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Exploring the Consumer Acceptance of Circular Housing from the Perspective of SOR Theory

Chun-Chih Chen [1], Chi-Hui Lai [2,*], Nai-Ren Guo [2] and Shu-Ming Wu [2]

[1] Department of Industrial Design, National Kaohsiung Normal University, Kaohsiung 82446, Taiwan
[2] Institute of Cultural and Creative Design, Tung Fang Design University, Kaohsiung 82941, Taiwan
* Correspondence: chihuilai0@gmail.com; Tel.: +886-955-022-303

Abstract: The reconstruction of residences has led to an increase in the use of single-use materials in the construction industry. In the context of the circular economy, with the implementation of circular housing from a cradle-to-cradle perspective, the field of housing construction is changing rapidly. Innovation and sharing improve the consumer experience and increase consumers' purchase intention. This research integrates design attributes, sharing attributes, perceived value, and affective value to study the impact of circular housing on acceptance and identification. The framework of SOR theory framework is used to analyze the predictive factors of consumer intention. The results emphasize that emotional responses in terms of affective value, perceived value, and social equity are the most prominent. This research also utilizes the KJ method. The research methods include a literature review, field observations, expert interviews, questionnaire surveys, and triangulation validation. Moreover, this research uses PLS-SEM to analyze the data of 568 participants. The structural analysis shows that consumers' acceptance and identification of circular housing are strongly influenced by social equity. A total of 16 out of 17 hypotheses are established, with eight partial mediating effects, including the mediating role of social equity. Perceived value is found to affect consumers' cognition and attitudes Perceived value and design attributes, as well as these factors combined, influence consumer acceptance and identification. This research provides strategies to enhance the design of circular housing and promote its development. This research explores the relationship between consumers' acceptance and identification of circular design and the development of circular housing. It first establishes a structural model based on the SOR theory. Adding the mental map of interview results to the model, the results of this research analyzes the design attribute value, and the SEM-PLS analysis influences highlights the identification and acceptance of circular housing.

Keywords: circular economy; circular housing; design attributes; perceived needs; stimulus–organism–response theory

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1. Introduction

Circular housing has previously been based on an economic model that allows for zero waste and recycling [1,2]. In the circular economy and circular housing, there has been an increasing focus on the comfort and well-being of residents, aiming to create a healthy and safe living environment. Building energy use contributes to greenhouse gas emissions [2], accounting for approximately 40% of the global energy consumption [3,4]. This has led to the development of circular housing as part of the transition towards a circular economy [5,6]. In the 21st century, environmental issues have caused severe damage, making sustainability the most important issue at present. Design attributes and perceived needs have gradually undergone reshaping [7].

Various external factors, such as population growth, industrialization, development, and the excessive exploitation of natural resources, have played a crucial role in environmental degradation. Community-oriented circular housing presented unprecedented

challenges during the COVID-19 pandemic. The promotion of personalized housing environments that cater to individual needs and incorporate smart management systems could break through several spatial and temporal limitations. With lifestyles and working patterns shifting predominantly to the home environment, the benefits of safe and healthy circular housing have attracted the attention of consumers [8,9].

Rethinking architecture from the perspective of circular design allows for carbon-footprint-based manufacturing standards for circular housing, creating a built environment that meets the requirements of a circular society [10]. It emulates the biological cycle by implementing the concept of zero waste through design and utilizing 100% recyclable building materials to achieve sustainable development in the built environment [11]. By adopting a cradle-to-cradle design approach, sustainable development could be achieved, considering the principles of material selection, recycling, energy efficiency, and other environmental concerns [11]. Old buildings could be transformed into new spaces through innovative economic models, employing disassembly, transformation, and reassembly, aligning with the cradle-to-cradle concept [12].

The transition towards community-oriented circular housing is of great significance regarding sustainable development within the construction industry. This transformation has had a profound impact on consumer behavior and business models, leading to the expansion of the economic aspects of the residential consumer market, such as the growing market scale of energy-efficient products [13]. Circular housing practices aim at reducing environmental impacts and improving quality [14]. Despite the higher construction costs and relatively higher occupancy costs associated with circular housing, the decision-making processes of consumers are positively influenced by building material classification and recycling rates.

This has undoubtedly created added value for the development of the circular housing industry [4,10]. The transformation and development of circular housing presents opportunities for the future, and consumers have high expectations for this market [9]. The understanding of consumers' behavioral intentions towards circular housing has become a crucial area of research in both academia and the industry [12]. Gaining insights into consumers' needs and preferences towards community-oriented circular housing, and determining how to enhance consumers' behavioral intentions and positive attitudes towards consumption, have emerged as essential paths by which to profit in the competitive, expanding environment of circular housing [13,14]. In the field of consumer behavior research, consumer perception, as an internal cognitive state, has a positive effect on purchase intention [15].

The primary objective of this research study is to delve into the intricate relationships between design attributes, community-oriented attributes, and consumers' attitudes towards circular housing. This research seeks to comprehend the impacts of consumers' perceptions of value consciousness and social equity. It also aims to identify critical factors that should be considered in circular design, providing valuable insights for the promotion of circular housing practices [16,17]. The methodology includes a comprehensive questionnaire survey to investigate the correlation between consumer demands and the design of circular housing. Scholars have applied SOR to consumers' purchase intentions, confirming the relationships involved and the significant influences of attitudes and repurchasing intention [18–23]. However, prior research has not explored the relationship between the design characteristics of circular housing design and consumers' attitudes.

This research embodies the integration of the principles of the circular economy into architectural practices, emphasizing a shared responsibility to protect our environment. It explores the potential of merging strategies from green and smart buildings and transitioning business operations from ownership to usage rights (leasing strategies) to spur innovation and transformation in the housing market [24]. The intended outcome is to position circular housing as a viable and effective sustainable solution, with the aim of minimizing the environmental impact of the construction industry [25]. The majority of the current literature is focused on the perspective of design, with less exploration from

the consumer's viewpoint, particularly in terms of health and comfort considerations for circular housing. This research aimed to understand the relationship between design guidelines, consumers' perceived value, emotional needs, and acceptance more clearly. It sought seeks to bridge the cognitive gap between users and designers.

2. Materials and Methods

2.1. Circular Economy and Circular Housing

As the global issue of climate change has become increasingly prominent, environmental protection and sustainable development have become the focus of attention in various sectors of society [25]. Green consumption is a new type of consumption behavior and process characterized by moderate consumption, avoiding or reducing environmental damage and advocating for nature and ecological protection [16,17]. Previous research on circular housing provides a limited discussion of the variables that influence consumer decision making, specifically focusing on consumer needs and a sharing-oriented approach [26,27].

The circular economy, the core of which is the sharing economy, impacts consumer satisfaction and repeat consumption behavior based on subjective consumer perceptions. By providing energy-efficient and environmentally friendly living environments, circular housing could help to reduce energy usage, minimize environmental pollution, and improve local living conditions and well-being. To achieve sustainable development, it is necessary to transform the current society into a circular society that effectively utilizes resources. A circular society aims to reduce waste and disposal, increase the use of renewable energy [13,28], reduce the consumption of natural resources, and minimize the impact on the environment at every stage.

Consumers also have a social responsibility to join the circular economy and practice green procurement [29]. The transformation economy is the fifth stage of the economy, focusing on service customization and personalization in products and services [23], with a sharing-oriented service value within the circular economy. It emphasizes the importance of consumer experiences and satisfaction [18] with products or sharing-oriented services for marketing. Consumers' concern for environmental protection is increasing. Circular housing, based on the principle of a circular economy, is expected to become a future trend [30,31]. The integration of the circular economy and circular housing development in the construction industry warrants an exploration of consumers' attitudes and consumption intentions towards circular housing, particularly its design and planning [32].

The Taiwanese government has emphasized the importance of circular housing in the circular economy and promoted interdepartmental cooperation since the establishment of the Circular Economy Implementation Roadmap in 2018. The Tai Sugar circular village serves as a practical example of circular housing aimed at reducing environmental impacts [33]. Despite the higher construction costs of circular housing, based on the notions of circular design and shared design, consumers maintain a positive attitude towards and acceptance of circular housing [34,35].

2.2. SOR Theory

2.2.1. Stimulus

When consumers have a positive impression of a product, they are more likely to continue using or purchasing it [18,19]. To identify the appropriate evaluation criteria in the minds of consumers, it is important to understand consumer demands and acceptance [36]. Stimuli (S) can influence individual behavioral responses (R) through an individual's internal cognitive state (O) and affect their purchase intention from the perspective of consumer perception. Consumer intention is also influenced by external variables, which include individuals' thoughts and evaluations of specific behaviors; on the other hand, attitudes towards use can also influence behavioral intention [37]. This research examines the practice of circular housing from a cradle-to-cradle perspective. It explores the interrelationships among consumer demand factors, focusing on stimulus factors such as design attributes and sharing-oriented attributes.

2.2.2. Organism

The framework of environmental psychology serves as an intermediate state between affect and cognition, influenced by external environmental stimuli. It involves the generation of emotional responses, including avoidance, pleasure, dominance, judgment, and cognition, which influence consumers' decision making or actions [19,36]. When consumers are immediately attracted to a product, they disregard other information, thus increasing its perceived value [20,21,37,38]. Based on the principles of the circular economy, circular housing has been adopted, along with innovative leasing business models, to plan sustainable and regenerative buildings and living environments. Consumer perceptions and environmental awareness could affect consumers' identification and acceptance of circular housing. Circular housing is aligned with the planning of the circular economy in this research. It explores the interrelationships among consumer demand factors, with a focus on organism factors including affective value, perceived value, and social equity.

2.2.3. Response

Liu [39] applied environmental attitude theory to examine the impact of individual attitudes and social trust on consumers' behavioral intentions and found that consumers' attitudes were important predictors of their intentions. As the consumer repurchasing power increased, their demand for housing space also grew [23]. Alongside hardware facilities, there has been a growing emphasis on service design. The satisfaction of intangible value or imagery has an impact on consumer perception. Factors such as the situation and environment also influence consumer intention [22,24]. This research explores the interrelationships among consumer demand factors, including identification and acceptance. The following hypotheses are proposed.

2.3. Hypotheses Development

2.3.1. Design Attributes

Circular housing has the potential to promote social interaction and community cohesion through the design of appealing shared public spaces and community facilities. It helps to foster a sense of community and relationships among community members, ultimately enhancing their quality of life. Circular housing is not solely focused on addressing energy and environmental concerns; it also plays a significant role in creating a healthy and welcoming community environment. This allows individuals to achieve social equity while living within their budgets [39].

The ReSOLVE theory has been applied in the built environment [5,7,24]. Circular design attributes emphasize the functional design of housing as stimuli, enhancing consumers' emotions and perceptions. The design follows the principles of biomimicry and the circular process, aiming to transform waste into reusable products or facilitate its return to natural systems [11].

An environmentally friendly type of housing focuses on resource conservation and reuse in its design and construction process. It also aims to minimize its environmental impact during use; for this reason, it has gained attention and favor from many people. The rethinking and design of building materials, the promotion of the application of green and smart building concepts, and their practice in the construction industry are essential. In addition to technological innovation, it is necessary to incorporate the commercial innovation service model that replaces ownership with the right to use; this could drive the transformation of housing. Through innovative transformation in circular housing, the environmental impact of the construction process and building waste could be reduced [40].

The functional or design attributes provided can influence consumers' behavioral intentions. Based on the research objective and research method, the following hypotheses are developed.

H1a. *Design attributes positively influence the economy via affective value.*

H1b. *Design attributes positively influence innovation via affective value.*

H1c. *Design attributes positively influence naturalness via affective value.*

H1d. *Design attributes positively influence safety via affective value.*

H1e. *Design attributes positively influence social equity.*

2.3.2. Shared Attributes

The ReSOLVE theory has been applied in the built environment [5,8]. It links shared attributes in the business model, incorporating virtual services as substitutes for physical services and promoting the intelligent management of diverse leasing services [27]. Sharing-oriented design, an integral aspect of the circular economy, has rapidly and extensively transformed human society; it presents numerous opportunities and challenges with regard to a circular economy. Shared attributes influence consumers' perceptions, including their attitudes and satisfaction [24,39].

In this research, the situational stimuli of circular housing's shared attributes are considered to enhance consumers' emotions and perceptions. Their impacts influence the formation of perceived value and social equity. Based on the research objective and research method, the following hypotheses are developed.

H2a. *Shared attributes positively influence the economy via affective value.*

H2b. *Shared attributes positively influence innovation via affective value.*

H2c. *Shared attributes positively influence perceived value.*

H2d. *Shared attributes positively influence social equity.*

2.3.3. Affective Value

Affective cognition is closely related to an individual's cultural background and lifestyle and is involved in a psychological process [20]. The perception of value and sensory appeal play a key role in the cognitive process, providing an intuitive sensation. Immediate attractiveness can draw consumers' attention [21]. Intentions include subjective behavioral intentions, the understanding and cognition of objects, and the generated emotions and feelings. This could extend to satisfying experiences, subjective inner feelings, positive evaluations, and resulting behaviors, such as recommendation intentions. Physiological needs can thus be satisfied, and the pursuit of self-actualization emerges. The trend of affective consumption has emerged, and consumer behavior has changed. Beyond their basic needs, consumers have begun to pursue satisfaction in terms of personal consciousness and identity.

The external stimuli of shared attributes in terms of consumers' emotional and cognitive expectations for circular housing create affective value, which is of great importance among consumers. It contributes to the formation of behavioral intention and satisfaction [41]. Customer satisfaction significantly impacts purchasing behavior and repurchase intention. The value of a product and its consumption process directly affects consumers' perceptions [22].

In this research, the operational measurement divides willingness into identification support and acceptance willingness. Based on the research objective and research method, the following hypotheses are developed.

H3a. *The economy, via affective value, positively influences identification.*

H3b. *Innovation, via affective value, positively influences acceptance.*

H3c. *Naturalness, via affective value, positively influences acceptance.*

H3d. *Safety, via affective value, positively influences acceptance.*

2.3.4. Perceived Value

With the promotion of the green building movement, people are increasingly recognizing the importance of psychological factors. According to flow experience theory, when consumers are immediately attracted to products, they ignore other information, thereby increasing their perceived value. Perceived value is defined as consumers' perception of the degree of pleasure and enjoyment obtained during an interaction. Perceived value is one of the factors influencing individual behavior and it has been explained that consumers' perception of technology plays a key role [23,41].

Perceived value is the desire of consumers to satisfy their curiosity, and it helps to maintain their interest in circular housing. This is especially true for young people, as perceived value is more likely to form habits. Perceived value appeals to the five senses, and the reactions that occur after perceptual processing, such as novelty, curiosity, and interest, influence consumers' behavioral intentions and satisfaction [42]

In this research, satisfaction refers to acceptance and identification with the behavioral orientation of circular housing. Consumers attach great importance to the perceived value of circular housing, which contributes to the formation of consumer willingness. Based on the research objective and research method, the following hypotheses are developed.

H4a. *Perceived value positively influences acceptance.*

H4b. *Perceived value positively influences identification.*

2.3.5. Social Equity

Circular economic policies and practices do not fully address the ecological impact of circular transformation in society [39,43]. Circular housing serves as an architectural approach to reducing environmental impacts and improving quality of life, as well as having strong social aspects. It aims to achieve sustainable development by considering not only the current needs but also the future needs. By providing energy-efficient and environmentally friendly living environments, circular housing helps to reduce energy consumption, decrease environmental pollution, and enhance the local living environments and health of residents.

The European Union's circular economy policies lack clear indicators, measures, mandatory goals, or supporting policies and regulations for social and cultural aspects [44]. Circular housing could also promote social interaction and community cohesion by providing attractive shared public spaces and community facilities. This not only establishes a context and relationships within communities but also enhances the quality of life of community members. Circular housing moves beyond solving energy and environmental problems; it also helps to create healthy and friendly community environments, while allowing consumers to live within their budgets and achieve social equity. Through the use of renewable energy and energy-efficient technologies, circular housing significantly reduces energy consumption [45], lowers costs, and minimizes environmental impacts.

When consumers are subjected to the influence of others, this may affect their attitudes towards products. This is often used to explore the factors that influence consumer satisfaction responses. Circular housing creates a healthier, environmentally friendly, and user-friendly living environment, thereby improving people's quality of life and achieving social sustainability [46]. It enhances consumers' behavioral intentions, which is a critical factor influencing satisfaction. Consumers highly value the social equity of circular housing. Based on the research objective and research method, the following hypotheses are developed.

H5a. *Social equity positively influences acceptance.*

H5b. *Social equity positively influences identification.*

The current study is based on the application of the Stimulus—Organism—Response (SOR) theory, which forms the foundation of the research model. This research conducted provides a comprehensive examination of the antecedents of perceived value within the scope of circular residential housing design. The impact of design and shared attributes on perceived value is assessed, and a model, specifically tailored to circular residential housing design, is proposed. Within this model, this research posited affective value, perceived value, and social equity are included as intermediary variables. Our research aimed to confirm their crucial role in influencing consumers' decision-making processes, thereby bridging the existing gaps in the scholarly literature. By leveraging the SOR model, this research delved into explores the multifaceted demand for circular housing and the influences exerted by affective value, perceived value, and social equity on the acceptance of such residences housing. This research undertook also presents a comprehensive review of both the literature and empirical research related to circular residential housing design, aspiring aiming to provide valuable implications directions for future investigations and foster the sustainable expansion of the circular economy.

3. Research Methodology

3.1. Data Collection

This research focused on consumers' perceptions of circular housing design attributes, value, and cognition. It aimed to consider design in alignment with consumers' needs, including their emotional needs, and serve as a reference for circular housing design. The design is practical and considers consumer acceptance to avoid waste. The research process was divided into two stages. The first stage included (1) expert interviews; (2) the collection of the relevant literature; (2) a questionnaire survey; (3) data analysis; (4) quality requirement planning; (5) the formulation of design factors; and (6) mental mapping. The second stage comprised a questionnaire survey, including (1) basic data; (2) the content of the questionnaire; and (3) the results. The flowchart of this research is shown in Figure 1.

The literature background considered for the research model was insufficient and lacked rigorous support from academic theory. The research questions were posited with the consumers as the research subjects. The study included a correlation analysis considering consumers' acceptance of circular housing, analyzing the data and factor associations. Affective value, perceived value, and social equity and their effects on acceptance and identification were examined to determine their interrelationships. Through a literature review and empirical research study of circular housing, this research aimed to contribute to subsequent related research and improve the design quality and sustainable development of circular housing. The research framework is shown in Figure 2.

Based on the literature review, this research use incorporated expert focus discussions and the content was organized into a questionnaire using the KJ method [47]. Five experts were invited to participate in a semi-structured qualitative interviews and statistical analysis. The research methods included a literature review, on-site observations, expert interviews, questionnaire surveys, and triangulation verification. Experts in architecture and design were invited for this research. These included professionals with a minimum of five years of practical design experience: an applied designer, an interior designer, an architectural designer, a construction project manager, and one individual with residential experience who was willing to participate. The respondents who had lived in these homes and were willing to participate in the interviews provided the most direct feedback on the functional use of shared services, the construction quality, and the appearance, color, texture, and other factors and experiences associated with circular housing. This allowed for the satisfactory fulfillment of residential needs and values. The test images used for the circular housing research process and its steps are shown in Figure 3.

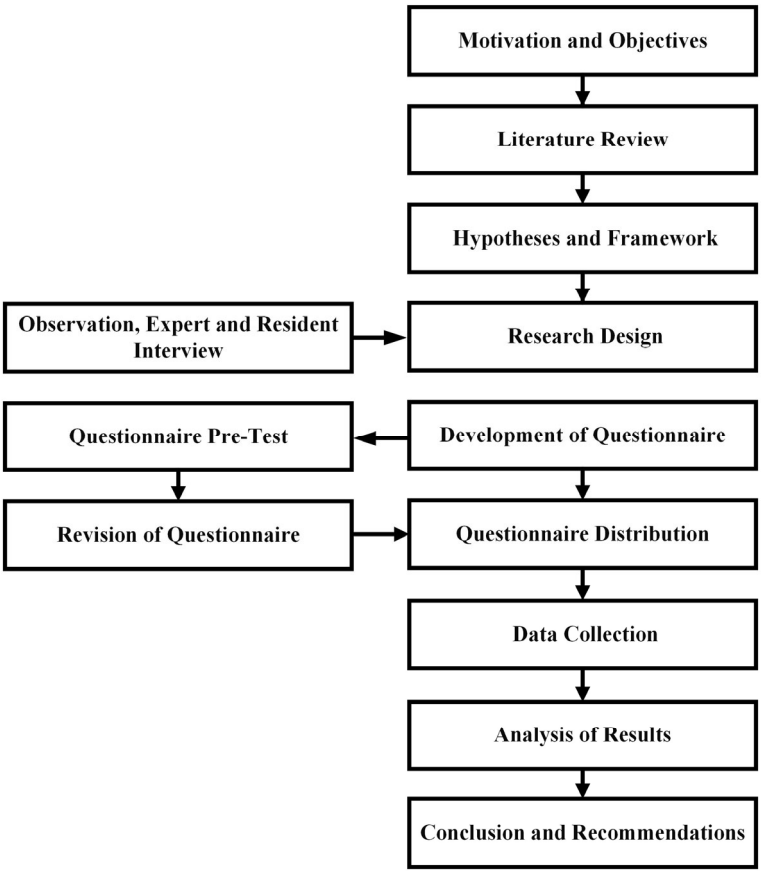

Figure 1. Research flowchart.

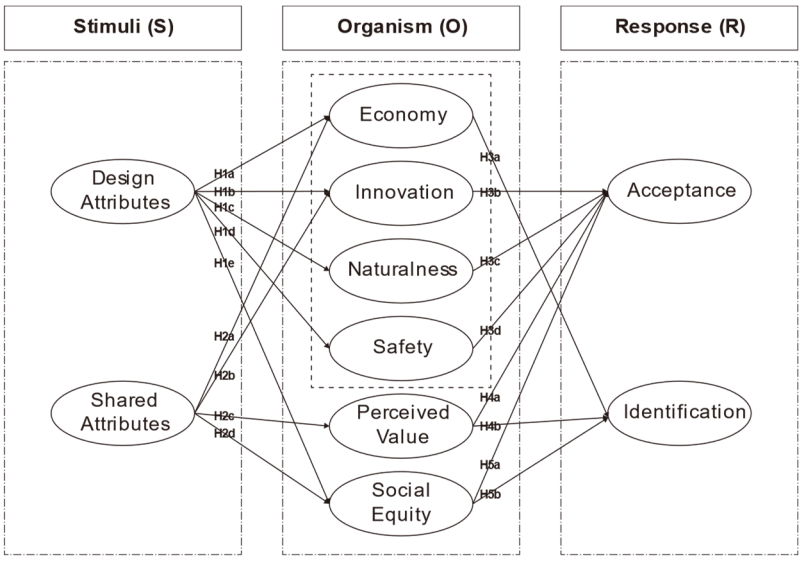

Figure 2. Research framework.

Figure 3. Sample images of circular housing. (**top left**) Sample image 1: Certification of circular housing. (**bottom left**) Sample image 2: Ambience of circular housing and utilization of recycled materials in circular housing. (**top right**) Sample image 3: Visual scenarios. (**bottom right**) Sample image 4: Actual scenarios.

The KJ method was employed to organize the large amount of unstructured information about the attributes into meaningful groups or categories, helping to streamline the process and understand the essence of the research problem, providing relevant viewpoints, facts, or concepts [47]. This research developed hypotheses and validated the effects of the design attributes and shared attributes on consumers' attitudes, perceived value, and social equity towards circular housing, as well as their correlations with the promotion of circular housing. The mental maps and feedback obtained from the interviewees are shown in Figure 4.

The survey asked about attitudes and intentions, the evaluation of design attributes, lifestyles, and expectations of the architectural space.

This research focused on circular housing, a high-value form of consumption, based on market segmentation concepts. The survey targeted Taiwanese internet users, aged 20 and above, who had economic discretionary power. The research subjects were selected from suitable, anonymous internet users who were willing to participate in the survey. To avoid duplicate responses, the Google Forms platform was used for e-mail account verification. The snowball sampling method was employed to increase the sample size. A total of 55 items were assessed, including sustainable attitudes towards circular housing design, related quality of living, the importance of shared design attribute requirements, emotional experience evaluations, and the degree of design acceptance. A Likert scale was used, with 1 indicating 'strongly disagree' and 5 'completely agree'. The survey data were collected and stored in a database to avoid missing values and invalid questionnaires.

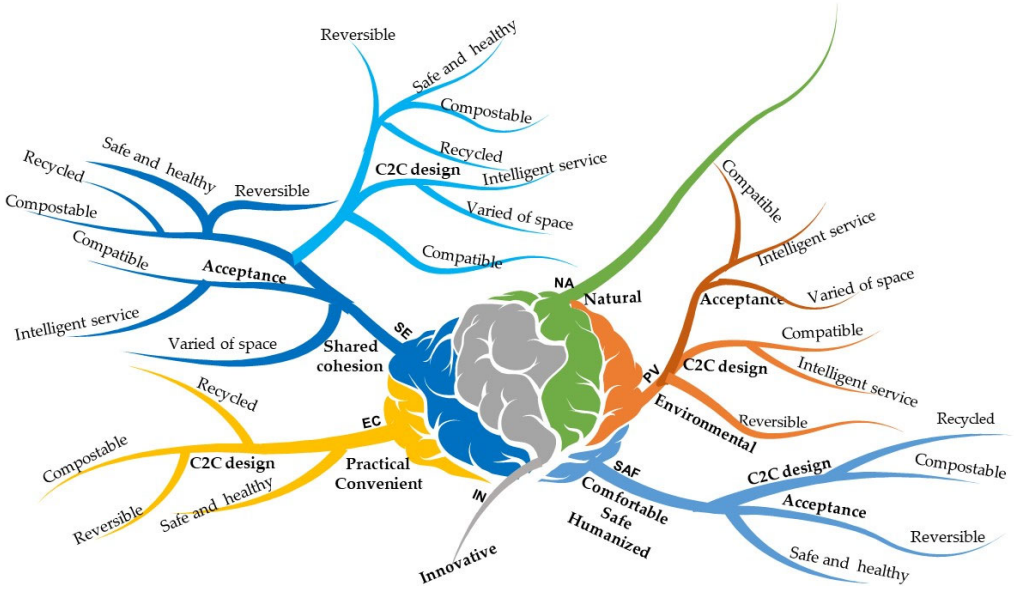

Figure 4. Mental maps and feedback from interviewees.

The survey responses were disseminated via the internet to achieve the effect of questionnaire publicity. Pre-testing and questionnaire modification were carried out to achieve complete responses. Demographic data were filled included in the first part, including gender, marital status, education, place of residence, and discretionary income.

The PLS-SEM bootstrap method, which focuses on prediction, requires a smaller sample size and has a non-normal distribution and formative measurement, ensures d convergence, and has lower requirements for the residual distribution. This research aimed to effectively reduce the bias, increase the credibility, and increase the questionnaire sample size. It reached more than 10 times the total number of questions proposed.

At the beginning of the survey, demographic questions were asked. The second section focused on participants' sustainable attitudes towards circular housing design and comprised 10 questions This section aimed to assess participants' attitudes and beliefs regarding the sustainability aspects of circular housing design. The importance of consumer needs regarding design attributes and service attributes in occupying circular housing was considered. This section was further divided into three phases.

In Phase 1, participants were asked to assess the quality design and service attribute needs regarding circular housing. This phase included 14 questions.

Phase 2 aimed to evaluate participants' sensory experiences of circular housing design attributes. This phase comprised 16 questions.

Phase 3 focused on participants' acceptance of circular housing design and their demands. It included 9 questions. The measurement items are shown in Appendix A, Table A1.

The results of the principal component analysis factor (PCA) using the Statistical Package for the Social Sciences (SPSS) [48], and the validation of the structural model using Smart PLS [49], confirmed the convergent and discriminant validity of the study [50]. Smart PLS employed a two-stage approach to validate the research model. The first stage examined whether the external model supported the construction of the hypotheses, starting with the convergent validity and discriminant validity. The second stage investigated whether the internal model validated the hypotheses, explaining the accuracy of the construction. The study employed an item-to-construct balance approach [51], initially conducting an exploratory factor analysis, followed by hypothesis testing, model prediction, and the validation of the results. This research used SOR theory to establish an equation and conceptual framework for development [19]. Two "stimulus" antecedents were defined as follows: design attributes, which referred to whether the circular housing design provided features such as accessibility, the reuse of materials, and resource recycling; and shared

attributes, which referred to the sharing-oriented design provided by the circular housing, including rental services, smart management, and diverse shared spaces. The "organism" was defined as consumers' cognitive and emotional responses generated by the scenario design of circular housing and the stimulating effects of sharing-oriented attributes. Perceived value was defined as the nature of the emotions expected by consumers when using circular housing. Affective value included economy, innovation, naturalness, and safety. As the dependent variable, the "response" was defined as consumers' behavioral intentions, cognitive perceptions, and acceptance of circular housing.

3.2. Measurement

To ensure the sample's quality, a convenient sampling method was employed to survey Taiwanese consumers. A total of 568 valid responses were collected from June to September 2023. Regarding the participants' ages, 54.90% were in the 20–35 age group, 26.40% were in the 36–54 age group, and 18.7% were over 55 years old. Regarding their marital status, 40.50% were married, 58.50% were single, and 1.1% indicated other. In terms of residential location, 40.30% were from the northern region, 23.80% from the central region, 28.00% from the southern region, 4.60% from the eastern region, and 3.3% from the outlying islands. A total of 45.20% of the participants held a master's degree, and 41.00% had a disposable income of TWD 20,000 or less per month.

Among the participants, 36.8% expressed a willingness to pay a 5% premium, 49.6% were willing to accept monthly rent below TWD 15,000, 36.4% had an indoor floor area requirement of 21–30 Taiwanese ping (approximately 3.3 square meters), and 40.8% desired 3 rooms. The results are shown in Table 1.

Table 1. Sample and descriptive statistics.

Construct	Item	Participants	Percentage
Gender	Male	287	50.5
	Female	281	49.5
Age	20–35	312	54.9
	36–54	150	26.4
	Above 55	106	18.7
Marital Status	Married	230	40.5
	Single	332	58.5
	Other	6	1.1
Residence	Northern region	229	40.3
	Central region	135	23.8
	Southern region	159	28.0
	Eastern region	26	4.6
	Outlying islands	19	3.3
Education	Senior high school	55	9.7
	Bachelor's degree	237	41.7
	Master's degree	257	45.2
	PhD	19	3.3
Disposable income per month	Below TWD 20,000	233	41.0
	TWD 20,001–40,000	161	28.3
	TWD 40,001–80,000	123	21.7
	TWD 80,001–120,000	30	5.3
	TWD 120,001 or above	21	3.7
Willingness to pay a premium for circular housing	5% more	209	36.8
	10% more	159	28.0
	15% more	114	20.1
	20% more	68	12.0
	25% more	18	3.2

Table 1. *Cont.*

Construct	Item	Participants	Percentage
Monthly rent I can accept for living in circular housing	Below TWD 15,000	282	49.6
	TWD 15,001–20,000	183	32.2
	TWD 20,001–25,000	71	12.5
	TWD 25,001–30,000	17	3.0
	TWD 30,001 or above	15	2.6
Actual indoor floor area requirement (Taiwanese Ping *)	Below 10	24	4.2
	11–20	101	17.8
	21–30	207	36.4
	31–40	164	28.9
	Above 41	72	12.7
Number of rooms required	1 room	43	7.6
	2 rooms	179	31.5
	3 rooms	232	40.8
	4 rooms	79	13.9
	5 rooms or above	35	6.2

* 1 Taiwanese Ping, approximately 3.3 square meters.

3.3. Data Analysis

The primary objective of this research was to explore the theoretical evolution of acceptance towards circular housing design. Given that Partial Least Squares—Structural Equation Modeling (PLS-SEM) imposes less stringent sample conditions [50], it is a statistical technique that is suitable for the testing of causal relationships [49]. PLS-SEM accommodates non-normally distributed data, minimizes measurement errors, and effectively manages structural models with multiple constructs; thus, it was deemed the most suitable analytical tool for this research [52]. Smart PLS v.4.0 was used for the analysis.

4. Results

4.1. Descriptive Statistics

The Cronbach's α coefficient in this research was higher than 0.7, indicating high reliability. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was used to determine the suitability for factor analysis, yielding a value of 0.907, with a significance level of 0.000, fulfilling the conditions for factor analysis. Principal component analysis (PCA and Varimax rotation were used for the factor analysis. The analysis identified factors that explained 61.742% of the total variance, representing the components of circular housing design [48]. The structural model of the SOR theory, was validated through an empirical study to explore the design attributes and sharing-oriented attributes factors in circular housing that influenced affective value, perceived value, social equity, identification and acceptance based on the survey results, and research hypotheses were verified.

Measurement methods from the previous literature were adopted [42,53]; detailed information on the measurement items is provided in Table 2. The means of the construct reflected the consumers' perceptions of the construct: social equity (Mean = 3.737), perceived value (M = 3.471), identification (M = 3.927), design attributes (M = 4.093), shared attributes (M = 4.078), naturalness (M = 3.754), and safety (M = 3.897), as shown in Table 2.

This research used the SOR theory to examine the relationships among circular housing design attributes, shared attributes, affective value, perceived value, and social equity, identification, and acceptance. The aim was to explore the interrelationships between the variables, rather than the relationships among individual sub-constructs within latent constructs.

Table 2. Constructs and descriptive statistics.

Construct	Item	Construct Average	M	SD
Social Equity (SE) [39,46]	SE1	3.737	3.702	1.133
	SE2		3.704	0.957
	SE3		3.745	0.845
	SE4		3.796	0.902
Perceived Value (PV) [23,41,42]	PV1	3.471	3.363	0.996
	PV2		3.361	1.103
	PV3		3.690	0.956
Identification (ID) [39]	ID1	3.927	4.063	0.778
	ID2		3.752	0.892
	ID3		3.965	0.789
Design Attributes (DA) [5,7,11,24]	DA1	4.093	4.086	0.775
	DA2		4.210	0.736
	DA3		4.040	0.822
	DA4		4.044	0.845
	DA5		4.150	0.760
	DA6		4.234	0.719
	DA7		3.942	0.881
	DA8		3.986	0.796
	DA9		4.144	0.722
Shared Attributes (SA) [27,28,54]	SA1	4.078	4.048	0.769
	SA2		4.040	0.816
	SA3		3.996	0.848
	SA4		4.099	0.763
	SA5		4.130	0.749
	SA6		4.153	0.743
Naturalness (NA) [30,37,38]	NA1	3.754	3.967	1.045
	NA2		3.521	1.074
	NA3		3.692	0.956
	NA4		3.676	1.009
	NA5		3.915	0.856
Safety (SAF) [11,55]	SAF1	3.897	3.974	0.912
	SAF2		4.028	0.971
	SAF3		3.680	1.033
	SAF4		3.907	0.917
Economy (EC) [11,56,57]	EC1	4.000	3.924	0.837
	EC2		4.046	0.781
	EC3		4.030	0.844
Innovation (IN) [30,34]	IN1	3.722	3.419	1.058
	IN2		3.567	1.015
	IN3		4.180	0.796
Acceptance (ACC) [6,58]	ACC1	3.542	3.688	0.860
	ACC2		3.701	0.958
	ACC3		3.540	0.996
	ACC4		3.174	1.087
	ACC5		3.609	0.926

4.2. Measurement Model

The analysis was conducted in two stages. The first stage evaluated the external model to support the assumed constructs, focusing on the convergent validity [59]. The second stage examined the internal model to validate the assumed hypotheses. The composite reliability (CR) was used to measure the construct reliability, with a critical value set at 0.7. The results indicated that the constructs met the reliability requirement, as shown in Table 3. The first step was to evaluate the construct reliability, convergent validity, and discriminant

validity using the measurement model. Each test is discussed in the following subsections The construct reliability was measured using the criteria of composite reliability (CR). The critical value was set at 0.7, indicating that the construct met the reliability requirement [52]. This research's CR (0.817–0.911), rho_A (0.698–0.893), indicated good composite reliability. The AVE (threshold is 0.5) tests two important constructs in a model, convergent validity and discriminant validity. Discriminant validity is observed when the AVE value is greater than the correlation coefficient between the latent variables. Regarding factor loading (the threshold was 0.5), for this research's individual items' reliability, the factor loading was (0.633–0.879). Regarding the AVE (0.516–0.678), the average variance of 10 dimensions was greater than 0.5, indicating good convergent validity. This shows that the internal consistency of the questionnaire was sufficient to support the research results, as shown in Table 3.

Table 3. Analysis of reliability and validity.

Construct	Loading		CR	rho_A	AVE	Cronbach's Alpha	VIF
Social Equity (SE)	SE1	0.727	0.842	0.765	0.573	0.750	1.488
	SE2	0.814					
	SE3	0.815					
	SE4	0.661					
Perceived Value (PV)	PV1	0.736	0.843	0.739	0.642	0.722	1.429
	PV2	0.827					
	PV3	0.837					
Identification (ID)	ID1	0.709	0.817	0.698	0.600	0.672	1.306
	ID2	0.777					
	ID3	0.832					
Design Attributes (DA)	DA1	0.734	0.911	0.893	0.533	0.890	1.893
	DA2	0.767					
	DA3	0.737					
	DA4	0.725					
	DA5	0.785					
	DA6	0.753					
	DA7	0.708					
	DA8	0.712					
	DA9	0.643					
Shared Attributes (SA)	SA1	0.794	0.827	0.820	0.529	0.820	1.742
	SA2	0.798					
	SA3	0.683					
	SA4	0.707					
	SA5	0.708					
	SA6	0.662					
Naturalness (NA)	NA1	0.741	0.870	0.812	0.574	0.812	1.758
	NA2	0.777					
	NA3	0.823					
	NA4	0.798					
	NA5	0.633					
Safety (SAF)	SAF1	0.766	0.870	0.723	0.544	0.721	1.366
	SAF2	0.734					
	SAF3	0.721					
	SAF4	0.728					
Economy (EC)	EC1	0.790	0.835	0.747	0.629	0.708	1.415
	EC2	0.866					
	EC3	0.716					

Table 3. *Cont.*

Construct	Loading		CR	rho_A	AVE	Cronbach's Alpha	VIF
Innovation (IN)	IN1	0.857	0.862	0.754	0.678	0.757	2.098
	IN2	0.879					
	IN3	0.725					
Acceptance (ACC)	ACC1	0.669	0.841	0.774	0.516	0.764	1.445
	ACC2	0.638					
	ACC3	0.780					
	ACC4	0.735					
	ACC5	0.757					

The common method variance (CMV) [60] was assessed using Harman's single-factor method and statistical correction techniques [61]. The single factor explained only 12.868% of the variance, below the threshold of 50%, indicating that CMV was not a concern in this research.

Structural equation modeling (SEM) using Smart PLS was employed to analyze the relationships between the constructs and validate the hypotheses. The factor loadings were significant, the composite reliability exceeded 0.7, and the average variance extracted (AVE) exceeded 0.5 [62].

The design attributes supported naturalness, safety, economy, innovation, and social equity, with explanatory power (AVEs) of 0.574, 0.544, 0.629, 0.678, and 0.573, respectively, indicating that the model had a good degree of explanation for acceptance. These five probable antecedent variables collectively accounted for 0.516 of the overall explanatory power for acceptance, with innovation being the most crucial source of variance. Economy, perceived value, and social equity, the three most probable antecedent variables, accounted for 0.6 of the overall influence on the sense of identification, demonstrating a good level of explanation.The most significant probable antecedent variable influencing identification was perceived value. The results are shown in Table 3 and Figure 5.

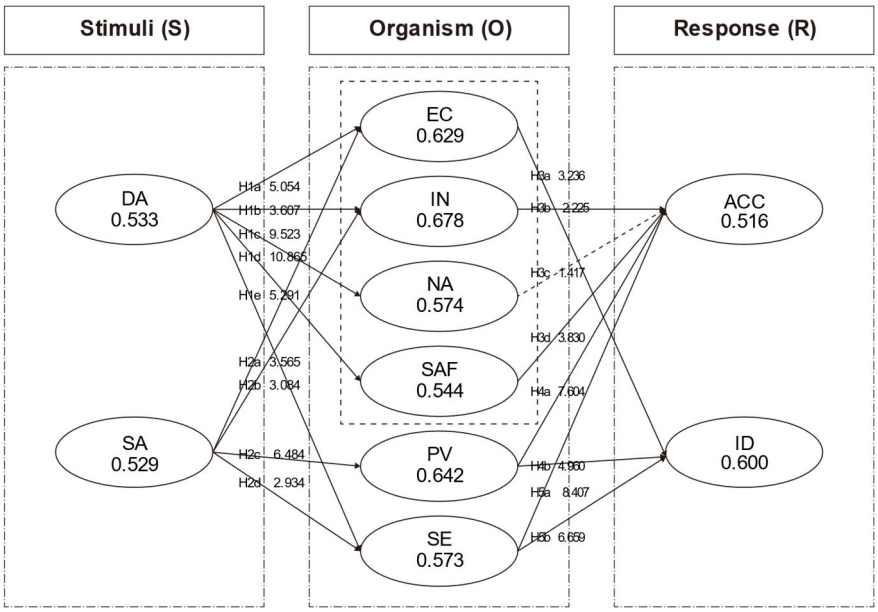

Figure 5. Structural model.

Regarding the comprehensive fit index, the goodness-of-fit value in the composite model SRMR was 0.067 (<0.08), indicating a good fit. The results indicated that the heterotrait–monotrait criterion (HTMT) values were all below 0.85, demonstrating good discriminant validity [63], as shown in Table 4.

Table 4. Discriminant validity (heterotrait–monotrait criterion, HTMT).

Construct	ACC	DA	EC	ID	IN	NA	PV	SAF	SA	SE
ACC										
DA	0.278									
EC	0.417	0.468								
ID	0.678	0.455	0.427							
IN	0.362	0.359	0.429	0.319						
NA	0.321	0.467	0.536	0.357	0.671					
PV	0.751	0.254	0.310	0.629	0.195	0.178				
SAF	0.521	0.520	0.699	0.469	0.590	0.684	0.354			
SA	0.359	0.712	0.449	0.496	0.371	0.293	0.334	0.423		
SE	0.791	0.457	0.433	0.703	0.391	0.502	0.714	0.545	0.397	

This research compriseds ten distinct elements, thus reinforcing the substantial positive correlation between consumers' awareness and the acceptance of circular housing.

4.3. Structural Model

The bootstrapping resampling method was used to examine the statistical significance of each path coefficient. A randomly selected subsample was used over 5000 iterations employing overlays to estimate the hypothesized relationships [51]. For the corresponding endogenous constructs, Stone–Geisser's Q^2 was used to assess the predictive relevance of the endogenous constructs [53]. The results indicated that the Q^2 values for identification (0.133) and acceptance (0.080) exceeded the recommended thresholds (>0) [52]. The *t*-statistic > 1.65, $p < 0.1$, and the effect sizes (f^2) were 0.35, 0.15, and 0.02, which represented large, medium, and small effects, respectively. The coefficient of determination R^2 had values of 0.75, 0.50, and 0.25, indicating significant, moderate, and weak effects, respectively, demonstrating sufficient predictive relevance for the respective constructs [60,62].

This research adopted the significance levels recommended by Henseler [63]. All statistical tests were conducted using a two-tailed format to evaluate the significance of the path coefficients and corresponding *t*-values [64].

The results showed that out of the 17 direct relationships, only one was rejected, namely H3c, which posited that naturalness would positively influence acceptance ($\beta = -0.052$, $p > 0.1$). The following hypotheses were supported.

- H1a states that design attributes positively influence the economy via affective value. The hypothesized path for H1a was positive and significant ($\beta = 0.268$, $p < 0.01$); thus, hypothesis H1a was supported.
- H1b states that design attributes positively influence innovation via affective value. The hypothesized path for H1b was positive and significant ($\beta = 0.182$, $p < 0.1$); thus, hypothesis H1b was supported.
- H1c states that design attributes positively influence naturalness via affective value. The hypothesized path for H1c was positive and significant ($\beta = 0.403$, $p < 0.1$); thus, hypothesis H1c was supported.
- H1d states that design attributes positively influence safety via affective value. The hypothesized path for H1c was positive and significant ($\beta = 0.421$, $p < 0.1$); thus, hypothesis H1d was supported.
- H1e states that design attributes positively influence social equity. The hypothesized path for H1e was positive and significant ($\beta = 0.286$, $p < 0.1$); thus, hypothesis H1e was supported.
- H2a states that shared attributes positively influence the economy via affective value. The hypothesized path for H2a was positive and significant ($\beta = 0.197$, $p < 0.01$); thus, hypothesis H2a was supported.
- H2b states that shared attributes positively influence innovation via affective value. The hypothesized path for H2b was positive and significant ($\beta = 0.190$, $p < 0.1$); thus, hypothesis H2b was supported.

- H2c states that shared attributes positively influence perceived value. The hypothesized path for H2c was positive and significant ($\beta = 0.265$, $p < 0.1$); thus, hypothesis H2c was supported.
- H2d states that shared attributes positively influence social equity. The hypothesized path for H2d was positive and significant ($\beta = 0.150$, $p < 0.1$); thus, hypothesis H2d was supported.
- H3a states that the economy positively influences identification. The hypothesized path for H3a was positive and significant ($\beta = 0.137$, $p < 0.1$); thus, hypothesis H3a was supported.
- H3b states that innovation positively influences acceptance. The hypothesized path for H3b was positive and significant ($\beta = 0.088$, $p < 0.1$); thus, hypothesis H3b was supported.
- H3c states that naturalness positively influences acceptance. The hypothesized path for H3c was positive and significant ($\beta = -0.052$, $p > 0.1$); thus, hypothesis H3c was supported.
- H3d states that safety positively influences acceptance. The hypothesized path for H3d was positive and significant ($\beta = 0.146$, $p < 0.1$); thus, hypothesis H3d was supported.
- H4a states that perceived value positively influences acceptance. The hypothesized path for H4a was positive and significant ($\beta = 0.301$, $p < 0.1$); thus, hypothesis H4a was supported.
- H4b states that perceived value positively influences identification. The hypothesized path for H4b was positive and significant ($\beta = 0.228$, $p < 0.1$); thus, hypothesis H4b was supported.
- H5a states that society positively influences acceptance. The hypothesized path for H5a was positive and significant ($\beta = 0.392$, $p < 0.1$); thus, hypothesis H5a was supported.
- H5b states that society positively influences identification. The hypothesized path for H5b was positive and significant ($\beta = 0.354$, $p < 0.1$); thus, hypothesis H5b was supported.

The design attributes showed significant positive correlations with economy, innovation, naturalness, safety, and social equity. The estimated values for these attributes were 5.504, 3.607, 9.523, 10.865, and 5.291, respectively.

In addition, the shared attributes exhibited positive correlations with economy, innovation, perceived value, and social equity. The estimated values for these attributes were 3.505, 3.084, 6.484, and 2.934, respectively.

Regarding the probable antecedent variables influencing identification, economy, perceived value, and social equity had estimated values of 3.236, 4.960, and 6.659, respectively. Among these variables, social equity was identified as the most important probable antecedent, showing positive correlations with economy, perceived value, and social equity.

In terms of acceptance, the probable antecedent variables were innovation, safety, perceived value, and social equity, with estimated values of 2.225, 3.820, 7.604, and 8.407, respectively. Social equity was found to be the most influential variable in terms of acceptance.

Naturalness was also identified as a probable antecedent variable influencing acceptance, with an estimated value of 1.417, although it did not reach the significance threshold. Circular housing is a practice rooted in cradle-to-cradle design principles. It aims to promote the concepts of valuing nature and minimizing waste, and it was perceived by participants as having a naturally inspired design. However, there were differing opinions, with some participants considering circular housing as a linear model. The results are shown in Table 5 and Figure 5.

The analytical results of the model from developed in this research are comprehensively compiled, as seen in Table 5, and the overall structural analysis of the research is depicted in Figure 5.

This research, comprising ten distinct elements, provided empirical support for 16 of the 17 proposed hypotheses, thus reinforcing athe substantial positive correlation between consumers' awareness and the acceptance of circular housing.

Table 5. Summary of path results.

Path Analysis	Hypothesis	Path Coefficient	*t*-Statistic	*p*-Value	Support
DA→EC	H1a	0.268	5.054	0.000	Supported
DA→IN	H1b	0.182	3.607	0.000	Supported
DA→NA	H1c	0.403	9.523	0.000	Supported
DA→SAF	H1d	0.421	10.865	0.000	Supported
DA→SE	H1e	0.286	5.291	0.000	Supported
SA→EC	H2a	0.197	3.505	0.000	Supported
SA→IN	H2b	0.190	3.084	0.002	Supported
SA→PV	H2c	0.265	6.484	0.000	Supported
SA→SE	H2d	0.150	2.934	0.003	Supported
EC→ID	H3a	0.137	3.236	0.001	Supported
IN→ACC	H3b	0.088	2.225	0.026	Supported
NA→ACC	H3c	−0.052	1.417	0.157	Not supported
SAF→ACC	H3d	0.146	3.820	0.000	Supported
PV→ACC	H4a	0.301	7.604	0.000	Supported
PV→ID	H4b	0.228	4.960	0.000	Supported
SE→ACC	H5a	0.392	8.407	0.000	Supported
SE→ID	H5b	0.354	6.659	0.000	Supported

4.4. Mediation Effect

The significance of the *t*-value was determined using a threshold of 1.96 [52]. A *t*-value greater than 1.96 was considered significant, while a *t*-value less than 1.96 was considered non-significant. A variance accounted for (VAF) value below 20% indicates no mediation effect, while a VAF between 20% and 80% indicates a partial mediation effect. A VAF above 80% indicates a complete mediation effect [63]. The significance of the indirect effect was assessed using the bootstrap method [65]. This research examined the mediation effects and interaction effects of two probable antecedent variables on another probable antecedent variable.

The test results indicated a positive and partial mediation effect of the mediating effect on the research hypothesis. The results of the questionnaire survey revealed the preferred order of consumer decision making based on their psychological needs, including social equity, and perceived value. Among them, for affective value, the order was safety, economy, innovation, and naturalness.

Consumers with higher purchasing power are increasingly seeking circular housing spaces that not only offer physical amenities but also emphasize service design, encompassing intangible values and imagery. These factors have the potential to influence consumers' perceptions, attitudes, and intentions. This research highlighted the significant mediating role of consumers' emotional attachment to organic materials, affective value, perceived value, and social equity. Consumer perception, as an internal cognitive state, positively influenced the development of purchase intention. The mediation analysis and total effects are shown in Tables 6 and 7.

Table 6. Mediation analysis.

Mediation Path	Specific Indirect Effect	Total Effect	VAF	*t*-Value	*p*-Value	Mediation
DA→SE→ID	0.102	0.240	42.50%	3.885	0.000	Supported
DA→SE→ACC	0.112	0.281	39.86%	4.423	0.000	Supported
SA→PV→ACC	0.080	0.236	33.90%	4.827	0.000	Supported
SA→PV→ID	0.060	0.201	29.85%	3.695	0.000	Supported
SA→SE→ACC	0.059	0.215	27.44%	2.776	0.006	Supported
SA→SE→ID	0.053	0.194	27.32%	2.604	0.009	Supported
DA→SAF→ACC	0.062	0.231	26.84%	3.653	0.000	Supported

Table 6. *Cont.*

Mediation Path	Specific Indirect Effect	Total Effect	VAF	*t*-Value	*p*-Value	Mediation
DA→EC→ID	0.037	0.175	21.1%	2.506	0.012	Supported
SA→EC→ID	0.027	0.168	16.07%	2.253	0.024	Not supported
SA→IN→ACC	0.017	0.173	9.83%	1.897	0.058	Not supported
DA→IN→ACC	0.016	0.185	8.65%	1.840	0.066	Not supported
DA→NA→ACC	−0.021	0.148	−14.19%	1.349	0.177	Not supported

Table 7. Total effects.

Construct	ACC	DA	EC	ID	IN	NA	PV	SAF	SA	SE
ACC										
DA	0.169		0.268	0.138	0.182	0.403		0.421		0.286
EC				0.137						
ID										
IN	0.088									
NA	−0.052									
PV	0.301			0.228						
SAF	0.146									
SA	0.156		0.197	0.141	0.190		0.265			0.150
SE	0.392			0.354						

5. Discussion and Conclusions

The results emphasized the importance of improving the service quality efficiency in terms of affective value, perceived value, and social equity. The focus was on emotional responses related to shared attributes that induced affective value, perceived value, and social equity. From a total of 17 hypotheses, 16 were significantly and positively supported, demonstrating partial mediation, with the mediation effect of social equity being more prominent. The prioritization of social equity, perceived value, and affective value (safety, economy, innovation, and naturalness) by consumers influenced their consumption decisions. Understanding the interaction effects of these factors is crucial for designers in regard to the design and demand for sustainable housing. The lack of support for one hypothesis may have been due to the consumer perception that naturalness is considered a prerequisite for circular housing but is insufficient to elicit consumer acceptance.

This research provides d design attribute—value—result strategies to enhance the design of circular housing and promote its development. It explored the relationship between consumers' acceptance and identification of circular design and the development of circular housing. It first established a structural model based on the SOR theory. Adding the mental map of interview results into the model, this research analyzed the design attribute—value—result, and the influence of applied SEM-PLS analysis on to examine the identification and acceptance of circular housing.

The consumer's perception of circular housing is formulated as below. Regarding the design attributes (DA) of circular housing, consumers greatly appreciate resource recycling designs such as water-saving methods, water supply systems, and energy-saving systems. Regarding the shared attributes (SA) of circular housing, consumers highly value charging policies and subsidies that uphold social justice. Regarding the affective value of the economy (EC), of circular housing, consumers strongly agree that the lifestyle and architectural space of circular housing should project a practical image, In Regarding the affective value of innovation (IN) of circular housing, consumers strongly agreed that the lifestyle and architectural space of circular housing should project an innovative image, In Regarding the affective value of naturalness (NA) of circular housing, consumers strongly agreed that the lifestyle and architectural space of circular housing should project a natural image, In Regarding the affective value of safety (SAF) of circular housing, consumers strongly agreed that the lifestyle and architectural space of circular housing should project a comfortable image. Regarding the perceived value (PV) of circular housing, consumers highly value

information related to environmental sustainability and low carbon. This significantly positively influences acceptance and identification. Regarding the social equity (SE) of circular housing, consumers highly appreciate the provision of shared facilities, which can foster greater community cohesion. This significantly positively influences acceptance and identification. Regarding the acceptance (ACC) of circular housing, consumers strongly desire sufficient information in order to decide whether to move into circular housing. Regarding the identification (ID) of circular housing, consumers strongly identify with the cradle-to-cradle design, which aligns with the trend of environmental sustainability.

Circular housing is still in its early stages, and the satisfaction with naturalness natural designs varies. The verification interviews indicated that the consumers had different responses to the affective value of naturalness, suggesting variations in consumer preferences and habits. With in the affective value of consumer perception, the sub-constructs "openness" and "efficiency" represent consumer expectations for an open, shared living lifestyle format (space, kitchen, facilities) while still desiring privacy, thus suggesting the need to enhance the design quality of the personal living space. The consumers expected a lease service model rather than ownership, and they desired efficient and immediate rental services. Decision -makers and designers are advised to adjust their circular housing design strategies accordingly. The interplay between circular design attributes, shared service attributes, affective value, perceived value, and social equity influenced the acceptance and identification of circular housing. The significance of the correlations assists could assist designers in selecting relevant design factors with high correlations for reference in prioritizing certain designs. This implies that circular housing design must create refined living environments and incorporate sustainable environmental and low-carbon contents, while also enhancing designs focused that are sharing-oriented and provide immediate service efficiency to attract consumers. The results of the study indicate that successful circular housing design should strive for excellence in terms of naturalness, innovative living functionalities, a sharing-oriented economy, safety, and diverse intelligent management.

This research, comprising ten distinct elements, provided empirical support for 16 of the 17 proposed hypotheses, thus reinforcing the substantial positive correlation between consumers' awareness and acceptance of circular housing. The research further validated the mediating effects and the results from of the interviews, revealing a significant connection between consumers' perceived value and their levels of acceptance. The aspect of social equity received the highest rating. It is recommended to incorporate consumers' preferences during the design process, in order to bolster consumer identification, bridge the gap in understanding gap between consumers and designers, and efficiently market the housing to a diverse customer base.

Circular housing illustrates represents an innovative approach in the architectural field, promoting sustainability. This concept amalgamates methods from green and intelligent building design, reconceptualizing the planning of materials and buildings in alignment with the principles of a circular economy. This approach underscores the optimal utilization of resources that are reusable, renewable, and sustainable, with the aim to of minimizing environmental impacts.

5.1. Managerial Implications

This research focused on general consumers to examine the positive impacts of design attributes and shared attributes on consumer value and willingness to accept. The results showed that the consumers had a positive perception and acceptance of circular design preferences, such as naturalness, innovation, economy, and safety, which positively influenced identification and acceptance. Perceived value and social equity enhanced the consumers' willingness to consume. The contextual and shared attribute designs of circular housing played important roles in perceived value and social equity, and they further generalized the impact of various affective factors on consumers. These findings could help designers to identify the key elements of circular design that attract consumers, avoid

design mismatches with market needs, and reduce the environmental impacts, providing practical guidance.

The survey results validated the positive correlation between participants' perceptions and affective value, perceived value, social equity, and consumption willingness; the consideration of these factors can enhance well-being, shared value, and acceptance in circular housing design. This survey revealed that the younger population, aged 20 and 35, is more receptive to circular housing than in the past. This is primarily attributed to the high cost of purchasing a house in Taiwan. Circular housing, which is emerging as a significant trend in the construction sector, requires consumer engagement for its sustainable development. The enhancement of consumer services and the assessment of quality satisfaction are thus imperative. Satisfaction surveys and purchase intention, as commonly employed in business management, have become crucial tools in understanding consumer dynamics in this context. Circular housing is a successful example of sustainable development in green architecture and is worthy of further research.

The research findings provide a reference for subsequent designers to establish quality designs at the early stage, while also reducing the environmental burden caused by designs that do not meet the market demands. This research adopted an online questionnaire survey, with respondents being proactive consumers who possessed a willingness to try and explore new concepts. Therefore, the use of online search keywords for the design was more suitable. The measurement of consumer lifestyles was achieved by describing consumers' psychological traits and analyzing them to provide effective marketing strategies, enabling more consumers to identify with and gain a deeper understanding of the concept of circular housing. As part of the design strategy improvement, it is recommended to increase consumers' willingness and acceptance of the housing by enhancing its effectiveness and stimulating consumers' behavioral intention.

The results of this research demonstrate that circular housing's design plays a crucial role in its success. By gaining an in-depth understanding of consumer needs and applying relevant models for analysis, the critical design features of circular housing could be identified, thereby increasing consumers' satisfaction and the success rate of circular housing design. Managers and designers of circular housing should prioritize circular housing design and create attractive and influential circular housing based on the research results, to increase the likelihood of a successful design. In the past, housing was merely used to fulfill residential needs and there was limited collaboration with shared services and other businesses. The adoption of a demand-oriented mindset to ensure reusability and provide shared design opportunities expands the housing opportunities while considering the reasons for the need for circular design. Exploring and defining competitors means satisfying needs, rather than merely providing housing itself. The transformation of housing has become an important issue in urban governance under the trend of the circular economy. This research provides valuable insights to promote the design and construction of circular housing. By understanding consumers' demands for design attributes and providing information on environmental sustainability, it is possible to enhance the acceptability of shared space design and circular housing. This research integrated ten research dimensions—design attributes, shared attributes, economy, innovation, naturalness, safety, perceived value, social equity, acceptance, and identification—applied to circular housing research, bridging the gaps in past research. This provides more practical and academic research value.

The outcomes of this research provided invaluable insights and implications for designers and managers of circular housing.

5.2. Research Limitations

As the implementation of circular housing in Taiwan is still ongoing, this research ensured representativeness by considering consumer acceptance The study's limitations include the nascent stage of circular housing in Taiwan. Expanding the research scope and sample population could add more value.

Due to the characteristics of leasing and the majority of renters being mobile populations in need of rental housing, it is not feasible to conduct comprehensive research and investigation on all circular housing designs. The relevance of other contextual factors related to circular housing design, such as social welfare or design quality, was not considered in this research. This research provides a clear theoretical framework and practical innovation for research in the field of circular housing design strategies. Future research is recommended to focus on collecting more data, exploring additional research methods and hypotheses, and improving the quality of design for circular housing.

The participants in this research were residents with prior living experience who were willing to engage in interviews. The study not only incorporated the methodology of participant interviews but also integrated the findings into the model. The implementation of new intelligent building regulations set for December 2024 in Taiwan, transitioning from the current 8 metrics to 6, is expected to impact the intelligent services and management associated with shared attributes. It is recommended that this aspect be continuously monitored in the future, with the potential for further research focused on residents' living experiences.

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Appendix A

Table A1. Measurement items.

Construct	Description
Social Equity	Circular housing adopts sustainable and eco-friendly building materials, beneficial to sustainable development. Circular housing can help residents avoid difficulties in their daily lives and provide equal housing options for different groups of people. Circular housing is an innovative type of housing that I am happy to recommend to families and friends. Circular housing provides shared facilities that enhance community cohesion.
Perceived Value	Compared to my friends, I own many energy-saving and energy-efficient products. I can clearly explain the characteristics and benefits of circular housing to others. I pay special attention to information related to circular housing, environmental sustainability, and low carbon issues.
Identification	Circular housing practices, from cradle-to-cradle design (C2C design), align with the trend of environmental sustainability. (C2C design) Circular housing is a worth investment choice. Living in circular housing is beneficial for overall physical and mental health. (Healthy)

Table A1. *Cont.*

Construct	Description
Design Attributes	Circular housing should use non-toxic building materials, pollution-free and environmentally friendly design, to meet the requirements of safety and environmental protection. (Regenerate) Circular housing should meet the planning and design requirements of the "circular economy" (e.g., rainwater harvesting, circular energy systems, solar energy, etc.). (Recycled) Circular housing should prioritize the use of renewable or recyclable materials for building materials, and allow for the reuse of materials when they are taken down in the future. (Reused) Circular housing should provide designs that are close to and friendly to nature, such as green spaces, rooftop gardens, natural lighting, and views. (Simple and pure) Circular housing should provide related air quality testing, water quality testing, etc., to meet the requirements of safety and health. (Safe and healthy) Circular housing should provide designs for resource recycling and utilization (e.g., water-saving water supply systems, energy-saving systems, etc.). (Reverisible) Circular housing should meet the needs of barrier-free/universal design, suitable for communities of all age groups/lifestyles (children, young, elderly/single or family forms, etc.). (Accessible) The design of the circular housing should provide simplified maintenance (repair) and updating (replacement) through surface- mounted pipes configuration and flexible spatial layout. (Renewed) Circular housing should provide waste treatment system (e.g., biological recycling, kitchen waste reuse systems, etc.). (Compostable)
Shared Attributes	Circular housing should provide economically efficient leasing models for appliances and equipment (e.g., appliances, elevators lighting fixtures, building materials, etc.). (Durable) Circular housing should provide a shared housing economy model that is economically efficient through leasing instead of buying. (Leasing service) The sharing economy of the consumer concept. (Shared) Circular housing should provide diverse shared functions and spaces (e.g., kitchen, fitness, medical, socializing, audio-visual, reading rooms, innovation centers childcare centers, electric vehicle charging stations, etc.). (Varied space) Circular housing should provide diversified intelligent services (e.g., smart home monitoring devices, energy-saving and smart control. etc.). (Intelligent service) The fees, related policies, and subsidies of the circular housing should be in line with social justice. (Compatible)
Naturalness	Natural lifestyle and expected in architectural space Open lifestyle and expected in architectural space Efficient lifestyle and expected in architectural space Healthy lifestyle and expected in architectural space Intelligent lifestyle and expected in architectural space
Safety	Safe lifestyle and expected in architectural space Comfortable lifestyle and expected in architectural space Happiness lifestyle and expected in architectural space Humanized lifestyle and expected in architectural space
Economy	Economical lifestyle and expected in architectural space Practical lifestyle and expected in architectural space Convenient lifestyle and expected in architectural space
Innovation	Exquisite lifestyle and expected in architectural space Aesthetic lifestyle and expected in architectural space Innovative lifestyle and expected in architectural space
Acceptance	Living in circular housing gives me a sense of honor. I have sufficient information capability to decide to live in circular housing on my own. When I choose to live in circular housing, I am more accepting compared to other types of housing. Compared to other rental housing, I am willing to pay a higher price for circular housing. In the future, I would be happy to choose to rent circular housing.

References

1. Wouterszoon Jansen, B.; Van Stijn, A.; Eberhardt, L.C.M.; Van Bortel, G.; Gruis, V. The Technical or Biological Loop? Economic and Environmental Performance of Circular Building Components. *Sustain. Prod. Consum.* **2022**, *34*, 476–489. [CrossRef]
2. Leising, E.; Quist, J.; Bocken, N. Circular Economy in the Building Sector: Three Cases and a Collaboration Tool. *J. Clean. Prod.* **2018**, *176*, 976–989. [CrossRef]
3. Pomponi, F.; Moncaster, A. Circular Economy for the Built Environment: A Research Framework. *J. Clean. Prod.* **2017**, *143*, 710–718. [CrossRef]
4. Hofstetter, J.S.; De Marchi, V.; Sarkis, J.; Govindan, K.; Klassen, R.; Ometto, A.R.; Spraul, K.S.; Bocken, N.; Ashton, W.S.; Sharma, S.; et al. From Sustainable Global Value Chains to Circular Economy—Different Silos, Different Perspectives, but Many Opportunities to Build Bridges. *Circ. Econ. Sust.* **2021**, *1*, 21–47. [CrossRef] [PubMed]
5. Iyer-Raniga, U. Using the ReSOLVE Framework for Circularity in the Building and Construction Industry in Emerging Markets. *IOP Conf. Ser. Earth Environ. Sci.* **2019**, *294*, 012002. [CrossRef]
6. Calvo-Porral, C.; Lévy-Mangin, J.-P. The Circular Economy Business Model: Examining Consumers' Acceptance of Recycled Goods. *Adm. Sci.* **2020**, *10*, 28. [CrossRef]
7. Liaros, S. A Network of Circular Economy Villages: Design Guidelines for 21st Century Garden Cities. *BEPAM* **2022**, *12*, 349–364. [CrossRef]
8. Diaz Moreno, J. Towards Sustainable Lifestyles: An Exploration of Cohousing in the North American Context. 2022. Available online: https://www.diva-portal.org/smash/record.jsf?pid=diva2:1665592 (accessed on 7 March 2024).
9. Agnew, M.D.; Pettifor, H.; Wilson, C. Lifestyle, an Integrative Concept: Cross-disciplinary Insights for Low-carbon Research. *WIREs Energy Environ.* **2023**, *12*, e490. [CrossRef]
10. Galle, W.; De Temmerman, N.; De Meyer, R. Integrating Scenarios into Life Cycle Assessment: Understanding the Value and Financial Feasibility of a Demountable Building. *Buildings* **2017**, *7*, 64. [CrossRef]
11. Braungart, M.; McDonough, W.; Bollinger, A. Cradle-to-Cradle Design: Creating Healthy Emissions—A Strategy for Eco-Effective Product and System Design. *J. Clean. Prod.* **2007**, *15*, 1337–1348. [CrossRef]
12. Rakhshan, K.; Morel, J.-C.; Daneshkhah, A. A Probabilistic Predictive Model for Assessing the Economic Reusability of Load-Bearing Building Components: Developing a Circular Economy Framework. *Sustain. Prod. Consum.* **2021**, *27*, 630–642. [CrossRef]
13. Li, F.; Liu, D.; Hu, P.; Shillair, R.; Shen, S. How Can Public Rental Housing Improve the Residence Stability of Migrants? *Evid. Cmds* **2022**.
14. Díaz-López, C.; Carpio, M.; Martín-Morales, M.; Zamorano, M. Defining Strategies to Adopt Level(s) for Bringing Buildings into the Circular Economy. A Case Study of Spain. *J. Clean. Prod.* **2021**, *287*, 125048. [CrossRef]
15. Charef, R.; Morel, J.-C.; Rakhshan, K. Barriers to Implementing the Circular Economy in the Construction Industry: A Critical Review. *Sustainability* **2021**, *13*, 12989. [CrossRef]
16. Taufique, K.M.R.; Vaithianathan, S. A Fresh Look at Understanding Green Consumer Behavior among Young Urban Indian Consumers through the Lens of Theory of Planned Behavior. *J. Clean. Prod.* **2018**, *183*, 46–55. [CrossRef]
17. Halog, A.; Anieke, S. A Review of Circular Economy Studies in Developed Countries and Its Potential Adoption in Developing Countries. *Circ. Econ. Sust.* **2021**, *1*, 209–230. [CrossRef]
18. Malhotra, G. Impact of Circular Economy Practices on Supply Chain Capability, Flexibility and Sustainable Supply Chain Performance. *Int. J. Logist. Manag.* **2023**, *ahead-of-print*. [CrossRef]
19. Yang, X.; Gu, D.; Wu, J.; Liang, C.; Ma, Y.; Li, J. Factors Influencing Health Anxiety: The Stimulus–Organism–Response Model Perspective. *INTR* **2021**, *31*, 2033–2054. [CrossRef]
20. Guo, J.; Li, Y.; Xu, Y.; Zeng, K. How Live Streaming Features Impact Consumers' Purchase Intention in the Context of Cross-Border E-Commerce? A Research Based on SOR Theory. *Front. Psychol.* **2021**, *12*, 767876. [CrossRef]
21. Song, Z.; Liu, C.; Shi, R. How Do Fresh Live Broadcast Impact Consumers' Purchase Intention? Based on the SOR Theory. *Sustainability* **2022**, *14*, 14382. [CrossRef]
22. Yang, J.; Peng, M.Y.-P.; Wong, S.; Chong, W. How E-Learning Environmental Stimuli Influence Determinates of Learning Engagement in the Context of COVID-19? SOR Model Perspective. *Front. Psychol.* **2021**, *12*, 584976. [CrossRef] [PubMed]
23. Zhu, B.; Kowatthanakul, S.; Satanasavapak, P. Generation Y Consumer Online Repurchase Intention in Bangkok: Based on Stimulus-Organism-Response (SOR) Model. *Int. J. Retail. Distrib. Manag.* **2019**, *48*, 53–69. [CrossRef]
24. Munaro, M.R.; Tavares, S.F.; Bragança, L. Towards Circular and More Sustainable Buildings: A Systematic Literature Review on the Circular Economy in the Built Environment. *J. Clean. Prod.* **2020**, *260*, 121134. [CrossRef]
25. Pao, H.-T.; Chen, C.-C. Decoupling Strategies: CO_2 Emissions, Energy Resources, and Economic Growth in the Group of Twenty. *J. Clean. Prod.* **2019**, *206*, 907–919. [CrossRef]
26. Obersteg, A.; Arlati, A.; Acke, A.; Berruti, G.; Czapiewski, K.; Dąbrowski, M.; Heurkens, E.; Mezei, C.; Palestino, M.F.; Varjú, V.; et al. Urban Regions Shifting to Circular Economy: Understanding Challenges for New Ways of Governance. *UP* **2019**, *4*, 19–31. [CrossRef]
27. Marciniak, S. Circular Affordable Community: Exploration of Sharing-Oriented Residential Architecture Models. Master's Thesis, Delft University of Technology, Delft, The Netherlands, 26 June 2020.
28. Ollár, A.; Femenías, P.; Rahe, U.; Granath, K. Foresights from the Swedish Kitchen: Four Circular Value Opportunities for the Built Environment. *Sustainability* **2020**, *12*, 6394. [CrossRef]

29. Srivastava, V.; Gupta, A.K. Price Sensitivity, Government Green Interventions, and Green Product Availability Triggers Intention toward Buying Green Products. *Bus. Strat. Environ.* **2023**, *32*, 802–819. [CrossRef]
30. Kato, M. Toward a New Capital by Le Corbusier—A Synthesis of Images with Different Origins. In Proceedings of the ICGG 2018—Proceedings of the 18th International Conference on Geometry and Graphics, Milan, Italy, 3–7 August 2018; Cocchiarella, L., Ed.; Springer International Publishing: Cham, Switzerland, 2019; pp. 820–831.
31. Dokter, G.; Thuvander, L.; Rahe, U. How Circular Is Current Design Practice? Investigating Perspectives across Industrial Design and Architecture in the Transition towards a Circular Economy. *Sustain. Prod. Consum.* **2021**, *26*, 692–708. [CrossRef]
32. Joensuu, T.; Edelman, H.; Saari, A. Circular Economy Practices in the Built Environment. *J. Clean. Prod.* **2020**, *276*, 124215. [CrossRef]
33. Van Bueren, B.J.A.; Leenders, M.A.A.M.; Nordling, T.E.M. Case Study: Taiwan's Pathway into a Circular Future for Buildings. *IOP Conf. Ser. Earth Environ. Sci.* **2019**, *225*, 012060. [CrossRef]
34. Tai Sugar Circular Village. 2024. Available online: https://www.taisugar.com.tw/circular/english/CP2.aspx?n=12428 (accessed on 3 January 2024).
35. Taipei City Government Development of Urban Development. 2024. Available online: https://english.udd.gov.taipei/News_Content.aspx?n=C2942D82D8C2F87C&sms=DFFA119D1FD5602C&s=976F25C25E7BAE07 (accessed on 3 January 2024).
36. Salehi-Amiri, A.; Zahedi, A.; Gholian-Jouybari, F.; Calvo, E.Z.R.; Hajiaghaei-Keshteli, M. Designing a Closed-Loop Supply Chain Network Considering Social Factors; A Case Study on Avocado Industry. *Appl. Math. Model.* **2022**, *101*, 600–631. [CrossRef]
37. Russell, J.A.; Mehrabian, A. Distinguishing Anger and Anxiety in Terms of Emotional Response Factors. *J. Consult. Clin. Psychol.* **1974**, *42*, 79–83. [CrossRef] [PubMed]
38. Haines-Gadd, M.; Chapman, J.; Lloyd, P.; Mason, J.; Aliakseyeu, D. Emotional Durability Design Nine—A Tool for Product Longevity. *Sustainability* **2018**, *10*, 1948. [CrossRef]
39. Liu, Y.; Hong, Z.; Zhu, J.; Yan, J.; Qi, J.; Liu, P. Promoting Green Residential Buildings: Residents' Environmental Attitude, Subjective Knowledge, and Social Trust Matter. *Energy Policy* **2018**, *112*, 152–161. [CrossRef]
40. Kabirifar, K.; Mojtahedi, M.; Wang, C.; Tam, V.W.Y. Construction and Demolition Waste Management Contributing Factors Coupled with Reduce, Reuse, and Recycle Strategies for Effective Waste Management: A Review. *J. Clean. Prod.* **2020**, *263*, 121265. [CrossRef]
41. Uzir, M.U.H.; Al Halbusi, H.; Thurasamy, R.; Thiam Hock, R.L.; Aljaberi, M.A.; Hasan, N.; Hamid, M. The Effects of Service Quality, Perceived Value and Trust in Home Delivery Service Personnel on Customer Satisfaction: Evidence from a Developing Country. *J. Retail. Consum. Serv.* **2021**, *63*, 102721. [CrossRef]
42. Lalicic, L.; Weismayer, C. Consumers' Reasons and Perceived Value Co-Creation of Using Artificial Intelligence-Enabled Travel Service Agents. *J. Bus. Res.* **2021**, *129*, 891–901. [CrossRef]
43. Bruderer Enzler, H.; Diekmann, A. All Talk and No Action? An Analysis of Environmental Concern, Income and Greenhouse Gas Emissions in Switzerland. *Energy Res. Soc. Sci.* **2019**, *51*, 12–19. [CrossRef]
44. Calisto Friant, M.; Vermeulen, W.J.V.; Salomone, R. A Typology of Circular Economy Discourses: Navigating the Diverse Visions of a Contested Paradigm. *Resour. Conserv. Recycl.* **2020**, *161*, 104917. [CrossRef]
45. Chen, C.C. The Path to a 2025 Nuclear-Free Taiwan: An Analysis of Dynamic Competition among Emissions, Energy, and Economy. *Energy Environ.* **2021**, *32*, 668–689. [CrossRef]
46. Fortunati, S.; Martiniello, L.; Morea, D. The Strategic Role of the Corporate Social Responsibility and Circular Economy in the Cosmetic Industry. *Sustainability* **2020**, *12*, 5120. [CrossRef]
47. Scupin, R. The KJ Method: A Technique for Analyzing Data Derived from Japanese Ethnology. *Hum. Organ* **1997**, *56*, 233–237. [CrossRef]
48. Podsakoff, P.M.; MacKenzie, S.B.; Lee, J.-Y.; Podsakoff, N.P. Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. *J. Appl. Psychol.* **2003**, *88*, 879–903. [CrossRef]
49. Hair, J.F.; Sarstedt, M.; Ringle, C.M. Rethinking Some of the Rethinking of Partial Least Squares. *Eur. J. Mark.* **2019**, *53*, 566–584. [CrossRef]
50. Ghafourian, K.; Kabirifar, K.; Mahdiyar, A.; Yazdani, M.; Ismail, S.; Tam, V.W.Y. A Synthesis of Express Analytic Hierarchy Process (EAHP) and Partial Least Squares-Structural Equations Modeling (PLS-SEM) for Sustainable Construction and Demolition Waste Management Assessment: The Case of Malaysia. *Recycling* **2021**, *6*, 73. [CrossRef]
51. Hair, J.F.; Risher, J.J.; Sarstedt, M.; Ringle, C.M. When to Use and How to Report the Results of PLS-SEM. *EBR* **2019**, *31*, 2–24. [CrossRef]
52. Sarstedt, M.; Ringle, C.M.; Hair, J.F. Partial Least Squares Structural Equation Modeling. In *Handbook of Market Research*; Homburg, C., Klarmann, M., Vomberg, A., Eds.; Springer International Publishing: Cham, Switzerland, 2022; pp. 587–632, ISBN 978-3-319-57411-0.
53. Tseng, H.-T.; Lo, C.-L.; Chen, C.-C. The Moderation Role of AI-Enabled Service Quality on the Attitude Toward Fitness Apps. *J. Glob. Inf. Manag.* **2023**, *31*, 1–20. [CrossRef]
54. Kirchherr, J.; Reike, D.; Hekkert, M. Conceptualizing the Circular Economy: An Analysis of 114 Definitions. *Resour. Conserv. Recycl.* **2017**, *127*, 221–232. [CrossRef]
55. Mendoza, J.M.F.; Sharmina, M.; Gallego-Schmid, A.; Heyes, G.; Azapagic, A. Integrating Backcasting and Eco-Design for the Circular Economy: The BECE Framework. *J. Ind. Ecol.* **2017**, *21*, 526–544. [CrossRef]

56. Tserng, H.-P.; Chou, C.-M.; Chang, Y.-T. The Key Strategies to Implement Circular Economy in Building Projects—A Case Study of Taiwan. *Sustainability* **2021**, *13*, 754. [CrossRef]
57. Chen, C.-C.; Pao, H.-T. The Causal Link between Circular Economy and Economic Growth in EU-25. *Environ. Sci. Pollut. Res.* **2022**, *29*, 76352–76364. [CrossRef]
58. Di Vaio, A.; Hasan, S.; Palladino, R.; Hassan, R. The Transition towards Circular Economy and Waste within Accounting and Accountability Models: A Systematic Literature Review and Conceptual Framework. *Environ. Dev. Sustain.* **2023**, *25*, 734–810. [CrossRef] [PubMed]
59. Wu, K.W.; Huang, S.Y.; Chen, C.C. Comparison of Mobile-Blogging Acceptance between Indonesia and Taiwan. *IJMC* **2012**, *10*, 150. [CrossRef]
60. Fuller, C.M.; Simmering, M.J.; Atinc, G.; Atinc, Y.; Babin, B.J. Common Methods Variance Detection in Business Research. *J. Bus. Res.* **2016**, *69*, 3192–3198. [CrossRef]
61. Lindell, M.K.; Whitney, D.J. Accounting for Common Method Variance in Cross-Sectional Research Designs. *J. Appl. Psychol.* **2001**, *86*, 114–121. [CrossRef] [PubMed]
62. Ab Hamid, M.R.; Sami, W.; Mohmad Sidek, M.H. Discriminant Validity Assessment: Use of Fornell & Larcker Criterion versus HTMT Criterion. *J. Phys. Conf. Ser.* **2017**, *890*, 012163. [CrossRef]
63. Henseler, J.; Hubona, G.; Ray, P.A. Using PLS Path Modeling in New Technology Research: Updated Guidelines. *Ind. Manag. Data Syst.* **2016**, *116*, 2–20. [CrossRef]
64. Lowry, P.B.; Gaskin, J. Partial Least Squares (PLS) Structural Equation Modeling (SEM) for Building and Testing Behavioral Causal Theory: When to Choose It and How to Use It. *IEEE Trans. Profess. Commun.* **2014**, *57*, 123–146. [CrossRef]
65. Tan, L.L.; Abd Aziz, N.; Ngah, A.H. Mediating Effect of Reasons on the Relationship between Altruism and Green Hotel Patronage Intention. *J. Mark. Anal.* **2020**, *8*, 18–30. [CrossRef]