

Social Media and Information Publicity in Shaping Electronic Waste Recycling Behaviour: A Review

Media Sosial dan Publisiti Maklumat dalam Membentuk Tingkah Laku Kitar Semula Sisa Elektronik: Satu Ulasan

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ABSTRACT

Advancing Sustainable Development Goal (SDG) 12 on responsible consumption and production requires stronger public participation in electronic waste (e-waste) recycling. Despite growing policy attention, consumer engagement remains limited, particularly in developing economies where informal disposal dominates. Social media and information publicity have emerged as transformative channels for environmental communication, capable of shaping awareness, attitudes, and behavioral intentions toward sustainable e-waste management. This review critically synthesizes 2015–2026 empirical studies to evaluate how digital communication influences recycling-related behavior. Drawing from both qualitative and quantitative evidence, it identifies dominant patterns, theoretical perspectives, and contextual limitations in existing scholarship. Findings reveal that while social media effectively disseminates environmental knowledge and fosters public engagement, its capacity to sustain long-term behavioral change is constrained by content credibility, message fatigue, and limited access to formal recycling systems. The review underscores the need for longitudinal, cross-cultural, and intervention-based research that bridges awareness with tangible recycling actions. By positioning social media as a driver of environmental literacy and civic participation, this study contributes to ongoing global efforts to strengthen digital sustainability strategies and accelerate progress toward SDG 12.

Keywords: Social media, information, publicity, e-waste, electronic, waste, recycling, disposal

INTRODUCTION

Electronic waste (e-waste) is a critical and growing global environmental challenge, driven by rapid technological advancement and consumer demand that shortens product life cycles. E-waste, which includes discarded devices like computers, phones, and home appliances, contains both valuable precious metals and hazardous materials like lead, mercury, and cadmium. Improper disposal through open burning, landfilling, and informal recycling poses severe risks to both the environment and public health (World Health Organization, 2024). According to Global E-Waste Monitor, 62 mt e-waste were generated of which only 22.3% was properly recycled (Balde et al., 2024). However, this figure appears notably higher than earlier estimation such as reported by The Roundup's, 59 mt in 2022, indicating either underestimated projections or faster-than-expected growth of e-waste. This phenomenon is worrisome and need strategies to mitigate it from harming further the environment and human health.

Asia itself generated 30 mt of e-waste, accounting nearly half of the world's total, with China and India as the key producer (Ruiz, 2024). Most countries in Asia are categorized as developing countries and the e-waste generation is influenced by rising income levels that increase demand for electronics, illegal e-waste imports, and shorter device lifespan. The growing consumption of electronic devices is alarming, as the amount of e-waste increases while proper disposal rates remain critically low (Zavazava, 2024). Further, the lack of adequate infrastructure and legal frameworks limits responsible recycling. Thus, this drives the monopoly of informal sectors in e-waste dismantling, burning and in the end reach the landfills and incineration which release hazardous toxins.

While governments and industries have introduced various policy and technological measures to enhance formal e-waste recycling systems, behavioral engagement among consumers, particularly at the household level remains a major bottleneck (Rajpoot, 2025). Approximately 85% of household e-waste is sent directly to landfills, resulting in the loss of valuable materials and the release of hazardous substances, thereby underscoring the urgent need for strategies that encourage responsible disposal practices (A-Jalil, 2024). This challenge is compounded by limited access to formal recycling programs (Gaghana, 2024) and the insufficient social marketing strategy that may maximizes the visibility of the program (Santiago & Vicente, 2024), as well as the use of social media as behavioral communication tools. Despite their potential to raise awareness, influence attitudes, and foster participation, these platforms remain underutilized in connecting households with recycling initiatives and promoting sustained environmental engagement.

Issues

The rapid growth of electronic waste (e-waste) has become a major environmental concern worldwide, particularly in developing economies where improper disposal practices remain prevalent. In recent years, social media platforms have emerged as powerful digital communication channels capable of influencing public awareness, information sharing, and behavioral change related to environmental sustainability. A growing body of literature has explored the potential of social media to promote pro-environmental behavior, environmental awareness, and sustainable consumption practices. However, despite the increasing scholarly attention, the existing literature remains fragmented and lacks a comprehensive synthesis specifically examining how social media influences individuals' behavior in the context of e-waste recycling. Many studies focus primarily on environmental communication or general sustainability campaigns without explicitly addressing the mechanisms through which social media engagement translates into actual recycling behavior, particularly in relation to electronic waste management.

Furthermore, prior research has often examined social media as a broad communication tool without sufficiently analyzing the specific features and interaction dynamics that may drive behavioral change, such as information dissemination, peer influence, user engagement, and digital community participation. Theoretical perspectives applied in previous studies also vary considerably, resulting in a lack of conceptual integration across disciplines including environmental management, information systems, and communication studies. In addition, empirical evidence remains geographically

concentrated in developed countries, while research focusing on emerging economies, where e-waste generation is rapidly increasing and digital platform adoption is expanding, remains relatively limited. Consequently, there is a need for a structured synthesis of the literature to better understand the current state of research, identify dominant themes, and highlight critical gaps that may guide future investigations on the role of social media in promoting responsible e-waste management.

In response to these gaps, this study conducts a structured narrative review informed by scoping review principles to synthesize existing research on the role of social media in encouraging environmentally responsible behavior related to e-waste recycling. The objective of this study is to systematically synthesize and critically analyze existing literature on the role of social media in promoting environmental awareness and behavioral change related to electronic waste recycling, with the aim of identifying key research trends, underlying mechanisms, and future research directions.

Social Media in Environmental Awareness

In recent years, social media have become powerful tools for influencing consumer awareness and behaviors particularly in brand awareness, purchasing behavior (Johari & Prashath, 2024) and enhances loyalty and trust (Neetu et al., 2024). Social media, driven by influencer engagement and value co-creation, enhances environmental awareness and fosters stronger commitment to sustainable consumption practices (Suryaputra et al., 2024). Another study indicated that reliable, well-structured, and evidence-based information from influencers is critical for successfully altering public views and improving digital environmental engagement (Jing et al., 2025). This is supported by a study in Morocco concluding that an effective and well-planned communication strategy is crucial for maximizing the impact of environmental initiatives on social media (Hajri & Daife, 2024).

Frequent social media use not only strengthens and encourages information sharing, entertainment, and social interaction (Zhao et al., 2022). The trend shows a growing research focus on social media and environmental awareness, reflecting their rising importance as tools for driving public engagement in sustainability (Abdullah, 2023). While general themes like awareness and sustainability dominate recent publications, more specific areas such as platform-focused and literacy-based interventions remain underexplored, signaling clear opportunities for deeper and more targeted future research. Generally, the social media use in the context of eco-literacy research are rising and yet very scarcely found from the perspective of electronic waste management. Thus, it is interesting to further investigate this issue in mitigating the rise number of e-waste ended up in the landfill.

Numerous case studies and accomplishments demonstrate the effectiveness of social media campaigns and technological platforms in promoting waste recycling practices. For instance, it was found that followers' opinions regarding environmental care were greatly affected by the #BijakKelolaSampah campaign on Instagram (Dirgantara & Fauzi, 2024). There was one study demonstrated that big data analytics of social media content reveals growing public engagement with zero-waste practices, underscoring social media's potential as an effective informal educational tool for fostering environmentally responsible behavior (Zulkifli & Abd Manaf, 2024). Thailand's social media campaigns initiatives have successfully reduced single-use plastic, increased recycling, and inspired community participation, proving their significant impact on reshaping behavior and perceptions towards sustainability (Jirasit, 2024).

It is found that social media enhances environmental awareness, promotes sustainable waste management and green economic growth (Redyantanu et al., 2022). A study on big data technology mentioned that publicity is found to be significant situational factor in electronic appliances waste (Hua, 2017). However, its effect on e-waste management (EWM) has not adequately researched (Tran et al., 2024; Jiang et al., 2021). This is supported with another waste management study that concluded the significant impact of digital communication channels is being underestimated and underutilized (Luić & Labura, 2021). This contradiction underscores a clear research gap, though digital channels show strong potential in raising awareness and molding sustainable behavior, yet their capacity to effectively suited in driving engagement within the context of EWM remains untapped.

Social media algorithms favor popular content, often limiting the visibility of critical and yet less sensational environment issues (Jain, 2025). The global discourse frequently focuses on government responsibilities, formal infrastructure, and engineering technology solutions, while ignoring how

everyday flow of information flows shape consumer behaviors towards sustainability and green practices (Hazra et al., 2024; Malik & Tass, 2025). A review of environmental studies highlighted challenges like misinformation and the digital divide, alongside the rise of online campaigns and virtual environmental communities (Lestari et al., 2025). However, despite its comprehensive scope, the study provides limited insight into platform-specific behavioral dynamics. Despite all of this, eSmartRecycling positively saying that social media can play a vital role in educating consumers about e-waste, and fostering them with sustainable recycling behavior (Alarcon, 2024). This is too supported by research suggested that an emotion-driven campaign using social media shall increase the e-waste recycling engagement (Sajid et al., 2025).

However, there is scarce number of literatures on how social media drives consumers to effectively managing e-waste unlike other types of waste like plastics and food waste. Understanding consumer behaviors, challenges and needs may provide social media support for efficient EWM. It could help e-waste stakeholders achieve optimal engagement and strengthen the circular economy. Therefore, in bridging this gap, this review objective was conducted to report on how social media and information publicity influence e-waste disposal behavior for the past ten years. The review seeks to examine approaches this communication channels applied in promoting EWM, as well as facilitators and barriers reported in relation to their effectiveness. It underscores the potential of social media as a driver of behavioral change, identifies gaps in existing research, and outlines future directions for promoting proper e-waste disposal. Bridging the persistent gap between awareness and action requires communication strategies that effectively inform, motivate, and sustain responsible recycling behavior.

E-Waste Current Disposal Behavior

The rise of IoT technology with smart devices for individual use such as smart watches, smart air purifiers, home security systems has made them as one of the major sources of e-waste generation (Razip et al., 2022). Repairing broken items has become less desirable since labour costs are rising while the cost of new electrical devices is decreasing (Fitzpatrick & Zeng, 2019). Despite the increase rates of e-waste recycling, assessments show that human will create more e-waste than before. End users contribute significantly to the production of e-waste (Srivastava & Sangwan, 2023; Mehra et al., 2025). The nature of e-waste differs from household wastes and it makes e-waste collection unique and complex (Parajuly, 2023).

In contrast to materials such as plastics or bottles wastes, electronic devices are far more complex to recycle, and consumers often lack clarity on proper disposal methods (Liu et al., 2023). Consumers even prefer to keep it at home or dump it to informal recycler due to the lack of facilities, lack of information and knowledge (Mohamad Zuhdi et al., 2023; Madeeha Nik Mohd Munir et al., 2023). A significant number of individuals are still uncertain about responsible recycling practices and may perceive existing initiatives as either inconvenient or difficult to access (Puzzo & Prati, 2024b). One of the issues is ignorance, which leads to the production of e-waste in the household (Leng et al., 2022). Psychological barriers such as habits, emotional attachment, and concerns over data security often discourage consumers from participating in formal recycling systems (Patrao & Karnik, 2023; Huang et al., 2023; Khan & Abideen, 2023).

Consumers exhibit low awareness, weak recycling intentions, unaware of proper disposal methods, unconcern of the hazardous impact of e-waste, nonchalance of the existence of recycling programs, and a lack of motivation to participate in formal e-waste recycling programs (Puzzo & Prati, 2024a; Erdiaw-Kwasie et al., 2024; Patrao & Karnik, 2023). Despite increased awareness of the environmental consequences of e-waste, the absence of accessible disposal options, limited time and the hassle of recycling methods discourage responsible consumer behavior (Siringo et al., 2020). Many individuals hesitate to recycle old electronics due to concerns over personal data stored in devices (Xiong et al., 2025). Further, the low rate of incentives is deemed unworthy of the effort of sorting and delivering, and the lack of such incentives discourages involvement in e-waste recycling (Яфень & Шевченко, 2021; Sahoo & Halder, 2020).

This study is essential as it address the critical global dilemma in managing e-waste which everyday becoming prevalent with the increasing use of smart digital technology. This study aims to map the extent, nature, and outcomes of research on social media and information publicity within the context of EWM. It highlights the need to better harness social media and information publicity in bridging the disconnect between the rising e-waste generation and low recycling rate. Furthermore, this study aims

to open new horizons and perspectives by examining the role of social media and information publicity in designing e-waste recycling behavior.

The findings of this review are expected to make a significant contribution to the academic discourse by addressing the existing gaps in understanding how behavioral interventions and communication mechanisms within the digital ecosystem influence electronic waste management, a domain that has received considerably less scholarly attention compared to other waste streams such as plastics and food waste. From a practical standpoint, the insights derived from this study hold substantial value for policymakers, recycling authorities, and business entities seeking to design and implement effective outreach and engagement strategies. By leveraging the persuasive and interactive potential of social media and information publicity, these stakeholders can cultivate stronger public participation in formal e-waste recycling programs, enhance awareness of proper disposal channels, and promote long-term behavioral change aligned with sustainable development goals and circular economy objectives.

METHODOLOGY

This study adopts a structured narrative review informed by scoping review principles to synthesize existing research on the role of social media in promoting electronic waste (e-waste) recycling behavior. Narrative reviews allow scholars to critically interpret and synthesize diverse bodies of literature, particularly in emerging interdisciplinary areas where research methods and theoretical approaches vary considerably. At the same time, this study incorporates key elements of the scoping review methodology proposed by Arksey and O'Malley (2005), which emphasizes systematic identification, selection, and mapping of relevant studies across a broad research domain. Scoping reviews are particularly suitable for examining complex or emerging topics where the objective is to explore the extent, nature, and characteristics of existing literature rather than to evaluate intervention effectiveness (Pham et al., 2014; Khalil et al., 2016).

Therefore, combining a structured narrative synthesis with scoping principles enables a transparent yet flexible review process that captures the breadth of research on social media-driven environmental behavior and digital engagement in EWM. This study followed a scoping review approach introduced by Arksey and O'Malley (2005) with the guidance of Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews to ensure systematic process of identifying, screening, and selecting relevant references. The study selection was selected documented using PRISMA 2020 flow diagram (Figure 1).

The literature review was conducted using the Scopus database due to its comprehensive coverage of peer-reviewed international research. Two separate search strategies with different keywords were applied to ensure broader retrieval of relevant studies. The first search yielded 36 articles, of which 7 were identified as relevant after screening. The second search produced 8 articles, with 3 meeting the inclusion criteria after excluding one inaccessible full-text paper. In total, 44 articles were retrieved, and 10 were ultimately included in the review.

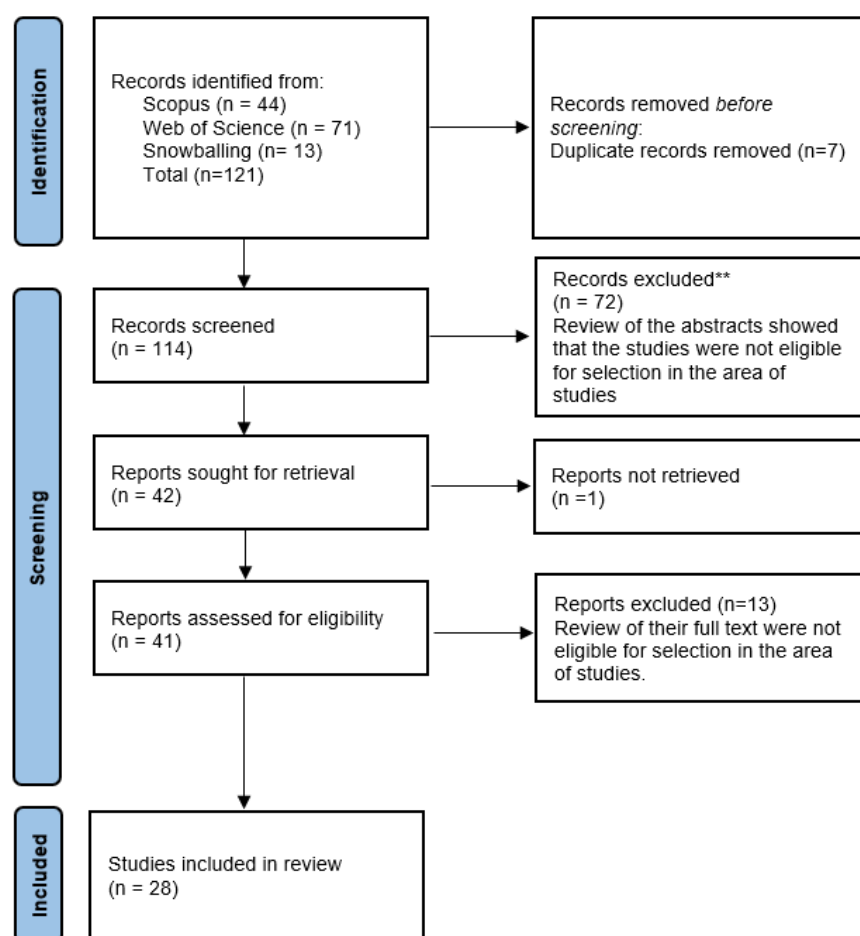


Figure 1: PRISMA-Scoping review flow chart

To ensure consistency throughout the review process, all identified papers were screened using the same predefined inclusion and exclusion criteria. The inclusion criteria for this review were journals articles and proceedings published in English from 2015 onwards. Eligibility studies selected are on social media and the publicity of e-waste and waste effective management to consumers, households and individuals. Exclusion studies were those irrelevant and limited to industrial, technical and engineering methods without considering consumers-oriented perspective together with non-English publications. Titles, abstracts, and full texts were systematically analyzed to determine relevancy. Any ambiguities occurred, such as whether to include a study or to interpret the data, the articles were rechecked to ensure they met the inclusion criteria. Decisions were made based on whether the study matched with the objective of this review.

To broaden the visibility, additional searches were conducted through Web of Science (WoS), and Google Scholar database with the same keywords use in search strategy in Scopus, as well as snowballing techniques using major publication reference list from Scopus. 71 studies in WoS were found, however 7 were removed due to duplication, and after screening only 5 studies are relevant. Following eligibility screening, this process yielded another 13 relevant articles from snowballing. In total, the final selection of articles was determined by their relevance to the research issue and contribution to understanding the role of social media and information dissemination in influencing e-waste proper disposal behavior. These articles were exported into Mendeley, and duplicate were removed.

Studies were excluded if they focused on industrial or organizational EWM, management policies and strategies, laws and regulations or addressed only engineering aspects of recycling without considering consumer behaviors. This review identified 28 primary studies published between 2015 to 2026 after applying rigorous screening that met eligibility criteria. This number may appear

insignificant; however, it is vital to know that the value of a review lies not in the volume of studies but the transparency of the process and insights generated. Even experts highlight that review with very few or no eligible studies are valuable, as they map the evidence based and identify crucial gaps for future research (DistillerSR, 2023).

All data were organized into a matrix table to compare studies and identify key themes, gaps, and implications regarding social media and information publicity in EWM. The studies then were summarized by design, findings, and future prospects, allowing this review to highlight communication-driven approaches that influence consumer e-waste behavior. This process enabled the identification of recurring patterns and critical insights across the literature.

RESULTS

This section presents the findings from the review alongside the discussion of their broader implications. The results are then synthesized thematically to provide an overview of the current state of research on social media and information publicity towards e-waste disposal behavior (Figure 5). The selected papers were relevant to examining the role of social media and information publicity in managing-waste and by thematic structuring it provides coherence to the amount of information, ensuring the review does not just reproduce individual study findings but constructively incorporates them into broader insights. Thus, it highlights not only what been found and studied but also what are underexplored. This approach enhances the paper contribution by providing a more comprehensive understanding of how social media and information publicity influence e-waste disposal behavior, as well as offering future study directions and practical applications.

Table 1: Thematic classification

Author	Theme		
	Consumer Attitude and Perceptions	Shaping Behavior	Education and Knowledge
Tong et al. (2025)		v	
Han et al. (2025)	v		v
Zhang (2025)	v	v	
Bejan & Pop (2024)	v		
Tran et al. (2024)	v	v	
Mehmood et al. (2024)		v	
Muthukumari et al. (2024)	v	v	
Shafahi et al. (2024)		v	
Jongsuksomsakul (2024)	v	v	
Ernawati et al. (2024)	v		v
Ngonso et al. (2023)		v	v
Pradaini Nadarajan et al. (2023)		v	
Mahat et al. (2023)	v		v
Elmosaad et al. (2023)	v	v	
Siswantini et al. (2023)		v	v
Nekmahmud et al. (2022)		v	
De Fano et al. (2022)		v	
Gong et al. (2022)		v	v
Karimi et al. (2021)		v	v
Jiang et al. (2021)		v	
Rezaei & Ho (2021)	v	v	
Delcea et al. (2020)		v	
Sujata et al. (2019)		v	
Wang et al. (2019)	v		v
Park et al. (2019)	v		v
Akifah et al. (2018)			v
Wang et al. (2018)		v	v
Hynes & Wilson (2016)		v	

The thematic categorization (Table 1) was derived from the review of selected papers and three themes emerged namely consumer attitudes and perception (CAP), shaping behavior (SB) and education and knowledge (EK). Studies grouped under CAP emphasizes how one's belief, awareness, and satisfaction influence their participation in EWM. The SB theme captures research that explores motivational drivers and intervention that directly influences recycling intentions and practices. Finally, EK theme highlights the role of information, awareness campaign, knowledge strategies in promoting sustainable EWM. This illustrates the multidimensional role of social media in EWM.

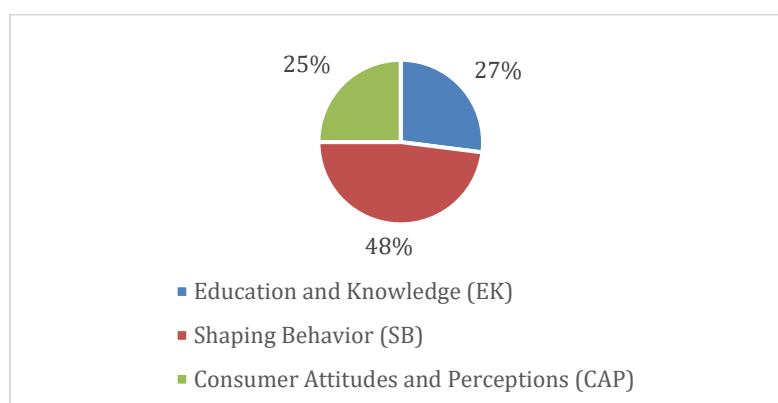


Figure 2: Distribution of themes in quantitative studies

The thematic distribution (Figure 2) shows that 48% of the studies focus on shaping behavior, demonstrating how social media influences recycling intention and behavior though it is usually limited to behavioral intention rather than actual practices. About 27% concentrate on educational and knowledge, highlighting the role of social media and information publicity in promoting awareness, albeit noting that awareness alone may not ensure long-term recycling practice. The remaining 25% cover on consumer attitudes and perceptions, which reflect cultural and moral influences but receive literally little attention. This distribution indicates that research has emphasize towards shaping behavior, with fewer studies linking attitudes and knowledge directly to actual e-waste recycling practices.

The results indicate that, out of 28 selected papers, 9 studies explicitly focused on e-waste, followed by 6 papers addressing broader environmental sustainability and pro-environmental behavior, with the remaining studies examining other waste streams such as plastic and food waste, and one study on green purchase intention. Although the primary search strategy emphasized e-waste, the inclusion of other waste types provided valuable comparative insights by highlighting cross-cutting behavioral drivers and barriers transferable across waste classifications. This broader scope is justified because e-waste is a heterogeneous stream containing significant plastic components, meaning that consumer behaviors observed in plastic waste management are directly relevant to e-waste disposal practices. In addition, food waste research offers well-established insights into habitual behavior, convenience, awareness, and social norms as factors that similarly influence household decisions to store, discard, or recycle electronic products. Therefore, integrating findings from plastic and food waste studies enables a more comprehensive understanding of universal behavioral mechanisms and strengthens the theoretical foundation for analyzing consumer participation in e-waste recycling.

In terms of methodological approaches, the reviewed studies demonstrate a balance mix of qualitative and quantitative method. A total of 11 papers adopted qualitative including reviews, analysis of posts, case studies, interviews, and observation. These qualitative studies provided in-depth and contextualized insights in shaping waste related practices. In contrast 17 papers adopted quantitative method guided by established theoretical model like Theory of Planned Behavior (TPB), Theory of Reasoned Action (TRA), and Norm Activation Model (NAM). These quantitative studies offered empirical evidence through surveys and statistical analysis in measuring relationship between social media engagement and attitudes and disposal behavior. Both methods enhance the robustness of the review by capturing both nuanced narrative and generalizable patterns.

The reviewed literature highlights social media as a significant tool for promoting sustainability by shaping consumer perceptions, behaviors, and knowledge. It plays a vital role in facilitating environmental communication and public engagement, although challenges remain in sustaining long-term impact. Several studies emphasize its influence on attitudes and perceptions, showing that social media can raise awareness and encourage sustainable practices (Zhang, 2025). However, consumer sentiment may shift negatively when recycling systems encounter technical or operational issues (Bejan & Pop, 2024). Similarly, while green literacy campaigns improve awareness, barriers such as apathy and limited access continue to hinder participation (Ernawati et al., 2024). These findings suggest that although social media effectively generates initial engagement, factors such as credibility and practical implementation are critical in maintaining consumer trust.

In terms of behavioral shaping, frequent social media use has been associated with stronger low-carbon intentions (Tong et al., 2025). Interactive features and accessible content, such as stories and community-driven initiatives, further encourage participation in waste management programs (Shafahi et al., 2024; Siswantini et al., 2023). From an educational perspective, social media significantly enhances awareness and understanding of sustainable practices, including the 3R principles (Ngonso et al., 2023). Public relations efforts delivered through social platforms have also been shown to improve recycling knowledge (Park et al., 2019), while online media continues to inform and persuade communities to engage in waste management initiatives (Akifah et al., 2018). Additionally, digital platforms support policy communication, as demonstrated in China's "Zero-Waste City" campaign via Weibo (Gong et al., 2022), and through intelligent analytics on WeChat that enable targeted household engagement (Jiang et al., 2021).

Despite the generally positive impact, inconsistencies remain regarding the sustainability of behavioral change. Increased awareness does not always translate into consistent participation, as influenced by apathy, misinformation, and limited technical support (Bejan & Pop, 2024; Ernawati et al., 2024). Furthermore, while strong short-term engagement is frequently observed, evidence of long-term behavioral change remains inconclusive (Zhang, 2025; Akifah et al., 2018). These contradictions indicate that the effectiveness of social media extends beyond communication alone and is highly dependent on contextual factors such as infrastructure, cultural attitudes, and content credibility.

The reviewed quantitative studies show that social media and information publicity significantly effects recycling attitudes, intention and norms, although its effectiveness in shaping actual recycling behavior remain inconsistent. Studies adopted TPB, NAM, and SOR framework confirm that publicity, social norm, persuasive messaging can positively affect recycling attitudes and intentions (Tran et al., 2024; Mehmood et al., 2024; Wang et al., 2019). However, findings are mixed between significant and insignificant. Some studies shows that social media use and recycling intention is significant (Pradaini Nadarajan et al., 2024; Nekomahmud et al., 2022), while the others reported that it is insignificant and weak on effect (Delcea et al., 2020; Wang et al., 2018; Hynes & Wilson, 2016). These differences emphasize the significance of mediating and moderating factors such as moral norms, communication quality, and perceived behavioral control (Muthukumari et al., 2024; Karimi et al., 2021).

Several studies looked at how social media and information publicity influences consumers recycling attitudes and perceptions. In Malaysia, moral attitudes and market maven tendencies motivate e-waste recycling behaviors indicating that consumers with strong market maven are more likely to share information about e-waste (Rezaei & Ho, 2021). Social media, however, were found had weaker impacts on recycling intentions (Delcea et al., 2020; Sujata et al., 2019). In Hungary, digital green marketing supports green product consumption and circular economy (Nekomahmud et al., 2022). All these suggest that consumer attitudes and perceptions are not only shaped by information, but also by culture, moral, and social context.

A significant number of studies indicate how social media and information publicity promote recycling behaviors. In China, multiple studies have demonstrated that information publicity substantially affects waste separation intents when moderated by information quality (Wang et al., 2019) or even mediated by personal norms and attitudes (Wang et al., 2018). Other studies shown that social pressure, media richness, and content trustworthiness influence positive recycling intention (Mehmood et al., 2024) while persuasive communication technique such as infographic and campaign were effective in Thailand (Jongsuksomsakul, 2024). However, in changing environmentally friendly food behavior in the UK, social media was not effective (Hynes & Wilson, 2016). Overall, cultural context, persuasive strategies and communication quality have significant impact on behavioral shaping.

In these quantitative studies also highlights social media's educational potential. Studies in United State of America (USA) validated that exposure to targeted content like plastic recycling campaign, can influence intention, but only if knowledge is clearly communicated (De Fano et al., 2022). In Saudi Arabia, surveys confirmed that social media and television are central for raising recycling awareness (Elmosaad et al., 2023). Social media like Facebook has become important sources for environmental knowledge in Malaysia, where consumers satisfaction is influenced by the information, system and service quality provided (Mahat et al., 2023). These findings indicate that transforming awareness into sustainable practice and actual recycling behaviors depends on the clarity, frequency, and legitimacy of knowledge dissemination.

The quantitative findings reveal a notable inconsistency in how social media and information publicity influence consumer behavior in EWM. While several studies report positive and significant effects of social media on pro-environmental attitudes and recycling intentions (Han et al., 2025; Tran et al., 2024; Pradaini Nadarajan et al., 2024; Nekmahmud et al., 2022), others demonstrate weak, indirect, or even insignificant relationships (Delcea et al., 2020; Wang et al., 2018; Hynes & Wilson, 2016). This divergence suggests that the effectiveness of digital engagement depends heavily on mediating factors such as message quality, media richness, social pressure, and perceived behavioral control (Mehmood et al., 2024; Muthukumari et al., 2024). Studies emphasizing information publicity often find its influence to be indirect, operating through attitudes, norms, and perceived behavioral control rather than exerting a direct impact on behavior.

Moreover, contextual disparities further complicate these findings. Most research has been conducted in Asia, particularly China, Malaysia, Vietnam, and Korea, where social media penetration and government-led environmental campaigns are high, yet infrastructural barriers and policy enforcement remain inconsistent. These regional contexts often reflect populations that are socially responsive but constrained by limited recycling access and systemic inefficiencies, which may explain the gap between intention and action (Wang et al., 2019; Rezaei & Ho, 2021). In contrast, studies in Western contexts, such as the United Kingdom and the United States, show weaker or more selective impacts of social media on behavioral outcomes (De Fano et al., 2022; Hynes & Wilson, 2016), implying that cultural norms, digital literacy, and the maturity of recycling systems shape how environmental messages are received. Collectively, these contradictions highlight that the behavioral influence of social media is neither uniform nor universally replicable. It is contingent on sociocultural, infrastructural, and informational contexts that mediate digital engagement and recycling practices

Discussion

The synthesis of the reviewed literature reveals that social media platforms play an increasingly influential role in shaping environmental awareness and behavioral intentions related to e-waste recycling. Many studies emphasize the capacity of social media to disseminate environmental information rapidly, mobilize community participation, and facilitate peer-to-peer influence that encourages responsible disposal practices. However, despite the growing attention to social media as a tool for sustainability communication, the existing literature remains fragmented in terms of theoretical grounding and empirical focus. Several studies primarily examine awareness-raising functions without sufficiently exploring how specific social media features such as interactivity, user-generated content, algorithmic recommendation systems, and digital engagement mechanisms, translate into sustained behavioral change. Moreover, many investigations rely on descriptive or perception-based analyses, which limits the ability to establish causal relationships between social media engagement and actual e-waste recycling practices. This indicates that while social media is widely acknowledged as a promising platform for environmental advocacy, its mechanisms of influence on consumer behavior remain insufficiently theorized and empirically validated.

From a critical perspective, the literature also demonstrates a strong geographical concentration in developed economies, with relatively limited empirical evidence from emerging economies where e-waste generation is rapidly increasing. In particular, the role of social media in facilitating sustainable e-waste practices in developing countries remains underexplored despite the growing digital connectivity and widespread use of online platforms in these contexts. Future research should therefore move beyond descriptive analyses to develop more theoretically integrated and empirically rigorous

investigations that examine how digital communication, behavioral nudges, and platform design can jointly influence consumer participation in formal e-waste recycling systems. Scholars are also encouraged to explore interdisciplinary frameworks that combine technology adoption theories, environmental behavior models, and digital engagement perspectives to better understand how social media ecosystems can support sustainable waste management initiatives. Such research would contribute to a more comprehensive understanding of the socio-technical dynamics that shape environmentally responsible behavior in the digital era.

The qualitative findings collectively demonstrate that social media plays a critical role in shaping consumer awareness, attitudes, and behaviors toward waste management and sustainability, though its effectiveness is shaped by both opportunities and limitations. Studies consistently highlight that frequent social media use fosters pro-environmental intentions by reinforcing social norms, improving perceived behavioral control, and raising green literacy. Platforms such as Instagram and campaign-driven initiatives further demonstrate how interactive tools, hashtags, and continuous storytelling can mobilize communities and sustain policy advocacy, as seen in the promotion of “zero-waste city” agendas.

However, the evidence also points to persistent challenges such as consumer enthusiasm often diminishes when faced with logistical and technical barriers in recycling processes, while limited accessibility to services and public apathy constrain meaningful behavioral change. Moreover, while social media proves highly effective in disseminating information and enhancing policy communication, the translation of awareness into long-term engagement remains uncertain. These findings underscore the dual role of social media as both an enabler of environmental communication and a mechanism for behavior shaping, while also revealing gaps in sustaining participation and overcoming systemic barriers in EWM.

Overall, the qualitative literature studies converge on the idea that social media and information publicity are powerful tools for environmental awareness and behavioral motivation. However, yet their effectiveness is contingent on message design, accessibility, and system integration challenges such as limited accessibility, information inconsistency, and weak behavioral conversion persist. Studies from Asia and Africa particularly emphasize that communication quality and system integration determine success in influencing real-world EWM behaviors. A persistent limitation across studies is the lack of empirical linkage between online engagement and actual recycling behavior, and the geographic bias toward Asian contexts limits cross-cultural insights.

The quantitative studies reviewed provide strong evidence that social media platforms and information publicity are important drivers of awareness, attitudes, and intentions toward e-waste recycling. Social media enables community engagement, knowledge sharing, and the shaping of pro-environmental attitudes, while information publicity enhances perceived behavioral control and indirectly influences recycling behavior through mediators such as moral norms, personal norms, and recycling attitudes. Additionally, structural factors such as system quality, service quality, and information quality are shown to significantly affect user satisfaction, reinforcing the role of platform design and trust in strengthening behavioral outcomes. Persuasive media formats, including infographics, documentaries, and campaigns, have been found to enhance residents’ attitudes toward recycling, while social pressure and market maven tendencies also amplify behavioral influence by fostering normative expectations and information diffusion within social networks.

Despite these positive pathways, findings suggest that the influence of social media is neither universal nor uniformly strong. In some contexts, social media and information publicity directly predict waste separation intentions, but in others, the effect is only indirect or statistically weak. For example, the role of social media is significant in certain consumer clusters such as those exposed to recycling-themed content, but shows limited predictive value when applied more broadly. Similarly, information overload can undermine waste-sorting behaviors, and low-quality or poorly tailored messages fail to promote willingness to recycle. These variations highlight that while social medias are promising tools

for shaping recycling attitudes and intentions, their effectiveness depends heavily on message design, content trustworthiness, perceived social pressure, and the alignment of digital strategies with users' socio-cultural and infrastructural contexts.

In summary, quantitative studies show that social media and information publicity significantly shape environmental attitudes and intentions, but their impact on actual recycling behavior remains uncertain. While some findings indicate positive effects, others reveal weak or indirect relationships influenced by factors such as information quality and social pressure. The dominance of studies from Asia also limits global generalization. A key gap persists in connecting online engagement to sustained behavioral change, underscoring the need for more rigorous, comparative, and longitudinal research to verify how digital communication drives real-world EWM outcomes.

Implications and Insights

The findings of this review underscore that social media and information publicity are not merely channels for information dissemination but strategic instruments capable of shaping environmental awareness, influencing social norms, and driving behavioral change in EWM. Across the reviewed studies, social media emerged as a catalyst for promoting sustainability through awareness creation, community mobilization, and public discourse on responsible e-waste disposal. However, the consistency and effectiveness of these interventions depend heavily on message quality, credibility, and the degree of interaction between users and information sources. This implies that environmental communication efforts must go beyond generic awareness campaigns toward more structured and persuasive content strategies that emotionally and socially engage audiences.

From a managerial perspective, these findings offer valuable insights for organizations, recyclers, and environmental agencies seeking to optimize communication strategies. Effective social media and information publicity campaigns should emphasize clarity, reliability, and localized relevance while leveraging social influence, storytelling, and visual persuasion to sustain engagement. When strategically leveraged, social media and information campaigns could play a transformative role in mobilizing public participation and bridging the persistent gap between awareness and action in EWM. Managers of recycling programs can also benefit from adopting evidence-based content planning, using analytics to understand what motivates sharing, participation, and long-term commitment to recycling practices. By doing so, they can transform social media into a behavioral tool rather than a mere promotional space.

For policymakers, the insights highlight the necessity of integrating social media into national e-waste awareness frameworks and environmental education programs. Governments should collaborate with communication experts, social influencers, and formal recyclers to design and disseminate verified information that counters misinformation and reinforces trust. Furthermore, public agencies can utilize social media to increase visibility of formal e-waste collection systems, raise awareness about authorized recyclers, and promote initiatives that make recycling more convenient. Effective information publicity can also inform the public about available services such as appointment-based collection or drop-off facilities, helping to bridge the gap between awareness and actual participation.

Academically, this review extends the growing discourse on digital environmental communication by identifying social media and information publicity as underutilized behavioral levers in sustainability studies. While prior research often focuses on technological or infrastructural factors, this paper emphasizes the communicative dimensions that underlie behavioral transformation. Future studies can build on these insights to develop integrative communication-behavioral frameworks, assessing not only the reach and engagement of social media campaigns but also their long-term influence on attitudes, trust, and behavioral intention toward e-waste recycling.

Existing studies consistently demonstrate that social media plays a significant role in disseminating environmental information and fostering pro-environmental attitudes. However, the findings of this review suggest that the influence of social media on actual e-waste recycling behavior remains inconsistent and context-dependent. While digital platforms facilitate rapid information diffusion and community engagement, their capacity to produce sustained behavioral change appears limited. One possible explanation is that environmental communication on social media often prioritizes awareness-building rather than actionable guidance, resulting in what can be described as an information-behavior

gap. In addition, algorithmic filtering and information overload may dilute environmental messaging, reducing its long-term impact on consumer behavior. These limitations indicate that social media alone cannot function as a sufficient behavioral intervention unless it is integrated with accessible recycling infrastructure, policy incentives, and credible information sources.

Ultimately, these implications suggest that social media and information publicity hold transformative potential in shaping environmental responsibility, provided they are applied strategically, ethically, and inclusively. By fostering trust, transparency, nudges, interactivity and participation, they can evolve from tools of awareness into catalysts of sustainable behavioral change, empowering societies to move closer to a circular and environmentally responsible economy.

Limitations and Future Researches

This review is constrained by several methodological and contextual limitations. First, the majority of studies analyzed were conducted in Asian contexts, particularly China, Malaysia, Vietnam, and Korea, where digital engagement and waste management infrastructures differ substantially from Western or African regions. This geographical concentration limits the cross-cultural generalizability of the findings and calls for more globally comparative analyses. Second, most of the reviewed works relied on cross-sectional survey designs and self-reported data, which restrict causal inference and may not accurately capture actual recycling behaviors. Third, the predominance of descriptive and qualitative analyses provides rich contextual insights but often lacks empirical rigor in evaluating the long-term effectiveness of social media and information publicity interventions.

Moreover, publication bias may exist, as studies with significant findings are more likely to be published, potentially skewing the evidence base toward positive outcomes of social media use. The exclusion of non-English publications and grey literature might have also limited the scope of perspectives included. Finally, the rapid evolution of digital communication platforms introduces temporal limitations, as newer algorithms, user behaviors, and content dynamics may render some insights contextually outdated. These limitations highlight the need for continuous, adaptive, and methodologically diverse research to capture the evolving role of social media and information publicity in environmental and EWM contexts.

Future research should move beyond awareness-focused investigations and examine how digital communication ecosystems can translate environmental awareness into sustained behavioural change. In particular, scholars should explore how social media strategies interact with institutional infrastructures such as formal recycling platforms, digital collection systems, and incentive-based programs. Longitudinal studies are also needed to examine whether repeated exposure to environmental messaging leads to durable changes in recycling habits over time. Furthermore, comparative cross-cultural research would provide deeper insights into how cultural norms, digital literacy, and policy environments shape the effectiveness of social media interventions. Integrating advanced analytical approaches, including social media analytics, behavioural experiments, and AI-driven sentiment analysis, could also offer new perspectives on how online engagement evolves into tangible environmental action. Such research would contribute to developing more comprehensive communication-behaviour frameworks capable of bridging the persistent gap between environmental awareness and responsible e-waste disposal practices.

Future research should advance beyond descriptive analyses and focus on empirically examining how social media and information publicity influence sustainable EWM behaviours across diverse social, cultural, and infrastructural contexts. Longitudinal and comparative studies are particularly needed to capture how online awareness translates into enduring behavioural change and to identify the contextual variables such as accessibility, digital literacy, policy support that moderate this relationship. Incorporating experimental, mixed-method, and big-data approaches, including social media analytics and sentiment mapping, would also allow for a deeper understanding of digital communication effectiveness and behavioural dynamics over time.

A crucial direction for future inquiry lies in exploring how social media and information publicity can enhance public awareness of existing digital platforms and formal e-waste systems. These systems increasingly provide practical solutions such as doorstep pick-up appointments, trade-in and resale options, or swap and drop-off services for electronic waste, yet public awareness and adoption remain limited. Investigating how social media campaigns can effectively communicate these platform

opportunities, build trust in formal recyclers, and bridge the gap between consumer intention and action represents a critical step forward in achieving e-waste circular economy.

Finally, future research should aim to develop frameworks that evaluate the scalability, inclusivity, and long-term impact of such digital awareness initiatives. Understanding how communication strategies interact with institutional infrastructure, consumer motivation, and technological design will help translate social media engagement into measurable environmental outcomes, thereby advancing both theory and practice in sustainable waste management.

SUMMARY

This review underscores that social media and information publicity play vital yet underutilized roles in shaping awareness, attitudes, and engagement toward EWM. While these communication channels effectively raise public consciousness and foster social participation, their capacity to convert awareness into sustained behavioral change remains limited. Despite the growing body of research, few studies examine how information publicity interacts with social norms, particularly the social pressures created by peer influence and online networks that shape collective environmental behavior. This gap is crucial, as social media now amplifies publicity effects through real-time feedback loops that reinforce shared expectations for sustainable practices.

Overall, the review reveals that social media and information publicity remain less explored compared to policy and infrastructural interventions, despite their potential to drive behavioral transformation. This study therefore highlights the importance of viewing communication technologies not just as tools for awareness, but as strategic mechanisms for connecting knowledge with action, bridging the persistent divide between e-waste awareness and responsible disposal behavior toward a more sustainable and circular digital future.

Acknowledgement

The author gratefully acknowledges Universiti Teknologi Malaysia (UTM) for its support and sincerely thanks colleagues for their constructive feedback, technical supports and collaboration throughout this study. Many thanks to the anonymous reviewers whose insightful comments greatly enhanced the quality of this paper.

Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: study conception and design: Rafiza Kasbun, Nurkaliza Khalid; data collection: Noor Fadzilah Abdul Rahman; analysis and interpretation of results: Rafiza Kasbun, Aizul Nahar Harun, Nurkaliza Khalid; draft manuscript preparation: Rafiza Kasbun, Nur Fatin Kasbun, Noor Fadzilah Abdul Rahman. All authors reviewed the results and approved the final version of the manuscript.

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