We install the rainwater harvesting and greywater recycling systems in all buildings.	☐	☐	☐	☐	☐
WE2	Water-efficient appliances/plumbing fixtures are active and work in all buildings.	☐	☐	☐	☐	☐
WE3	Landscaping includes the use of native or drought-resistant plants in all buildings.	☐	☐	☐	☐	☐
EE1	Renewable energy sources, such as solar and wind, are utilized to produce energy in all buildings.	☐	☐	☐	☐	☐
EE2	The building utilizes high-performance insulation and an airtight envelope.	☐	☐	☐	☐	☐
EE3	Energy-efficient systems (e.g., LED lighting, HVAC) are integrated and operationalized in all buildings.	☐	☐	☐	☐	☐
EE4	An optimized passive solar design (orientation, natural light, shading) has been installed in all buildings.	☐	☐	☐	☐	☐
EnQ1	Low-VOC paints, adhesives, and finishes are used.	☐	☐	☐	☐	☐

EnQ2	Ventilation and air filtration systems enhance indoor air quality.	☐	☐	☐	☐	☐
EnQ3	Natural lighting and outdoor views are incorporated in the design.	☐	☐	☐	☐	☐
WM1	Construction waste is managed using recycling or recovery methods.	☐	☐	☐	☐	☐
WM2	We designed all buildings with durability and future adaptability in mind.	☐	☐	☐	☐	☐
WM3	Demolition waste is minimized through detailed planning.	☐	☐	☐	☐	☐

Note: transformative management capacity (TMC), Social and Human Well-Being (SHW), Sustainable Material (SusM), Water Efficiency (WE), Water Management (WM), Energy Efficiency (EE), and Environmental quality (EnQ), SD=strongly disagree, D=disagree, N=neutral, A=agree, SA=Strongly agree.

Appendix A4: Final data for analysis (N=585); current data is based on frequency analysis of raw data.

Items	**SD**	**D**	**N**	**A**	**SA**
SHW1	18	15	119	265	168
SHW2	19	14	113	274	165
SHW3	13	21	128	257	166
SHW4	20	13	120	273	159
SHW5	17	17	134	258	159
SHW6	18	14	115	283	155
TMC1	4	10	79	370	122
TMC2	4	47	65	317	152
TMC3	9	46	50	344	136
TMC4	22	37	68	311	147
TMC5	8	41	82	302	152
TMC6	5	7	85	357	131
SM1	70	20	96	252	147
SM2	62	25	121	230	147
SM3	59	27	120	229	150

WE1	61	26	117	234	147
WE2	61	27	104	243	150
WE3	59	28	99	233	166
EE1	59	17	130	245	134
EE2	49	26	108	280	122
EE3	56	18	127	226	158
EE4	61	13	118	257	136
EnQ1	30	2	120	289	144
EnQ2	28	6	125	269	157
EnQ3	27	7	123	279	149
WM1	75	26	112	224	148
WM2	83	19	97	253	133
WM3	65	38	105	235	142

Note: transformative management capacity (TMC), Social and Human Well-Being (SHW), Sustainable Material (SusM), Water Efficiency (WE), Water Management (WM), Energy Efficiency (EE), and Environmental quality (EnQ), SD=strongly disagree, D=disagree, N=neutral, A=agree, SA=Strongly agre