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Sustainable healthcare: Unraveling the impact of positive perception on community healthcare choices

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ABSTRACT

Sustainability has become a primary driver of business strategy and customer behavior. This study investigates the interrelationships among sustainability perception (SP), sustainability attitudes (SA), and sustainability choices (SC) to develop environmentally friendly decision making. Adopting a quantitative design, data were collected from a diverse group of 381 consumers through a structured questionnaire. Structural equation modeling (SEM) was applied to study the interrelation between SP, SA, and SC. The findings reveal a significant and positive relationship between SP and SA, indicating that individuals with higher perceptions and knowledge of sustainability prefer to have better attitudes toward sustainable behavior. Furthermore, the results also highlight SA as a key mediator between SP and SC, suggesting that perception alone is insufficient to drive behavioral change unless it is accompanied by a positive attitude. These findings underscore that increasing sustainability perceptions create favorable attitudes to translate sustainability perceptions into actionable choices. The study offers valuable insights for policymakers, educators, and business leaders by highlighting the need for targeted communication strategies and educational interventions that enhance public perception and attitudes toward sustainability. Future research is encouraged to explore the role of contextual factors in promoting sustainable behaviour, such as social norms, peer influence and regulatory approaches at the community level.

Keywords: sustainability perception, sustainability attitudes, sustainability choices, consumer behavior, structural equation modeling, sustainable decision-making

INTRODUCTION

The global healthcare sector is facing the challenge of reconciling quality delivery of services, environmental sustainability, and economic viability. With healthcare facilities generating significant waste and carbon emissions, sustainability adoption remains inconsistent due to public perception, cost concerns, and lack of awareness (Lenzen et al., 2020; Zhang et al., 2022). Globally, the healthcare industry accounts for 4.4% of net carbon emissions, with major contributions from the United States, China, and the EU (Eckelman et al., 2020; Karliner et al., 2019). In India, despite 54,000 hospitals and 1.3 million beds, the bed-to-population ratio remains at 1.3 per 1,000 people, significantly below World Health Organization's [WHO] recommended 3 per 1,000 (Asian MediTour, 2024; The Economic Times, 2024). Moreover, 62% of healthcare facilities are private, limiting accessibility in rural areas, where 70% of the population resides but only 25% of healthcare infrastructure is available (Private Healthcare in India: Boons and Banes | Institut Montaigne, n.d.).

This study contributes to the global effort toward achieving the United Nations Sustainable Development Goals (SDGs). It supports SDG 3 (Good Health and Well-being) by encouraging healthcare choices that benefit both personal health and the environment, and SDG 12 (Responsible Consumption and Production) by promoting sustainable healthcare consumption. The findings underscore the need for educational and policy interventions to bridge the gap between perception and behavior, offering practical insights for advancing sustainable healthcare systems. Similar to Kioumarsi and Liu (2025), this research highlights the importance of integrating health and environmental priorities in policy planning.

Sustainable healthcare seeks to balance quality service delivery, environmental responsibility, and financial viability, yet public perception significantly influences its adoption. While awareness of sustainability is rising, affordability and convenience often take precedence, limiting engagement with sustainable healthcare options. Despite its growing relevance, research remains scarce on how sustainability perceptions impact healthcare choices, particularly considering the

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moderating roles of health consciousness and perceived costs. Addressing these gaps can inform strategies to enhance public acceptance and drive sustainable healthcare adoption.

This study examines how SustainaPerception (SP) impacts SustainaAttitude (SA) and SustainaChoice (SC), with Personal Health Consciousness (PHC) and Perceived Cost of Sustainable Healthcare (PCSH) as moderating variables. It contributes to SDG 3 (Good Health and Well-being) and SDG 12 (Responsible Consumption and Production) through green hospitals, green practices, and effective utilization of resources (SDG Indicators, n.d.; WHO, 2022). It fills knowledge gaps on determinants of healthcare behavior that is more sustainable, informing policy interventions, financial incentives, and health education to enhance adoption of sustainability and healthcare equity Kioumarsi and Liu (2025).

THEORETICAL BACKGROUND

The Value-Belief-Norm (VBN) Theory by Stern (2000) provides a theoretical explanation of why individuals develop pro-environmental behaviors through their values, environmental attitudes, and personal norms. The people with biospheric or altruistic values finds environmental, and sustainability matters to be personally relevant, according to the theory. The values induce ecological worldviews such as New Environmental Paradigm (NEP), which in turn inform environmental threat perceptions. When issues of sustainability become morally significant to people, they feel personally committed (activation of norm) to engaging in sustainable behavior. External factors such as perceived cost can increase or decrease the translation of attitudes to actual decision making on issues of sustainability.

For this research, SustainaPerception (SP), SustainaAttitude (SA), and SustainaChoice (SC) fit nicely with VBN theory. SP refers to the individual's belief and perception that healthcare must be sustainable because of their health- and environmental-related values. SA refers to the individual's internalized moral obligation to act sustainably as a direct outcome of norm activation. Finally, SC refers to the actual decision to practice or consume sustainable healthcare or products and is the behavior that VBN theory predicts will occur.

Perceived Cost of Sustainable Healthcare (PCSH) mediates this relationship to establish whether people will behave according to their attitudes to sustainability. According to VBN theory, people will behave sustainably if they perceive that they have control over doing something about their moral obligation. If people perceive that sustainable healthcare is expensive, they will experience "norm suppression" so that financial constraints become more important than moral obligation and therefore will have lower uptake of sustainable healthcare options. If people perceive that they can afford it, they will be more likely to behave according to their attitudes to sustainability and will take up sustainable healthcare options.

Hence, applying VBN theory to this study provides a robust framework to explain why values and beliefs of sustainability translate into actions and to explain how barriers to behavior (e.g., cost) condition this relationship. It highlights that policies, incentives, and prices have to be framed in such a manner that they bridge attitudes of sustainability with sustainable healthcare behavior.

Related Works and Hypotheses Development

Sustainaperception (SP) and sustainaattitude (SA)

The interrelationship between SustainaPerception (SP) and SustainaAttitude (SA) is crucial in influencing sustainable behaviors because people's perceptions of sustainability drive their values, attitudes, and intentions to act sustainably. Stronger perceptions of sustainability translate to more positive attitudes to sustainability that ultimately drive pro-environmental and ethical decision-making (Beulah & Chitrakala, 2024). Furthermore, perception of sustainability impacts loyalty because research has established that perceived benefits and skepticism have substantial impacts on attitudes to sustainability that ultimately mediate customer loyalty in green businesses (Ünal et al., 2024). Furthermore, perception of environmental sustainability has a high correlation with pro-environmental behavior and therefore emphasizes increasing positive attitudes to sustainability through awareness initiatives (Omar et al., 2024). People with higher knowledge and awareness of sustainable investing have more positive attitudes to sustainability, particularly in developing countries (Yucel et al., 2023). Lastly, research on food sustainability shows that knowledge and values regarding sustainability drive attitudes and behavior among consumers with personal lifestyle and routines reinforcing positive attitudes (Gianfredi et al., 2024). In conclusion, literature exists that consistently demonstrate SustainaPerception (SP) has a positive significant impact on SustainaAttitude (SA), since people's perceptions of environmental, social, and financial sustainability drive their intentions to practice sustainable behavior. The findings demonstrate that interventions like education, promotion, and policies must be undertaken to increase perceptions of sustainability and induce long-term attitudinal changes.

Thus, this study proposes the following hypothesis:

H1: SustainaPerception (SP) positively influences SustainaAttitude (SA).

Sustainaperception (SP) on sustainachoice (SC)

The relationship between SustainaPerception (SP) and SustainaChoice (SC) is a primary driver of consumer behavior in scenarios of sustainability. How people perceive sustainability affects their buying behavior, brand selection, and environmental values. Consumer behavior in areas such as food, fashion, and soft drinks is influenced by sustainability perception to a great extent since consumers consider sustainability while making purchasing decisions (Oh et al., 2024). Subjective factors such as feeling younger have also been seen to increase sustainable choices since people associate youth with being more sustainable and modify their purchasing behavior (Lee & Kim, 2024). Marketing also plays a role; advertising on issues of sustainability has been seen to have a positive impact on consumer perception and therefore more sustainable fashion purchases if messages are value-congruent and credible (Manurung, 2023). Another research on brand gender signals indicates that products with feminine brands are seen to be more sustainable and therefore drive

purchasing intentions (McKinney, 2024). Consumer knowledge gaps on issues of sustainability remain a challenge wherein, most consumers overestimate or underrate issues such as packaging and origin of products and therefore make uninformed purchases (Groth et al., 2023). The findings suggest that clear and accurate communication of issues of sustainability and education programs must be used to bridge issues of sustainability perception with actual purchasing behavior that is more sustainable.

H2: SustainaPerception (SP) positively influences Sustainachoice (SC).

Sustainaattitude (SA) and sustainachoice (SC)

The relationship between SustainaAttitude (SA) and SustainaChoice (SC) is pivotal in driving sustainable healthcare decisions, as individuals with positive sustainability attitudes are more likely to adopt sustainable choices (Ajzen, 1991). Evidence confirms that attitudes to sustainability lead to behavioral intentions, substantiating the Theory of Planned Behavior (TPB) and the Value-Belief-Norm (VBN) Theory to place attitudes at the forefront of pro-environmental behavior (Moták et al., 2017; Stern, 2000). Evidence indicates that those with favorable attitudes to sustainability actively choose green healthcare providers, green medicines and pharmaceuticals, and green medical services (Unal et al., 2024). Trust in sustainable healthcare (TSH) substantiates this relationship also, with higher trust equating to more efficient sustainability decision making (Martinez et al., 2022). Nevertheless, although attitude predicts behavior with strength, extraneous factors such as cost and lack of information can deter translating attitudes to sustainability to actual decision making (ElHaffar et al., 2020). This substantiates that interventions through policies, public information messages, and monetary incentives can bridge this gap between attitudes to sustainability and uptake of sustainable healthcare (Martinez et al., 2022).

H3: SustainaAttitude (SA) positively influences SustainaChoice (SC).

The mediating role of sustainaattitude (SA) between sustainaperception (SP) and sustainachoice (SC)

SustainaAttitude (SA) mediates between SustainaPerception (SP) and SustainaChoice (SC), and it defines how perceptions of sustainability translate into tangible consumer behaviors. Empirical research has discovered that perceptions of sustainability have a substantial impact on attitudes, and attitudes in their turn drive pro-environmental behaviors and purchasing decisions. For instance, research on education for sustainable development discovered that attitudes to the environment mediate between knowledge of sustainability and behavioral options (Zhang & Cao, 2025). Similarly, perceived policies of sustainability enhance pro-environmental behaviors but only if attitudes to sustainability have a mediating function (Soeharso et al., 2023). In consumer markets, perceived sustainability impacts purchasing decisions indirectly through emotional and social values and emphasizes that strong attitudes to sustainability are crucial to engage consumers (Shih et al., 2024). Furthermore, trade-offs in product attributes due to concern with sustainability matter to purchasing behavior only if moral attitudes of consumers have a mediating function (Suh & Yoo, 2024). Lastly, research on managing resources sustainably indicates that perceptions of environmental policies and regulations will more likely lead to consumption sustainably if positive attitudes have a mediating function (Kherazi et al., 2024). These studies confirm that SustainaAttitude (SA) is a bridge between perception and action and that strengthening attitudes with information and policy interventions is crucial to induce behavioral changes.

H4: SA mediates the relationship between SP and SC.

The moderating role of personal health consciousness in the relationship between sustainability attitude and sustainable choice

No direct research has been done to test the moderating effect of Personal Health Consciousness (PHC) on the relationship between SustainaAttitude (SA) and SustainaChoice (SC). However, research in related areas suggests that Personal Health Consciousness (PHC) plays a role in shaping attitudes to sustainability and their translation into sustainable behaviors. For instance, research has found that health-conscious consumers opt to purchase more environmentally friendly products, particularly organic and environmentally friendly products, because of their health-related connotations (Gianfredi et al., 2024). Similarly, health consciousness enhances sustainability-related behaviors in consumption options, particularly in areas such as organic products, personal care products, and environmentally friendly packaging (Oh et al., 2024). Further, research on healthcare's sustainable consumption patterns suggests that personal health factors drive purchasing options related to sustainability such as choosing environmentally friendly medical products (Chambon et al., 2023). Furthermore, research on PHC suggests that it enhances attitudes to sustainability and behavior relationship, particularly if choices to sustainability have perceived health benefits to oneself (Cudjoe & Wang, 2024). These pieces of research suggest that Personal Health Consciousness is a significant moderator that enhances attitudes to sustainability and choices relationship, particularly if choices to sustainability have perceived health benefits to oneself.

H5: Personal Health Consciousness (PHC) positively moderates the SA-SC relationship.

The moderating effect of perceived cost of sustainable healthcare in the relationship between sustainability attitude and sustainable choice

Perceived cost of healthcare is a moderating factor in SustainaAttitude (SA)-to-SustainaChoice (SC) relationship such that it will determine whether people will make their attitudes to sustainability translate into more sustainable healthcare choices. It is reported that while people have positive attitudes to being green, perceived cost discourages people to make green purchases. Empirical research has found that perceived financial constraints negatively impact green purchasing behavior such that concern over cost trumps concern over being green (ElHaffar et al., 2023). Similarly, healthcare consumers can make more sustainable consumption choices but will be deterred by cost constraints if perceived cost is not justified by tangible benefits (Graça &

Table 1. Key constructs of conceptual framework

Variable	Operational Definition	Citation
SustainaPerception (SP)	Awareness, understanding and subjective judgment of healthcare dimensions of sustainability like environmental, social and economic sustainability. It refers to people's perception of long-term benefits and outcomes of healthcare practices that are sustainable.	Gianfredi et al. (2024)
SustainaAttitude (SA)	A person's positive or negative inclination to practice health-promoting behaviors that contribute to sustainability, based on their values, beliefs, and perceived moral obligation.	Shih et al. (2024)
SustainaChoice (SC)	The actual decision or behavior to consume healthcare that is environmentally friendly, such as choosing environmentally friendly medical products, shopping at green healthcare facilities, or participating in sustainability schemes, ranging from habitual actions to one-time decisions and high-effort choices involving significant cost or effort.	Oh et al. (2024)
Personal Health Consciousness (PHC)	Degree of awareness, concern, and proactive participation in choosing healthcare decisions that give sustainability top priority along with personal well-being.	Cudjoe & Wang (2024) Dutta-Bergman (2004)
Perceived Cost of Sustainable Healthcare (PCSH) (Moderator Variable)	The attitude of an individual with regard to the price or affordability of embracing sustainable healthcare options in terms of cost, availability, and trade-off between monetary expense and sustainability benefits.	ElHaffar et al. (2023) Graça & Khare (2023)

Source: Review of literature

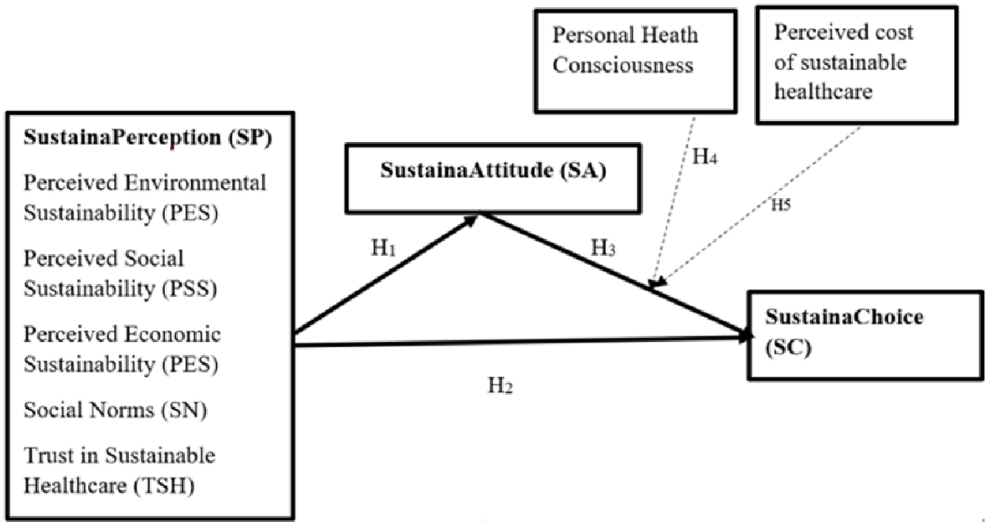

Figure 1. Conceptual framework (Source: Authors' own elaboration)

Khare, 2023). Empirical research on green luxury products also supports this such that perceived cost and perceived scarcity influence attitude to sustainability to actual purchasing (Park et al., 2022). Empirical research on policies influencing adoption of sustainability also shows that if people perceive that policies positively support or subsidize adoption of sustainability, then cost's moderating effect to choosing to be more sustainable is alleviated (Ridzuan et al., 2022). The findings show that while attitudes to being green propel people to make more sustainable healthcare choices, perceived cost dampens such that cost reduction initiatives, incentives, and policies become vital to enabling adoption of more sustainable healthcare.

H6: Perceived Cost of Sustainable Healthcare (PCSH) negatively moderates the SA-SC relationship.

Conceptual Framework

The theoretical framework of this study is based on the Value-Belief-Norm (VBN) Theory (Stern, 2000) and examines how SustainaPerception (SP) impacts SustainaAttitude (SA), with SA influencing SustainaChoice (SC), moderated by Personal Health Consciousness (PHC) and Perceived Cost of Sustainable Healthcare (PCSH) (Refer **Table 1**). SP is concerned with people's perceptions of environmental, social, and economic sustainability, social norms, and trust in healthcare that is sustainable that shape their attitudes to sustainability (Beulah & Chitrakala, 2024). SA with positive attitudes encourages people to make healthcare choices that favor sustainability, consistent with literature linking pro-environmental attitudes with pro-environmental behaviors (Omar et al., 2024). But PHC reinforces this relationship because health-aware people opt for healthcare services that are sustainable because of perceived health benefits (Brown et al., 2023), while PCSH suppresses it because high prices deter people from making choices that favor sustainability even if they have positive attitudes (Williams & Rangel-Buitrago, 2019). The framework stresses that perceptions of sustainability have a key role to play in shaping attitudes and behaviors and emphasizes that to make a positive contribution, initiatives to raise awareness, reduce financial constraints, and induce adoption of healthcare that is sustainable must be adopted (Refer **Figure 1**).

Table 2. Respondents' profile

Variables	Category	Frequency	Percentage
Age	18–24 years	55	14.4%
	25–34 years	83	21.8%
	35–44 years	115	30.2%
	45–54 years	128	33.6%
Gender	Male	211	55.4%
	Female	170	44.6%
Education Level:	High school or below	21	5.5%
	Bachelor's degree	214	56.2%
	Master's degree	115	30.2%
	Doctoral degree	18	4.7%
	Other	13	3.4%
Occupation	Student	55	14.4%
	Private employee	281	73.8%
	Government employee	16	4.2%
	Others	29	7.6%
Monthly Income	Less than 10,000	61	16.0%
	10,001–30,000	86	22.6%
	30,001–50,000	89	23.4%
	Above 50,000	145	38.1%
Geographic Location:	Urban	180	47.2%
	Rural	201	52.8%

Source: Survey Data

METHODOLOGY

Research Design

This study employed a quantitative cross-sectional design with survey-based data collection to examine the relationship between SustainaPerception (SP), SustainaAttitude (SA), and SustainaChoice (SC), with intervening factors being Personal Health Consciousness (PHC) and Perceived Cost of Sustainable Healthcare (PCSH). The population of study consisted of those making healthcare choices on their behalf or on behalf of their family members to make sure that respondents had healthcare decision-making experience.

Sample Profile

Demographic Profile

The sample (N=381) is well-represented (**Table 2**), with 63.8% of respondents aged 35 and above, aligning with the study's focus on healthcare decision-makers. Gender distribution is 55.4% male and 44.6% female, ensuring a balanced perspective. The majority hold a bachelor's (56.2%) or master's degree (30.2%), indicating an informed sample. Private employees (73.8%) dominate the occupation category, while 38.1% earn above 50,000, reflecting financial stability's role in sustainable choices. Geographic distribution is balanced (52.8% rural, 47.2% urban), capturing diverse sustainability perspectives. This composition strengthens the study's relevance, though future research should explore broader socioeconomic variations.

Procedure

Stratified random sampling was applied to obtain coverage of public and private healthcare sectors. The sample size was determined using Cochran's formula with an infinite population and converted to a finite population of 54,000 hospitals in India. For a 95% level of confidence with assumed response distribution of 50% and margin of error of 5%, infinite population required sample size was 384 respondents. Applying finite population correction (FPC) to 54,000 hospitals, minimum required sample size adjusted to 381 respondents to offer statistical reliability and representativeness.

To ensure content validity and contextual relevance, professionals in consumer behavior and sustainable healthcare were contacted prior to the questionnaire being distributed to participants. Their input was instrumental in improving the survey's wording, organization, and clarity to better alignment with the study's emphasis on attitudes, perceptions, and healthcare decisions related to sustainability. In order to enhance comprehensibility and ensure that the questionnaire appropriately reflected respondents' viewpoints on the adoption of sustainable healthcare, minor adjustments were made in response to expert comments.

The study included participants aged at least 18 years old and actively involved in healthcare decision-making for themselves or their family, with voluntary consent. It excluded non-decision-makers, medical professionals to avoid bias, and those unwilling to consent. Incomplete responses and participants unable to understand the survey language were eliminated to ensure data validity and reliability.

Data Analysis

Descriptive statistics were used to analyze demographic characteristics to describe the sample. Structural equation modeling using SMART PLS was employed to test study hypotheses and to analyze associations between SP, SA, and SC. Additionally, mediation analysis was performed using bootstrapping techniques to evaluate the indirect effects of SA in the SP-SC relationship. Furthermore, moderation analysis examined the influence of PHC and PCSH on the SA-SC relationship, providing insights into how health consciousness

Table 3. Validity and reliability measures

Constructs	Cronbach's alpha	CR	AVE
PCSH	0.858	0.859	0.638
PES	0.846	0.848	0.620
PESE	0.888	0.889	0.691
PHC	0.860	0.862	0.642
PSS	0.880	0.882	0.678
SA	0.894	0.894	0.703
SC	0.868	0.869	0.654
SN	0.847	0.849	0.621
SP	0.876	0.878	0.669
TSH	0.871	0.871	0.660

Source: Survey Data

Note: PCSH: Perceived Cost of Sustainable Healthcare; PES: Perceived Environmental Sustainability; PESE: Perceived Economic Sustainability; PHC: Personal Health Consciousness; PSS: Perceived Social Sustainability; SA: SustainaAttitude; SC: SustainaChoice; SN: Social Norms; SP: SustainaPerception; TSH: Trust in Sustainable Healthcare; CR: Composite Reliability; AVE: Average Variance Extracted

strengthened, while cost concerns weakened, sustainability-driven healthcare choices.

Ethical Considerations

This study was performed in accordance with guidelines of Scientific Review Board. Ethical approval was given by the Scientific Review Board of YEN-REFINED (YIASCM/SRB-06/COM/05/2025). Prior to data collection, informed consent was obtained from each participant. Confidentiality as well as anonymity was ensured by safely handling and preserving the data to avoid any unauthorized access. Participation was voluntary, and the participants were allowed to withdraw their participation at any time without facing any penalty.

Research Instrument

The questionnaire is divided into comprehensible sections based on the various aspects of the variables described in this study. A demographic profile of the respondents includes age, gender, educational qualification, occupation, monthly income, geographical location.

The primary variables of the study includes SustainaAttitude, SustainaChoice, Personal Health Consciousness, and Perceived Cost of Sustainable Healthcare. SustainaPerception is measured by Perceived Environmental Sustainability, Perceived Social Sustainability, Perceived Economic Sustainability, Social Norms, and Trust in Sustainable Healthcare.

Construct Development

A comprehensive literature review was conducted to develop the key constructs for this study, measured using a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). The constructs were measured using validated scales that were adapted from prior research, with minor modifications to suit the healthcare sustainability context. The questionnaire consists of nine constructs: Perceived Environmental Sustainability (PES) (5 items) adapted from Beulah and Chitrakala (2024), Ünal et al. (2024), and Perceived Social Sustainability (PSS) (5 items) from ElHaffar et al. (2020) and Martinez et al. (2022), which measures social responsibility in healthcare; Perceived Economic Sustainability (PESE) (5 items) based on the Manurung (2023) and McKinney (2024), which assesses financial stability and affordability.

Social Norms (SN) (5 items) from Ajzen (1991) and Ünal et al. (2024), captures peer influence on sustainable healthcare choices. Trust in Sustainable Healthcare (TSH) (5 items) adapted from Gianfredi et al. (2024) and Oh et al. (2024), measures trust in certified sustainable providers. SustainaAttitude (SA) (5 items) from Ünal et al. (2024) and McKinney (2024), assesses attitudes toward sustainable healthcare. SustainaChoice (SC) (5 items) from the Manurung (2023) and Lee and Kim (2024), measures sustainable healthcare preferences. Personal Health Consciousness (PHC) (5 items) adapted from Gianfredi et al. (2024) and Garnett et al. (2015), evaluates respondents' health awareness. Finally, Perceived Cost of Sustainable Healthcare (PCSH) (5 items) based on Gianfredi et al. (2024) and Martinez et al. (2022), captures cost-related barriers. The tool was designed to examine the relationships between sustainability perceptions, social norms, trust, and sustainable healthcare choices. The scales were carefully selected based on their relevance and prior validation. The final items demonstrated acceptable psychometric properties in terms of reliability and validity.

The reliability and validity analysis (**Table 3**) confirms that all constructs exhibit strong internal consistency, as indicated by Cronbach's Alpha (0.846-0.894) and Composite Reliability (0.848-0.894), both exceeding the acceptable threshold of 0.7 (Fornell & Larcker, 1981; Hair Jr et al., 2021; Sarstedt et al., 2021). This suggests that the measurement items are highly reliable. Moreover, AVE values (0.620-0.703) are all > 0.5, indicating adequate convergent validity in that each construct explains a significant portion of variance in indicators. Overall, the measurement model is strongly valid and reliable and can be utilized in subsequent statistical analyses such as SEM.

Discriminant Validity

The Heterotrait-Monotrait Ratio (HTMT) matrix (**Table 4**) tests discriminant validity by checking to what extent constructs differ from one another. The results indicate that all values of HTMT are lower than the commonly accepted cut-off value of 0.85, showing that constructs have good discriminant validity (Henseler et al., 2015). Importantly, PCSH and PHC have a high value of HTMT = 0.843, indicating some level of overlap between perceptions of health consciousness and cost that would necessitate additional research to confirm their conceptual distinctiveness.

Table 4. Heterotrait - Monotrait Ratio (HTMT) matrix

	PCSH	PES	PESE	PHC	PSS	SA	SC	SN	TSH	PHC x SA	PCSH x SA
PCSH											
PES	0.538										
PESE	0.593	0.739									
PHC	0.843	0.572	0.617								
PSS	0.551	0.672	0.749	0.564							
SA	0.739	0.675	0.659	0.782	0.594						
SC	0.801	0.573	0.597	0.855	0.549	0.776					
SN	0.699	0.651	0.697	0.676	0.605	0.677	0.764				
TSH	0.770	0.595	0.629	0.768	0.613	0.746	0.809	0.817			
PHC x SA	0.050	0.060	0.128	0.065	0.154	0.100	0.040	0.056	0.033		
PCSH x SA	0.050	0.060	0.134	0.052	0.187	0.127	0.027	0.057	0.036	0.799	

Source: Survey Data

Note: PCSH: Perceived Cost of Sustainable Healthcare; PES: Perceived Environmental Sustainability; PESE: Perceived Economic Sustainability; PHC: Personal Health Consciousness; PSS: Perceived Social Sustainability; SA: SustainaAttitude; SC: SustainaChoice; SN: Social Norms; SP: SustainaPerception; TSH: Trust in Sustainable Healthcare

Table 5. Fornell-Larcker analysis

	PCSH	PES	PESE	PHC	PSS	SA	SC	SN	TSH
PCSH	0.799								
PES	0.458	0.787							
PESE	0.519	0.642	0.832						
PHC	0.724	0.488	0.541	0.801					
PSS	0.480	0.581	0.662	0.492	0.823				
SA	0.646	0.587	0.589	0.684	0.528	0.839			
SC	0.696	0.492	0.528	0.745	0.485	0.686	0.809		
SN	0.600	0.553	0.607	0.580	0.525	0.590	0.656	0.788	
TSH	0.667	0.513	0.554	0.668	0.538	0.659	0.706	0.703	0.812

Source: Survey Data

Note: PCSH: Perceived Cost of Sustainable Healthcare; PES: Perceived Environmental Sustainability; PESE: Perceived Economic Sustainability; PHC: Personal Health Consciousness; PSS: Perceived Social Sustainability; SA: SustainaAttitude; SC: SustainaChoice; SN: Social Norms; SP: SustainaPerception; TSH: Trust in Sustainable Healthcare

SustainaAttitude (SA) and SustainaChoice (SC) have an HTMT value of 0.776, showing that while related to each other, they can still be separated empirically. Furthermore, SN (SustainaNorms) and TSH (Trust in Sustainable Healthcare) have high correlations with SC (0.764 and 0.809, respectively), confirming their roles in influencing healthcare decision making. Interaction effects (PHC × SA = 0.100; PCSH × SA = 0.127) have acceptable levels that confirm their moderating functions. Because all values of core constructs are lower than the acceptable level of HTMT, findings assure discriminant validity of the measurement model to make sure that each construct measures a unique concept without undue overlap.

Fornell-Larcker criterion (see **Table 5**) is a popular procedure to check discriminant validity in structural equation modeling by comparing square root of Average Variance Extracted (AVE) of each construct with their correlations with other constructs (Fornell & Larcker, 1981). The results indicate that square root of AVE (diagonal values) of each construct is higher than their inter-construct correlations and hence indicate acceptable discriminant validity. For instance, SustainaAttitude (SA) (0.839) and SustainaChoice (SC) (0.809) both have higher diagonal values than their correlations with other variables and hence indicate that they represent different constructs. In addition to this, Personal Health Consciousness (PHC) (0.801) and Perceived Cost of Sustainable Healthcare (PCSH) (0.799) also meet Fornell-Larcker (1981) criterion and indicate that these constructs are different from each other. However, some correlation values approach the AVE square root threshold, such as PCSH and PHC (0.724), suggesting a strong but distinct relationship. Overall, the findings confirm that the constructs exhibit sufficient discriminant validity, ensuring that they are not excessively overlapping and are appropriate for further structural equation modeling analysis (Hair Jr, 2014; Hair Jr et al., 2019; Harm, 2019).

RESULTS

Direct Effect

In order to determine the direct relationship between sustainable practices on sustainable attitude and sustainable choice, SEM is employed.

The path analysis results (**Table 6**) confirm several key relationships within the proposed conceptual framework. The findings strongly support the hypothesis that SustainaPerception (SP) positively influences SustainaAttitude (SA) ($\beta = 0.723$, $p < 0.001$), indicating that individuals with favorable sustainability perceptions develop stronger sustainability attitudes (Henseler et al., 2015). Additionally, SA significantly impacts SustainaChoice (SC) ($\beta = 0.177$, $p = 0.003$), supporting the hypothesis that positive attitudes toward sustainability lead to sustainable healthcare choices (Hair Jr, 2014; Hair Jr et al., 2019; Harm, 2019).

Table 6. Regression weights

H	Path	β	STDEV	T Value	P values	Significance	H Supported
H1	SP → SA	0.723	0.030	24.178	<0.001	Significant	Yes
H2	SA → SC	0.177	0.060	2.969	0.003	Significant	Yes
H3	SP → SC	0.231	0.053	4.364	<0.001	Significant	Yes

Source: Output computed using SMART PLS

Note: SA: SustainaAttitude; SC: SustainaChoice; SP: SustainaPerception; H: Hypothesis; β: Coefficient; STDEV: Standard deviation; P Value < 0.001; P Value < 0.005

Table 7. Mediating effect estimate results

H	Path	β	STDEV	T statistics	P values	Significance	H Supported
H4	SP → SA → SC (Total)	0.128	0.044	2.902	0.004	Significant	Yes
	SP → SA (Direct)	0.723	0.030	24.178	<0.001	Significant	Yes
	SA → SC (Indirect)	0.177	0.060	2.969	0.003	Significant	Yes

Source: Survey Data

Note: SA: SustainaAttitude; SC: SustainaChoice; SP: SustainaPerception; H: Hypothesis; β : Coefficient; STDEV: Standard deviation; P Value < 0.001; P Value < 0.005

Table 8. Moderating effect estimate results

H	Path	β	STDEV	T statistics	P values	Significance	H Supported
H5	PHC × SA → SC (Total)	0.040	0.057	0.704	0.481	Not Significant	No
	PHC → SC (Direct)	0.322	0.063	5.064	<0.001	Significant	Yes
	SA → SC (Indirect)	0.177	0.060	2.969	0.003	Significant	Yes
H6	PCSH × SA → SC (Total)	0.006	0.055	0.114	0.909	Not Significant	No
	PCSH → SC (Direct)	0.197	0.053	3.700	<0.001	Significant	Yes
	SA → SC (Indirect)	0.177	0.060	2.969	0.003	Significant	Yes

Source: Survey Data

Note: PHC: Personal Health Consciousness; SA: SustainaAttitude; SC: SustainaChoice; SP: SustainaPerception; PCSH: Perceived Cost of Sustainable Healthcare; H: Hypothesis; β: Coefficient; STDEV: Standard deviation; P <0.01; P <0.05

Mediating Effect

The mediation analysis (**Table 7**) confirms that SustainaAttitude (SA) significantly mediates the relationship between SustainaPerception (SP) and SustainaChoice (SC). The total effect of SP on SC via SA is statistically significant (β = 0.128, p = 0.004), indicating that sustainability attitudes play a crucial role in translating sustainability perceptions into actual choices. Additionally, the direct effect of SP on SA (β = 0.723, p < 0.001) is strong, supporting the premise that positive sustainability perceptions enhance sustainability attitudes (Henseler et al., 2015). The indirect effect of SA on SC (β = 0.177, p = 0.003) further confirms that attitudes significantly influence sustainable healthcare choices (Hair Jr, 2014; Hair Jr et al., 2019; Harm, 2019). These findings align with the Value-Belief-Norm (VBN) Theory, reinforcing that sustainability-related beliefs and norms drive pro-environmental choices (Stern, 2000). The study highlights the importance of awareness campaigns, policy interventions, and behavioral strategies that enhance sustainability attitudes to facilitate sustainable healthcare adoption. Future research could explore longitudinal effects and cultural variations in this mediation model to strengthen theoretical and practical implications (Zhao et al., 2010).

Moderating Effects

The moderation analysis tested whether Personal Health Consciousness (PHC) and Perceived Cost of Sustainable Healthcare (PCSH) influenced the relationship between SustainaAttitude (SA) and SustainaChoice (SC). However, both moderation effects were found to be not significant, indicating that neither PHC nor PCSH altered the impact of SA on SC (**Table 8**).

For H5 (PHC × SA → SC), the moderation effect was not statistically significant (β = 0.040, p = 0.481), suggesting that while health-conscious individuals may prefer sustainable healthcare options, their level of health consciousness does not necessarily strengthen or weaken the link between sustainability attitude and choice (Hair Jr, 2014; Hair Jr et al., 2019; Harm, 2019). Despite this, the direct effect of PHC on SC was significant (β = 0.322, p < 0.001), confirming that individuals with higher health consciousness are generally more inclined to choose sustainable healthcare options (Henseler et al., 2015).

For H6 (PCSH × SA → SC), the moderation effect was also not significant (β = 0.006, p = 0.909), indicating that perceived cost concerns did not significantly alter the impact of sustainability attitudes on healthcare choices. However, the

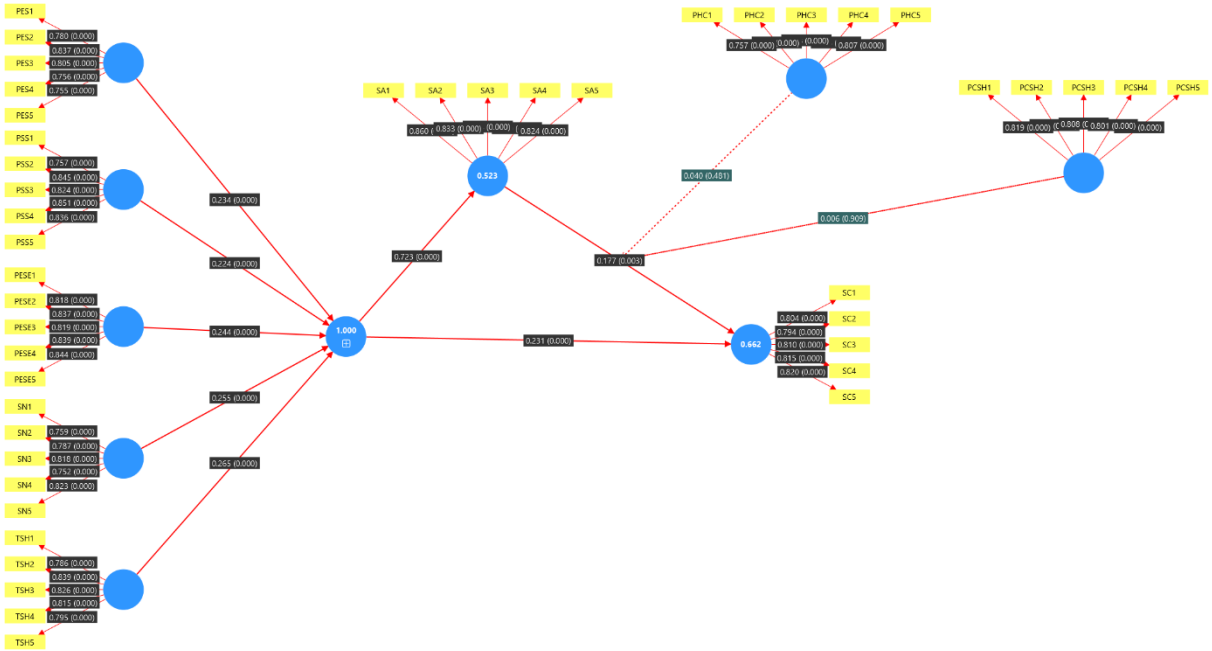

Figure 2. Path analysis (Source: Authors' own elaboration, using SmartPLS)

direct effect of PCSH on SC was significant (β = 0.197, p < 0.001), reinforcing the idea that cost remains a critical barrier to sustainable healthcare adoption (ElHaffar et al., 2020). These findings suggest that while attitudes to sustainability have a considerable impact on health care that can be maintained, cost and health consciousness have no significant moderating effect.

Overall, research suggests that merely raising attitudes to sustainability is not enough; it may take financial incentives, government policies, and targeted communication strategies to induce adoption of sustainable healthcare (Zhao et al., 2010). Subsequent research can investigate other moderating factors such as social influence and government assistance to provide more insight into consumer decision making in sustainable healthcare.

Path Analysis of the Constructs

The structural model revealed a mix of significant and non-significant pathways, offering valuable insights into proposed theoretical framework (**Figure 2**). The higher order construct exerted strong and statistically significant impact on SustainaChoice (SC) (β = 0.662, p < 0.001) and SustainaAttitude SA (β = 0.523, p < 0.001), accounting for 66.2% and 52.3% of the variance respectively, which demonstrates substantial predictive power of sustainable choice and attitude. Conversely, the direct influence on Perceived Cost of Sustainable Healthcare (PCSH) was weak and insignificant (β = 0.006, p = 0.909), suggesting the presence of mediating mechanism. In contrast, the path from SA to Personal Health Consciousness (PHC) was insignificant (β = 0.040, p = 0.481), implies individual attitudes, though relevant, do not automatically enhance perceptions of healthcare quality unless supported by social and contextual factors. Patients' assessments are influenced more by shared experiences, societal norms, and environmental influences than by attitudes alone. These findings collectively emphasise the predominance of collective and environmental considerations in healthcare.

DISCUSSION

The findings of this study provide empirical evidence of the significant effect of SustainaPerception (SP) on SustainaAttitude (SA) and SustainaChoice (SC). The findings affirm that perceptions of sustainability have a significant effect on attitudes to sustainability (β = 0.723, p < 0.001), supporting previous research that has observed that heightened perceptions of sustainability produce pro-environmental attitudes (Beulah & Chitrakala, 2024). The study also affirms that SustainaAttitude (SA) has a significant effect on SustainaChoice (SC) (β = 0.177, p = 0.003), supporting the assertion that positive attitudes to sustainability equate to more sustainable healthcare choices (Hair Jr, 2014; Hair Jr et al., 2019; Harm, 2019). This is in line with previous research that has observed that individuals with more positive attitudes to sustainability engage in more ethical and environmentally friendly behaviors (Ünal et al., 2024).

Additionally, SustainaAttitude (SA) acts as a mediator between SustainaPerception (SP) and SustainaChoice (SC) (β = 0.128, p = 0.004), supporting attitudes as a bridge between perception and action (Zhao et al., 2010). This supports previous studies that demonstrated that awareness of sustainability must be converted to positive attitudes before it can influence choices (Zhang & Cao, 2025). Additionally, the relationship between SP and SC remains significant (β = 0.231, p < 0.001), suggesting that individuals with high perceptions of sustainability can still engage in sustainable behavior without positive attitudes, although attitudes enhance this relationship.

The moderation effects of Personal Health Consciousness (PHC) and Perceived Cost of Sustainable Healthcare (PCSH) on the SA-SC relationship were found to be non-significant,

indicating that neither factor significantly altered how sustainability attitudes influence sustainable choices. Although PHC did not moderate the SA-SC relationship (β = 0.040, p = 0.481), its direct effect on SC was significant (β = 0.322, p < 0.001), confirming that health-conscious individuals are more inclined toward sustainable healthcare options (Henseler et al., 2015). Similarly, PCSH did not moderate the SA-SC relationship (β = 0.006, p = 0.909), but it had a significant direct impact on SC (β = 0.197, p < 0.001), reinforcing that cost concerns remain a critical barrier to sustainable healthcare adoption (ElHaffar et al., 2020).

Despite prior studies identifying PHC as a significant predictor of sustainability-related behaviors in domains such as organic food consumption (Garnett et al., 2015), eco-friendly home products (Amalia et al., 2024), and green tourism (Monroy-Rodriguez & Caro-Carretero, 2024). However, its non-significant moderating role in this study suggests that health-conscious individuals may already be inclined toward sustainable healthcare, regardless their sustainability attitudes. This aligns with the findings of Cudjoe and Wang (2024), who found that PHC directly affects sustainable decisions without necessarily modifying the impact of sustainability attitudes. Additionally, prior research highlighted that individuals prioritize sustainability when they perceive direct personal health benefits (Oh et al., 2024), which may explain why PHC directly influences SC rather than moderating the SA-SC link.

This outcome warrants a deeper theoretical interpretation. Perhaps the most prominent explanation would be the ceiling effect, where individuals with elevated levels of health consciousness tends already embedded sustainable healthcare behaviors into their routines, leaving minimal scope for attitudes to further influence choices (López-Mosquera & Sánchez, 2012). Another possible explanation relates to measurement precision. Although the PHC and PCSH constructs, while valid, may have captured overarching behavioral patterns rather than the specific trade-offs consumers navigate in healthcare decisions, balancing health risks and financial considerations (Lichtenstein et al., 1993; Michaelidou & Hassan, 2008). This could reduce the statistical detection of interactive effects. Moreover, cultural and contextual influences cannot be overlooked. In many developing regions, including the context of this study, health is frequently prioritized over environmental sustainability, particularly when financial constraints are present (Chung & Leung, 2007). As a result, cost and health consciousness may act as direct antecedents to healthcare choices rather than as moderators of sustainability attitudes. These findings suggest that sustainability interventions in healthcare may need to account for these boundary conditions. Future research should consider adopting longitudinal designs or controlled experiments to examine how such relationships evolve over time or under varying conditions of healthcare urgency and economic affordability (Steg & Vlek, 2009).

The complexity or cost of sustainable choices can significantly influence the strength of the observed relationships between sustainability attitudes and effective behavior. Decisions involving higher complexity or cost, such as paying a premium for eco-friendly healthcare services, require stronger sustainability attitudes to justify the trade-off between cost, convenience, and environmental effect. These decisions reflect a more deliberate and conscious choice, influenced by personal values and the perceived benefits of sustainability (Steg & Vlek, 2009). In contrast, habitual actions or one-time decisions that involve minimal cost or effort are more directly influenced by positive sustainability attitudes, as the barriers to adopting these behaviors are lower (Lichtenstein et al., 1993). Therefore, when sustainable choices involve greater effort or financial commitment, individuals with stronger sustainability attitudes are more likely to overcome these barriers and make environmentally responsible decisions.

Similarly, the lack of a substantial moderating effect for PCSH contradicts previous research showing that cost perceptions often diminish sustainable behaviour in healthcare services (Ensor & Cooper, 2004) and consumer goods (Hur et al., 2013). This suggests that while cost remains a significant direct barrier to sustainable healthcare adoption, it does not necessarily weaken the impact of sustainability attitudes on choices. One rational is that subsidies and policy support may offset financial concerns, making cost considerations less significant when making decisions (Ridzuan et al., 2022). Furthermore, consumers may occasionally justify the long-term financial benefits of sustainable healthcare, thereby mitigating the moderating effect of perceived cost (Van Hoang & Le Thanh, 2024).

These impacts may also be mediated by cultural and socioeconomic factors in addition to financial and health-related ones. Individuals prioritize immediate healthcare access over sustainability considerations, especially in areas where availability and affordability of healthcare continue to be major challenges (Ensor & Cooper, 2004). People may be more concerned with whether they can afford healthcare at all than with whether their sustainability attitudes affect their decisions, which could explain why cost worries do not immediately erode the SA-SC relationship. Additionally, social norms and institutional trust may play a larger role in determining sustainable healthcare behaviors, requiring further investigation.

These findings highlight critical implications for sustainable healthcare adoption. Although strengthening sustainability attitudes is important, it may not be sufficient to encourage broad behavioral change. Policy interventions such as subsidies, incentives, and awareness campaigns are essential to address cost concerns and encourage sustainable healthcare adoption (Reddy, 2013). Additionally, healthcare providers should integrate personal health benefits into sustainability, as individuals with high PHC are already inclined to make sustainable decisions.

These results validate the Value-Belief-Norm (VBN) Theory, affirming that sustainability-related beliefs and attitudes drive pro-environmental choices (Stern, 2000). However, the non-significant moderation effects suggest that factors such as financial incentives, policy interventions, and targeted communication strategies may be needed to enhance sustainable healthcare adoption (Zhao et al., 2010). Future research should investigate a serial mediation model that explores pathways such as SP → SN/TSH → SA → SC to provide a more comprehensive understanding of how sustainability perceptions translate into choices. Furthermore, examining

alternative moderating variables including societal impact and regulatory support may provide more in-depth understanding of sustainability-driven healthcare decision-making. Future research can create a more complex behavioral framework that reflects how outside factors impact sustainability attitudes and decisions by combining mediation and moderation effects. This will help guide policies and interventions to enhance sustainable healthcare adoption. Future research should explore alternative moderating variables, such as regulatory support and social influence, to deepen insights into sustainability-driven healthcare decision-making.

Implications of the study

The findings of this study have significant managerial, theoretical, and societal implications in the context of sustainable healthcare choices. From a managerial perspective, healthcare institutions and policymakers should focus on enhancing sustainability perception (SP) through awareness campaigns and educational initiatives, as SP strongly influences both sustainability attitudes (SA) and sustainable healthcare choices (SC). Additionally, cost concerns (PCSH) and personal health consciousness (PHC) directly impact SC, highlighting the need for subsidies or incentive programs to mitigate financial barriers and promote affordability.

Theoretically, this study develops the Value-Belief-Norm (VBN) theory by confirming SA's role as a mediator between perceptions of sustainability and behavioral decision making through empirical validation, supporting attitude formation in adopting sustainability. The lack of significant moderating effect of PHC and PCSH suggests that personal motivation and financial concerns do not alter the SA-SC relationship, refuting previous assumptions that such factors have a universal effect in making sustainable decisions.

From a societal standpoint, the study underscores the importance of fostering pro-sustainability attitudes through social norms (SN) and trust in sustainable healthcare (TSH), as these significantly contribute to sustainability adoption. Public health campaigns should leverage social influence strategies and emphasize institutional trust to encourage individuals to make sustainable healthcare choices. Overall, these insights provide actionable strategies for managers, contribute to theoretical advancements in sustainability behavior research, and promote societal well-being through improved sustainable healthcare adoption.

CONCLUSION

This study provides empirical validation of the Value-Belief-Norm (VBN) theory in understanding sustainable healthcare choices, emphasizing the critical role of sustainability perception (SP) in shaping sustainability attitudes (SA) and ultimately influencing sustainability choices (SC). The findings confirm that while SA significantly mediates the SP-SC relationship, SP also has a direct impact on SC, underscoring the importance of enhancing sustainability perceptions to drive behavioral change. The results highlight that perceived environmental, economic, and social sustainability, along with social norms and trust in sustainable healthcare, significantly influence sustainability attitudes and subsequent decision-making. However, the non-significant moderating effects of Personal Health Consciousness (PHC) and Perceived Cost of Sustainable Healthcare (PCSH) indicate that these factors do not substantially alter the attitude-behavior relationship, though their direct effects on SC suggest their independent influence on sustainable healthcare adoption.

Future studies would benefit by studying longitudinal approaches to measure changes in attitudes and perceptions over time while accounting for exogenous factors such as policy changes and healthcare technology innovations. Additional research on regional and cross-cultural variations can provide more insights on differences in adoption of sustainability among population subgroups. Additional research on digital health technology and tailored interventions to increase sustainability can make such findings more practically relevant. The model can be developed by including behavioral intention as a mediator or testing other alternative factors like regulatory support or institutional trust to make it more accurate. Lastly, experimental research approaches must be employed to determine causation to make it more effective in explaining mechanisms driving healthcare decision making in sustainability.

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