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Environmental Communication Through Duitin Indonesia: A Qualitative Descriptive Study on the Duitin Application

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Abstract: This study analyzes how Duitin Indonesia, a digital recycling startup, implements environmental communication within the framework of Rogers' Diffusion of Innovation theory. Drawing on in-depth interviews with three key informants—the CEO, COO, and Lead of UI/UX Design—the research explores how Duitin promotes recycling behavior through mobile technology and participatory communication. The findings reveal that each diffusion stage—knowledge, persuasion, decision, implementation, and confirmation—is supported by deliberate communication strategies. Duitin raises public awareness through educational content, motivates users with reward-based persuasion, and fosters adoption through trust-building and user-friendly design. The implementation stage demonstrates collaboration with informal waste sectors, while the confirmation stage emphasizes sustained engagement through storytelling and impact visualization. Duitin's model exemplifies how digital platforms can transform environmental awareness into collective action, positioning recycling as both a technological innovation and a social movement. The study concludes that effective environmental innovation depends on the synergy between communication design and user participation, offering insights into sustainable digital transformation in developing contexts.

Keyword: Environmental Communication, Diffusion Of Innovation, Digital Sustainability, Recycling Technology, Duitin Indonesia

INTRODUCTION

In the modern era, waste management has emerged as a major challenge for many countries, including Indonesia. The steadily rising volume of waste exemplifies this issue: for instance, data from the Ministry of Environment and Forestry of the Republic of Indonesia (KLHK) indicate that Indonesia generated tens of millions of tons of waste annually, with a significant portion originating from households and informal sectors. This trend reflects that society's patterns of consumption and disposal still largely follow a linear "take-use-discard" logic rather than a circular economy model (Dro, 2020). In other words, the paradigm of

resources being used and immediately discarded persists, undermining the potential for reuse, recycling, and recovery.

The significance of this challenge extends beyond volume alone. For example, food waste in Indonesia alone reached between 23 and 48 million tons per year in the last two decades, with serious environmental implications including large greenhouse-gas emissions. In parallel, the government has recognized circular economy as a strategic imperative: for example, KLHK stated that maximizing the value of products and components repeatedly is essential to prevent resource waste.

Within this context, the role of digital technological innovation and behavioural change becomes increasingly important — especially in the domain of environmental communication. Environmental communication can be understood as the planned exchange of information (via knowledge, policy, media) to manage and protect the environment (Alexander & Cangara, in Deasastika & Nugrahani, 2021). According to Cox (in Wahyudin, 2017), environmental communication performs two primary functions: firstly, a pragmatic function that educates and helps solve environmental problems; secondly, a constitutive function that shapes representations of nature and the environment, imbuing them with meaning and significance in human life. In short, beyond simply handing over information about waste, environmental communication seeks to change mental models, behaviours and social norms.

It is in this space of innovation and behavioural transformation that Duitin emerges. Founded on 11 July 2020, Duitin is a startup that leverages a mobile application to facilitate the collection, sorting and recycling of household waste. Its mission is to encourage users to actively sort, collect and manage recyclable materials so these materials gain a "second life" through recycling processes. Duitin's vision goes beyond the purely technical service of waste collection: it also emphasizes behavioural change among households and empowerment of informal waste-sector actors (e.g., "pickers"). The application allows users to request a pickup for recyclable waste, have it weighed, and receive rewards in the form of "Duitin Coins" once the transaction is completed. This digital platform thereby offers a relative advantage over conventional waste-management methods (which often involve waiting for scheduled collection or transporting waste to a disposal site) by turning waste into an economic asset while contributing to environmental protection.

From a social-empowerment perspective, Duitin positions the role of the waste-picker as an integral part of the recycling ecosystem and aims to elevate the status and livelihood of this informal profession in society. Thus, the innovation is not merely technological or procedural but encompasses a broader socio-technical system — one in which behaviour, culture, and social structure interact with digital tools and infrastructure.

Based on the background described above, the research problem of this study is formulated as follows: How does Duitin Indonesia carry out the process of innovation diffusion via the Duitin application? In other words, this study seeks to examine how the digital recycling service innovation is communicated to society, through which channels, over what time-span, and how the social dynamics of adoption function.

In line with the research problem, the objective of this study is to identify and analyse the process of innovation diffusion employed by Duitin Indonesia through its application. Specifically, the study intends to outline how the innovation is introduced (knowledge), how the audience responds (persuasion), how adoption decisions are made (decision), how implementation occurs (implementation), and how confirmation is effected (confirmation) — as informed by the diffusion of innovations theory developed by Everett M. Rogers (Puspitasari, 2017; Suriani, 2018).

This research holds several important significances. Firstly, from an academic perspective, it contributes to the literature by bringing together two fields: environmental

communication and innovation diffusion. By doing so, it enriches understanding of how technology-based services in waste-management can be communicated and adopted within society. Secondly, from a practical perspective, the findings are expected to provide recommendations for stakeholders (such as waste-management start-ups, local government agencies, and environmental communities) regarding how to design effective communication strategies to encourage broad adoption of digital recycling services. Thirdly, from a social vantage point, this study contributes to efforts to raise awareness and participation among citizens in the circular economy movement — particularly in the context of household-waste management, which remains a persistent challenge in Indonesia (Karomah, 2021; Tahar, 2021).

To address the research objective, this study adopts the diffusion of innovations theory by Everett M. Rogers. Rogers (in Suriani, 2018) defines innovation diffusion as the process by which an idea, practice, or object perceived as new by an individual or other unit is communicated through certain channels over time among members of a social system. The theory identifies four key elements: innovation, communication channels, time dimension, and social system. In the context of this research:

- Innovation refers to the digital waste-management service offered by Duitin — the mobile application that enables users to schedule recyclable-waste pickups, receive reward points, and contribute to recycling workflows.
- Communication channels involve the means by which Duitin promotes its application and service, such as in-app articles on environmental topics, social-media campaigns, partnerships with corporates and community outreach events (Duitin.id, 2020; Ancely, 2022).
- Time dimension relates to the period during which an individual becomes aware of the application, tries the service, and eventually decides whether to adopt and continue using it.
- Social system encompasses the culture, values, norms, household behaviours, and informal waste-sector actors (such as pickers and informal waste collectors) within which the innovation is deployed.

Rogers further outlines five stages of adoption decision-making: (1) Knowledge, (2) Persuasion, (3) Decision, (4) Implementation, and (5) Confirmation. Additionally, Rogers identifies five attributes of innovations that influence adoption rate: relative advantage, compatibility, complexity, trialability and observability. These will be used to analyse how the Duitin service is perceived and adopted by users.

To maintain focus and clarity, this study sets specific boundaries. First, the research concentrates only on the Duitin application service active within certain service areas in Indonesia — specifically: DKI Jakarta, Tangerang Selatan, Bogor, Depok and Yogyakarta (Ancely, 2022). Second, the study emphasises the diffusion-of-innovation process in the context of environmental communication; technical aspects of waste-processing (e.g., final recycling plant operations) are not the primary focus. Third, the research utilises a qualitative approach via interviews and secondary-document analysis (including literature, in-app articles, and partner reports) to examine how communication and adoption processes unfold.

METHOD

This study employs a qualitative research approach. According to Afrizal (2014), qualitative research is a form of social science research that collects and analyzes data in the form of words—spoken, written, or observed human behavior. Similarly, Moleong (2014) defines qualitative research as an approach that seeks to understand research subjects in terms of their behavior, motivations, and perceptions toward the phenomena they experience. Nasution (as cited in Sugiyono, 2014) further explains that qualitative research fundamentally

involves observing individuals in their natural environment, interacting with them, and understanding their surrounding world. Based on these perspectives, the researcher adopted a qualitative approach to observe and describe the phenomenon under study comprehensively. This method enables a deeper understanding of environmental communication through Duitin Indonesia by examining real-life activities and collecting descriptive data during field observation.

The research design applied in this study is descriptive qualitative research. Mukhtar (2013) defines descriptive research as a method used to collect and describe information about a phenomenon or behavior as it occurs at a specific time. In this study, the primary subjects are informants. Goetz and LaComte (as cited in Ahmadi, 2014) describe informants as individuals who possess relevant knowledge, status, and communication skills, and who are willing to provide accurate information based on real conditions in the field. Morse (as cited in Ahmadi, 2014) adds that good informants are those who are articulate, cooperative, and capable of contributing meaningful insights.

The sampling technique used is purposive sampling, which, according to Sugiyono (2014), involves selecting participants based on specific criteria relevant to the research objectives. The criteria for informants in this study are: (1) individuals who possess knowledge and direct involvement with Duitin; (2) individuals who have worked at Duitin for at least one year; and (3) individuals who are engaged in the planning and operational activities of Duitin. Based on these criteria, three informants were selected: the Chief Executive Officer (CEO) or Founder, the Chief Operating Officer (COO) or Co-Founder, and the Lead of UI/UX Design at Duitin Indonesia.

The data collection techniques include observation, interviews, and documentation. Observation was conducted to understand Duitin's digital activities and environmental communication practices through its mobile application. Patton (as cited in Ahmadi, 2014) states that observation allows researchers to describe the ongoing activities, participants, and context of a phenomenon. Afrizal (2014) adds that observation involves using one's senses to perceive and understand what happens in a setting. In addition to observing the Duitin application, the researcher also examined the company's content creation process, article development, and interaction strategies for promoting recycling awareness.

Furthermore, interviews were conducted to gain a deeper understanding of Duitin's environmental communication practices. Esterberg (as cited in Sugiyono, 2014) defines interviews as a face-to-face interaction aimed at exchanging information through a structured dialogue. Stainback (as cited in Sugiyono, 2014) emphasizes that interviews are useful for exploring a phenomenon in depth, while Sarosa (2017) notes that interviews allow researchers to collect diverse insights across different situations.

The documentation technique was also employed to obtain written, visual, and creative materials relevant to the research. According to Moleong (2014), documentation involves collecting records in various forms, including written texts, photographs, or artifacts. These sources support the empirical basis of the study by providing secondary data to complement field observations and interviews.

Finally, data were analyzed using Miles and Huberman's (1994) model, which consists of three stages: data reduction, data display, and conclusion drawing/verification. Data reduction involves selecting and simplifying relevant information; data display refers to organizing and presenting the findings; and conclusion drawing entails interpreting the data to produce meaningful insights. This structured process allowed the researcher to systematically analyze the qualitative data and draw conclusions regarding environmental communication through Duitin Indonesia.

RESULT AND DISCUSSION

This section discusses the findings of the study on the diffusion of innovation and environmental communication practices implemented by Duitin Indonesia, a digital recycling startup founded in 2020. Through interviews with three key informants—the Chief Executive Officer (CEO), Chief Operating Officer (COO), and Lead of UI/UX Design—this research analyzes how Duitin disseminates its recycling innovation to the public, how users adopt the technology, and how environmental communication principles support this adoption process. The discussion is guided by Everett M. Rogers' Diffusion of Innovation Theory, focusing on the five stages of adoption: knowledge, persuasion, decision, implementation, and confirmation (Rogers, as cited in Suriani, 2018).

According to Rogers' framework, diffusion begins when individuals gain knowledge of an innovation (Rogers, 2003). In Duitin's context, this stage involves introducing the concept of recycling through a mobile-based system that transforms household waste management into a digital experience.

The CEO of Duitin emphasized that the company's primary goal in its early stage was to raise public awareness of the possibility of managing recyclable waste more efficiently through technology. Public awareness campaigns were conducted primarily via social media, digital articles within the app, and community-based collaborations with schools and environmental organizations. The COO noted that Duitin used simple, visually appealing infographics and storytelling to make complex waste management issues more relatable. This aligns with Cox's (as cited in Wahyudin, 2017) concept of pragmatic environmental communication, which emphasizes educating and empowering the public to take actionable steps toward environmental change.

Moreover, the Lead of UI/UX Design described how the app interface was deliberately created to be intuitive and user-friendly to encourage initial engagement. The design integrates icons, visual cues, and "gamified" progress indicators to help users visualize their environmental impact. This strategic design choice represents a communication channel that translates environmental messages into interactive digital experiences. As Rogers (in Puspitasari, 2017) suggests, communication channels play a crucial role in the early diffusion phase because they mediate the user's first encounter with innovation.

Through these strategies, Duitin successfully positioned itself not only as a waste collection platform but as a digital environmental educator, fostering awareness and shaping behavioral intention.

In the persuasion stage, potential adopters form attitudes toward the innovation based on perceived benefits (Rogers, 2003). Duitin's communication strategy during this stage focuses on enhancing motivation and emphasizing the relative advantage of its system compared to traditional waste management.

The CEO explained that Duitin positions recycling as an activity with tangible rewards, offering users digital coins ("Duitin Coins") after verified waste collection. These coins can be exchanged for vouchers or merchandise, transforming recycling from a moral obligation into a socially rewarding activity. This approach reflects Rogers' principle of relative advantage, where individuals are more likely to adopt an innovation if it provides measurable benefits.

The COO elaborated that Duitin also employs social proof to build trust and persuasion. Testimonials, user stories, and leaderboard rankings are displayed in the app to show that others are participating and gaining value. By integrating these persuasive elements, Duitin aligns environmental goals with psychological motivators, promoting intrinsic and extrinsic satisfaction.

In addition, the Lead of UI/UX Design described how the app employs visual feedback mechanisms—such as digital badges and impact scores—to strengthen users' sense of

achievement. These features serve both communicative and motivational functions, reinforcing users' commitment to sustainable behavior. The approach resonates with the constitutive function of environmental communication (Cox in Wahyudin, 2017), which constructs shared meanings and positive representations of environmental action.

Thus, in the persuasion stage, Duitin combines digital incentives, social influence, and aesthetic communication to shift users' perception of recycling from a passive routine to an empowering, socially valued behavior.

Rogers (2003) identifies the decision stage as the phase when individuals choose to adopt or reject an innovation. At this point, perceived compatibility and complexity become decisive factors.

The COO stated that Duitin's users often decide to adopt the application after realizing that the platform simplifies existing recycling routines. Before Duitin, households had to store recyclables or sell them manually to collectors. Through the app, users can schedule waste pickup, track progress, and receive direct rewards without leaving their homes. This convenience represents a significant reduction in behavioral complexity, making adoption more likely.

The CEO highlighted that building trust was a key challenge in this stage. Because the platform involves direct waste collection and reward systems, Duitin had to ensure transparency in how data and rewards were managed. The company responded by introducing real-time tracking and providing verification receipts after each collection. These actions fostered a sense of reliability among users, addressing initial skepticism.

Furthermore, the Lead of UI/UX Design mentioned that many design choices were guided by user feedback from early adopters. Regular updates and usability testing ensured that the app remained compatible with users' habits and expectations. This iterative design process is consistent with the trialability and observability dimensions of innovation (Rogers, as cited in Puspitasari, 2017), which allow users to experience and witness the innovation's outcomes before full adoption.

Through transparency, user-centered design, and adaptive communication, Duitin successfully encouraged adoption decisions among environmentally conscious users while also attracting new demographics unfamiliar with digital recycling.

Once adoption occurs, the implementation stage focuses on putting the innovation into practical use. Duitin operationalizes its environmental communication through integrated actions across technology, community engagement, and behavioral reinforcement.

The COO explained that Duitin collaborates with informal waste sectors—such as local collectors (pickers)—to ensure that waste is properly sorted and delivered to recycling partners. This inclusive approach recognizes pickers as part of the social system in Rogers' framework, highlighting how innovation interacts with existing structures (Suriani, 2018). The CEO emphasized that Duitin's vision goes beyond technology: it seeks to empower informal workers, enhance their livelihoods, and reframe public perceptions of their profession.

The Lead of UI/UX Design described that implementation is also sustained through content management—articles, infographics, and push notifications that provide users with continuous education about recycling habits and environmental impact. These communication strategies reflect an ongoing process of knowledge reinforcement, ensuring that users remain engaged beyond initial adoption.

This phase demonstrates how Duitin translates the abstract ideals of circular economy and sustainability into tangible, daily digital interactions. The company's operational model exemplifies a form of participatory environmental communication, where technology becomes a medium for collective environmental action.

The confirmation stage marks the point where adopters seek reinforcement for their decision and continue using the innovation (Rogers, 2003). For Duitin, this involves maintaining user satisfaction and fostering long-term engagement.

The CEO observed that sustained participation depends on whether users perceive ongoing benefits—not only economic but also social and environmental. Duitin reinforces user commitment by displaying impact dashboards showing total waste collected, carbon emissions reduced, and rewards earned. These visual narratives act as continuous affirmations of users' contribution to the environment.

The COO added that Duitin's confirmation strategies also involve community storytelling. Users are invited to share their recycling experiences through the app and social media. By doing so, they become "micro-ambassadors" of sustainable living, strengthening the diffusion network. This aligns with Rogers' notion that confirmation occurs not only at the individual level but also through social communication loops that validate collective behavior.

Additionally, the Lead of UI/UX Design pointed out that Duitin monitors behavioral analytics to refine user experience and communication strategies. Feedback loops between users and developers ensure that innovation remains responsive to evolving expectations. This dynamic interaction represents a continuous diffusion cycle rather than a linear process, where communication sustains adoption and adaptation simultaneously.

Through these sustained reinforcement mechanisms, Duitin transforms short-term participation into a culture of digital environmentalism, positioning recycling as both an ecological necessity and a lifestyle choice.

The findings illustrate how Duitin embodies Rogers' (2003) four elements of diffusion—innovation, communication channels, time, and social system—within a contemporary digital ecosystem. The innovation lies not only in the app's technological features but also in its behavioral framing of recycling as a rewarding, social activity. The communication channels—ranging from in-app messages to social media storytelling—serve as the connective tissue for environmental awareness. The time dimension reflects the gradual transition from awareness to sustained use, while the social system encompasses both users and the informal waste sector, linked by shared ecological values.

From an environmental communication perspective, Duitin fulfills both pragmatic and constitutive functions (Cox, in Wahyudin, 2017). Pragmatically, it educates and facilitates eco-friendly behavior; constitutively, it redefines waste as a resource and recycling as a meaningful act of citizenship. By doing so, Duitin not only diffuses technological innovation but also constructs a new environmental narrative in Indonesia's urban culture.

Furthermore, the findings suggest that digital innovation in environmental management must be understood as a process of cultural mediation—where technology translates ecological principles into everyday practices. Duitin's experience shows that innovation adoption is not merely about usability but about meaning-making, where communication plays a transformative role.

CONCLUSION

This study examined the diffusion of innovation and environmental communication strategies implemented by Duitin Indonesia, a digital platform that promotes recycling through mobile technology. Guided by Rogers' Diffusion of Innovation theory, the research found that Duitin's success in promoting recycling behavior relies on its integration of technological innovation and strategic communication.

At the knowledge stage, Duitin effectively disseminates awareness through digital education and participatory campaigns that make recycling relevant and accessible. During the persuasion stage, it constructs motivational narratives by offering tangible rewards and

emotional engagement, increasing users' perceived value of participation. The decision stage highlights the importance of trust and simplicity in technology design, enabling smooth adoption among users. In the implementation stage, Duitin operationalizes environmental values through collaboration with informal waste sectors and sustained digital education. Finally, in the confirmation stage, the company reinforces engagement through community storytelling and data visualization, transforming recycling into a lifestyle practice.

Overall, Duitin's approach demonstrates that environmental innovation thrives when communication, design, and participation are interlinked. The platform's success underscores that environmental communication is not merely about transmitting information but about creating meaningful, continuous interaction between humans, technology, and ecology.

Future research should explore comparative analyses of similar digital environmental platforms in Southeast Asia to deepen understanding of how local culture, digital literacy, and policy frameworks shape innovation adoption.

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