BEHAVIOR CHANGE STRATEGIES IN WASTE MANAGEMENT: A COMPARATIVE ANALYSIS OF DUTCH AND INDONESIAN NGO PRACTICES

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ABSTRACT

This study examines the influence of contextual factors on behavior change approaches in waste management in Indonesia and the Netherlands, highlighting the roles of NGOs in these processes. Utilizing the COM-B model, the research explores how capability, opportunity, and motivation are influenced by institutional, social, and economic contexts. Through qualitative interviews with NGO representatives, the study identifies strategies for enhancing the effectiveness of behavior change approaches in centralized and decentralized systems. Findings suggest that integrating contextual and institutional perspectives is crucial for promoting sustainable waste management practices.

Keywords: Behavior change, waste management, COM-B model, NGO, nonprofit, institutional theory, contextual perspectives, Indonesia, Netherlands.

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INTRODUCTION

The management of waste presents a critical challenge globally, particularly in countries undergoing rapid urbanization and industrialization like Indonesia (Wilonoyudho, 2017). Population growth and urban expansion leads to a surge in waste generation. As cities expand and more goods are being produced, the amount of trash continuously goes up. This increased waste generation has heightened environmental and health risks which require an immediate action and efficient waste management to minimize the negative effects (Adelodun et al., 2021). In response, behavior change interventions have emerged as essential strategies to promote sustainable waste practices (Klaniecki & Wuropulos, 2018). These interventions aim to shift individual and community behaviors towards responsible waste disposal, recycling, and resource conservation. Essentially, these initiatives aim to change how individuals and communities handle waste, promoting responsible disposal, and higher recycling rates. Through these interventions, the objective is to raise collective awareness and action for responsible waste management, mitigating environmental harm and promoting sustainability.

Non-governmental organizations (NGOs) play a significant role in waste management due to various reasons. Firstly, NGOs often possess expertise, resources, and flexibility that enable them to initiate and implement innovative solutions in waste management (Gulbrandsen & Andresen, 2004). The flexibility of NGOs allows them to adapt quickly to changing circumstances and tailor their interventions to suit the specific needs of local communities. Secondly, NGOs operate with a mission-driven approach, allowing them to focus on specific environmental issues and communities that may be

overlooked by governmental bodies (Ascher et al., 2016). This mission-driven approach enables NGOs to target their efforts towards addressing specific environmental challenges or serving the needs of particular communities in a more targeted and responsive manner.

The Netherlands is recognized for its successful centralized waste management system. The centralized system in the Netherlands ensures consistent and reliable waste management practices across the country, supported by stringent regulations and efficient infrastructure (Goorhuis et al., 2012). In contrast, Indonesia, with its decentralized approach, focuses on building community awareness and capacity to improve waste management practices. This decentralized approach requires localized and culturally sensitive interventions to address the diverse needs and contexts of different regions (Adelodun et al., 2021). The different systems in place in the Netherlands and Indonesia provide a unique opportunity for mutual learning. By understanding the strengths and challenges of both centralized and decentralized systems, NGOs in both countries can develop more effective behavior change strategies

However, despite their efforts, NGOs face significant challenges in waste management, including capacity constraints and difficulties in engaging communities effectively (Malhotra et al., 2021). The difficulties in engaging communities effectively can possess a major challenge caused by cultural differences and varying levels of awareness, which then can hinder the NGOs from achieving their desired outcomes. Additionally, the lack of coordination and collaboration between NGOs and governmental bodies, such as municipalities, can further hinder their effectiveness.

Local governments, represented by municipalities, hold significant responsibility for waste management (Agovino et al., 2018). However, they often face challenges such as bureaucratic processes, limited resources, and competing priorities, which can hinder

their ability to implement innovative and community-focused waste management strategies (Godfrey et al., 2013). The decentralized nature of waste management systems in many countries, including Indonesia, often results in fragmented governance structures and coordination challenges between municipalities and other stakeholders.

Given the challenges faced by both NGOs and municipalities in waste management, this research focuses on NGOs as key actors in behavior change approaches. By examining the experiences of NGOs in the Netherlands and Indonesia, the study aims to identify strategies for behavior change approaches to create effective and sustainable waste management within different contexts. This comparative analysis between countries with centralized and decentralized systems offers valuable insights for learning and improvement.

This research also seeks to examine the contextual factors that shape waste management practices in the Netherlands and Indonesia to identify the challenges and opportunities to navigate behavior change approaches more effectively. Understanding these contextual factors can help NGOs develop strategies that align with local regulations, cultural norms, and governance structures (Tugyetwena, 2023). Moreover, this study will investigate how NGOs can collaborate with different types of stakeholders as effective collaboration is key to implementing sustainable and effective waste management practices by allowing for the pooling of resources, expertise, and knowledge (Storey et al., 2015). Specifically, the research seeks to answer the following question:

How do contextual factors influence behavior change approaches in waste management in the Netherlands and Indonesia, and how can strategies implemented by NGOs in both countries enhance the effectiveness of these strategies, benefiting each other?

THEORETICAL BACKGROUND

COM-B Model

The COM-B model, proposed by Michie and colleagues (2011) provides a comprehensive framework for understanding the components of behavior change. The framework explains that behavior is influenced by three key components: capability, opportunity, and motivation.

Capability refers to the individual's psychological and physical capacity to engage in the behavior. This includes both the knowledge and skills necessary to perform the behavior and the physical ability to do so (Michie et al., 2011). For example, in the context of waste management, capability may involve being aware of the importance of effective waste management and knowing how to sort and recycle different types of waste properly, as well as having the physical ability to lift and transport recycling bins.

Opportunity consists of the external factors that make the behavior possible. This includes environmental factors, such as access to resources and opportunities, as well as social factors, such as cultural norms and social support (Michie et al., 2011). In waste management, opportunities could include the availability of recycling facilities in a region, the presence of recycling bins in public spaces, and social norms that support recycling behavior.

Motivation refers to the individual's psychological processes that energize and direct behavior. It includes both conscious and unconscious processes, such as beliefs, attitudes, values, and emotions (Michie et al., 2011). Motivation can be influenced by personal goals, social pressures, and emotional responses. For instance, a person may be motivated to recycle because they believe it is important for environmental conservation,

or because they feel guilty about contributing to pollution.

The COM-B model emphasizes the dynamic interconnectedness between these three components. Changes in one component can affect the others, leading to shifts in behavior (Jatau et al., 2019). For example, improving an individual's capability through education and training may increase their motivation to engage in sustainable waste management practices. Similarly, creating more opportunities for recycling, such as installing recycling bins in public places, can enhance both capability and motivation.

Waste Management

Waste Management in Developing Countries

In many developing countries, waste management faces significant challenges due to inadequate infrastructure, limited financial resources, and a high prevalence of informal waste collection systems. These issues often stem from decentralized waste management systems. Studies by Wilson, Velis, and Cheeseman (2006) highlight the critical role that the informal sector plays in waste collection and recycling. Informal waste pickers, despite their marginalized status, play an essential role in collecting and sorting waste. This emphasizes the importance of developing waste management strategies that recognize and integrate the contributions of the informal sector, such as nonprofit organizations, to create more inclusive and effective systems.

Comparative Waste Management

Lu and Sidortsov (2019) emphasize the importance of context-specific waste management strategies. Some countries benefit from a highly structured and regulated waste management system, which provides consistency and efficiency. In contrast, a decentralized approach requires more localized and culturally sensitive interventions.

Comparative studies can be used to address this issue by understanding different contexts to effectively implement a behavior in a specific area (Kane et al., 2014). Integrating waste management practices with the social, economic, cultural, and institutional contexts of a region can ensure that behavior change approaches are relevant to local conditions and needs, highlighting the necessity for waste management practices to be flexible and adaptable.

Contextual Perspectives

Contextual perspectives emphasize the significance of the broader context in understanding and shaping behaviors, systems, and outcomes. This theoretical framework asserts that behavior and practices must be considered within the specific social, cultural, and economic in which they occur (García-Álvarez et al., 2009). By examining the interplay between individuals and their environments, Contextual perspectives provide a comprehensive lens through which to analyze behavior change interventions, particularly in diverse settings such as waste management practices in the Netherlands and Indonesia.

In the context of waste management, the theory highlights that the effectiveness of behavior change strategies is deeply influenced by local conditions (Agovino et al., 2018). This includes understanding the specific social norms, cultural practices, economic factors, and institutional structures that shape waste management behaviors in different regions. The theory underscores the importance of tailoring interventions to resonate with local customs and practices, ensuring that they are relevant and effective within the given context.

Integrating Institutional Factors with Contextual Perspectives

Institutional factors are components of the broader contextual environment that

play an important role in shaping behaviors and outcomes. Institutional Theory, which examines the role of formal rules, norms, and practices, complements Contextual Perspectives Theory by providing insights into how these institutional pressures influence behavior and decision-making processes (Lin & Sheu, 2012).

Institutional theory explains the importance of considering formal regulations, policies, and norms in shaping behavior in a region. Institutional pressures can act as a double-edged sword; they can facilitate or hinder the desired behavior change (Abayomi et al., 2020). For example, strong enforcement and regulations can drive sustainable practices, whereas poorly enforced policies can lead to inconsistent behavior.

Integrating institutional theory with contextual perspectives is crucial. Besides using regulations to drive behavior, it is essential to consider broader contextual factors such as social, economic, and cultural aspects (Zhou et al., 2021). This approach provides a comprehensive understanding of the multifaceted influences on behavior and underscores the importance of aligning institutional frameworks with local contexts to achieve effective and sustainable behavior change.

Studies on social capital and community resilience further support this integrated approach, demonstrating the effectiveness of leveraging local networks and social structures to foster collective and collaborative action (Maulana & Wardah, 2023). By considering both institutional and contextual factors, the research aims to develop tailored strategies that resonate with the specific conditions of different regions, enhancing the relevance and impact of behavior change interventions.

METHODS

Research Design

The research adopts an inductive approach to explore behavior change interventions in waste management, focusing on the contexts of the Netherlands and Indonesia. This approach aims to develop insights based on empirical observations and data collected during the study (Douglas, 2003). Prior literature has primarily examined behavior change from a top-down policy making perspective, which highlights the role of governmental policies and regulations in driving change. However, this study diverges from this approach and shifts the focus towards grassroots implementation facilitated by NGOs. Qualitative data collection methods are chosen to allow for an in-depth exploration of the experiences, perspectives, and practices of NGOs in both countries (Alam, 2021). These methods enable open-ended discussions and are well-suited for generating new theories and understanding complex phenomena, as it enables researchers to identify patterns and relationships in the data (Tracy, 2019). The research employed a comparative case study design involving two countries, represented by one nonprofit organization in Indonesia and three nonprofit organizations in the Netherlands. This design allows for a detailed examination of behavior change strategies and contextual factors in both settings. Through this approach, the research seeks to uncover new insights and contribute to the development of theory in the field of waste management behavior change.

Cases

This research included four non-profit organizations: two NGOs and one municipality-owned non-profit organization from the Netherlands, and one NGO from

Indonesia. The Indonesian NGO, based in Bali, specializes in circular economy approaches to waste management, focusing on the global south, specifically Indonesia and Argentina. In Indonesia, they have empowered six villages in Bali. The two leading Dutch NGOs are renowned for their expertise in advocating for sustainable practices and environmental protection, with a strong track record of innovative initiatives and advocacy campaigns in waste management. The municipality-owned non-profit organization is well-known for its significant contributions to circularity in the Netherlands by providing waste management services across the country. These organizations provide valuable insights into implementing community-level behavior change initiatives, offering a comprehensive examination of effective strategies and potential challenges.

Participants and Procedure

Qualitative semi-structured interviews were conducted with a total of 6 participants. This included 3 individuals from different work streams within an Indonesian NGO, and 3 individuals from Dutch nonprofit organizations: 2 from NGOs and 1 from a municipality-owned waste management organization, with each organization being represented by one participant (see Table 1). The interviews offered diverse perspectives from both countries, enriching the insights on waste management practices and behavior change strategies. Participants were carefully selected to represent various roles within each NGO, with assistance from a representative from each organization to ensure diversity.

Each participant reviewed and signed an informed consent form, which can be found at this link. The interviews were conducted online using Google Meet and

Microsoft Teams to accommodate their remote locations. The interviews were conducted between May 13, 2024, and May 25, 2024. The interview guide (Appendix A) was reviewed by the organization representatives prior to data collection to ensure clarity and relevance of the questions. The interviews began with introductory questions to establish the participants' roles and experiences within their organizations. Subsequent questions explored specific aspects of behavior change approaches in waste management, including challenges faced, strategies employed, and opportunities for improvement. The interviews were audio-recorded with the consent of the participants and transcribed using Notta software. For the Indonesian NGO, the interviews were conducted in Bahasa, transcribed with Notta, and then translated into English using Neural Writer. The interviews with the Dutch NGOs were conducted in English and transcribed directly using Notta.

Interviewee Code	Country	Role	Duration of Interview
M1	Indonesia	Behavior Change Senior Associate	3:11:54
L1	The Netherlands	Project Manager	48:18
J1	The Netherlands	Head of Communication	1:13:00
A1	The Netherlands	Program Director	38:20
J2	Indonesia	Behavior Change Lead	42:39
A2	Indonesia	Program Analyst	1:26:14

Table 1. Research participants

Data Collection and Analysis

Data analysis involved manual coding of the transcripts in Microsoft Word and Excel, focusing on predefined themes related to behavior change barriers and interventions. This involved organizing the coded data into meaningful categories and interpreting the relationships between them (Kawulich, 2017). Initially, first-order categories were developed, representing the initial codes derived from the data. Following this, axial coding was performed, which involves determining the connections between open codes to form second-order themes. Major codes were developed as an aggregation of the most closely connected open codes. This axial coding resulted in second-order codes that define the links between themes. The analysis continued by integrating the first-order categories and second-order themes into aggregate dimensions, forming a comprehensive coding framework. The coding framework, including the coding tree, can be seen in Appendix B. The analysis was iterative, with constant comparison between data points to refine themes and ensure their accuracy and relevance. The goal is to provide a rich and nuanced understanding of behavior change approaches in waste management and identify potential areas for collaboration and improvement between Dutch and Indonesian NGOs.

RESULTS

This section presents a detailed examination and analysis of the results from interviews with representatives from NGOs in both Indonesia and the Netherlands. These results focus on explaining the various contextual factors influencing how behavior change approaches in waste management can be effectively implemented by NGOs in

both countries. The results are categorized into several themes derived from the interview coding process, which refer to the aggregate dimensions identified. Each category is supported by quotes from the interviews and corresponding analysis.

Institutional Contexts

Government and Community Collaboration

The waste management system in Indonesia is decentralized. It can be challenging to implement uniformity in the system due to the fact that each village in a single province can have different regulations and waste management practices. In Bali, for example, where cultural aspects are very strong, traditional leaders known as 'Pendesa' have a significant role in influencing community behavior. However, traditional leaders in the other islands and provinces may not have the same degree or level of influence. The extent of authority and respect the leaders command in Bali is not necessarily replicated elsewhere. In Bali, these leaders are highly respected and their commands are often followed by the community, even more so than the heads of the village themselves, as mentioned by M1 in the interview:

"...The influence of traditional leaders in Bali is massive and crucial. When a traditional leader speaks, it has a significant impact on the community's behavior. In Bali, specifically in Denpasar, when a traditional leader says something, it has a strong influence on households compared to when the village head speaks. Traditional leaders have very strong influence because the community listens to and obeys them. For instance, if we have a program at the city level in Denpasar that is not implemented through traditional channels, its impact will not be as significant as when it is implemented through the traditional context. In Indonesia, and especially in Bali, the cultural aspect is very strong." (M1)

Given that Indonesia has a decentralized waste management system, it is fundamentally important to understand the local context in each region and strategically adapt approaches that are sensitive to cultural nuances for the effectiveness of these strategies.

Policy and Regulatory Framework

In contrast, the waste management in the Netherlands is centralized. This is because the governmental regulations align well with EU regulations, and they have already established an effective framework for waste management. NGOs in the Netherlands believe that this centralized system can support the creation of effective waste management policies. On the interview, J1 conveyed this idea:

"The campaign for behavior change is something that takes a lot of time. Our waste campaign in this region has been ongoing for more than 10 years, and while we see positive changes, it requires a long-term strategy. A temporary campaign isn't sufficient; you need a sustained effort." (J1)

In the Netherlands, NGOs benefit from this centralized system by aligning their programs with national policies. L1, as a project manager in a Dutch NGO, explained that their initiatives are supported by governmental regulations and can be implemented consistently across different regions.

"Long-term effects include influencing governmental policies. European laws are pushing for reduced disposables, and our project helped advise on implementing these laws in the Netherlands." (L1)

The consistency of these governmental regulations can be seen as an indicator that the behavior change initiatives are strongly supported by a stable regulatory environment. In the Netherlands, local governments in the regions work synergistically

with waste management companies. J1 illustrated how this centralized system operates:

"We are part of the local government. Business waste is a different subject because it's often commercial waste. Our stakeholders are the municipalities—they are our clients and our owners. This setup can be complicated, but our goal is to have a successful business, meaning people pay low waste rates and municipalities see high profits. The profit we make from collecting and processing waste is invested in sustainable projects." (J1)

One advantage of this centralized system in the Netherlands is that it enables a cohesive and integrated strategy, where profits gathered from waste management can be reinvested into sustainability projects at national level. This practice results in a feedback loop that strengthens the regulatory goals and is supported by the fact that the majority of the Dutch population is already aware of waste management and therefore, there is a high number of engaged users. This contrasts with Indonesia, where the approach is fragmented.

In Indonesia, the regulatory framework is highly decentralized, resulting in different waste management policies and implementations across various regions. In this case, creating consistent waste management practices can be challenging. For example, the implementation of TPS3R (reduce, reuse, recycle) facilities can vary significantly from one region to another. J2, a behavior change lead of an Indonesian NGO highlighted these challenges:

"In Indonesia, the waste management system is very scattered. Even between two villages with TPS3R, the management can be very different. This decentralization makes it difficult to apply a uniform strategy for behavior change." (J2)

Despite these challenges, the Indonesian approach also has its opportunities. For example, it can provide community-specific solutions that offer a flexible and adaptable

approach to local needs. Each area can develop waste management practices designed to meet its unique requirements. When solutions are tailored to fit the local contexts, it becomes easier to increase community engagement and participation, leading to the creation of sustainable waste management practices.

Behavior Change Strategies

Advocacy and Awareness Campaigns

To effectively implement behavior change initiatives, NGOs must instill education and awareness of the importance of waste management. In Indonesia, the NGO utilizes large-scale education sessions at the 'Banjar' level, where people attend workshops and watch presentations, followed by targeted door-to-door visits. This method ensures and covers the varying levels of community awareness in different villages in Bali, as mentioned by J2:

"Our first mission is to raise awareness about the benefits of waste management. We focus on explaining why waste separation is important, both for individuals and the environment. We conduct large-scale education sessions at the 'Banjar' level to reach as many people as possible. Within these sessions, we provide detailed information about different waste categories and how to separate them properly. After these sessions, we follow up with targeted door-to-door visits to address any specific questions or concerns from the households. To reinforce our message, we use prompts like flyers, stickers, and other educational materials. Our hope is that by understanding the purpose and benefits of waste management, both for themselves and their environment, people will feel more motivated to participate. We also offer small financial incentives, so households can earn some money by selling separated waste." (J2)

In the Netherlands, because public awareness of waste management is already established, public campaigns are integrated with existing waste management infrastructure. Information is disseminated at points of sale and through digital tools,

ensuring continuous engagement. L1 mentioned that these public campaigns may include using signage, informational campaigns, and setting up systems in controlled environments like cinemas and festivals:

"We used communication strategies at points of sale and practical approaches in closed environments like cinemas. We had success with closed environments like cinemas and festivals, where the packaging stays within the same area." (L1)

From what L1 has already explained, it is evident that closed or controlled environments can provide a manageable setting for behavior change initiatives, where its implementation and monitoring can be applied consistently. This approach ensures that waste management practices are effectively implemented and can be scaled to other settings in the Netherlands.

Social Networks and Influencers

Both countries have utilized social networks and influencers to promote behavior change, as it has been proven that these platforms and figures are easily recognized by the current generation, which frequently involves smartphones in their daily activities and has become highly tied to their devices due to that reason. However, the effectiveness of this method can vary due to local contexts. In Bali, traditional leaders and women's groups like PKK are highly influential in disseminating information and encouraging community participation in waste separation, simply because these figures are trusted by the society. Therefore, when NGOs involve them, it will be easier to raise awareness and motivate households to adopt sustainable waste management practices.

The approach is done by integrating waste management education into the existing community structures in Bali, and the messages are not only delivered by the NGO, but also by the trusted and influential community members mentioned above. This

method not only enhances the reach and impact of the educational initiatives but also ensures that the behavior change is sustained through continuous support and reinforcement from the community, as mentioned by J2:

"We identify key influencers within the community through our research. For example, we work closely with PKK, a women's organization, which is already well-established and trusted in the community. The head of PKK can effectively motivate households to participate in waste separation. We also engage traditional leaders to endorse our programs, knowing their influence will drive better adherence. If these leaders say that throwing trash carelessly is a sin, the community will instantly believe them more than they would a sustainability expert. Their word carries a lot of weight and people in the village are more likely to listen to and follow their guidance." (J2)

Despite the fact that the majority of current generations in Bali use social media, it does not yet cover the entire population. Many of these influential figures in villages, particularly the PKK members, do not yet utilize smartphones. Therefore, the use of social media among this group is limited. When it comes to delivering the behavior change initiatives, they focus on utilizing face-to-face interactions that are usually facilitated by the NGO and involving community leaders and organizations like PKK, who are very influential despite the lack of digital connectivity. Social sanction in Indonesia, particularly in Bali, is significant: many people fear social exclusion. Influencers like traditional leaders and PKK members are highly respected because they can leverage these sanctions. If someone improperly disposes waste, they may become the subject of gossip. Therefore, in this case influencers must engage directly with the community or target audience to achieve effective desired outcomes.

In contrast, in the Netherlands, the use of social media and public figures has proven to be an effective strategy for NGOs to nudge people towards better waste management practices. A1, as a program director of a Dutch NGO mentioned that public

figures and sports personalities are often involved in campaigns to enhance their reach and impact:

"We found that leveraging social media platforms allowed us to reach a large audience quickly. For example, when we introduced reusable packaging for food and beverages, we collaborated with well-known sports personalities and public figures. They shared their experiences and encouraged their followers to adopt similar practices. This approach not only raised awareness but also motivated people to participate because they saw their role models doing the same." (A1)

In summary, while the use of social networks and influencers is a common strategy in both Indonesia and the Netherlands, the execution differs due to local technological and social contexts. The success of using social media and influencers by NGOs in the Netherlands has shown that the platforms can be effectively utilized to engage communities and reach a broader audience in delivering behavior change initiatives, but this can only be possible when the target population has access to smartphones and uses social media on a daily basis. In the Netherlands, social exclusion is less of a factor and involving influencers can be done digitally, meanwhile in Indonesia, particularly in Bali, influencers need to engage with the community in person in order to ensure effective engagement.

Implementation Approaches

The implementation of behavior change strategies varies between the two countries. In Indonesia, the focus is on practical, low-tech solutions that are easy to adopt. For example, color-coded bins are provided for waste separation. In the Netherlands, the approach is more structured, with a significant reliance on digital tools and solutions. This includes the use of smart waste management systems and automated sorting technologies.

Practical Implementation

The practical implementation strategies differ between the two countries due to varying demographics, levels of infrastructure, technological advancements and reach to the community. In Indonesia, NGOs adopt a community-based approach to foster behavior change in waste management. A common example is the use of color-coded bins in villages and community research to tailor the program to the specific needs of local communities in an area.

Whereas in the Netherlands, practical implementation is already supported by advanced technology. Additionally, the structured waste management systems have allowed for optimization in the implementation. The use of smart waste management systems and automated waste sorting technologies support effective and efficient waste management behaviors among the society.

Technological Integration

Technological integration in waste management varies significantly between Indonesia and the Netherlands. In Indonesia, digital solutions have been adopted to support the creation of sustainable waste management systems. However, the technology or apps are primarily used for technical support, such as managing waste and tracking the amount of incoming waste, rather than for changing behavior. This was mentioned during the interview by A2, a program analyst of an Indonesian NGO:

"We also have technological innovations, such as an implementation of back-office systems for tracking financial transactions and waste flows, and a knowledge management app to educate the community and boost participation in waste separation." *(A2)*

In the Netherlands, technological integration is more advanced. Digital tools and automated systems are widely used to enhance efficiency and ensure compliance with waste separation regulations.

Measuring Effectiveness

Metrics and Evaluation

In Indonesia, NGOs track customer participation rates before, during, and after program implementation to measure the effectiveness of behavior change initiatives. Monitoring these rates over time helps assess the impact of initiatives and allows for necessary adjustments, as noted by A2:

"By comparing participation rates before, during, and after program implementation, we measure impact and fine-tune our activities based on local needs and feedback from pilot programs." (A2)

Additionally, M1 emphasized the importance of community research and the COM-B framework in designing and evaluating their interventions:

"We use community research and the COM-B framework to design our interventions and assess capabilities, opportunities, and motivations." (M1)

Adopting the COM-B framework is important for NGOs, as it ensures that strategies are not only relevant to local contexts but also effective. The iterative process of pilot testing and gathering community feedback allows NGOs to continuously improve their strategies, ensuring these interventions can be effectively implemented across various local contexts in different regions of Indonesia.

In the Netherlands, NGOs measure the effectiveness of their initiatives through financial incentives and public compliance. A waste management organization in the Netherlands uses financial consequences, where individuals who properly dispose of their

waste pay less, to motivate people to dispose of and separate waste correctly, as highlighted by J1 on the interview:

"In all of this money, that's a very important one. When people do have the feeling that their behavior makes it that they pay less for their waste, by having better behaviors, they pay less. That's the combination which works in all of it." (J1)

Further, J1 explained how financial incentives play a key role in influencing behavior:

"But in Holland, mainly the most effective one is trying to influence people by their financial consequences, by the fee they pay. By working together with the municipalities, we can track compliance rates and the resulting financial savings for households that adhere to the guidelines." (J1)

These financial incentives have been proven to increase public compliance with waste separation regulations and provide tangible measures of the success of behavior change initiatives through higher compliance rates and financial savings for compliant households.

Contextual Adaptation

Contextual adaptation is an important indicator for NGOs to measure the success of their behavior change initiatives. In both Indonesia and the Netherlands, NGOs use metrics and community research to continuously develop and refine their strategies. By sharing best practices and learning from each other, NGOs in both countries can enhance their effectiveness and promote sustainable waste management practices more broadly. A1 emphasized that each region has a unique cultural, social, and institutional context, highlighting the importance of understanding the local context before implementing solutions:

"We should be aware of the importance of contextual research before rolling out solutions. For example, this can be done by conducting pilot programs for testing, and

also iteration can help us adapt our approach to fit the different cultural, social, and institutional contexts in an effective way." (A1)

In Indonesia, the NGO conducts community research to tailor their programs to local needs. A2 highlighted the role of community research in adapting their approach:

"One of our successful strategies involves holding large education sessions in sub villages level units called 'Banjar'. We try to keep track of attendance to see if participation is increasing. If some people don't attend, we follow up with door-to-door visits to ensure more people get involved. To fine-tune our activities, we conduct community research in each village before launching new initiatives. By doing this we can implement our approach based on the local needs and feedback from pilot programs." (A2)

Knowledge Sharing and Mutual Learning

Cross-Cultural Learning

Cross-cultural learning and international collaboration are essential for enhancing the effectiveness of behavior change strategies in different institutional contexts. Through cross-cultural learning, NGOs can share best practices and learn from each other's successes and failures. NGOs in Indonesia and the Netherlands believe that knowledge exchange and mutual learning with their international stakeholders provide significant benefits in this regard.

M1 highlighted the importance of international collaboration, particularly between their teams in Indonesia and Argentina. He mentioned:

"We have internal meetings to share our experiences and learn from each other's methods, especially in community research and program implementation." (M1)

This dialogue through regular meetings allows the organization to continuously assess and refine its approach by integrating successful strategies from different regions, thereby increasing its overall effectiveness.

A1 also conveyed the benefits cross-cultural learning and the exchange of knowledge with other countries can have. She highlighted how the organization engages in knowledge exchange with Finland, Norway, Denmark, and Sweden. This exchange primarily focuses on the technical aspects of waste management installations. By collaborating with these countries, the organization stays informed about the latest innovations and best practices in waste management. A1 explained:

"We focus on knowledge exchange with Finland, Norway, Denmark, and Sweden, mainly on the technical part of installations. This helps our organization stay informed with the latest innovations and best practices in waste management, which can be adapted to the Netherlands' local context." (A1)

The mutual learning process involves sharing insights and adapting strategies that have proven successful in other countries. This approach not only helps in refining existing programs but also in avoiding potential pitfalls by learning from the experiences of others.

For the Indonesia context, M1 explained how their organization benefits from mutual learning:

"We share our stories and approaches, aligning behavior targets and understanding broader contexts. When we share knowledge, we always start by explaining the context. For example, if we're discussing barriers in Indonesia or Argentina, we first conduct research to identify these barriers. This way, we can have a comprehensive conversation because we understand that various factors influence behavior in different contexts. We also align our behavior change targets to ensure we are all on the same page. In Argentina, the target might be just to get people to start sorting waste, whereas in Indonesia, it could be to make people consistently sort their waste. These are different

goals, and understanding this distinction is important." (M1)

This exchange of knowledge allows the organization to implement strategies that are informed by a broader range of experiences and makes their programs more resilient and adaptable to different contexts. A1 further supports this point by noting how the organization implements lessons learned from international collaborations:

"We learn from each other's successes and challenges, which helps us refine our strategies and improve our programs." (A1)

This learning process ensures that organizations' behavior change initiatives are both innovative and grounded in proven methodologies. By continuously refining their strategies based on lessons learned from their partners, these organizations can ensure their programs remain effective and sustainable. A1 has proven that mutual learning and adaptation is a key factor in the success of their waste management initiatives and highlighted the added value gained from the international collaborations in achieving long-term sustainability goals.

Sharing Best Practices

In Indonesia, the NGO uses the local cultural context to enhance the effectiveness of its programs. For example, in Bali, incorporating traditional leaders and cultural norms into waste management strategies not only fosters a sense of formality and commitment but also ensures that the initiatives are more easily understood and accepted by the community. This method, which relies on existing social structures and respected authorities, has proven effective in driving behavior change and achieving program objectives. Local figures are very important in Bali. Therefore, the initial step in mobilizing the community involves engaging local leaders rather than directly addressing the community. M1 discussed how traditional leaders play a massive role in promoting

waste separation practices:

"To give you an example, during the 'Nyepi' (Day of Silence) in Bali, the rules are very clear. There is a traditional regulation advising people not to leave their homes, and it is enforced by 'pecalang'. The 'pecalang' do not enforce the rules to punish people but to maintain order and adherence to tradition. This cultural enforcement makes people follow and obey. The existence of such cultural enforcement systems, like 'pecalang', definitely plays a role. Like when it comes to waste management, using these local figures and systems means that people are more likely to comply without needing extensive explanations. The community respects these traditional figures, and their involvement in waste management initiatives greatly enhances compliance and effectiveness." (M1)

In the Netherlands, NGOs adapt global best practices to meet local needs. A1 explained on the interview:

"We implement lessons learned from international collaborations and tailor them to our local context, ensuring that they are effective and relevant. There are different contexts for creating behavior change: closed, semi-closed, and open environments. In closed environments, it's easier to implement changes because you can have targeted communication and simple return systems. In semi-closed environments, more communication and technology support are needed. Open environments are the most challenging. Success in closed environments comes from stakeholder alignment, engaging the whole team, and starting with small pilots. This inclusive process allows for testing and adaptation in real-world contexts." (A1)

A1 explained that the organization in the Netherlands identifies environmental context classification in implementing its behavior change approach. Categorizing their behavior change approach based on closed, semi-closed, and open environments allows them to tailor their strategy to the unique characteristics and challenges of each setting. In this context, Indonesia can be categorized as an open environment due to its cultural, social, and geographical diversity. For example, local governments have varying degrees of autonomy over waste management policies. Consequently, in Indonesia, behavior

change often has to be self-initiated, which presents significant challenges.

DISCUSSION

The current study investigated whether and how contextual factors can influence behavior change approaches in waste management in the Netherlands and Indonesia, as well as how strategies implemented by NGOs in both countries can improve the effectiveness of those strategies and how these two countries can learn from each other, given that they are two very different countries in this regard, the Netherlands is centralized, while Indonesia is decentralized. Contextual factors and behavior change strategies that shape effective and sustainable waste management practices have been identified through an in-depth analysis of six interviews with NGO representatives in the Netherlands and Indonesia. This discussion will outline the findings, contributions, recommendations for NGOs, limitations of the study, and suggestions for future research.

Institutional Context and Behavior Change Approaches

The institutional contexts in the Netherlands and Indonesia significantly shape their respective behavior change approaches to waste management. In Indonesia, especially in rural areas such as villages in Bali, there is a strong reliance on institutional initiatives to build community awareness and capacity to manage waste wisely. The level of awareness and understanding of waste segregation varies among residents and regions. For example, as mentioned in the interviews, the organization's approach involves mass education campaigns followed by door-to-door visits to ensure that the education on waste segregation is comprehensive and wide-ranging. This method helps raise awareness and provides practical and basic knowledge on waste management to

encourage behavioral change in a decentralized country like Indonesia.

In contrast, the Netherlands benefits from a more structured and centralized waste management system. Here, behavioral change is driven by regulations and financial incentives. Effective strategies can also be optimized due to digital tools and their maximum use in this country, public campaigns and also financial consequences for those who dispose of waste improperly.

Increasing Effectiveness Through NGO Strategies

NGOs play an important role in improving the effectiveness of waste management strategies by changing the behavior of the people. This is done by taking an approach that is tailored to the local context. In Indonesia, especially in Bali, NGOs work with the government and involve influential figures to support behavior change and its penetration into the community. This strategy leverages the strong social influence in the community, making it more effective in driving behavior change. In Indonesia, behavior change starts with motivation; in this context, motivation can move people to sort and dispose of waste. For example, listening to traditional leaders and the fear of being ostracized by the community when littering.

In the Netherlands, NGOs can improve their strategies by understanding social dynamics and utilizing community engagement to complement regulatory and financial incentives. In the Netherlands, behavior change is driven by initiating 'opportunities.' Knowledge sharing and international collaboration between NGOs in both countries can lead to innovative solutions that are effective in different contexts. For example, the Netherlands can learn from the social influence strategies used in Bali, while Indonesia can utilize the structured and uniform systems implemented in the Netherlands.

Institutional Pressure and Regulatory Support

Strong government regulations on waste segregation are essential to support behavior change initiatives. In Indonesia, NGOs collaborate with local governments to set and enforce waste segregation rules, ensuring that communities are engaged and compliant. In the Netherlands, NGOs work with policymakers to advocate for sustainable waste management practices and ensure that regulations support their initiatives.

Community engagement and social norms are critical to promoting waste segregation practices in Indonesia, where people tend to fear social sanctions, and social sanctions can have a deterrent effect on people who do not comply with regulations. Traditional leaders and organizations such as PKK in the community play an important role in encouraging compliance and participation in this regard. In the Netherlands, public campaigns and financial incentives are more effective in influencing behavior. Understanding these social dynamics can help NGOs improve their strategies by incorporating elements of community engagement and social influence.

Challenges and Opportunities

Developed countries like the Netherlands rely heavily on a structured system for waste management, so the success of behavior change initiatives is closely linked to the reliability of the waste management infrastructure. Any disruption in this system can have a significant impact on people's behavior.

In Indonesia, the diversity of the waste management system poses a challenge in implementing a uniform behavior change strategy. However, this also opens up opportunities for NGOs to innovate and develop approaches that are tailored to local needs. For example, the use of digital tools such as waste management apps and back-office systems can simplify processes and increase participation and efficiency in

both contexts.

By understanding and addressing these challenges, NGOs can design strategies that are more effective and suited to each country's local conditions, thereby increasing public awareness and participation in sustainable waste management.

Contribution

This research contributes to the understanding of how contextual factors such as institutional structures, culture, regulatory frameworks, social norms, technological adoption, and knowledge exchange can influence behavior change approaches in waste management. It confirms the importance of tailoring strategies to the local context and leveraging social and regulatory influences to promote behavior change. These findings provide valuable insights for NGOs working on behavior change in waste management in countries with both decentralized and centralized waste management systems, on effective strategies to conduct behavior change approaches in their communities. NGOs can improve the overall effectiveness of their initiatives. This knowledge is useful for the future because the context in this research is that both countries can learn from each other, not necessarily now but more to contribute to knowledge.

Recommendations for Indonesian and Dutch NGOs

Strengthen Education Programmes

Indonesia can continue to focus on education initiatives as part of the behavior change approach to improve communities' ability to understand and implement waste management practices.

Education methods that are tailored to the local context, coupled with the involvement of trusted community leaders, can make the program more effective. For

example, an NGO's strategy of conducting community research before launching an initiative ensures that the education program is relevant and resonates with the local population. By identifying influential figures in the community, such as traditional leaders or respected figures, the NGO can utilize these trusted voices to disseminate information and encourage participation in waste segregation practices.

The effectiveness of this approach was seen in the interviews where it was mentioned that traditional leaders have a significant influence on community behavior in Bali. Engaging these leaders in educational initiatives can result in higher compliance and sustainable behavior change. In addition, using existing community structures, such as local women's groups (PKK), can facilitate wider reach and impact. By integrating waste management education into these established networks, NGOs can ensure that the information is accessible and trusted.

Meanwhile, the Netherlands can utilize digital tools and public campaigns to complement regulatory and financial incentives, ensuring comprehensive coverage and engagement. The structured nature of the Dutch waste management system provides an opportunity to integrate technological solutions that increase efficiency and participation. For example, the use of mobile apps that provide real-time information on waste collection schedules, recycling tips, and the location of landfills can help residents comply with waste segregation regulations. Public campaigns that highlight the environmental and financial benefits of waste segregation can further reinforce the importance of this practice.

Utilizing Social Influence

Indonesia can engage traditional leaders and community influencers in areas where social influence is strong to complement regulatory measures. Interviews revealed

that in Bali, the influence of traditional leaders is critical to driving behavior change. These leaders can use their authority and respect within the community to promote waste segregation practices and encourage compliance. NGOs can facilitate this by providing training and resources to these leaders, enabling them to effectively communicate the importance of waste management to their communities.

For example, organizing workshops or community meetings led by traditional leaders can create a platform to discuss waste management practices and address concerns or misconceptions. In addition, rewarding households or individuals who consistently follow waste segregation guidelines can create positive reinforcement and motivate others to adopt similar behaviors.

The Netherlands can incorporate elements of community engagement and social influence into existing strategies to increase effectiveness. While regulatory and financial incentives are strong drivers of behavior change, adding a social dimension can further strengthen this practice. For example, community-led initiatives or competitions that encourage residents to participate in waste segregation can create a sense of collective responsibility and pride. Highlighting stories of successful waste management practices in communities can also inspire others to follow suit.

NGOs can collaborate with local influencers, such as environmental activists or popular public figures, to promote waste management practices through social media campaigns. These influencers can reach a wide audience and use their platforms to raise awareness and encourage participation. By integrating social influence into existing strategies, NGOs in the Netherlands can increase the overall effectiveness of their behavior change initiatives.

Promoting a Uniform System

Indonesia can learn from its centralized waste management system to improve consistency and effectiveness in a decentralized context. Developing a uniform system can facilitate easier implementation and monitoring of behavior change initiatives. Interviews highlighted the challenge of waste management practices varying across different regions in Indonesia. By adopting elements of a centralized system, such as standardized waste collection schedules and uniform waste sorting guidelines, NGOs can create a more consistent approach that is easier to manage and monitor.

Implementing pilot programs in selected villages to test this uniform system can provide valuable insights and help refine the approach before scaling up. Involving local government and communities in the planning and implementation process can ensure that the system is tailored to the specific needs and context of each area. By creating a more structured and uniform approach, NGOs can increase the overall effectiveness of their behavior change initiatives in Indonesia.

The Netherlands can continue to support and refine the centralized system to ensure reliability and consistency in waste management practices. The existing centralized waste management infrastructure provides a strong basis for promoting behavior change. NGOs can work with local authorities to identify areas for improvement and implement changes that increase efficiency and compliance. For example, regular audits of waste collection services and recycling facilities can help identify gaps and areas for improvement.

Additionally, incorporating feedback mechanisms that allow residents to report issues or make suggestions can improve services and community satisfaction. By continuously improving and supporting the centralized system, NGOs in the Netherlands can ensure that waste management practices remain effective and reliable.

Limitations and Future Research Recommendations

While this study provides valuable insights, it also has limitations. The study mainly relied on qualitative data from interviews, which may be prone to bias and limited perspectives. The sample size of six interviews, although in-depth, may not fully capture the diversity of experiences and practices across different regions and organizations. In addition, this study focuses on specific NGOs and their strategies, which may not be generalizable to all NGOs or contexts. The Indonesian NGO interviewed is currently operating exclusively in Bali and has not yet expanded to other regions in Indonesia. Consequently, the insights gained from this research are limited to the context of Bali.

Future research should ideally aim to address these limitations by increasing and expanding the sample size and including a wider range of perspectives. In the Indonesian context, the sample could be drawn from different provinces. In addition, quantitative data collection methods, such as surveys and statistical analysis, can complement the qualitative findings and provide a more comprehensive understanding of behavior change in waste management. Comparative studies across different regions and countries can better explain the influence of institutional context and identify best practices to promote sustainable waste management practices.

In addition, future research should explore the long-term impact of behavior change initiatives on environmental sustainability, including tracking metrics such as carbon emission reduction and biodiversity conservation. This can provide a more holistic understanding of the effectiveness of waste management strategies and their contribution to broader environmental goals.

Conclusion

This research confirms the significant influence of institutional context on behavior change approaches in waste management in the Netherlands and Indonesia. By understanding and addressing these contextual factors, NGOs can improve the effectiveness of their strategies and promote sustainable waste management practices. The results highlight the importance of educational programs, social influence, uniform systems, contextual adaptation, technology integration, and international collaboration in driving behavior change.

Broadly speaking, referring to the COM-B framework, through this research it can be seen that Indonesia and the Netherlands focus on different elements of COM-B. We can see how the utilization of digital tools in Indonesia and the Netherlands is different, in Indonesia digital tools refer more to increasing capability, by focusing on technology and apps to help technical things in waste management. Whereas in the Netherlands it is more about opportunities because the structured and centralized system enables people to easily access and comply with waste management practices. In Indonesia, the behavior change approach focuses on motivation. Getting people to change their behavior in Indonesia should start with growing their motivation, leveraging social influence is essential to promote waste segregation practices in a decentralized system. In contrast, in the Netherlands, the behavior change approach starts from opportunity, where structured systems and regulatory measures are effective in encouraging compliance and participation.

Learning from NGOs in these two countries with very different waste management systems, one decentralized and one centralized, can help NGOs worldwide improve the effectiveness of their behavior change initiatives. Thus, this research contributes to knowledge for NGOs, applicable to both these different systems.

Through continuous research and collaboration, NGOs can develop innovative solutions that address the complex challenges of conducting behavior change initiatives in waste management and contribute to environmental sustainability. By encouraging a culture of shared learning and adaptation, NGOs can create a positive impact on waste management practices and promote sustainable behavior change in various contexts.

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APPENDICES

APPENDIX A. Interview Guide

1. How does your organization evaluate people's capability, opportunity, and motivation regarding reusable packaging practices in the country?

2. Can you provide examples of specific educational programs provided by your organization to enhance people's knowledge and motivation for adopting effective waste management? How does your organization create opportunities for the adoption of effective waste management in different regional contexts?

3. How does the social influence aspect of the COM-B (Capability, Opportunity, Motivation) model vary between one region to another, and how does your organization adjust its behavior change strategies accordingly?

4. What role do infrastructure and cultural norms play in shaping attitudes and behaviors towards waste management in the country? How does your organization adapt its approach to these differences?

5. How does your organization promote consistency in the waste management system, and how does this impact behavior change efforts?

6. How does your organization leverage community trust and social networks to influence the adoption of effective waste management behaviors?

7. How does your organization navigate dependency on infrastructure and centralized structures in promoting waste management, and what are the implications for behavior change initiatives in the country?

8. Can you provide examples of how your organization facilitates knowledge exchange and mutual learning between Indonesia and other countries to enhance behavior change approaches and strategies?

9. How does your organization measure the effectiveness of its behavior change initiatives in promoting the effective waste management in the country?

10. Can you share successful behavior change initiatives in promoting effective waste management and what factors contributed to their success?

11. How does your organization adjust its behavior change approaches and strategies based on local findings and feedback from pilot programs?

12. How does your organization collaborate with local governments, businesses, and stakeholders to scale its behavior change solutions related to reusable packaging?

13. How does your organization ensure inclusivity in its projects and consider diverse perspectives in promoting the adoption of reusable packaging?

14. What role does strategic analysis play in you organization's approach to solving environmental challenges and contributing to the success of its behavior change initiatives related to waste management?

15. Can you provide examples of how your organization redesigns systems to support the adoption of waste management effectively?

16. How does your organization demonstrate the effectiveness of its model in pilot communities and scale its solutions to multiple regions?

17. Can you provide insights into the long-term effects of your organization's behavior change approaches on promoting effective waste management in communities?

18. How does your organization ensure the sustainability of behavior changes in waste management practices?

19. Could you discuss the economic implications of your organization's behavior change initiatives, such as cost savings and increased economic opportunities associated with waste management?

20. How does your organization incorporate technological innovations into its behavior change strategies related to reusable packaging?

21. How does your organization measure the environmental impact of its behavior change initiatives beyond waste reduction?

22. Can you provide examples of how your organization's initiatives contribute to broader environmental goals, especially in reducing plastic pollution?

23. How does your organization engage policymakers to advocate for regulatory changes in support of sustainable waste management?

24. What role does your organization play in fostering a circular economy, particularly in promoting reuse and recycling through your initiatives?

25. How does your organization address social equity and inclusion in its initiatives related to waste management?

26. What are the challenges your organization faces in scaling up its initiatives, and how are they being addressed?

27. How does your organization collaborate with academia and research institutions to enhance its understanding of behavior change related to waste management?

28. What role does public awareness play in your organization's behavior change approaches related to waste management?

APPENDIX B. Coding Tree

First-Order Categories	Second-Order Themes	Aggregate Dimensions
National Policies		
Local Regulations	Policy and Regulatory Frameworks	
Policy Influence		Institutional Context
Government Partnerships	Government and Community Collaboration	
Community Engagement		
Door-to-Door Education		
Public Campaigns	Education and Awareness	
Advocacy and Awareness Campaigns		Behavior Change Strategies
Community Influencers	Social Networks and Influencers	
Social Media and Ambassadors		
On-Site Education		
Closed-Environment Initiatives	Practical Implementation	
Local Innovations		Implementation Approaches
Advanced Technologies		
Digital Tools and Solutions	Technological Integration	
Technological Needs		
Stakeholder Engagement		
Adoption Rates	Metrics and Evaluation	
Financial Incentives		Measuring Effectiveness
Regional Contexts	Contextual Adaptation	
Tailored Approaches		
Knowledge Exchange	Cross-Cultural Learning	
Mutual Learning		Knowledge Sharing and Mutual Learning
International Collaboration	Sharing Best Practices	
Guidance and Reports		