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Bridging the Gap: Circular Economy Adoption in Residential Renovation through Stakeholder Lenses

Stakeholder Perspectives: Professionals and Non-professionals

Master's thesis in Design and Construction Project Management

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DEPARTMENT OF Architecture and Civil Engineering

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Abstract

The construction and renovation sector is an major contributor to global greenhouse gas emissions, which has led to growing interest in circular economy strategies. While principles such as reduce, reuse, and recycle are increasingly adopted in new construction, their practical application in residential renovation remains limited and less studied. This thesis explores how circular economy principles are understood and applied in interior renovation projects by both professionals, including architects and project managers, and non-professionals, including homeowners and tenants.

The study is based on a mixed methods approach, combining qualitative interviews with professionals and a quantitative survey distributed to residents. The findings show that although professionals are aware of the environmental benefits of circular strategies, they often face challenges such as limited time, unclear regulations, and concerns about the quality of reused materials. Knowledge of circular economy practices remains limited among non-professionals. These actors tend to base their decisions primarily on functionality, durability, and cost, placing less emphasis on the use of recycled or reused materials.

The research identifies several enablers that could strengthen the use of circular economy in residential renovation, including clear policy support, incentives, better digital tools, and stronger collaboration between stakeholders. The study also emphasizes the need for targeted education to close the knowledge gap between professionals and non-professionals. By presenting both technical and behavioral insights, this thesis offers practical guidance for advancing sustainability in small-scale renovation contexts and contributes to ongoing discussions about circularity in the built environment.

Keywords: Circular Economy, Residential Renovation, Reuse, Sustainability, Stakeholder Engagement, Housing, Circular Renovation.

Att överbrygga klyftan: Cirkulär ekonomi i bostadsrenovering ur olika aktörsperspektiv Perspektiv från professionella och boenden
Mina Hamed
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Sammanfattning

Bygg- och renoveringssektorn står för en betydande andel av världens utsläpp av växthusgaser, vilket har bidragit till ett växande intresse för strategier kopplade till cirkulär ekonomi. Principer som att minska, återanvända och återvinna tillämpas i allt högre grad inom nyproduktion, men inom bostadsrenoveringar är den praktiska användningen av dessa principer fortfarande begränsad och relativt outredd. Denna studie syftar till att undersöka hur cirkulära principer förstås och tillämpas i inredningsrenoveringar, både av professionella aktörer såsom arkitekter och projektledare, och av icke-professionella, inklusive bostadsägare och hyresgäster.

Studien bygger på en kombination av kvalitativa intervjuer med yrkesverksamma och en kvantitativ enkätundersökning riktad till boende. Resultaten visar att även om de professionella respondenterna har kunskap om de miljömässiga fördelarna med cirkulära strategier, upplever de flera hinder i praktiken. Dessa inkluderar begränsad tid, otydliga regelverk samt osäkerhet kring kvalitet och tillgång på återbrukade material. Kunskapen om cirkulära ekonomiprinciper är fortfarande begränsad bland icke-professionella. Dessa aktörer tenderar att fatta beslut främst baserat på funktionalitet, hållbarhet och kostnad, medan användningen av återvunna eller återbrukade material ges mindre vikt.

Studien identifierar möjligheter som kan stärka användningen av cirkulär ekonomi i bostadsrenovering. Dessa innefattar tydligare politiska riktlinjer, ekonomiska incitament, förbättrade digitala verktyg samt ökad samverkan mellan aktörer. Ett viktigt behov som lyfts fram är också riktad utbildning för att minska kunskapsklyftan mellan yrkesverksamma och slutanvändare. Genom att kombinera tekniska perspektiv med insikter om användarbeteenden bidrar denna uppsats med vägledning för att främja hållbar utveckling i mindre renoveringsprojekt och stärker den bredare diskussionen om cirkularitet i den byggda miljön.

Nyckelord: Cirkulär ekonomi, Bostadsrenovering, Återbruk, Hållbarhet, Intressentengagemang, Bostäder, Cirkulär renovering.

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This thesis marks the final step of my academic journey at Chalmers University of Technology, and I would like to express my deepest gratitude to the individuals who supported me throughout this process.

I would like to thank my supervisor, Jonathan Cohen, for his guidance, insightful feedback, and valuable support. I also wish to thank my examiner, Martine Buser, for her understanding and encouragement during the course of this work.

I am grateful to all the professionals and residents who participated in the interviews and survey. Their contributions were essential to the development of this research.

Mina Hamed, Gothenburg, June 2025

List of Acronyms

Below is the list of acronyms that have been used throughout this thesis listed in alphabetical order:

CE	Circular Economy

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1
Introduction

This section introduces the thesis by outlining the background of the study, its overall aim and research objectives, as well as the scope and limitations that define its focus within the context of circular economy implementation in residential renovations.

1.1 Background

The construction sector has a significant impact on the environment and plays a key role in the shift toward more sustainable ways of building and renovating.Globally, it accounts for approximately 37% of total greenhouse gas emissions when considering both operational emissions such as energy use and embodied emissions including material extraction, production, and transport (Environment, 2024).Emissions in the construction sector arise from both building operations and the extraction, processing, and assembly of materials. Cement production, for example, accounts for approximately 8% of global CO_2 emissions, ranking it among the largest industrial sources worldwide (Andrew, 2019; Pomponi & Moncaster, 2017).

This challenge is particularly pronounced in renovation projects. Although often regarded as a more sustainable alternative to demolition and new construction, renovation can still generate substantial environmental impacts. The continued reliance on carbon-intensive materials, including concrete and steel, significantly contributes to greenhouse gas emissions. In addition, renovation activities can accelerate the depletion of natural resources and contribute to the loss of biodiversity, primarily through increased material extraction and land use.(Seto et al., 2012) Without thoughtful design and material choices, the environmental benefits of energy-efficient renovations can be weakened or undermined by unsustainable design choices (Göswein et al., 2021).

In response to these challenges, the principles of circular economy (CE) have gained recognition as a promising framework within the construction and renovation sectors. CE emphasizes minimizing waste, reusing materials, and designing for longevity, adaptability, and reduced environmental impact (EEA, 2016). Although existing research has explored circular design strategies to support decision making in construction projects, these approaches are mainly developed for the early stages of new building design and offer limited insight into how they apply in renovation contexts or which elements remain relevant (Dams et al., 2021).

This study focuses on renovation projects that involve interior design and home improvement. It examines how CE principles are currently integrated into residential renovation practices and how key stakeholders, including both professionals and non-professionals, understand and apply these principles in practice. By exploring this topic, the study contributes to a deeper understanding of how sustainability goals can be advanced through small-scale renovation and improvement efforts.

1.1.1 A missing Link: Tools, Actors, and Research gaps

Tools like material passports have been introduced to support circular construction by improving transparency and encouraging material reuse (Leindecker et al., 2025). However, their use is still mostly limited to larger commercial or institutional projects where structured processes are more common (van Capelleveen et al., 2023). This reveals a gap in how circular principles and supporting tools can be applied in residential contexts, where projects are often smaller and more varied. The lack of tailored tools, clear actor roles, and research focused on everyday renovation practices represents a missing link in the transition toward more sustainable home improvement. This study addresses that gap by exploring how circular practices are understood and used in residential renovations regarding interior design and what factors influence their adoption.

1.1.2 Research Problem

Research on circular economy (CE) principles in construction has grown, however, little is known about how these ideas are applied at the household level. Most studies have focused on large-scale projects and professional practices, leaving a gap in our understanding of everyday decision-making in residential renovations (EEA, 2016; Pomponi & Moncaster, 2017).

In residential settings, many small decisions are made by consumers' choices that directly influence material use and waste. However, these fragmented and decentralized decisions have not been thoroughly examined.This gap is significant due to current CE strategies often assume a top-down approach led by professionals and institutional policies, such assumptions may overlook the practical realities and constraints faced by non-professional actors, who play a critical role in implementing circular practices during home renovations (Leindecker et al., 2025; van Capelleveen et al., 2023). Without a deeper understanding of household-level dynamics, efforts to promote a circular economy may fail to reach one of the most active segments of the built environment. By addressing this gap, the study aims to capture how circular practices are understood and negotiated in everyday home renovation projects. This insight is essential to develop CE strategies that are effective in both theory and practice, everyday choices made by residents.

1.2 Aim

The aim of this masters thesis is to explore how circular economy principles are applied in residential renovation and interior design. The study adopts a stakeholder perspective, focusing on two groups: professionals, including architects and project managers, and non-professionals, such as homeowners and residents.

By examining how these groups perceive and engage with circular practices, the research seeks to identify both the challenges and the enabling factors that influence the implementation of circular economy strategies in residential renovation projects. By analyzing both professional approaches and non-professionals decisions in everyday renovation contexts, this thesis aims to contribute to a deeper understanding of how circular renovation can be advanced at the household level.

1.3 Research Objectives

To fulfill the purpose of this thesis, the work begins with a review of existing literature on circular strategies within the residential built environment, with particular attention to how these principles are conceptualized and discussed in the context of small-scale renovation. This review provides the theoretical basis for the empirical investigation. Building on this foundation, the study investigates how professionals, including architects and project managers, integrate circular practices into their design and project management processes, drawing on insights from qualitative interviews. The research also examines how non-professionals, including as homeowners and tenants, understand and engage with circular principles, using survey data to analyze their levels of awareness, decision-making patterns, and underlying motivations.

The study further identifies the barriers and enabling conditions that influence the implementation of circular strategies at both the professional and household level. By comparing findings across stakeholder groups, the research aims to uncover existing gaps, shared challenges, and potential opportunities for advancing circular practices in residential renovation.

1.4 Research Questions

This thesis is guided by one main research question:

How are CE principles adopted and implemented in residential renovation, and what factors influence their application among professionals and non-professionals?

To support this investigation, the following sub-questions are addressed:

1. How do professionals engage and imply CE principles in the context of home renovation?
2. How do non-professionals engage and imply CE principles in the context of home renovation?
3. What challenges and enabling factors shape the implementation of CE at both the professional and the household level?

1.5 Scope

This thesis focuses on the application of circular economy principles in residential renovation, specifically in small-scale interior improvement projects. The study investigates how architects, project managers, and residents understand and engage with circular approaches, emphasizing the aspects of behavior, design, and decision making. Broader technical systems, material production, and industrial processes are beyond the scope of this document. Instead, attention is directed toward the practical conditions, motivations, and constraints that shape the use of circular strategies at both professional and household levels.

1.6 Research Significance

This thesis contributes to sustainable development research by addressing a clear and underexplored gap: the application of circular economy principles in residential renovation. While circular strategies are increasingly integrated into large construction projects, their relevance and implementation at the household level remain limited. Through a mixed-methods approach combining interviews with architects and project managers and a survey targeting homeowners and tenants, the study explores how circular concepts are interpreted, adapted, and challenged in everyday renovation decisions. These dual perspectives reveal specific barriers that hinder adoption, while also identifying enabling conditions.

The findings offer actionable insights for multiple stakeholders. Professionals can apply the results to strengthen circular checkpoints within design. Policymakers gain empirical input for designing incentives and regulatory support structures tailored to the housing sector. Researchers are provided with a foundation for further

exploration of behavioural factors such as perceived risk, design preferences, and sustainability trade-offs. For residents, the study raises awareness of how renovation choices affect environmental impact. By connecting the lived realities of both professionals and end-users, this thesis offers a grounded and relevant contribution to advancing circular practices in the built environment.

2

Theoretical Background

This chapter presents a theoretical background based on the existing literature and serves as a foundation for the empirical study. It introduces key concepts related to the principles of circular economy in residential renovation, including stakeholder participation, definitions of circularity, and its application within the contexts of home improvement. In addition, the chapter discusses common barriers and enabling factors encountered in practice. By clarifying these concepts, the section builds a conceptual framework that guides the design and interpretation of the interview and survey components of the research.

2.1 Circular Economy

Circular Economy is an approach to production and consumption. The objective is to retain the value of materials, products, and resources in the economy for as long as possible while minimizing waste generation (Foundation, 2019). It is based on three following key principles:

- Eliminating waste and pollution through thoughtful design
- Keeping products and materials in use at their highest utility
- Restoring and enhancing natural systems

The Butterfly Diagram, developed by the Ellen MacArthur Foundation, is a key illustration that explains how a circular economy operates by maintaining the value of materials and products through continuous circulation. The diagram presents two main and interconnected cycles: the biological cycle and the technical cycle. The biological cycle, shown on the left side of the diagram, focuses on organic materials that can safely return to the environment through processes such as composting, anaerobic digestion, and natural regeneration. These materials are designed to be non-toxic and biodegradable, contributing to the restoration of ecosystems (Foundation, 2021).

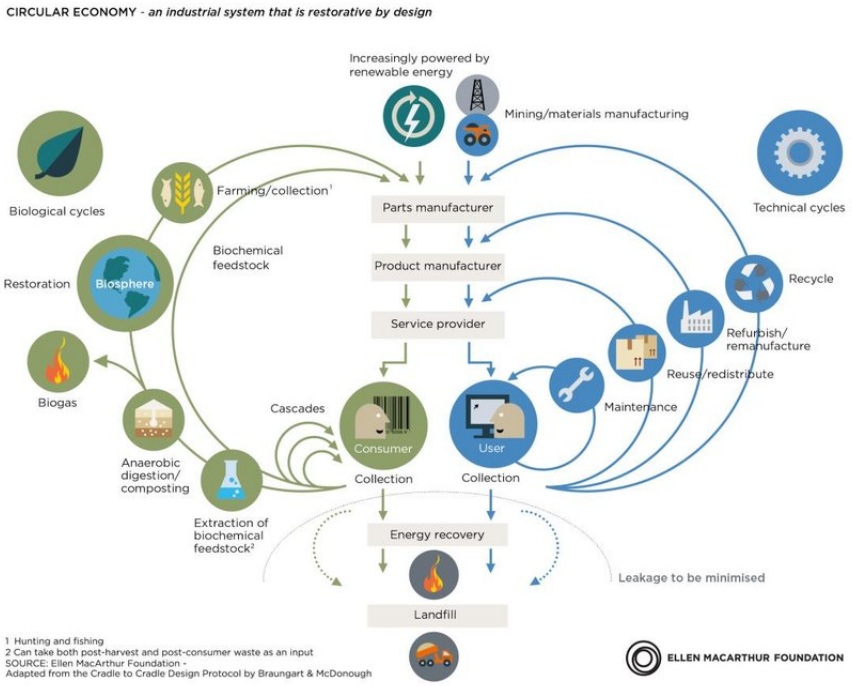

Figure 2.1: The butterfly diagram: visualising the circular economy (Ellen MacArthur Foundation, 2021)

In contrast, the technical cycle on the right side of the diagram represents non-biodegradable materials such as metals, plastics, and synthetic products. These materials are not suitable for natural decomposition and are instead kept in use through strategies such as maintenance, reuse, refurbishment, re-manufacturing, and recycling (Foundation, 2021). The diagram highlights that the closer a product or material remains to its original form, the more value is preserved. Therefore, inner loops such as reuse and repair are preferred over outer loops such as recycling, which typically require more resources and energy.

By distinguishing between these two cycles, the Butterfly Diagram illustrates how materials and products can be managed in a circular system (Foundation, 2021). It encourages the design of products that are biodegradable safely or suitable for long-term use and recovery. The diagram also reflects a broader shift away from the traditional linear economic model of take, make, and dispose, toward a system that eliminates waste, keeps materials in use for as long as possible, and supports the regeneration of natural systems. This model promotes long-term sustainability by reducing resource consumption and environmental impact while supporting economic resilience. Moving away from dependence on limited natural resources allows the circular economy to offer a meaningful response to some of the most urgent global challenges of today.

The circular economy (CE) has gained traction as a framework for reducing environmental impact and improving resource efficiency. However, the term remains inconsistently defined across academic, policy and industry contexts. According to Kirchherr et al. (2017), there are 114 definitions revealed wide variation, with most

focusing on strategies like reduce, reuse, and recycle. While fewer address deeper systemic changes such as product redesign, business model innovation, or changes in consumer behavior (Kirchherr et al., 2017). Social dimensions and links to larger sustainability goals are often overlooked, making it difficult to develop consistent policies or assess the real impact of circular practices.

2.2 Circular Economy in Practice

In the context of renovation projects, the circular economy presents an opportunity to re-evaluate the management and transformation of existing buildings. Circular renovation focuses on retaining, adapting, and upgrading what already exists instead of demolishing and rebuilding. This involves reusing building components, extending the lifespan of structures, and reducing the need for new materials that contribute to both resource efficiency and significant reductions in greenhouse gas emissions (EEA, 2020).

To put these principles into practice, circular renovations are based on a range of strategies. These include designing for disassembly, enabling materials to be reused in future projects, using reclaimed or recycled materials from other buildings, and applying selective renovation methods that prioritize preservation over replacement. Tools such as material passports and life cycle assessments (LCA) support decision making by mapping the environmental impact and future reuse potential of building elements (Leindecker et al., 2025). In addition, Arup's circular building toolkit also provides a structured approach to applying circular principles in design and renovation. It includes practical tools such as a circularity scorecard, a material selection guide, and adaptable layout planning strategies that help project teams assess flexibility, ease of disassembly, and reuse potential across different building elements (Arup, 2025). These resources aim to support early stage decision making and facilitate the transition to more circular practices in both new construction and renovation projects.

The European Union is promoting a more sustainable and resource-efficient economy through several key policy initiatives. The European Green Deal, launched in 2019, outlines the EUs goal of becoming climate neutral by 2050 and highlights the role of a circular economy in reducing environmental impacts in key sectors such as construction, textiles and electronics (Environment, 2024). As part of this strategy, the Circular Economy Action Plan was introduced in 2020 to promote sustainability throughout the life cycle of products. The plan encourages improvements in product durability, repairability, and recyclability and focuses on sectors with high resource use, including construction, packaging, and plastics (wfto, 2023). The Circular Economy Act, expected to be in 2026, will aim to create more consistent rules for circular economy practices across EU Member States. It is expected to include requirements that all packaging must be reusable or recyclable by 2030 and introduce measures that support the use of recycled materials and the development of circular business models in industries such as electronics, construction, and textiles (Jurak,

2025). Together, these initiatives reflect the long-term vision of the EU for a circular economy that supports sustainable growth and reduces environmental harm.

2.3 Stakeholder Roles in Circular Economy Renovation

Making renovation projects more circular requires the involvement of both professionals and non-professionals. On the professional side, architects and project managers play a key role in planning and designing projects in ways that support the objectives of the circular economy (CE). They can choose building materials that are easier to reuse, plan for future changes, and think about how to reduce waste and environmental impact throughout the building life cycle (Van Uden et al., 2025). Through their decisions in the early stages of a renovation project, professionals can help shape buildings that are more adaptable, efficient, and environmentally responsible.

Non-professionals, homeowners and tenants, also play a significant role, particularly residential projects. Their choices around maintenance, material reuse, and energy upgrades can have a big impact on how circular a renovation becomes. Research shows that although these individuals are key to putting CE ideas into practice, they often lack the knowledge, support, or tools to make circular decisions confidently (van Capelleveen et al., 2023) (Leindecker et al., 2025). Collaboration between professionals and non-professionals is essential for this issue. Homeowners/ residents are more likely to choose solutions that align with circular goals when homeowners are involved early in the process and given access to clear information and guidance. This includes better communication between professionals and homeowners, as well as practical tools and systems that support circular decisions on a smaller scale (Jurak, 2025; Killip et al., 2014).

2.4 CE in Renovation Projects

Renovation supports the circular economy by extending the life of buildings, reducing material use, and minimizing waste through adaptation of existing structures rather than demolition and new construction (O'Grady et al., 2021). A key part of this connection is the use of circular design strategies during renovations, including designing buildings to last longer, be more flexible, and allow easy disassembly. Choosing durable and adaptable materials makes it easier to adjust buildings in the future without major changes. Design for disassembly also makes it possible to take apart and reuse building parts, supporting material reuse and recycling. These practices help buildings and materials go through several life cycles, which is a core idea in the circular economy. Renovation also creates opportunities to recover valuable materials. Many buildings contain items such as wood, bricks, tiles and metal that can be reused instead of discarded. Using these existing materials reduces the demand for new resources and helps reduce environmental impacts. However, proper

planning and coordination between architects, builders and other stakeholders is needed to make material recovery successful (Kavini, 2024; Lucas & Löschke, n.d.).

2.5 The Implementation Gap: Circular Economy in Private Renovation Projects

A wide range of actors play a crucial role in enabling circular renovation in the built environment. Building owners influence outcomes through their decisions, opting for reusable materials or incorporating design features that support future adaptability (Senaratne, 2023). Designers and builders are responsible for applying circular principles in practice and translating abstract strategies into tangible solutions on-site. Public authorities also play an important role by creating enabling conditions, offering incentives, setting clear regulatory frameworks, and integrating circular requirements into publicly funded renovation projects (Fernandes & Ferrão, 2023).

Digital tools and regulatory instruments further strengthen the connection between renovation practices and circular economy objectives. Technologies such as Building Information Modeling (BIM) and Material Passports facilitate the documentation, traceability, and reuse of materials, making it easier to plan for circular outcomes. In parallel, regulations and public procurement policies can drive industry-wide change by establishing clear expectations and providing institutional support for circular approaches (Chaturanga, 2024). Employees also serve as key agents in the implementation of circular practices during renovation activities. Through actions such as minimizing waste, reusing materials and sorting recyclable content on site, workers directly contribute to reducing the environmental impact of renovation processes (Guo et al., 2022). Research highlights that on-site waste management and the practical application of circular strategies can lead to significant reductions in carbon emissions, underscoring the importance of the participation of the workforce in achieving sustainable renovation outcomes.

Despite increasing attention to circular economy principles in large-scale public construction projects, their application in residential renovation remains limited (Pomponi & Moncaster, 2017). Renovation has the potential to significantly extend the life of existing buildings and avoid the emissions associated with demolition and new construction. However, circular strategies are still rarely prioritized in practice, particularly in smaller private (Ma et al., 2024)

This gap between potential and implementation is especially evident in small-scale residential renovations, which represent a substantial portion of the renovation activity in the built environment. Although Sweden's national strategy for a circular economy (2020) promotes reuse and waste reduction across sectors, existing policy frameworks and innovation efforts remain primarily focused on commercial and institutional buildings (Regeringskansliet, 2020). As noted by Lund University (2021),

private home renovations continue to be underrepresented in circular policy discussions (Lukac & Ljajic, n.d.). Given the scale and frequency of residential renovation, this oversight may limit progress toward broader sustainability and climate goals.

2.6 Barriers and Opportunities in Implementing CE

The implementation of circular economy (CE) principles in residential renovation remains limited due to a complex combination of technical, economic, educational, and regulatory challenges (Rosado, 2025). Although awareness of circular approaches is growing, translating these principles into everyday renovation practice is still difficult.

A key challenge lies in the limited knowledge and competence related to circular practices. Both professionals and residents often lack familiarity with circular methods, and in many cases, the confidence or practical guidance needed to implement them effectively. Studies show that awareness of CE is often surface-level, and that both architects and end-users frequently lack the practical tools needed to make informed circular decisions (Killip et al., 2014). Technical issues are also common. Most existing buildings are not designed to allow for disassembly or the reuse of components. In addition, material traceability is often poor, making it difficult to assess whether salvaged elements meet safety, quality, or performance standards (Ghisellini et al., 2016). Even when reuse is technically feasible, the process of adapting components to new requirements can be time-consuming (Knoth et al., 2022).

Economical factors continue to be a major constraint. Reuse can involve additional planning, storage, and labor costs, factors that may discourage decision-makers from prioritizing circular solutions in renovation projects. Markets for second-hand materials are still relatively immature, making it harder to source components of consistent quality and volume. This uncertainty often undermines confidence in the financial viability of circular strategies (Zuo & Zhao, 2014). Regulatory conditions also create complications. Current building codes and procurement rules are often structured around new materials, leaving limited space for circular alternatives. The absence of clear standards or guidelines for reused components contributes to risk aversion among project teams and complicates approval processes (Wilts & O'Brien, 2019).

Behavioral and cultural dimensions add further difficulty. In residential projects, where personal preferences and aesthetic expectations play a strong role, reused materials may be seen as inferior or undesirable. Both professionals and residents may default to conventional approaches out of habit, convenience, or concern about long-term performance (Sauvé, 2016). There are also infrastructural challenges. Many regions lack systems for collecting, storing, and distributing reclaimed materials at scale. This makes it difficult for practitioners to plan projects that include

reuse, especially when construction timelines are tight or materials are needed on short notice (Bohne & Wærner, 2014).

Moreover, circular strategies are often discussed in either broad policy contexts or specific product-focused settings. At the level of individual renovation projects, where many critical decisions are made, there is a lack of tools and frameworks tailored to the realities of daily design and construction work. Without support at this intermediate level, circular principles risk remaining abstract rather than actionable (Pomponi & Moncaster, 2017).

3

Methods

This chapter outlines the research design, data collection methods, and ethical considerations for the study. The general aim is to understand how the principles of Circular Economy (CE) are applied in residential renovation projects by professionals and non-professional perspective, to identify the opportunities and barriers they face in practice.

3.1 Research design

This thesis adopts a qualitative research approach, with primary data collected through interviews with professionals, and supported by a survey to include the perspectives of non-professionals, defined in this study as homeowners and tenants. The research design consists of three main components:

- A review of relevant literature to establish background knowledge and define key concepts related to circular economy and renovation
- Semi-structured interviews with professionals, including architects and project managers
- A survey targeting non-professionals to explore their attitudes, experiences, and engagement with circular practices in residential renovation

The study takes an exploratory approach, aiming to gain insight into a developing and relatively under-researched topic. It follows an abductive research strategy (Dubois & Gadde, 2002), in which empirical findings and theoretical understanding are developed in parallel throughout the research process. This design enables a nuanced investigation of how circular economy principles are understood and applied in practice, from both professional and user perspectives.

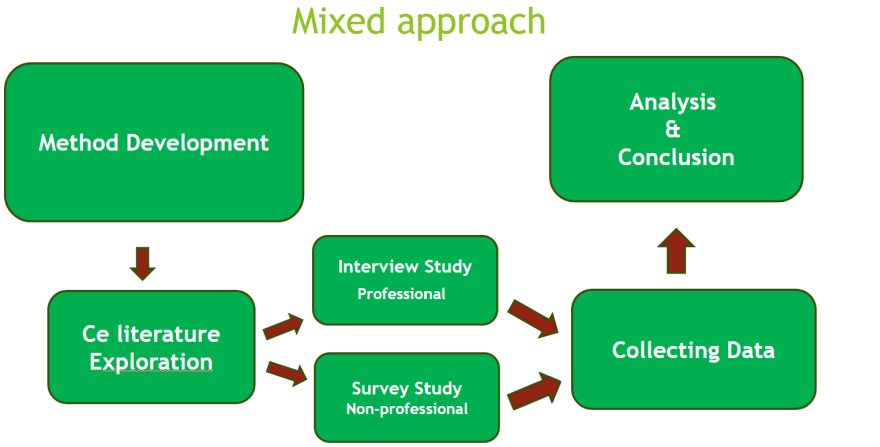

Figure 3.1: Research Design Illustrating Methodology and Data Collection

3.2 Literature Study

A literature study was conducted to examine how the principles of circular economy have been addressed in previous research on renovation.This serves as the conceptual foundation of the study and is outlined in the section on theoretical background. This helped shape the research questions and guided the design of the interviews and the survey. Relevant sources were found through Google Scholar, the Chalmers Library database, and industry-related publications. The literature search was based on keywords that reflect the main themes of the study. These included circular economy, circular practices, circular renovation, renovation, interior design, stakeholders, residential renovation, material reuse, adaptive reuse, and sustainable design strategies. These keywords were used in different combinations to identify studies related to how the principles of circular economy are applied in home renovation and how different actors are involved in the process.

3.3 Interview Study

To explore the perspectives and experiences of professionals working with circular renovation, semi-structured interviews with architects and project managers were conducted. These interviews were held online through Microsoft Teams, each session lasting approximately 60 minutes. All interviews were recorded with the consent of the participants to enable accurate transcription and analysis. In this study, no interviews with non-professionals were conducted. Instead, their perspectives were captured through a separate survey to complement the professional insights.

The interviews followed a thematically structured guide aligned with the studys research questions and objectives. The table below outlines the key themes and the corresponding focus areas covered in the interviews.

Theme	**Focus Area**
Professional Background	Role in renovation projects, responsibilities, education, and use of digital tools
Knowledge of Circular Economy (CE)	Understanding of CE, familiarity with concepts, and evolution of perspectives
Practical Application	Use of CE strategies (e.g., reuse, modular design, material efficiency), frameworks and standards
Tools and Information Management	Experience with material passports, digital registers, and environmental certifications
Stakeholder Collaboration	Role of professionals, interaction with clients, and influence on decision-making
Challenges and Opportunities	Barriers to implementation (e.g., cost, time, knowledge), drivers for circular practices
Future Outlook	Expectations for CE in the coming years and visions for industry development

Table 3.1: Overview of Interview Themes and Corresponding Focus Areas

A qualitative research approach was selected due to its strength in investigating complex, context-specific phenomena by capturing insights from those directly engaged in the subject matter. This approach adopts a flexible and exploratory design that seeks to understand behaviors, perceptions, and decision-making within real-world settings (Wilson, 1998). This aligns closely with the aims of the study, investigating how circular economy principles are interpreted and operationalization in residential renovation projects. Since the implementation of circular strategies often depends on professional judgment, contextual constraints, and experiential knowledge, a qualitative approach enables a more nuanced and in-depth understanding of these processes. Accordingly, this methodological choice supports the exploratory nature of the study and provides a robust foundation for examining the dynamics that shape circular renovation practices in practice.

The participants were selected based on their professional experience with renovation and interior design projects. To ensure confidentiality, all participants are presented anonymously. A table summarizing the roles of the participants is included below, and the full list of interview questions is available in the Appendix.

Interview No.	Professional Role	Educational Background	Duration & Platform
1	Project Manager	Engineering	50 min, Microsoft Teams
2	Architect	Architecture	70 min, Microsoft Teams
3	Architect	Architecture	58 min, Microsoft Teams
4	Project Manager	Engineering	49 min, Physical
5	Architect / Project Manager	Architecture	65 min, Microsoft Teams
6	Project Manager	Engineering	50 min, Microsoft Teams

Table 3.2: Interview details

The interview recordings were transcribed and analyzed using thematic analysis. This means that the data were read carefully and coded for key ideas that were then grouped into larger themes. The steps were:

- Reading all transcripts
- Highlighting important points and assigning codes
- Organizing similar codes into themes
- Comparing findings to the circular economy and stakeholder theories

3.4 Survey Study

To complement the interview findings and incorporate the perspective of non-professionals, a survey was distributed to residents/homeowners. The survey was carefully constructed to capture how residents understand, interpret, and apply circular renovation principles in practice. Its design was reviewed in collaboration with the thesis supervisor to ensure clarity, relevance, and alignment with the overarching research objectives.

The survey was administered through Questback, a digital platform widely used in academic and professional research. Its flexible interface allowed for a diverse range of question formats, including multiple choice, ranking scales, open-ended responses, and Net Promoter Score. The platform ensured secure data management and full anonymity for respondents, enabling the collection of both quantitative and qualitative insights from residents/homeowners with direct renovation experience.

The questionnaire addressed key themes such as awareness of the concepts of circular economy, renovation behavior, sustainability attitudes, and preferences for material reuse. To further examine the trade-offs that shape renovation decisions, the survey incorporated scenario-based questions. These scenarios were made by a method developed by (Choi et al., 2021), in which factors such as cost, environmental impact, and reuse potential were systematically varied. This approach provided a structured way to explore how individuals prioritize between competing values in renovation contexts.

The design of the scenarios was inspired by MIT's Moral Machine experiments, which aim to capture human perspectives on ethical decision-making by presenting participants with various moral dilemmas (Iyad et al., 2019). These dilemmas were presented through different scenarios to identify which factors influence decision-making. The figure below illustrates how the scenarios were presented, each encompassing five distinct dimensions. These dimensions were systematically varied across the different scenarios to explore how they influence decision making.

By adjusting factors such as cost, material reuse, functionality, appearance, and environmental impact, the survey aimed to reveal the underlying preferences of participants and the trade-offs they are willing to make when selecting renovation options. The two figures below present examples of the scenarios used in the survey, illustrating how the available options differed across key dimensions.

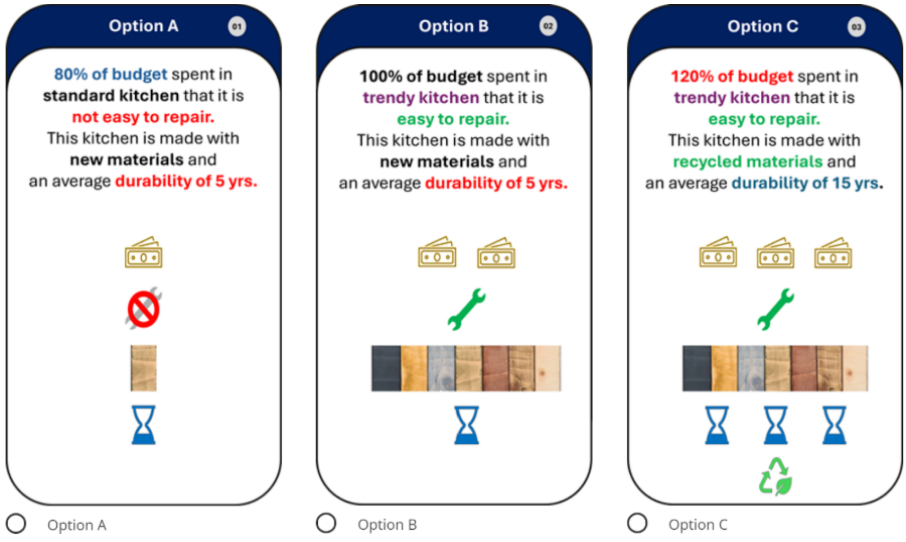

Figure 3.2: Showing scenario-based example, Scenario 8

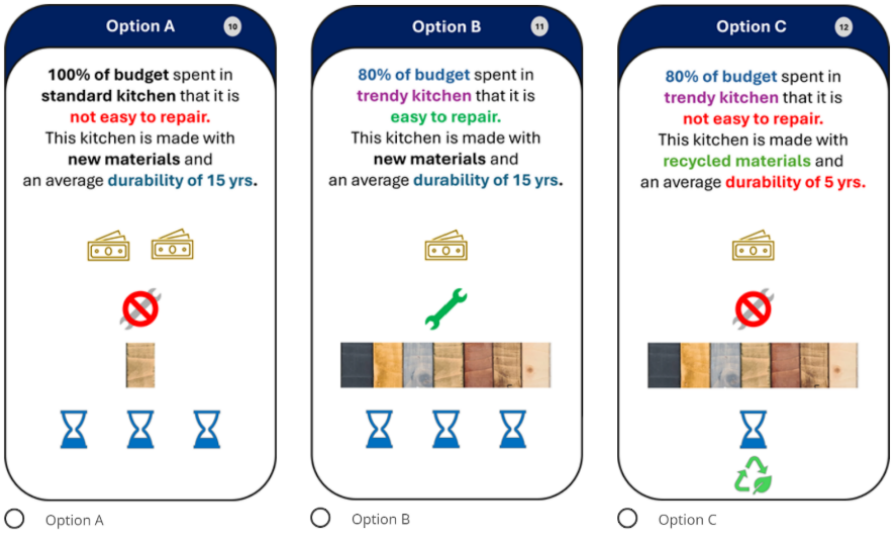

Figure 3.3: Showing scenario-based example, Scenario 4

To understand how personal characteristics influence renovation choices, the survey collected basic background information such as age, income, and education. The questions were carefully designed to gather a wide range of data. Multiple-choice questions helped identify general behavior patterns, while ranking tasks revealed what respondents considered most important. Open-ended questions gave participants the opportunity to share their thoughts in their own words, and a Net Promoter Score was used to measure their overall attitude toward circular renovation. The survey was shared online, tested beforehand to ensure that the questions were clear, and kept short and easy to complete in order to encourage participation.

By combining detailed insights from interviews with broader input from the survey, the study gives a well-rounded picture of how circular economy practices are viewed and used in residential renovation. The survey results were analyzed using basic descriptive statistics to identify patterns in attitudes and behaviors of homeowners.

3.5 Ethical Considerations

The study followed ethical research guidelines and met all requirements under the General Data Protection Regulation (GDPR). Participants were clearly informed about the purpose of the study, how their information would be used, and that they could withdraw at any time. Everyone gave informed consent before taking part and agreed to be recorded. To protect privacy, all data were anonymised and stored securely. After the research was completed, recordings and notes were deleted. These steps helped ensure that participants felt safe, respected, and able to share their views openly.

4

Results

The following chapter presents the results of the empirical data collection, including the findings of the survey and the interview study. Each section is structured to highlight key themes, insights, and patterns that emerged from the respective methods.

4.1 Interview Findings

The interviews revealed key challenges in applying circular practices in residential renovation. Participants expressed similar views on many of the issues discussed and a clear pattern could be seen in the responses. Although there was general agreement on the importance of circularity, some differences emerged regarding how it is implemented in practice. The following chapter builds on these findings by exploring the underlying conditions that shape how circular practices are approached and applied in renovation projects from a professional perspective.

4.1.1 Professionals Understanding in Practice

All interviewees defined the circular economy in broadly similar terms: extending material lifespans, reducing waste, and keeping buildings adaptable. The participants emphasized that their understanding of circular principles had developed primarily through hands-on professional experience rather than formal academic training. This reflects a broader trend in which knowledge of circular methods has emerged organically within project environments, shaped by real-world challenges and solutions. An interviewee noted:

***When I studied, the circular economy was not really mentioned. I have learned mainly through real projects.*(Interview 6)**

This comment highlights how the transition from theory to practice is still evolving and how professionals are often left to interpret and apply circular concepts within the context of everyday project work. It was also mentioned that the circular economy was implied in different projects before the term was defined. Other participants shared this experience. One observed that circular economy is often used more as a marketing term than a real strategy and called for more practice-oriented education (Interview 2), while another reflected that their work with reuse began long before the terminology became common, describing it simply as *rebuilding or conversion* at the time (Interview 1).

4.1.2 Common Strategies for Circular Renovation

Several specific strategies were mentioned by the interviewees. Among these, the reuse of structural and interior components such as façades, doors, and partition walls was identified as a key circular measure. In addition, modular design solutions that allow for future adaptability were described as a way to reduce material turnover and facilitate long-term flexibility. These approaches were described as environmentally conscious and were also seen as effective tools for achieving design efficiency, especially in long-term renovation planning. Modular layouts allow spaces to evolve gradually, avoiding large-scale demolition when needs change.

We reuse existing elements such as facade panels and work with modular solutions that can be adapted over. (Interview 3)

Other respondents identified digital tools as essential to allow long-term circular practices (Interview 2, 3, 5, 6) . Documentary passports and structured documentation were considered valuable for increasing transparency and traceability. These tools were described as helping reduce demolition waste and supporting better planning for future reuse.

Material passports create transparency about materials inside buildings and make future reuse more feasible. (Interview 3)

Interview 6 emphasized the integration of climate data libraries into BIM models, noting that these tools allow decisions to be made based on the actual impact of carbon.

We use climate data libraries directly in our BIM models. That helps us to make decisions based on actual CO_2 impact. (Interview 6)

Multiple interviewees highlighted the importance of developing standardised digital systems that facilitate life-cycle tracking and improve coordination between suppliers. Although material passports are not yet widely adopted, they have consistently been viewed as promising innovation, particularly when integrated into procurement processes and supported by suppliers. Today's organisations currently relies on internal documentation systems that serve a similar purpose, though they are not formally structured as material passports (Interview 6). Despite these current limitations, the general view was that material passports have significant potential to support traceability, strengthen procurement practices, and help embed circularity in renovation projects from the early planning stages.

They could be a game changer if we can make the process standardized and efficient. Having a material passport that shows different qualities of the material simplifies implementation and makes it easier to use across different organisations and companies. It helps move away from isolated internal databases toward a more unified and standardised approach. **(Interview 5)**

4.1.3 Client Commitment and Early-Stage Integration

The successful implementation of circular economy strategies in renovation projects depends not only on technical solutions but also on the level of commitment of the clients and how the first circular principles are addressed in the process. All respondents emphasized that the client's ambition and priorities often shape the extent to which reuse and sustainability measures are adopted. Without clear direction from the client, project teams can turn to conventional approaches. As explained in Interview 4, illustrates how economic constraints and unclear objectives can limit the space for innovative or resource-efficient practices, even among motivated professionals.

We aim to be circular, but what actually gets done depends heavily on the client and budget. (Interview 4)

Introducing circular goals early in a renovation project is just as important as having a committed client. The majority of the respondents emphasized that for these goals to be successfully applied, they must be integrated from the very beginning, particularly during the initial planning or procurement stage. When circular ambitions are introduced later in the process, they often end up being side considerations rather than shaping the overall direction of the project.

If you don't introduce sustainable alternatives early, the project just continues with old habits. (Interview 5)

This highlights the importance of proactive leadership and forward-thinking planning in embedding circular principles into the project's foundation. An example of how early commitment can support circular implementation was provided in Interview 5. In this project, all stakeholders signed a reuse declaration at the very beginning, establishing a shared understanding of the renovations sustainability objectives. This formalized commitment helped align the entire team around circular goals from the outset.

Having that agreement in place from day one made everything smoother. Everyone understood what reuse meant in our context and how we were expected to integrate it into our work. (Interview 5)

This example demonstrates how early-stage alignment and explicit commitments can move circular ambitions from theory into coordinated action. When sustainability expectations are clearly defined and jointly embraced from the start, they are more likely to shape decisions across the entire renovation process.

4.1.4 Residential perspective

The interviews highlighted that the residential sector remains underutilized in applying the principles of circular economy, despite having significant potential to reduce environmental impact. Several participants expressed concern that many home renovations prioritize aesthetic upgrades at the expense of material efficiency and sustainability.

Functional kitchens or bathrooms are often removed just to justify rent increases, even when small changes could have been enough. For example, raising the counter would have achieved the same goal without waste. (Interviewee 6)

This observation underscores how decisions driven by standards-enhancing upgrades can undermine circular ambitions. The interviewees also emphasized the importance of involving tenant organizations in renovation planning. Interviewee 2 suggested that tenant groups could play a stronger role in re-questioning unnecessary replacements and advocating for more resource-conscious solutions.

"enants can be a driving force if they demand that existing elements be preserved rather than replaced without reason. (Interview 2)

These insights suggest that both stronger tenant engagement and a change in the way renovation value is perceived could support the adoption of circular strategies in housing. By adopting selective renovation methods, reusing existing components and encouraging collaborative decision making with tenants, the residential sector could make a more meaningful contribution to circular goals.

4.1.5 Barriers to Circular Implementation

The interviews identified several key barriers that hinder the consistent implementation of circular economy principles in renovation projects. These challenges, as described by the participants, fall into three main categories: economic constraints, technical difficulties, and regulatory limitations.

Economical considerations were consistently raised in the interviews as a fundamental obstacle. The participants highlighted that the use of reclaimed materials often incurs higher costs due to the need for additional inspections, certifications, storage, and specialized logistics. These requirements increase the financial burden on project teams and reduce the competitiveness of circular solutions compared to conventional practices. As an interviewee explained:

Reuse is often not cheaper due to the additional inspections, certifications, and logistics required for stored materials. (Interview 6)

Another participant reflected on the difficulty of justifying reuse under current market conditions, underscoring the importance of economic incentives in making circular practices viable and attractive within project constraints

You would not buy a second hand bicycle if it cost the same as a new one. (Interview 5)

Technical limitations further complicate the integration of circular strategies. Respondents described how reclaimed materials often vary in condition, appearance, and performance, making them difficult to standardize or incorporate into established design processes. Aesthetic inconsistencies, such as color variations in brickwork or uneven textures in salvaged timber, were cited as barriers that can deter both clients and design professionals. These concerns are intensified by the challenges of meeting functional and safety requirements, including fire resistance and structural integrity. These requirements also add complexity to project planning and reduce the flexibility needed for adaptive reuse.

Regulations concerning product certification and building standards often make circular solutions more complicated to implement. (Interview 3)

Regulatory frameworks were another barrier aligned with circular objectives. The interviewees observed that the prevailing building codes, insurance standards, and approval procedures typically assume the use of new standards. This assumption restricts the use of alternative or reused components, even when they meet equivalent performance criteria. Interviewee 1 explained that todays building codes are too strict and are not suitable for reused materials. They also noted that the supply chain for reclaimed materials is not well developed, making it difficult to use them in large renovation projects. Interviewee 2 similarly highlighted the lack of infrastructure for storage and quality assurance, which limits the feasibility of integrating reused materials within current regulatory frameworks.

Knowledge and training gaps were identified as the main barrier to circular renovation. Several participants pointed out that both professionals and clients often lack the practical experience needed to work confidently with circular solutions. Although sustainability awareness is growing, knowledge about reuse, life-cycle assessment, and adaptive design remains limited. Many professionals only learn about these topics once they are already working, indicating shortcomings in current education. The lack of warranties for reused materials also creates uncertainty and hesitation.

4.1.6 Potentials for Future Development

Future-oriented developments that could facilitate the broader implementation of circular economy practices in renovation were identified. A recurring theme was the potential of material passports and digital documentation systems to enhance transparency and enable long-term reuse of material. By systematically recording data on the origin, condition, and technical properties of building components, these tools could support more informed decision-making and help minimize demolition waste. Although their use remains limited in current practice, participants viewed material passports as a promising solution, particularly if their application becomes

standardized and integrated into procurement processes with the support of material suppliers.

Material passports create transparency about materials inside buildings and make future reuse more feasible. (Interviewee 3)

The interviews also underscored the influential role of architects and project managers in the advancement of circular strategies within renovation projects. Several participants emphasized the importance of starting discussions about circular economy principles early in the planning phase. This proactive involvement was considered critical for shaping the direction of the project and embedding sustainability from the outset. Interviewee 4 stressed the need to *Question industry truths* and to ground design decisions in thorough and context-specific assessments. Likewise, Interviewee 5 highlighted that project leaders should *Take initiative early* and actively present clients with alternative approaches. These professionals were expected to demonstrate technical expertise while also serving as advisors, guiding stakeholders toward solutions that challenge conventional practices and promote circular outcomes.

The interviews also addressed the influence of organizational structures. Participants noted that companies that engaged in knowledge sharing, organized study visits, and established internal sustainability goals were more likely to include circular principles in their projects. Interviewee 1 described that project teams regularly present their circular projects and invite others to visit finished buildings, a practice intended to spread knowledge and increase familiarity with circular methods. Pilot projects were referred to as important opportunities to test new strategies, although several participants emphasized the need for the knowledge gained through such projects to be shared and integrated more broadly.

Education was highlighted as lacking, particularly in providing practical guidance for implementing CE principles. Professionals noted that current architectural and engineering programs often cover sustainability in theory but do not equip students with the hands-on tools needed to apply circular strategies in practice.

Education often focuses on sustainability in theory but lacks hands-on methods to implement circular strategies in practice. (Interview 5)

The participants also reflected on how circular approaches can influence the design process. Reusing materials and designing for long-term adaptability were considered ways to not only improve environmental outcomes but also create buildings with unique character. These insights suggest that closer integration of circular methods into both education and design thinking could support broader adoption in future renovation projects.

Reuse can create unique and characterful spaces, something that new production rarely offers. (Interviewee 3)

4.2 Survey study

To complement the qualitative interview insights, a digital survey was distributed to Swedish residents during April and May 2025, aiming to understand how individuals engage with circular practices in home renovation. The survey collected 53 valid responses, with 12 participants indicating recent or ongoing renovation experience. The sample included both homeowners and tenants, covering a range of ages and types of dwelling. The survey addressed general renovation behavior, attitudes toward circularity, key decision factors, and trade-offs made in renovation scenarios. The results are presented thematically.

The sample consisted of respondents across a range of age groups, with the largest proportion (42%) aged between 2635 years, followed by 3645 years (28%). A majority of respondents (66%) reported living in multi-family dwellings, while 34% lived in single-family homes. Regarding tenure, approximately 62% were renters and 38% were homeowners. Household size varied, with most participants (57%) reporting two or more individuals in the home. This diversity provides a useful background for interpreting renovation preferences and engagement with circular strategies.

4.2.1 Renovation Experience and Engagement with Circular Practices

Out of the 53 respondents, 22.6% reported that they had personally engaged in home renovations in recent years. Among this subgroup (n = 12), several circular practices were adopted to varying degrees.

- Reusing salvaged materials or furniture: 58%
- Choosing durable or easily repairable products: 75%
- Installing modular or adaptable systems: 17%
- Using second-hand or reclaimed materials: 42%
- Selling or donating leftover renovation materials: 50%

The table below presents the practical limitations that residents and homeowners face when attempting to adopt circular renovation practices. The insights are drawn from open-ended survey responses, where participants described their experiences in their own words. The responses have been categorized to highlight key areas that influence the implementation of circular economy principles and can inform future strategies to improve accessibility.

Table 4.1: Resident-stated barriers to circular renovation

Theme	**Resident comment**	**Survey question**
Access to circular materials	*I find it important but hard to reuse and recycle things in renovations. It is hard to find and buy materials that are reused or recycled.*	Q38
Affordability and practicality	*Its important overall, but hard to find solutions that work for a consumer, and with a competitive price.*	Q38
Uncertainty about future use	*The difficulty lies in not knowing how long youll live there, and how you can be sure it will last for 15 years.*	Q48
Renovation depends on future plans	*I think how long you see yourself living in the home affects what kind of renovation youre willing to invest in.*	Q48

4.2.2 Awareness and Definitions of Circularity

To assess baseline familiarity, respondents were asked to rate how familiar they were with the concept of a circular economy. Only 17% described themselves as *Very familiar,* while 39% indicated some familiarity and 44% reported being not familiar at all. This suggests that circularity remains an abstract or unfamiliar topic for a significant portion of the general population.

When invited to define the term in their own words, most participants associated circular economy with waste reduction, reuse of materials, and sustainable resource use. However, several responses revealed a limited or vague understanding. For instance:

Using things again instead of throwing them away.

Its about reducing waste and recycling properly.

Not sure, but I think its something about being more environmentally friendly.

These definitions, while generally aligned with the reuse-reduce-recycle framework, often lacked deeper insight into systemic or design-related aspects of circularity such as modularity, adaptability, or lifecycle-thinking.

The chart below illustrates how important respondents consider circular practices and the use of sustainable materials when planning a renovation. As shown, 75% of respondents can be categorized as detractors, while only 8% expressed a clear willingness to adopt such practices. It is important to note that the survey did not specify which types of circular practices were being referred to, which may have influenced the responses. The second figure shows how familiar respondents are with circular practices. The responses were evenly split, with an equal number of participants stating that they were either familiar or unfamiliar with the concept. This suggests that the lack of engagement with circular renovation cannot be explained by awareness alone. Other factors such as accessibility, affordability, or perceived relevance may also influence their decisions.

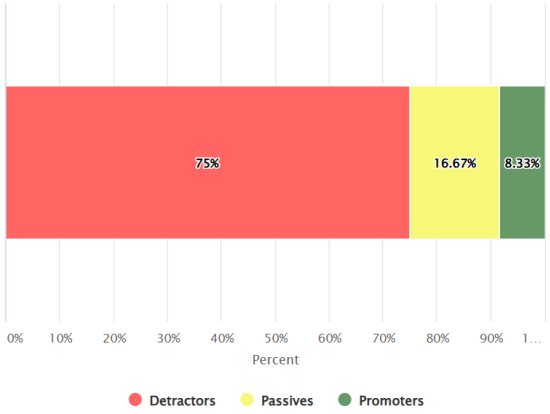

Figure 4.1: Importance of Circular Practices

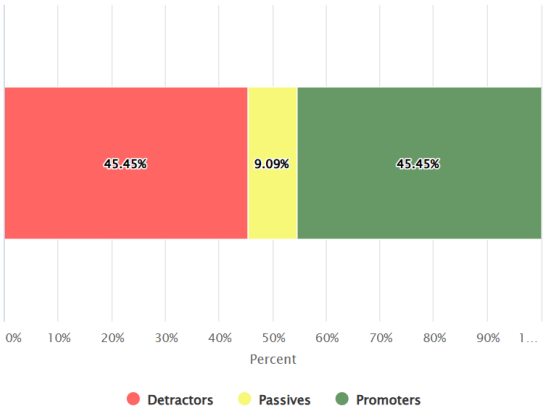

Figure 4.2: Familiarity with Circular Practices

4.2.3 Drivers of Renovation

Respondents prioritized appearance, functionality, and comfort when rating factors influencing their renovation decisions. While 67% valued design improvements, only 25% considered energy efficiency important, and just 19% prioritized environmental aspects. This reflects a gap between sustainability awareness and its influence on actual choices.

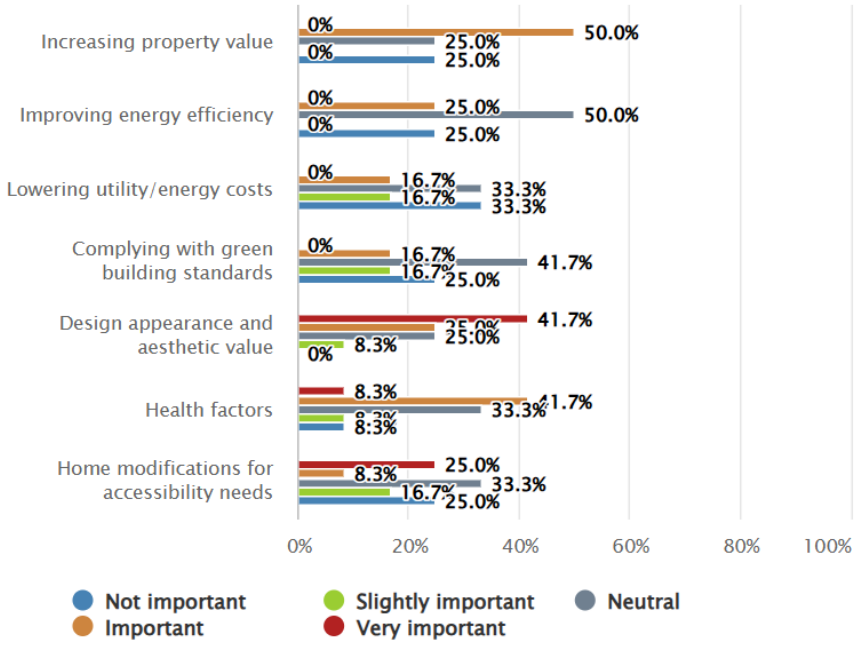

Figure 4.3: Respondents ratings of how important various reasons were in their decision to renovate their home.

The results show that many people tend to renovate several parts of their homes at the same time. Bedrooms were the most commonly renovated spaces, followed by bathrooms and kitchens. This pattern may help increase the use of circular solutions, as higher demand across different rooms can make it easier to access and apply circular alternatives. The responses reveal a variety of reasons for undertaking renovations, ranging from aesthetic preferences and aging materials to energy inefficiency and structural damage. Some renovations were planned, while others were triggered by unexpected issues, such as collapsing walls or deteriorating components. The respondents also mentioned external factors, including decisions made by housing associations. These insights highlight both personal motivations and practical needs as key drivers of renovation.

In a ranking task, respondents were asked to prioritize six factors typically considered during renovation. In the figure below, the results show how the respondents ranked product-related factors when making renovation decisions. A lower average score indicates higher importance. Performance, price, and durability emerged as the top priorities, while aspects such as special deals and extended warranties were considered less important.

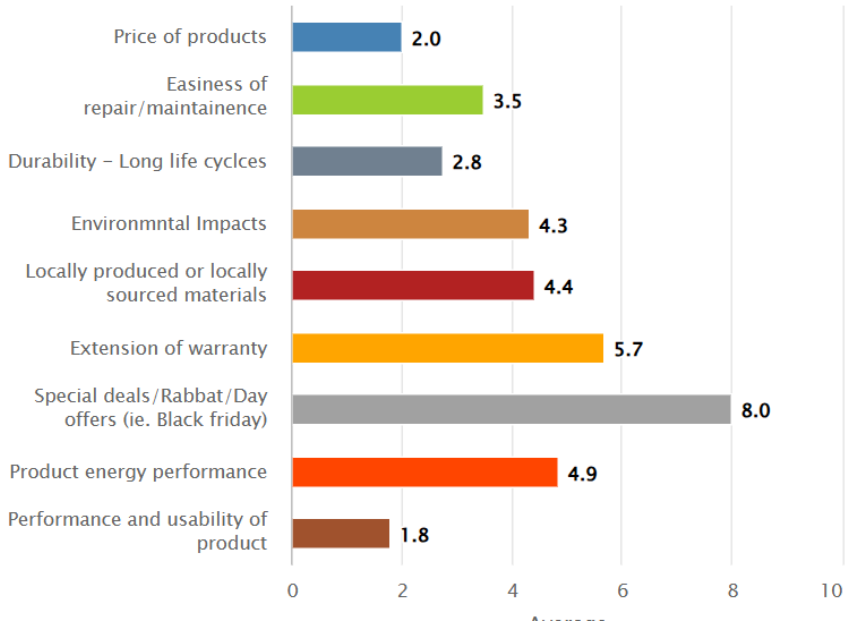

Figure 4.4: Priority factors in renovation decisions

4.2.4 Scenario Experiment Results

To explore how residents prioritise different renovation attributes, participants were presented with eight hypothetical renovation scenarios. Each scenario offered three options (A, B, or C) combining different levels of durability, ease of repair, appearance, price, and environmental features such as the use of recycled materials.

Across the scenarios, a consistent pattern emerged. The options that were chosen most frequently included durability and ease of repair. These two features were present in the majority of the top-ranked alternatives, indicating that residents value long-term usability and the possibility to maintain or extend the lifetime of the product over time. After these two attributes, financial considerations and aesthetic appearance were also shown to influence decisions. When durable and repairable options were combined with reasonable price and attractive design, they gained even higher preference rates.

In contrast, environmentally friendly aspects such as the use of recycled materials were generally less prioritised. In several scenarios, participants preferred new materials over recycled ones when the new options offered longer lifespan or simpler maintenance. This indicates that for most respondents, environmental features alone are not sufficient to justify a choice if other essential factors like durability, cost, or design are compromised.

The figure below presents the results for Scenario 2, in which the majority of respondents selected the option that involved a simpler repair process, despite its higher associated cost. This suggests a preference for convenience over cost efficiency among many participants. Nevertheless, economic considerations remained relevant, as 26% of respondents chose the alternative that emphasized the use of recycled materials, even though it entailed a higher price. This indicates that sustainability considerations held importance for a notable share of the respondents, although this pattern was not as evident in the other scenarios.

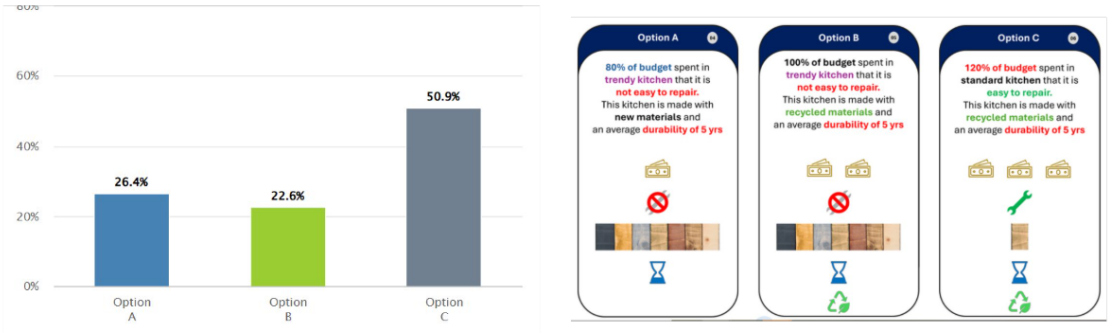

Figure 4.5: Results from scenario 2

The results of Scenario 4 indicate that the durability and ease of repair were more important to the respondents than the use of recycled materials.

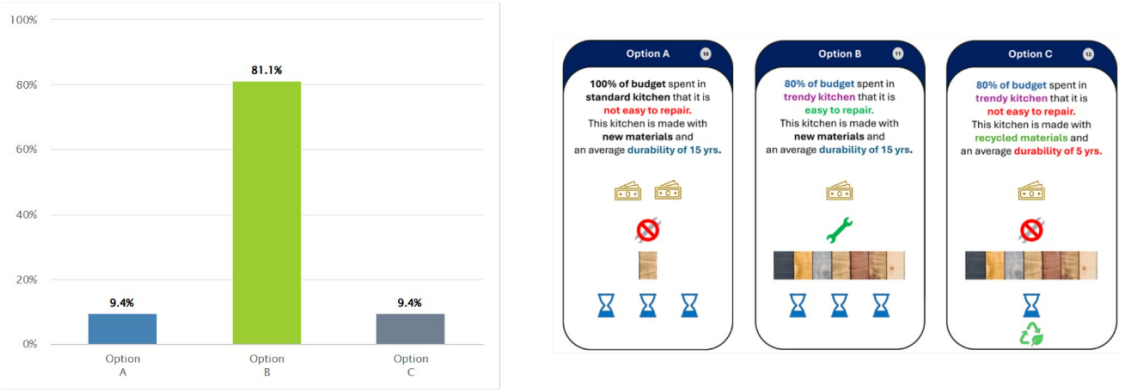

Figure 4.6: Results from scenario 4

The results of Scenario 8 also highlight the importance of material durability, even when it involves a higher cost.

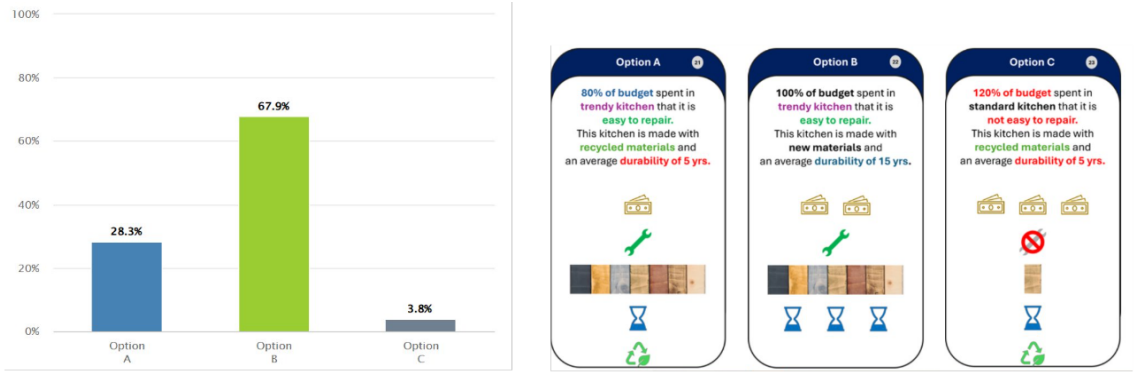

Figure 4.7: Results from scenario 8

4.2.5 Key Takeaways

The survey results reveal several important insights into how residents perceive and engage with circular practices in the context of home renovation. Circular engagement is limited but present. However, more advanced strategies, reflecting both knowledge gaps and structural limitations in the renovation process.

Functionality, cost, and aesthetic design appear to have a stronger influence on material choices in residential renovation than the use of reused or recycled materials. Findings from both the ranking tasks and scenario-based questions indicate that practical performance and affordability are consistently prioritised by respondents. Environmental considerations, including the use of circular materials, were generally rated as less important and were often deprioritised when trade-offs were involved. These results are further supported by the interviews, where professionals emphasised that renovation decisions are typically guided by visual preferences and budgetary constraints rather than sustainability objectives.

Knowledge of circular economy is low and superficial. While many residents were somewhat familiar with general sustainability concepts, few had a deeper understanding of circularity. The term was often associated with recycling or reuse, and there was limited awareness of broader strategies such as design for disassembly, material traceability, or planning for long-term flexibility.

These findings confirm that although residents may express a desire to act sustainably, practical decisions are shaped more by immediate benefits than by long-term ecological outcomes. Bridging this gap may require targeted education, financial incentives, and design solutions that make circular options more visible, accessible, and appealing in everyday renovation contexts.

5
Discussion

This chapter interprets the empirical findings in relation to the study's research questions and the broader context of circular economy (CE) implementation in renovation. The discussion is structured around key themes that emerged from interview and survey results, as well as relevant academic literature.

5.1 Roles and Priorities of Key Actors

Across the interviews, professionals expressed strong ambitions for sustainability, with a particular focus on material efficiency, long-term usability, and the reduction of environmental impact through waste minimisation. These priorities are closely aligned with circular economy principles. However, many participants noted that their understanding and application of such strategies had developed primarily through hands-on experience in real-world projects, rather than through formal academic training.

This finding is similar to concerns raised in earlier studies. Pomponi and Moncaster (2017) note that although the circular economy is becoming more discussed in the building sector, much of the academic discourse remains conceptual and detached from practice (Pomponi & Moncaster, 2017). The lack of empirical studies and actionable implementation frameworks has contributed to a gap between theory and everyday construction work. As a result, professionals often rely on informal learning, trial-and-error, and knowledge sharing within their networks to apply circular approaches in practice.

While this type of experiential learning can be valuable, it also presents limitations. Without a solid theoretical foundation, the implementation of circular strategies can remain fragmented or inconsistent. Interviewee 2 highlighted this challenge, by explaining a construction worker has only been trained to install modern, standardized windows, they may not have the skills required to fit reused or older components. In such cases, even if reuse is prioritized by architects or project managers, it may be difficult to implement on-site. This underscores the need for circular knowledge to be shared more broadly across all levels of the construction process. It should not be limited to planners and designers, but it must also reach contractors, tradespeople, suppliers, and other actors who influence project execution. A more inclusive and comprehensive approach to knowledge distribution is essential if circular principles are to move from intention to practice in a meaningful and scalable way.Integrating

circular economy principles in building projects requires collaboration across disciplines and phases. (AlJaber, 2024).

Professionals shared a foundational understanding of circular economy principles, However, their approaches to implementation varied. Some focused on modular design and strategies for disassembly, whereas others prioritized the reuse of structural components or the integration of digital tools for material tracking and documentation. These strategic choices were shaped by ideological commitments and contextual factors, for instance the organizational environment, the scope of the project, and the level of client engagement. In this regard, circular renovation can be seen as a context-dependent practice, where professionals must continually balance sustainability ambitions with the practical constraints of time, budget, and regulatory requirements.

Residents showed a different set of priorities compared to professionals. While many expressed a general interest in sustainability, their renovation decisions were mainly guided by cost, appearance, durability, and everyday functionality. The use of reused or recycled materials was often seen as less important than these more immediate and visible qualities. For example, materials that looked new, were easy to maintain, or matched the desired design were typically preferred over those selected primarily for environmental reasons. It is important to highlight, however, that preferences for durability and ease of repair can still contribute to environmental goals. Materials with a long lifespan reduce the need for frequent replacement, which helps lower the demand for new products and decreases the environmental impact associated with manufacturing and waste. In this way, even when circular practices are not a conscious priority in form av reusing/recycling, residents choices may still support circular outcomes by promoting longevity and resource efficiency.

Professionals and residents play important roles in renovation projects. Professionals typically influence the early stages of planning and design, where key decisions about materials and methods are made. Residents, on the other hand, determine what is accepted, used, and maintained over time. When these perspectives are not integrated, circular ambitions risk being lost during the implementation phase. Creating space for early communication, shared decision-making, and mutual understanding can help bridge this gap and increase the likelihood that circular strategies are realized in both design and everyday use.

5.2 Enabling Factors for the Practical Application of Circular Strategies

Circular renovation is widely acknowledged as a valuable strategy for promoting sustainability in the built environment. However, this study confirms that its implementation remains limited by a combination of structural, organizational, and behavioral barriers. One frequently challenge mentioned is the lack of early integration. Several professionals noted that once the concept design is finalized, it becomes difficult to introduce circular alternatives. These options are often excluded due to time pressures, budget constraints, or a lack of interest from clients. To prevent such trade-offs, circular goals need to be established from the outset of the project. Instruments such as reuse declarations, carbon budgets, and circularity scorecards can support this process by helping to define ambitions early and guide decisions throughout the design and construction phases (Pomponi & Moncaster, 2017).

Digital tools, such as material passports and Building Information Modeling (BIM), are highlighted as key enablers of circular renovation. These tools can provide valuable information about the origin, condition, and future reuse potential of materials. Despite their technical maturity, however, their use in practice is often fragmented.The effectiveness of digital tools such as material passports and Building Information Modeling (BIM) depends on more than their technical capabilities; it also requires consistent application across the project life-cycle and sustained collaboration among designers, contractors, and suppliers (Mankata, 2025). Without shared data standards, regular updates, and clearly defined roles and responsibilities, these tools risk functioning as static repositories rather than as active enablers of circular practices. Interview insights further revealed that many organizations currently rely on internal databases to manage reused materials. Advancing towards more standardized and interoperable systems could improve information accessibility and foster greater cross-sector collaboration. This highlights the need for further research into the wider integration of such tools, particularly regarding their scalability and potential for international standardization within the construction sector.

In addition to digital tools, existing project routines and incentive structures present further challenges. Many professionals perceive circular strategies as time-consuming and uncertain. Concerns were raised about reused materials, particularly the absence of warranties and the additional effort required to source, test, and verify their quality. Guo and Hao (2022) refer to this as an implementation gap, where the environmental benefits of circular practices are recognized in theory but are rarely achieved in practice due to logistical and economic limitations (Guo et al., 2022). The wider adoption of circular strategies is unlikely unless supportive policies are introduced, such as product guarantees for reused materials or financial incentives that reward material efficiency.

5.3 Governance and Leadership for Circular Renovation

Despite growing interest in CE from both professionals and some segments of the public, the study identifies several persistent barriers that hinder wider adoption in renovation projects. Many of these are structural and well documented in the literature, while others relate more directly to cultural and organizational routines. A key challenge is the higher cost associated with reused materials, often due to additional testing, handling, and logistical requirements. Interviewees emphasized that even when reuse is technically possible, it is rarely the cheaper option. This observation is supported by studies showing that reclaimed materials often carry a financial premium compared to mass-produced new ones (Boverket, 2025). Without financial incentives or subsidies, it is difficult to justify such choices, especially in cost-sensitive projects. Regulatory frameworks also play a significant role. The traditional way of building/renovating includes new materials. This creates uncertainty when reusing components that lack clear documentation or performance guarantees. As noted by the European Environment Agency (2021), many CE efforts are stalled by certification barriers and a lack of trust in reused materials (EEA, 2020). Standardized guidelines and warranty systems could alleviate some of these concerns. Supply-chain fragmentation is another barrier. Interviewees pointed to a lack of reliable marketplaces and storage infrastructure for salvaged components. This often means that opportunities for reuse are missed simply because materials are not available at the right time or in the right condition. Establishing regional reuse platforms, supported by digital traceability tools, could help address these bottlenecks and improve access to quality-assured materials.

Additionally, both professionals and residents expressed uncertainty around the meaning and implementation of circular practices. While professionals may understand the technical aspects, they often lack clear workflows or support systems. Residents, on the other hand, tend to conflate circularity with basic recycling or energy efficiency. This highlights a broader need for education, capacity building, and practical demonstration projects to foster deeper understanding and trust.

Leadership should also extend beyond clients and contractors. Tenant-oriented organizations, such as Hyresgästföreningen, play a key role in translating high-level circular economy objectives into practical actions by facilitating information campaigns and promoting awareness at the household level. Interview evidence indicates that projects involving such organization progress more smoothly and face less resistance because tenants feel empowered to influence material selection rather than passively accept finished interiors. (Sacranie & Çetin, 2022). Aligning governance, incentives and leadership across multiple levels therefore increases the likelihood that circular renovation becomes a repeatable process rather than an exception. Formal targets, supportive financial instruments and inclusive decision-making together provide professionals and residents with the legitimacy and motivation needed to embed circular practices in everyday renovation work.

5.4 Methodological Reflections and Limitations

This study benefits from a comprehensive mixed-methods design that combines qualitative interviews with professionals and a quantitative survey of residents. This combination allowed for a comprehensive and detailed exploration of both institutional frameworks and individual behaviors, offering a broader understanding of the conditions shaping circular renovation in residential contexts. The integration of professional and resident perspectives adds analytical depth and helps bridge the gap between strategic intentions and lived experiences. There are, however, several limitations that should be acknowledged. The study is situated within the Swedish context, which may limit the transferability of findings to other countries with different regulatory systems, market dynamics, or cultural attitudes toward renovation and sustainability.

The survey relied on a relatively small and self-selected sample, which restricts the external validity of the results and introduces potential bias due to self-reporting. The interviews offered insight into the professional perspectives on circular economy implementation. The absence of direct dialogue with tenants or homeowners constrained the studys ability to fully capture the lived experiences, motivations, and concerns of end-users. Without engaging residents in more open-ended discussions, opportunities to explore nuanced behaviors and contextual factors influencing their renovation choices were limited, thereby narrowing the studys perspective on user engagement and acceptance.While the survey findings contributed valuable insight into resident preferences, they lacked the depth and contextual richness that qualitative methods typically offer. The absence of open-ended dialogue with residents limited the studys ability to explore the underlying values, trade-offs, and personal experiences shaping renovation decisions. Incorporating these voices in future research would strengthen the understanding of how circular practices are perceived, negotiated, and adopted at the household level.

Moreover, the study deliberately focused on behavioral and organizational dynamics, excluding technical assessments such as life cycle analysis or cost-efficiency evaluations of reused materials. This methodological choice was intended to foreground the human and systemic dimensions of circular implementation. However, the lack of technical performance data constrains the ability to assess the long-term viability and practical trade-offs of circular approaches. Future research would benefit from a more integrated approach that combines social perspectives with environmental and economic analyses, offering a more comprehensive foundation for guiding policy and practice.

The results also reveal a disconnect between stakeholder ambition and actual practice. Although both professionals and residents express interest in circular strategies, this interest does not consistently translate into implementation. This gap appears to stem from knowledge-and-structural limitations , economical and perceptual barriers. Supporting meaningful change will require a combination of policy interventions, institutional support, and deeper engagement with end-users to foster practical, scalable, and socially accepted circular renovation practices.

6
Conclusion

This thesis aimed to investigate how circular economy (CE) principles are applied in residential renovation projects, focusing on the perspectives and roles of professionals and end users. In the following, the research questions are directly addressed based on the findings.
This thesis is based on one main research question:

How are CE principles adopted and implemented in residential renovation, and what factors influence their application among professionals and non-professionals?

Circular economy (CE) principles are understood and partially adopted in residential renovation, but their practical implementation remains limited. Among professionals, CE awareness is relatively high, yet they face several barriers that hinder application. These include financial constraints, complex regulations, limited access to certified reused materials, and uncertainty around material quality. However, professionals who are involved early in the project and use digital tools such as material passports are more likely to implement circular strategies.

For nonprofessionals, such as residents and homeowners, awareness of circular practices varies. Although sustainability may be valued in principle, decisions are largely driven by functionality, durability, cost, and aesthetics. Recycled materials are rarely prioritized unless they offer clear personal benefits. Factors such as previous renovation experience and stronger financial resources increase the likelihood of adopting circular approaches. In both groups, improved communication, targeted incentives, and supportive policies are key enabling factors for a wider adoption of CE.

In conclusion, the implementation of CE principles in residential renovation is shaped by a combination of practical, financial, and psychological factors. Progress requires collaboration between stakeholders and systemic efforts to align circular practices with users' expectations and capacities.

To support this investigation, the following sub-questions are addressed. The conclusion for each sub-question is presented below.

How do professionals engage and imply CE principles in the context of home renovation?

The study finds that professionals are increasingly aware of the CE principles and recognize the importance of strategies. However, their application of these principles remains limited. Practical constraints such as cost, time pressure, regulatory barriers, and the complexity of working with reused materials hinder the widespread adoption of circular practices. Although professionals have the technical capacity to integrate CE principles, without client demand and supportive regulatory frameworks, their influence remains constrained. Knowledge about CE is acquired primarily through professional experience rather than formal education, suggesting a need for more structured and practical sustainability training in architectural and engineering programs.

How do non-professionals engage and imply CE principles in the context of home renovation?

The survey reveals that nonprofessional actors, such as residents and homeowners, generally understand the principles of CE, although their level of familiarity varies, there is moderate awareness of circular practices. This awareness does not always lead to sustainable renovation decisions. Instead, choices are primarily influenced by factors such as functionality, durability, cost, and aesthetics. However, the preference for long-lasting and high-performance materials can contribute positively to environmental outcomes, even if the use of recycled materials is not prioritized. These findings indicate that non-professionals are more likely to adopt sustainable practices when the results offer clear personal benefits, such as improved performance or long-term value.

What challenges and enabling factors shape the implementation of CE practices at both the professional and the household level?

This study highlights that both professionals and end users face distinct challenges in adopting the principles of circular economy in residential renovation. For professionals, the main barriers include financial constraints, complex regulations, and limited access to certified reused materials. In contrast, end-users face challenges such as affordability, lack of technical knowledge, and hesitation in using reused products.

Despite these challenges, several enabling factors were identified. For professionals, early involvement in projects and the use of tools such as material passports can support circular approaches. For end users, the outcome of their choices plays a central role in decision making. When circular solutions offer clear personal benefits, such as quality, durability, or cost-effectivenessthey are more likely to be adopted. Previous renovation experience and stronger financial resources further support this willingness. In addition, improved communication, targeted financial incentives, and

supportive policies can encourage broader adoption between both groups of users. The findings underscore the need for collaboration. Advancing circular renovation requires shared efforts from professionals, end-users, policymakers, and educators.

6.1 Future Research

This study primarily focused on behavioural factors and did not explore technical aspects in depth. However, future research could benefit from a more integrated approach that examines both technical and behavioural dimensions. Comparing these factors may reveal meaningful patterns and interdependencies, offering a more holistic understanding of how circular practices are adopted and implemented in renovation projects. A deeper understanding of the decision-making processes of homeowners can support greater acceptance and integration of circular practices. Expanding the study to include a broader and more diverse sample would strengthen the applicability of the findings to a wider context.

Furthermore, incorporating interviews and direct dialogues with residents and homeowners could improve the reliability of the results and provide additional information on their level of awareness regarding circular economy principles.

Future research should consider expanding the geographic scope to include international comparisons. Different cultural and regulatory environments may yield different patterns of CE adoption, providing a more nuanced understanding of the global potential for circular renovation. Another approach for research involves exploring the role of digital technologies, such as Building Information Modeling (BIM) and material passports, in facilitating circular renovation. These tools have the potential to enhance transparency and material traceability, thereby overcoming some of the logistical barriers identified in this study.

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A

Interview Questions

In this appendix, the interview questions will be presented. Transcriptions are available upon request. Please contact the author for further information.

Syfte: Syftet med intervjun är att utforska hur arkitekter, projektledare och slutanvändare arbetar med cirkulär ekonomi vid renovering av bostäder. Även andra typer av projekt är av intresse. Innan vi börjar: Kan du kort presentera dig själv?

Bakgrund och Erfarenhet

- Kan du berätta kort om din professionella bakgrund och erfarenhet inom arkitektur, projektledning eller inredningsdesign?
- Vilken är din nuvarande yrkesroll och vad ansvarar du främst för i dina projekt?
- Vilken utbildning har du och hur har den format ditt synsätt på hållbarhet och cirkulär ekonomi inom bygg- och renoveringssektorn?
- Hur ofta arbetar du med renoverings- eller ombyggnadsprojekt?
- Använder du digitala verktyg (t.ex. BIM, materialdatabaser) i dina projekt för att stötta hållbarhets- eller cirkulära lösningar?

Kännedom och Användning av Cirkulär Ekonomi:

- Hur bekant är du med begreppet cirkulär ekonomi i bygg- och renoverings sammanhang? Kan du beskriva vad det innebär för dig?
- Tillämpar du principer för cirkulär ekonomi i dina projekt? Om ja, på vilket sätt (t.ex. återbruk, design för demontering, materialval)?
- Hur har din syn på cirkulär ekonomi utvecklats över tid genom ditt arbete?
- Hur uppfattar du att andra arkitekter, projektledare eller kunder ser på användningen av cirkulär ekonomi i renoveringsprojekt?

Praktisk Tillämpning i Renovering och Inredning:

- Vilka specifika cirkulära strategier (t.ex. återbruk,modulär design, materialeffektivitet) använder du i dina projekt?
- Hur säkerställer du att en strategi verkligen uppfyller principerna för cirkulär ekonomi? Finns det specifika riktlinjer, verktyg eller standarder du använder?
- Arbetar du utifrån några erkända ramverk, som t.ex. Cradle to Cradle, återbruksmanualer eller materialguider?

Materialpass och Informationshantering:

- Har du erfarenhet av att använda materialpass eller liknande digitala materialregister i dina projekt?

- Hur tror du att materialpass kan stödja cirkulära strategier i renoveringsprojekt?
- Vilka hinder eller möjligheter ser du för att införa materialpass i praktiken?

Roller, Kundsamverkan och Beslutsfattande:

- Vilken roll anser du att arkitekter och projektledare bör ta i att driva cirkulära lösningar, initiativtagare eller rådgivare?
- Upplever du att kunder efterfrågar cirkulära lösningar, eller behöver du ofta introducera och förklara dessa alternativ?
- Hur påverkar kundens attityd och kunskap valet mellan traditionella och cirkulära lösningar i projekten?

Utmaningar och Möjligheter:

- Vilka är de största utmaningarna du stöter på när du försöker implementera cirkulära principer (t.ex. kostnader, tidspress, kunskapsbrist, tillgång på material)?
- Kan du ge exempel på situationer där cirkulära lösningar valdes bort och varför?
- Ser du några tydliga möjligheter eller drivkrafter för en ökad användning av cirkulär ekonomi inom renovering och inredning?

Framtidsperspektiv:

- Vilken roll tror du att cirkulär ekonomi kommer att spela inom arkitektur och renovering om 510 år?
- Hur tror du att branschen kan utvecklas för att öka användningen av cirkulära
- metoder i renoveringsprojekt?

Avslutande Fråga:

- Finns det något mer du skulle vilja tillägga kring ämnet cirkulär ekonomi och
- renovering/andra projekt som du tycker är viktigt?

GDPR & Konfidentialitet (påminnelse i början av intervjun) Notis: Informationen du delar kommer att behandlas konfidentiellt och användas enbart för forskningsändamål enligt GDPR. Resultat presenteras anonymt

B

Survey Questions

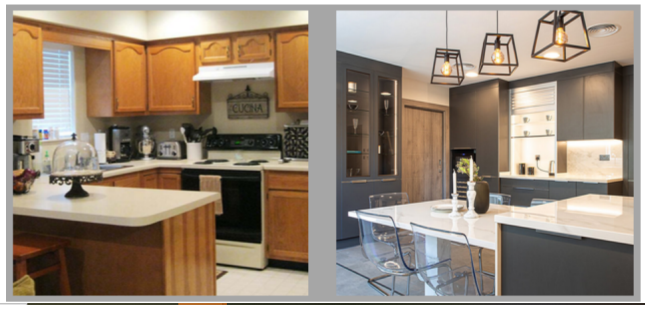
In this appendix, the survey questions will be presented. Please contact the author for further information, or to request a detailed report of the total responses to each survey question.

Circular practices in home renovations

This survey is part of a master's thesis exploring how circular economy practices are applied in renovations and home improvements. Your responses will help us gain valuable insights into how circular strategies are used in practice.

The survey will take approximately 7-10 minutes to complete and consists of 5 short pages. Please note that your identity will remain completely anonymous throughout. If you have any questions or feedback, you are welcome to contact the following email address: minah@chalmers.se

Thank you for participating!



1) * How old are you?

- ◯ 18-25
- ◯ 25-35
- ◯ 35-45
- ◯ 45-55
- ◯ 55-65
- ◯ +65

2) * How many children under the age of 18 live in your household?

This includes all individuals under 18 years of age residing in your household, whether on a full-time or part-time basis.

- ◯ 0
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ More than 4

3) * How many people live in the same home?

- ◯ Just me
- ◯ 2 adults
- ◯ 3 adults
- ◯ More than 4 audlts

4) * What is your educational background?

- ◯ Primary education
- ◯ Secondary education
- ◯ Master's degree and above

5) What is your monthly income? Tusen Sek

Low income — High income

Circular practices in home renovations

6) * What type of home do you live in?

- ◯ Apartment in a multi-family building
- ◯ Detached house (villa)
- ◯ Semi-detached / terraced house (row house)
- ◯ Student housing

7) * What is the status of the property you currently live in?

Specify the ownership or rental status of your current residence. This information is important for understanding different household living conditions.

Select... Select...

8) * How many years have you been living in your current home?

Just moved in — More than 10 years

9) Approximately, what was the year (or decade) of construction of your home?

If you remember place the exact year, for example 1954.
Otherwise, refer to the close decade: 1950
Leave blank in case you do not know

0/255

10) * Which of the following applies to you?

By renovation experience, it means anyone who has recently completed, is currently engaged in, or is about to start a renovation project.

- ○ I have experience with renovations
- ○ I have never renovated OR have no plans to rennovate in the near future

11) What is the main reason you have not renovated or are not planning to renovate your home?

In this opportunity we refer as renovations as those changes, maintenance or improvement jobs done inside someones home.

Select... Select...

Circular practices in home renovations

Did you know that up to 90% of materials from building renovations can be reused or recycled? That means your old walls, windows, and even flooring might just be someone else's next eco-friendly treasure!
In the following section, you will be asked about your renovation experience.

13) * Which areas of your home would/did you renovate?

☐ Balcony/Patio ☐ Livingroom/Hall ☐ Garage/Cellar ☐ Kitchen ☐ Bathroom ☐ Bedroom ☐ Other

Circular practices in home renovations

14) What aspects of the kitchen have you renovated or planning to renovate?

☐ Cabinets ☐ Sink ☐ Flooring ☐ Built-in microwave ☐ Lighting fixture ☐ Plumping

15) What aspects of the bedroom, livingroom or hall have you renovated or planning to renovate?

☐ Cabinets ☐ Sink ☐ Flooring ☐ Built-in microwave /fridge ☐ Lighting/electricitity ☐ Plumping ☐ Tiles

16) What aspects of the bathroom have you renovated or planning to renovate?

☐ Toilet ☐ Bathroom sink ☐ Bathtub/Shower ☐ Heating ☐ Plumbing ☐ Storage ☐ Floors ☐ Window ☐ Insulation ☐ Electric systems

17) What aspects of the rest of your home have you renovated or planning to renovate?

☐ Flooring ☐ Railings ☐ Waterproofing and drainage ☐ Walls and facade repairs ☐ Roof/overhead cover

☐ Lighting installation or upgrade ☐ Heating elements ☐ Ventilation improvements ☐ Doors and access points

18) Please in the following box, describe the reasons behind your renovation. We want to hear more about what has triggered that process.

0/255

19) Please indicate how important each of the following reasons was when you decided to renovate your home.

	Not important	Slightly important	Neutral	Important	Very important
Increasing property value	☐	☐	☐	☐	☐
Improving energy efficiency	☐	☐	☐	☐	☐
Lowering utility/energy costs	☐	☐	☐	☐	☐
Complying with green building standards	☐	☐	☐	☐	☐
Design appearance and aesthetic value	☐	☐	☐	☐	☐
Health factors	☐	☐	☐	☐	☐
Home modifications for accessibility needs	☐	☐	☐	☐	☐

20) Please rank the following main factors from highest to lowest priority based on their importance during your renovation.

When you started planning your renovation, how important was the possibility of reusing existing materials, components, or spaces in driving your decision?

- Price of products
- Easiness of repair/maintainence
- Durability - Long life cyclces
- Environmntal Impacts
- Locally produced or locally sourced materials
- Extension of warranty
- Special deals/Rabbat/Day offers (ie. Black friday)
- Product energy performance
- Performance and usability of product

22) How familiar are you with the concept of a circular economy in home renovations?

Not familiar — Very familiar

Reduce: *Using fewer resources from the start.*
It's about minimizing waste, energy use, and material consumption by being more efficient and mindful in design, production, and usage.

Reuse: *Using items again in their original form.*
Instead of throwing things away, reuse them as they are — which extends their lifespan and avoids the need for new production.

Recycle: *Processing materials into new raw materials.*
When something can't be reused, it can often be broken down and reprocessed to make new products — like recycling plastic into pellets or paper into pulp.

23) Which of the following Circular Practices have you applied in your renovation project?

- ☐ Reuse: Using salvaged wood, bricks, or kitchen fittings instead of buying new ones
- ☐ Reuse: Planning buildings so components (walls, floors, windows) can be taken apart and reused
- ☐ Reduce: Choosing products that are easy to maintain and repair rather than replace
- ☐ Recycle: Installing insulation made from recycled textiles or bio-based
- ☐ Reduce: Using systems that can be adapted over time (e.g., prefabricated wall systems or modular bathrooms).

24) In your own words, what does the concept of circular economy or circular practices in renovation projects mean to you? (Please answer as thoroughly as possible)

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25) How important is it for you to consider circular practices or choosing sustainable materials when planning a renovation?

○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 10

Imagine that you've just moved into a new apartment. One of the things you've been thinking about is renovating your kitchen. After setting aside some savings, you're now ready to consider different options for upgrading key parts of the kitchen — such as the oven, the benchtop and tiles, and the storage space.

In this survey, we'd like to better understand your preferences when it comes to kitchen renovations. Specifically, we're interested in the kinds of choices people make when faced with different renovation alternatives.

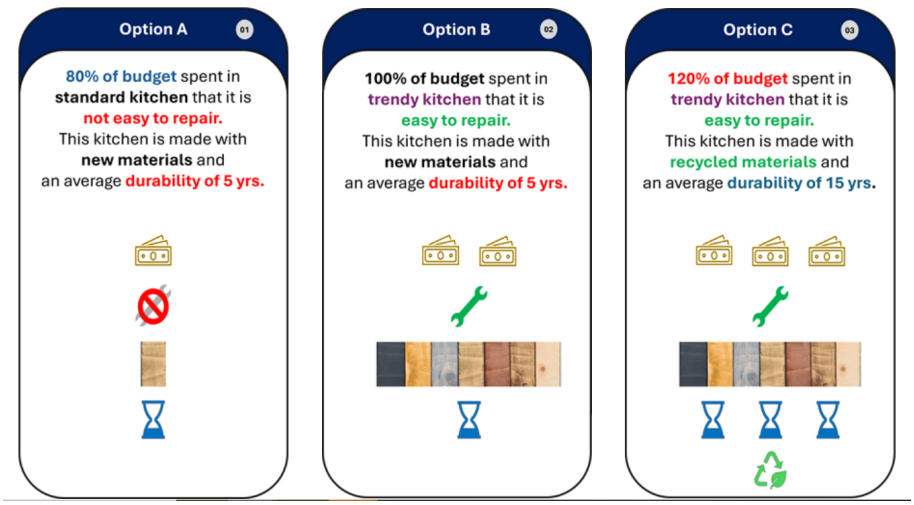
You will be presented with **8 choice tasks**. In each task, you'll see **3 different kitchen renovation alternatives**. Each alternative will show a unique combination of features, including:

- **Cost: spending 80%, 100% or 120% of the initial budget**
- **Durability: if it lasts for 5 yrs or 15 yrs**
- **Ease of repair: if it easy or difficult to repair**
- **Style: if it is standard or a more stylish kitchen that you can personalize to your taste**
- **Use of recycled or reused materials: if the materials used are mainly from recycled or reused products**

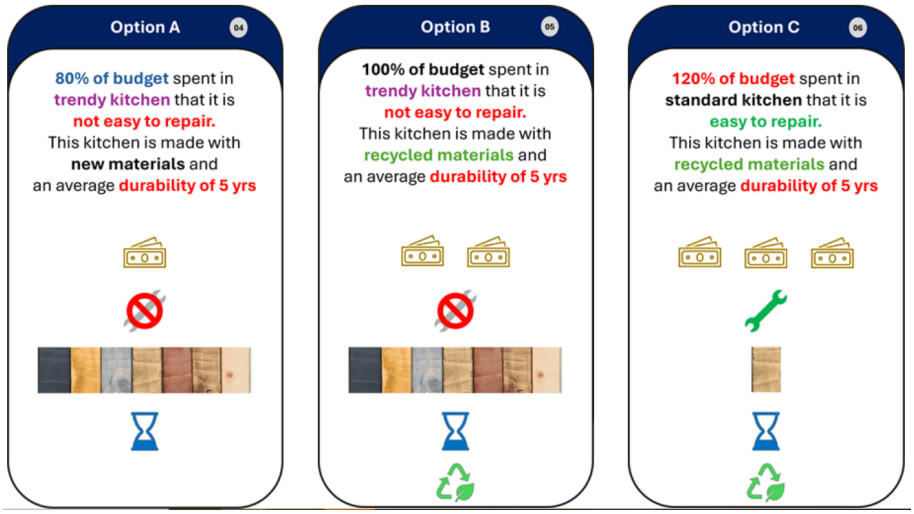
Please review each set of alternatives carefully and choose the one you would prefer, based on your own preferences and priorities.

There are no right or wrong answers — we're simply interested in your views. Your responses will help us learn more about what matters to people when making home renovation decisions.

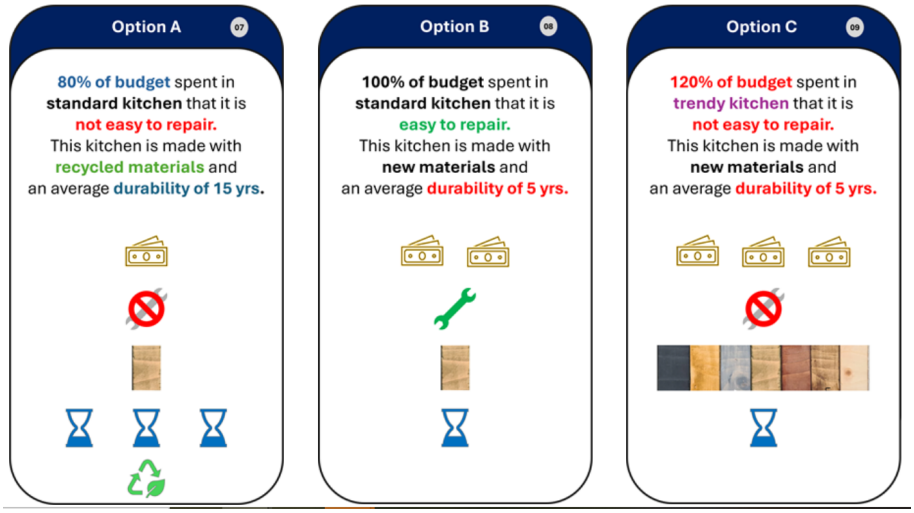
27) * Choose one of the following options (1/8)



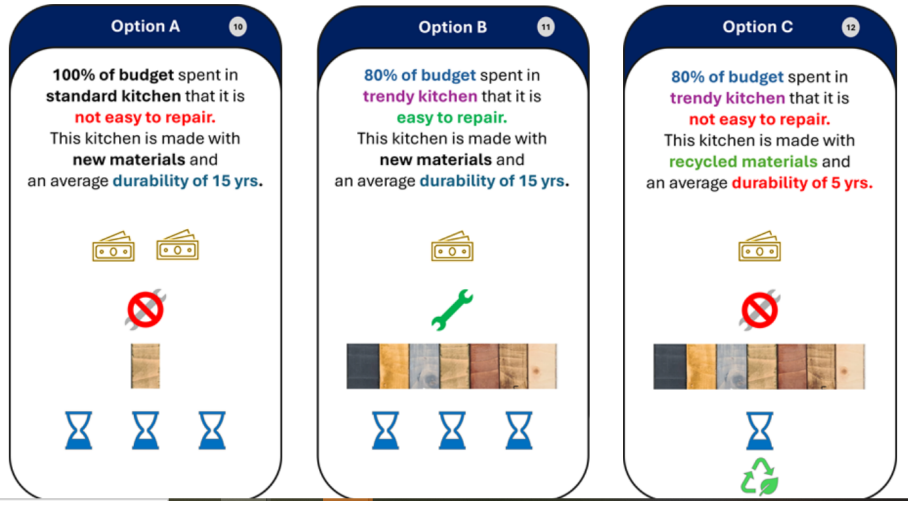
28) * Choose one of the following options (2/8)



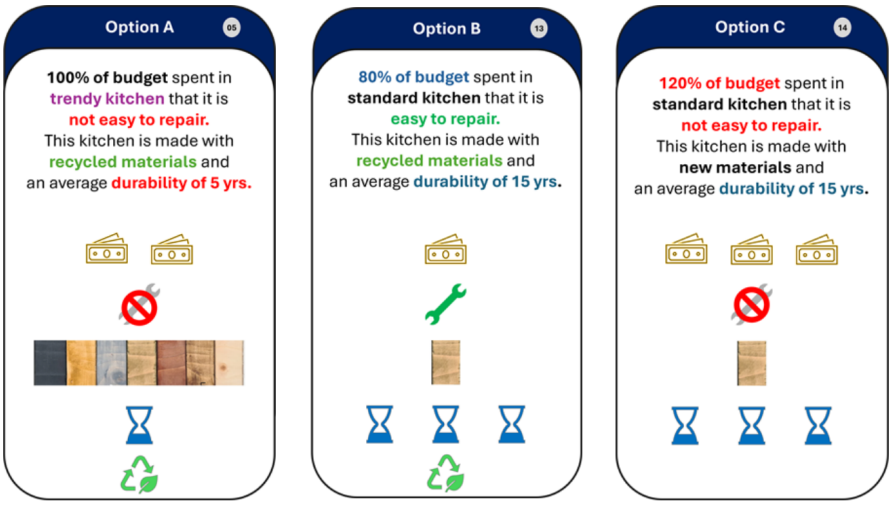
29) * Choose one of the following options (3/8)



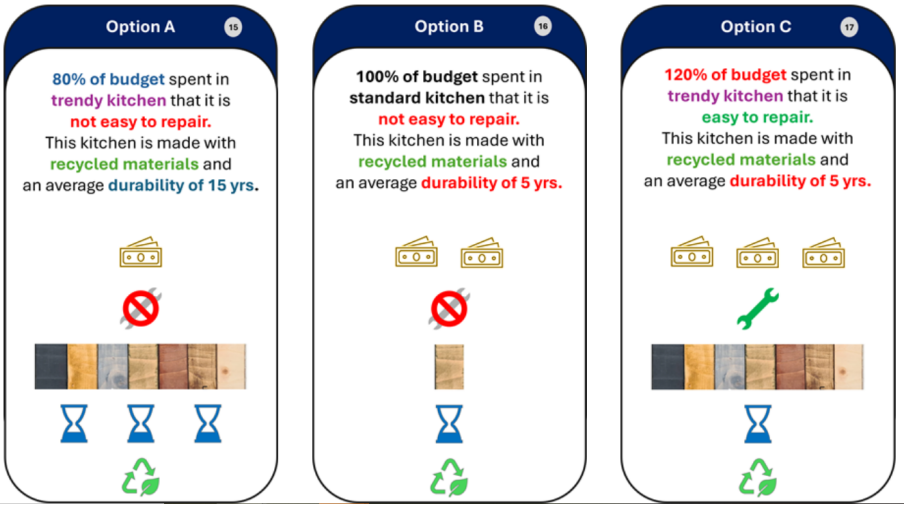
30) * Choose one of the following options (4/8)



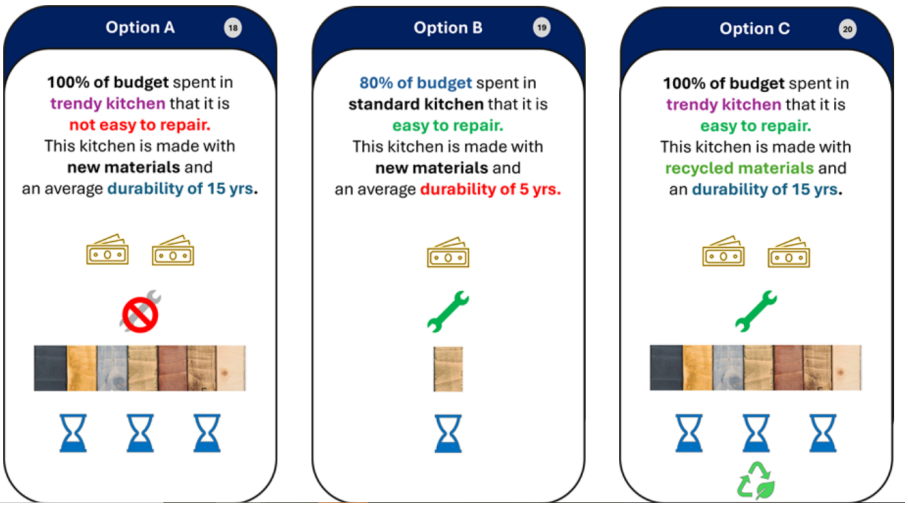
31) * Choose one of the following options (5/8)



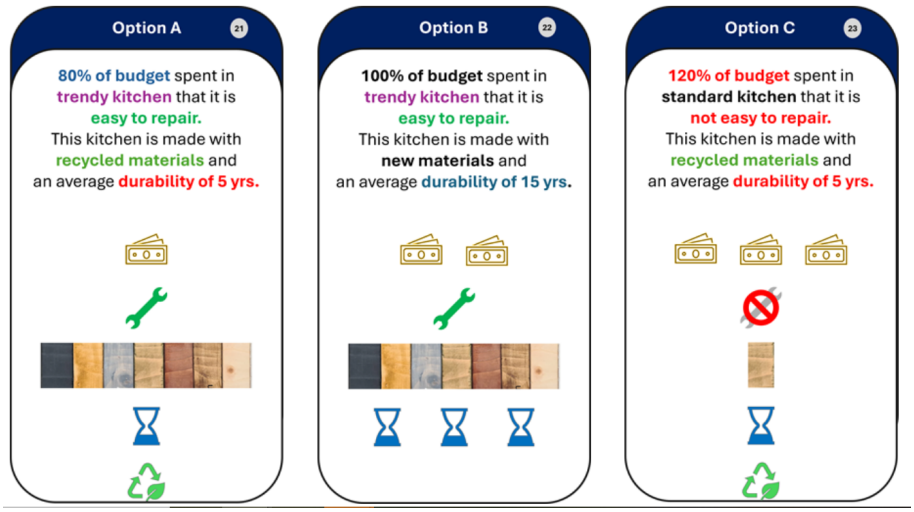
32) * Choose one of the following options (6/8)



33) * Choose one of the following options (7/8)



34) * Choose one of the following options (8/8)



35) Please, let us know if you have any further comments about this project! Hope that you enjoyed playing around the scenarios! :)

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