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REVIEW

Nudging Human Behaviour towards Sustainability Practices: A Systematic Review

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ABSTRACT

Nudges can be defined as any factor that influences an individual's behaviour in a predictable way, without removing the choices available to them. Over the past decade, nudging has emerged as a prominent behavioural policy tool. Different types of nudges and how they are used to increase sustainable behaviours in individuals are widely explored in contemporary studies. However, a consolidated understanding of the effectiveness of these nudges and the role of individual differences remains limited. The current study conducted a systematic review of relevant publications on nudges using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. A comprehensive search across multiple databases was conducted and 27 empirical studies that met the predefined eligibility criteria were included in the final review. The results indicated the presence of various nudges including default, digital, emotional, informational, norm-based and promotional nudges, which were effective in nudging human behaviour towards sustainable practices. Nudges can also influence decision-making regarding various choices presented by the choice architecture. The influence of personality traits on the effectiveness of nudges was also observed. The study highlights the potential of nudges in promoting sustainable behaviours while also emphasizing the need to consider individual differences in the design of nudging strategies.

Keywords: Nudging; Decision-Making; Types of Nudges; Personality Traits; Sustainable Behaviour

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1. Introduction

Nudging refers to "any aspect that changes the behaviour of people in a very predictable way without altering or deleting possible options or changing their economic incentives" [1]. A nudge can be used to predict human behaviour without altering an individual's right to make choices. Nudging is guided by the notion that human choices are influenced by cognitive biases and other environmental factors. Nudging, an emerging concept, can be applied in various domains where human behaviour is involved. Different types of nudges include framing, priming, labels, reminders, positioning, default choices and social norms. It was primarily used in 'Behavioural Economics' (BE). Behavioural economics, which combines ideas from psychology and economics, aims to understand how individuals make decisions in different contexts and also supports the assumption that human beings are not always rational. Cognitive biases identified by behavioural economics are also used in nudge interventions. Framing, choice architecture, defaults, and social norms are all concepts grounded in behavioural economics and are used in nudging strategies. We can leverage nudging as a tool to make positive behavioural changes. Thus, the term "nudge" refers to a small intervention designed to influence a specific choice without forbidding alternative options. Nudges capitalise on heuristics and function by altering the arrangement or format of choices. Nudging can be used to enhance sustainability practices. Adapting to sustainable practices is a demand of the time. Sustainability can be defined as "meeting our needs today without compromising future generations' ability to meet theirs" [2]. Building and maintaining a sustainable practice is a challenging task. Nudges will fade away over time if they are not appropriately reinforced, so to nudge human behaviour towards a sustainable practice for an extended period requires more research.

1.1. Nudge Theory

This concept is intended to subtly influence an individual's choices or behaviour without any restrictions on their choices. Richard Thaler and Cass Sunstein popularised the idea in their book *Nudge: Improving Decisions about Health, Wealth, and Happiness* in 2008. According to Thaler and Sunstein, nudge is "any aspect of the choice architecture that predictably alters people's behaviour without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not taxes, fines, subsidies, bans, or mandates. Putting fruit at eye level counts as a nudge. Banning junk food does not." Nudging can help predict behaviour, even without completely controlling it. Even though a nudge is used, the final decision will still be made by the individual. The underlying principles of nudging include choice architecture, non-coerciveness, and human biases. An individual's cognitive preferences and limitations help them in making decisions. Personality plays a crucial role in how individuals respond to nudges designed to promote sustainable behaviour. Research indicates that specific personality traits, such as openness, conscientiousness, agreeableness, and extraversion, influence the likelihood and effectiveness of sustainability-oriented nudges. Individual differences may influence how people perceive, interpret, and respond to different nudges.

1.2. Types of Nudges

Researchers have given different types of nudges. Depending on which component of inattentive choice is affected, nudges were categorised as pure or preference nudges [3]. Researchers Aravind et al. (2024) studied emotional, normative and gain nudging [4]. Emotional nudging involves the representation of emotions, whereas normative nudging represents social implications. Gain nudging, on the other hand, emphasises the benefits that the individual could gain. Another type of nudge includes informational nudges and understanding mapping nudges [5], among which informational nudges are found to be more effective in digital nudging. A default nudge, in which a preselected choice is presented, is also considered an effective nudging technique. According to the study conducted by Weijers et al. (2024), default nudges could affect an individual's expected autonomy, while their experienced autonomy remains unaffected [6].

Prior research, systematic literature review and meta-analysis on nudging are mainly domain-specific, focusing more on dietary choices or healthcare. Demographic factors and individual differences were overlooked, despite their potential to influence nudges.

1.3. PRISMA Guidelines

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) provides guidelines for conducting systematic reviews. It includes a checklist of 27 items, which includes all phases from title to results.

1.4. Rationale of the Study

In a world where environmental concerns have become an alarming issue to be addressed, promoting sustainable practices is crucial. Behavioural interventions should be made to maximise sustainability practices. Nudging has become a trending concept and is perceived as an effective tool in promoting sustainable behaviours, although its persistence is often questioned. A systematic review will thus help us understand different nudges, how they are effective, and the varying nudging interventions that have been made. As nudging is closely related to decision-making, this review also incorporates some relevant studies on nudging and decision-making. This study will examine the effectiveness of nudges in various sustainable behaviours. We will also examine the potential impact of demographic and personality factors.

The objectives of this systematic review are to understand the various types of nudges and to assess the effectiveness of nudging interventions in promoting sustainable practices. The present review will try to answer the following questions:

(1) How can we, as behavioural scientists, influence human decision-making to favour sustainability?
(2) What types of nudges are effective in promoting sustainable behaviours?
(3) Are the interventions equally effective across different demographic groups?

2. Method

2.1. Eligibility Criteria

Studies that assess how nudging influences decision-making or sustainable behaviours and whether nudge effectiveness is influenced by individual differences, such as personality traits, were eligible to be included in the review. Other inclusion criteria were: (a) published between January 2020 and December 2024, (b) published in the English language, (c) study should be empirical in nature (RCTs, quasi-experiments, mixed methods, etc.), and (d) full text of the study should be available. Exclusion criteria were: (a) unavailability of full text, (b) studies conducted outside the time frame, (c) editorials or opinions, (d) poor score in quality assessment (MMAT score less than 60%).

2.2. Information Sources and Search Strategy

Scopus, Wiley Online Library, Web of Science, and Science Direct were used for searching the literature. Keywords like ‘nudging and decision making’, ‘nudging and sustainability’, or ‘nudging and personality traits’ were used. Filters and limits were used for year, subject area, document type, keywords and language. The year was selected from 2020 to 2024; subject areas were limited to Social sciences, Psychology, Decision sciences, Economics, Multidisciplinary, business, and management. In terms of document type, editorial, note, and review articles were excluded, and the language was limited to English. The strategy in Scopus was TITLE-ABS-KEY (nudging AND sustainability) AND (LIMIT-TO (SUBJAREA , “SOCI”) OR LIMIT-TO (SUBJAREA , “PSYC”) OR LIMIT-TO (SUBJAREA , “DECI”) OR LIMIT-TO (SUBJAREA , “ECON”) OR LIMIT-TO (SUBJAREA , “MULT”) OR LIMIT-TO (SUBJAREA , “BUSI”)) AND (EXCLUDE (DOCTYPE , “ed”) OR EXCLUDE (DOCTYPE , “no”) OR EXCLUDE (DOCTYPE , “cr”) OR EXCLUDE (DOCTYPE , “re”)) AND (LIMIT-TO (LANGUAGE , “English”)) and TITLE-ABS-KEY (“sustainability” OR “decision making”) and

TITLE-ABS-KEY (nudging AND personality traits) AND PUBYEAR > 2019 AND PUBYEAR < 2025 AND (LIMIT-TO (SUBJAREA , “PSYC”) OR LIMIT-TO (SUBJAREA , “SOCI”) OR LIMIT-TO (SUBJAREA , “MULT”) OR LIMIT-TO (SUBJAREA , “ECON”) OR LIMIT-TO (SUBJAREA , “NEUR”) OR LIMIT-TO (SUBJAREA , “MEDI”) OR LIMIT-TO (SUBJAREA , “ENVI”) OR LIMIT-TO (SUBJAREA , “BUSI”)) AND (LIMIT-TO (DOC-

TYPE , “ar”)) AND (LIMIT-TO (LANGUAGE , “English”))

2.3. Selection and Data Collection Process

After identifying studies, the abstracts were screened and further assessed before being included for review. Title and abstract screening were performed by a single reviewer based on predefined eligibility criteria. The same reviewer assessed full texts to decide whether they met the eligibility criteria. The eligibility criteria were established in prior and consistently applied throughout the screening process to minimise selection bias. Study design, methods used, study results, demographics, nudge types, and limitations were extracted.

2.4. Quality Assessment

Mixed Methods Appraisal Tool (MMAT) version 2018 was used for quality assessment. MMAT was used because the studies reviewed included randomised controlled trials, non-randomised studies, and mixed methods studies. A single reviewer conducted quality assessment in accordance with the MMAT user guidelines. It includes five questions for each study, which can be marked as ‘Yes’, ‘No’, or ‘Cannot tell’. The average MMAT score of this study implies that 80% of the quality criteria were met. The detailed representation of the MMAT score is given in **Figure 1**.

2.5. Data Synthesis

Narrative synthesis was conducted in this study. Meta-analysis was not employed due to the heterogeneous nature of the included studies. The studies reviewed vary in study designs, interventions used and how they were measured.

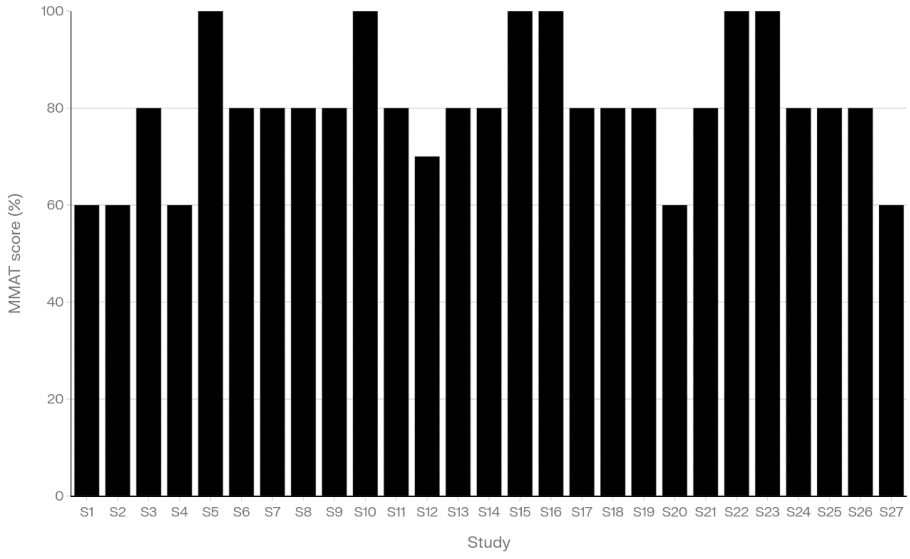

Figure 1. MMAT score of each study reviewed.

3. Results

3.1. Study Selection

A total of 1009 studies (Scopus, n = 422; Wiley Online Library, n = 102; Science Direct, n = 469; Web of Science, n = 16) were identified in the initial search. 945 studies were removed before screening due to duplication and unsuitability. 64 studies were screened, whereas 32 studies were assessed for eligibility. Studies were excluded because they did not meet the eligibility criteria, such as the availability of full-text articles. After following all these procedures, 27 eligible studies were included for review. **Figure 2** illustrates the PRISMA 2020 flow diagram, which represents the selection process for the studies.

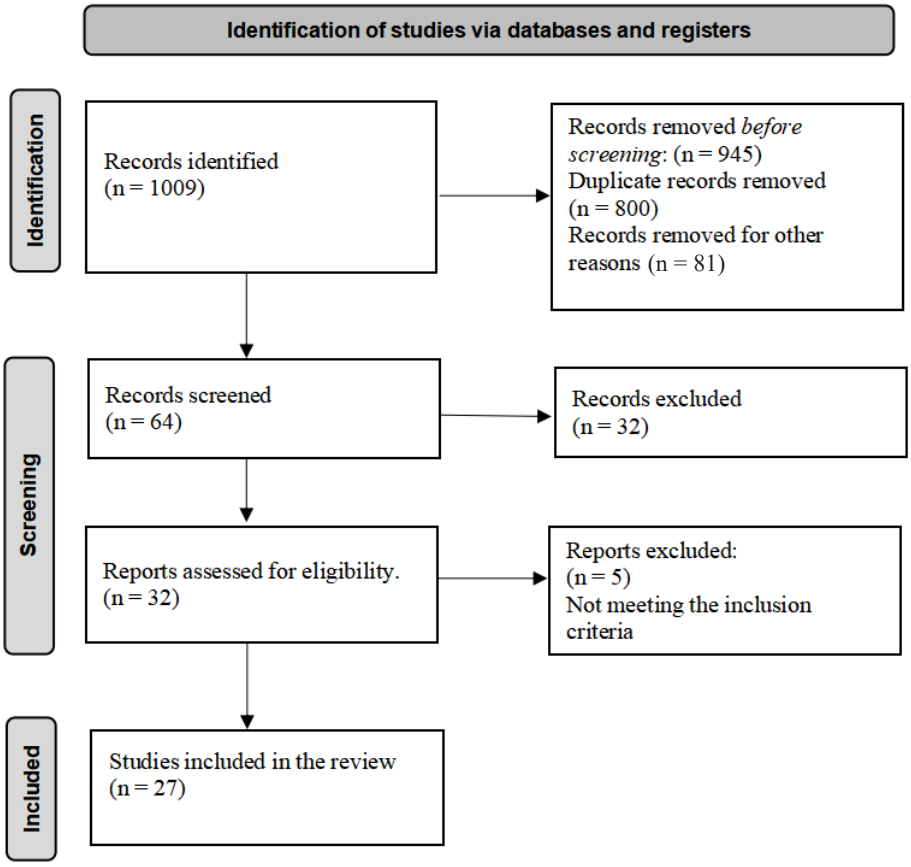

Figure 2. PRISMA flow diagram for the present study.

3.2. Study Characteristics

The study characteristics, including authors, findings, methodology, and limitations of 27 eligible studies (2020–2024), are represented in **Table 1**. Different study designs, including randomised controlled trials, non-randomised designs, and qualitative and mixed methods, were employed in these studies.

Table 1. Authors, findings, methodology and limitations of studies reviewed.

Study	Findings	Methodology	Limitations
Aljamal and Speece (2024) [7]	The results indicate the effectiveness of nudges in encouraging people to use trash bins in a film theatre and to sort their trash before disposing of it in the allocated bins at a university.	ANOVA was used for analysing data.	The influence of cultural or individual factors was not taken into account.
Anderson et al. (2024) [8]	Results showed that more plant-based items were sold when promotional nudges, such as increasing the proportion, changing the placement of items, taste-focused labelling, social media, and promotional posters, were used.	Descriptive statistics were used, and the analysis was done using R Studio.	Only the track sales of items were assessed by the Point of Sale system; other trends, such as the proportion of items purchased, were neglected. The study did not focus on whether any other factors influenced participants' dietary behaviours.
Aravind et al. (2024) [4]	The result indicated that emotional nudging, normative nudging and gain nudging can positively impact sustainable urban mobility; however, gain nudging is more effective. It was also found that personal norms are more important in decision-making than social norms.	The experimental design consists of one control group and three treatment groups. A survey method was employed to collect the data.	The study was limited to the residents of the state of Tennessee.
Au et al. (2024) [9]	Results showed that green or light colours are perceived as being associated with environmental friendliness. Thus, colour-based nudges can be used to promote sustainable practices, such as renting electric vehicles, as demonstrated in the study.	Chi-square analysis and ANOVA were used.	The possibility of differences in choice in practical situations due to factors like price and availability.

Table 1. *Cont.*

Study	Findings	Methodology	Limitations
Balsa et al. (2024) [10]	The results show that when e-messages were sent about healthy food choices, they had an effect on the participants, and it was also found that this effect did not persist after the intervention.	An intention-to-treat approach was also used for analysing data.	The sample of this study included individuals who expressed interest in participating, so it is essential to determine whether their motivation for a healthy diet has any impact on the study.
Gan et al. (2023) [11]	The result indicated that motivation, engagement and satisfaction could help in adopting sustainable habits.	Quantitative and qualitative data were collected using a questionnaire, and a semi-structured interview was also conducted.	The students included in the study were working with the same stakeholder, which may have led to sampling bias.
Gonçalves et al. (2021) [12]	The study found that social norms can influence customers' purchasing habits, with improvements being more pronounced in soft buyers than in hard buyers.	A one-sample *t*-test with a 95% confidence level was used.	Demographic and economic diversity were left unconsidered.
Guan and Lin (2024) [13]	The results showed that consumers consider energy saving while purchasing energy-efficient home appliances. It also found that perceived service benefits, perceived functional benefits, perceived price benefits, and brand trust all have a positive impact on customers' intentions to purchase energy-efficient appliances.	An NLP-based method, employing a mixed-methods approach, was used to perform both quantitative and qualitative analyses.	The study, conducted in China, reveals a change in the consideration of energy-saving factors based on location and appliance type. Hence, the study should be conducted in various geographical locations to generalise the results.
Gupta et al. (2024) [14]	Nudging can effectively influence customers' behaviour towards adopting sustainable products. Economic responsibility, environmental awareness, socio-cultural values, and concerns about climate change can also influence consumer choices.	Questionnaires were used to collect data, and PLS-SEM was employed to evaluate the hypotheses.	The study only focuses on the immediate response of the consumers; it doesn't investigate whether these behavioural changes are persistent over a long period.
Houdek (2024) [15]	This study argues that the success of a nudge is significantly influenced by a specific context, challenging the notion of it being a universal solution for organisational behaviour modification.	Semi-structured interviews and focus group discussions were conducted.	The study was conducted only on professionals from Central Europe. The measures to reduce biases from participant self-reporting and the researcher's interpretation were not taken into account.
Jain and Singh (2024) [16]	Results suggested that attitudes, green nudges and perceived behavioural control have an impact on behavioural intention and actual buying behaviour in terms of electric vehicle adoption in India.	Data were collected through a questionnaire and analysed using a two-step approach, which included the PLS-SEM model and ANN.	Features of electric vehicles, including cost and performance, could also influence customer choice.
Komatsu et al. (2022) [17]	The results showed that people with higher agreeableness, lower Machiavellianism and lower psychopathy have a greater effect on nudging messages. It was also observed that textual nudging has more impact on women.	A randomised control trial was conducted via an online survey. Descriptive statistics, correlation analysis and panel analysis were done.	The study only discusses the impact on attitude but not on behaviour. An online survey could also raise some biases that were not discussed.
Marques et al. (2020) [18]	The study found that impulsivity does not affect the effectiveness of nudges.	A comprehensive case analysis was conducted using data collected from an RFID bracelet. Mixed model ANOVA and linear regression were employed for statistical analysis.	Behaviours in an experimental food setting would differ from those in a real-life situation.
Mejtoft et al. (2023) [19]	The results show that nudging has an impact on the decision-making process. It was also found that nudging is more effective than design friction. Detailed information can also significantly impact decisions.	Case studies and interviews were employed.	It is limited to participants from a single demographic region.
Meske et al. (2022) [5]	Informational nudge and understanding mapping nudge are helpful in online choice environments. Information nudges (emission labels in this study) have a greater effect in encouraging sustainable booking behaviour for reducing aviation-related carbon emissions.	Two nudging interventions were implemented in an experimental setting.	The sole presentation of sustainability nudges may have primed participants towards sustainability awareness and environmentally friendly behaviour.
Mizrachi and Tal (2024) [20]	Alternative nudges were found to be more effective in increasing sustainable fashion.	A quasi-experiment was done. ANOVA, multiple regression and *t*-test were used for analysing data.	Limitations of the quasi-experimental design are not addressed.

Table 1. *Cont.*

Study	Findings	Methodology	Limitations
Nijssen et al. (2023) [21]	The result showed that the default nudge is most effective for sustainable delivery choice. Informational nudges yield different effects for each level of complexity, from high to low.	The study included a randomised controlled trial, one control condition and four treatment conditions, which included nudges.	The participants selected their gift first after accepting their invitation to participate in the study, which may have alerted them, potentially leading to social desirability bias.
Nowak et al. (2023) [22]	Norm-nudges are effective in increasing sustainable tourist behaviour.	The number of bikes was counted using EcoCounter Easy Zelt, and additional data was collected through a survey method.	The presence of other factors was not taken into account.
Vassilopoulos et al. (2023) [23]	The result showed that Virtual reality experiences can nudge toward green investment choices when risk and time preference parameters are controlled.	An experimental design was used.	The sample size is very small, making it difficult to generalise it to a larger population. Gender differences are often overlooked.
Vugts et al. (2024) [24]	The results suggest that, at least for specific nudges, it is best to encourage the desired/healthy behaviour instead of discouraging the unwanted/unhealthy behaviour.	Qualtrics was used for data collection. ANOVA and paired samples *t*-test were performed.	Issues of applicability to real-life settings are not addressed.
Weijers et al. (2024) [25]	The results showed that a hedonic label nudge could help promote sustainable dining by encouraging vegetarian choices. It was also found that a chef's recommendation nudge could also increase vegetarian meal choices, whereas a salience nudge wasn't effective.	Participants were exposed to four different conditions, based on which they answered the questions. Data was collected using Qualtrics.	Data was collected through an online platform rather than in a real-life setting. The sample mainly consists of the young population.
Weijers et al. (2024) [6]	It was found that default nudge can be used as a successful tool for promoting donations, and it was also found that experienced autonomy is not decreased by default nudge.	A field experiment was conducted, followed by a questionnaire. Independent samples *t*-tests and chi-square analyses were performed.	The study doesn't take into account whether the amount of the item plays a role in it. All the donations in the study were for less than one euro, so it is important to prove whether the result will be the same for a higher amount of money.
Boz-Yılmaz and Boduroglu (2024) [26]	The findings indicate that forecast nudge led to improvement in decision accuracy.	An experimental design in which participants were supposed to do a binary decision task. Chi-square analysis was done.	The effectiveness of forecast nudging in various contexts and demographic places was not taken into account.
Zadka-Peer and Rosenbloom (2024) [27]	The findings showed that reminder and negative reinforcement nudges have faster responses compared to social norm nudges. Even though social norm nudges were observed to have a longer impact. Individuals with high neuroticism showed lower response, whereas individuals with high conscientiousness showed increased response to social nudges.	Chi-square, *t*-test, repeated-measurements two-way ANOVA, and one-way ANOVA were employed.	The study doesn't include real-time conclusions. A comprehensive analysis was done only on one personality trait, conscientiousness.
Zhang et al. (2024) [28]	The study shows that default changes require less effort, have a greater impact, and are more generalizable in nudging people towards more sustainable food choices.	Data collection was conducted using Google Forms and Qualtrics surveys, and regression analysis was employed to compare participants in the default vegetarian and meat groups.	Interventions were given at catered events. Results from a single event alone can't predict food choices.
Pu et al. (2024) [29]	Results indicated that Visual saliency could impact volunteer task choices. It was also found through eye-tracking that task order and feedback are capable of capturing the attention of participants.	2 × 2 × 2 factorial experiment embodied with eye-tracking research methods.	The interaction effects of these nudges weren't considered.
Zucchelli et al. (2023) [30]	The study finds that using a default nudge is effective among individuals who are anxious and avoidant.	Logistic regression analysis was performed considering four scenarios presented during the experiment.	Hypothetical scenarios were presented.

3.3. Integrative Synthesis of Included Studies

A structured narrative approach was used to synthesise results, considering recommendations of PRISMA 2020 for systematic reviews without meta-analysis. Studies were categorised and compared based on predefined categories, including types of nudges, outcomes (classified as actual behaviour, behavioural intention, attitude, perception, or knowledge), research design, and geography. Most included studies assessed outcomes in terms of ac-

tual behaviour, while fewer studies examined behavioural intentions and attitudes or perceptions. The majority of the included studies employed quasi-experimental designs or randomised controlled trials (RCTs).

3.4. Types of Nudges

Studies have demonstrated effectiveness of various nudges including norm nudges [7,11,21,23], promotional nudges [6], emotional nudges [7], gain nudges [7], colour based nudges [8], forecast nudges [26], digital nudges [9], green nudges [15], informational nudge [4,5,17,18,20], default nudges [20,25,28,30] and labelling nudges [5,24,29].

Informational nudges were the most frequently studied, while promotional, emotional, gain, and colour-based nudges received the least attention. The majority of the studies included in this review reported positive effects of nudges, with most focusing on actual behavioural outcomes rather than attitudes or intentions. These studies predominantly utilised quasi-experimental designs or randomised controlled trials, thereby offering strong evidence of causal relationships. Although some research was conducted in controlled environments, the prevalence of field-based designs and objective behavioural measures indicates that these nudges are likely to be effective in real-world settings across various types and contexts.

3.5. Geographic Characteristics

Studies included data collected from Canada [6], two studies from China [12,29], Greece [22], two studies from India [13,15], Israel [19], Kuwait [5], four studies from Netherlands [20,23–25], Portugal [11], Singapore [10], two studies from Sweden [18,21], Turkey [26], United Kingdom [4], United States [7,28], Uruguay [9], one study from Denmark [17]. There were cross-cultural studies that included data from Australia and China [8], Czechia, Germany, and Slovakia [14], as well as Japan, Canada, and the United States [16]. The majority of the included studies were conducted in high-income countries. Two studies were conducted in India, as well as in another middle-income country. No studies were conducted in low-income countries.

3.6. Participants

The reviewed studies included a total of almost 11,700 participants, excluding the sample collected from an e-commerce site [12]. Participants from different age groups, genders and places were included. Some studies had an age range as an eligibility criterion. However, for most studies, there was no proper distinction between these demographic variables.

4. Discussion

This review encompasses studies on the impact of various nudges on human behaviour towards sustainability and decision-making, as well as the influence of personality factors on the effectiveness of nudges [31]. 27 studies conducted in different parts of the world were reviewed. This review examines the findings of the reviewed studies, the methodology used, the country from which the data were collected, and the limitations of those studies. The review included studies conducted in various geographical locations, including Asia, Australia, Europe, North America, and South America. Cross-cultural studies provided insights into whether nudging interventions are equally effective across different countries. The majority of the studies reviewed were conducted in Europe (n = 14), followed by Asia (n = 10), North America (n = 3), Australia (n = 1) and South America (n = 1).

Most studies included the adult population without a clear distinction between males and females, which limited conclusions on gender differences. Most studies didn't take into account the demographic variables. The studies that were reviewed included randomised controlled trials, non-randomised designs, qualitative studies, and mixed-methods studies.

The review identified various nudges that effectively promote sustainable practices. Nudging encouraged people to use trash bins and sort their trash before disposing of it [5]. In today's world, where waste management has become a significant concern across countries, encouraging people to adopt these simple behaviours is beneficial. Promotional nudges, which increase the demand for plant-based items [6], could be used to increase many other positive behaviours for sustainability. Emotional nudging, normative nudging and gain nudging impact sustainable urban mobility [7]. Colour-based nudges are also effective as some colours are perceived to be environmentally friendly [8] and can be

used to promote eco-friendly products.

Nudges have some influence over decision-making [18]. Some nudges, such as forecast nudges, influence decision accuracy [26]. Thus, using nudges, human decision-making could be influenced towards increasing sustainability. Results also showed that factors such as motivation, engagement, and satisfaction [10], as well as economic responsibility, environmental awareness, socio-cultural values, and concerns about climate change [13], can also influence sustainable habits. An individual's connection to nature and attitudes towards exploration amplify the impact of nudges. Nature relatedness shows positive link with efforts towards environmental sustainability [32]. Those who have a strong relationship with nature or enjoy exploring new experiences are generally more likely to engage in sustainable behaviours across domains—conservation, citizenship, transportation, and ethical purchasing [32,33].

Nudging can be applied in various fields of life, from promoting pro-environmental behaviour to adopting a healthy diet. Numerous studies have explored the connection between personality traits and pro-environmental behaviours. These investigations have consistently demonstrated a positive association between personality traits and intentions to engage in environmentally responsible actions. Such traits impact various aspects like energy conservation behaviours [12] and purchase decisions favouring environmentally friendly products [11,15]. It was also found that personal norms are more important in decision-making than social norms.

Balsa et al. (2024) [10] found that sending e-messages about healthy food choices affected the participants, but this effect did not persist after the intervention. 'Intention to treat' approach was also used for analysing data. The sample of this study included individuals who expressed interest in participating, so it is essential to determine whether their motivation for a healthy diet has any impact on the study. Case studies and interviews employed by Mejtoft et al. (2023) [19] showed that nudging has an impact on the decision-making process. It was also found that nudging is more effective than design friction. Nowak et al. (2023) [22] found that norm nudges are effective in increasing sustainable tourist behaviour. Boz-Yilmaz and Boduroglu (2024) [26] indicated that forecast nudge led to improvement in decision accuracy. Thus, nudging involves subtle behavioural interventions that steer individuals towards pro-environmental choices without limiting their freedom, such as default energy-saving settings, eco-labels, and strategic placement of recycling bins.

Wagler and Wells (2024), in their review on 'Effects of personality and gender on nudge ability for mental health-related behaviours', have concluded that different nudges are effective for different personality traits [31]. Zadka-Peer and Rosenbloom (2024) [27] observed that high neuroticism and conscientiousness can influence the effect of social nudge differently. While one lowers the response, later one increases the response rate. Individuals with higher agreeableness, lower Machiavellianism, and lower psychopathy are more influenced by textual nudges [16]. Studies have observed that even anxious and avoidant individuals respond to nudges [30].

Informational, normative, and default nudges were the most frequently studied. In contrast, promotional, emotional, gain, and colour-based nudges were less common, suggesting that evidence on the latter types is more limited and needs further research. All nudges demonstrated positive effects, with the majority of studies measuring actual behavioural outcomes. Measuring actual behavioural outcomes instead of self-reports provides better understanding about effectiveness of interventions [34]. The predominance of quasi-experimental and randomised controlled trials strengthens causal inference.

Most studies were conducted in high-income countries, with only a few from middle-income settings and none from low-income countries. These patterns suggest that most evidence on nudge effectiveness reflects contexts with higher economic resources, infrastructure, and social norms, which may influence behavioural responses. The predominance of studies from high-income countries may reflect their focus on sustainability, whereas low-income and middle-income countries may be prioritizing more immediate socioeconomic challenges. Furthermore, SDG progress has been uneven across country groups [35]. While the positive effects observed in high-income settings indicate strong potential for real-world impact, the limited representation of lower-income contexts highlights a gap in generalizability. It underscores the need for future research to evaluate how nudges function across diverse cultural and economic environments.

5. Conclusions

This systematic review examined the effectiveness of different nudges in decision-making and promoting sustainable behaviours, as well as the influence of personality factors. This systematic review was conducted, adhering to the guidelines of PRISMA. PRISMA provides a standardised framework for systematic reviews, ensuring systematic and transparent synthesis. The examined studies suggest that nudging interventions can influence individuals toward sustainable choices. Research over the last decade has shown that nudging is effective in multiple domains, including food choices, energy conservation, transportation, and waste management, often increasing the adoption of sustainable behaviours. Typical nudging techniques include informational nudges, reminders, financial and non-financial incentives, social norm displays, and positioning strategies, with effectiveness enhanced by leadership support and minimal effort required from individuals. Findings also suggest that normative, informational, and default nudges are most frequently effective. Effectiveness assessments have employed objective measures, self-report surveys, controlled environment experiments, and mixed methods, primarily focusing on short- to medium-term impacts; there is a call for more longitudinal and cross-cultural research.The review also identifies research gaps in theoretical consistency, cultural adaptability, and long-term behaviour sustainability, recommending integration of digital nudging and policy frameworks to support sustained ecological benefits.

In the concluding remark, it's suggested that nudging is a promising, low-cost behavioural approach for promoting sustainable practices, but further research is needed to enhance its durability and cultural adaptability in diverse contexts.

5.1. Implications

- Helping us to understand different nudges better.
- It would aid in policy-making for sustainability by explaining how different nudges work in various aspects of sustainable practices.
- Throws light on different nudging interventions done across the globe.

5.2. Limitations of the Present Study

- Some relevant studies may have been missed in the review process due to the unavailability of full-text articles, database limitations, or other factors.
- Although nudging interventions have shown success in various countries, most studies have not distinguished participants by gender or age, and few have examined cross-cultural or contextual differences. Therefore, conclusions about demographic or contextual influences on nudge effectiveness cannot be drawn from this review.
- Screening and selection were conducted by a single reviewer, which may introduce subjectivity despite the use of predefined eligibility criteria and structured assessment tools.
- MMAT was used for quality assessment. MMAT is a potential tool for quality assessment; however, it is recommended that at least two assessors assess it.
- Different types of risk of bias are not explored in detail.
- It was conducted in a limited time period.

5.3. Suggestions for Future Research

- It was observed that, although the effectiveness of nudging was discussed, its persistence has been largely unaddressed. Even in a study [9], it was found that nudging does not persist over an extended time period. Hence, it is essential to investigate the factors that influence the maintenance of nudged behaviour. Interventions should also be conducted to determine which types of nudges will persist for a longer period.
- Gender differences in the effectiveness of nudges should be considered in conjunction with contextual factors, including cultural, geographical, and institutional settings.
- Developing a standardised sustainability measure could foster future research.
- A broader framework that analyses the role of nudging in decision-making can be developed in future studies.

Author Contributions

Conceptualization, A.M. (Atasi Mohanty) and D.V.S.; methodology, D.V.S.; validation, A.M. (Atasi Mohanty), D.V.S. and A.M. (Aashish Mohanty); formal analysis, D.V.S.; investigation, D.V.S.; resources, D.V.S.; data curation, D.V.S.; writing—original draft preparation, D.V.S.; writing—review and editing, D.V.S; visualization, D.V.S; supervision, A.M. (Atasi Mohanty); project administration, A.M. (Atasi Mohanty). All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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