

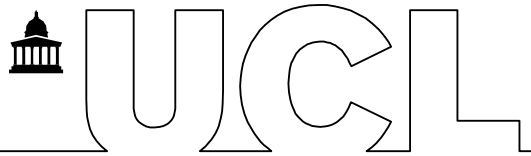
DISSERTATION

STUDENT NAME: Valeria Zapata Jaramillo

CANDIDATE NUMBER: JKNY3

MODULE CODE: BGLP0014

WORD COUNT: 14,915



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Redefining Design Boundaries: Exploring the Transition from Human-Centred to Humanity-Centred Practices through a Multiple Case Study of Transformative Enterprises

Abstract

The design field is in a constant state of evolution, driven by the development of frameworks, methodologies, and tools that shape the products, services, and technologies we use daily. Among these, Human-Centred Design has become one of the most influential frameworks in recent decades, focusing on placing people at the core of the design process by prioritising their needs and experiences through a collaborative, empathetic approach. While this model has proven invaluable in creating solutions that enhance people's lives and boost user engagement, it has faced criticism for its narrow focus on individual well-being, often overlooking the wider social and environmental impacts on the ecosystem. In response, Humanity-Centred Design has emerged, expanding the design lens to include environmental and social considerations that tackle broader global challenges. This study delves into how Transformative Enterprises, which aim to address pressing global issues, implement the Humanity-Centred Design model. Through a multiple-case study of two start-ups promoting eco-conscious consumption, the research identifies key differentiating strategies such as diversifying stakeholders for a more inclusive design process, leveraging enablers of behavioural change, setting mission-driven metrics for decision-making, and adopting marketing and positioning strategies that raise awareness, foster community engagement, and communicate their mission in innovative ways. These findings lay a critical foundation for the practical implementation of the Humanity-Centred Design model, bridging the gap between theory and practice by offering a more inclusive and transformative approach to the design process.

Keywords

Human-Centred Design, Humanity-Centred Design, Transformative Enterprises, Behavioural Change, Eco-conscious Consumption, Socio-Environmental Mission, Grand Challenges.

Acknowledgements

I would like to express my sincere gratitude to Dr. Onya Idoko for her invaluable guidance in defining the research approach and her support throughout the master's programme. Her expertise was crucial to the successful completion of this dissertation. Special thanks also go to Dr. Mara Torres for her constant support and encouragement, which provided essential clarity and motivation during challenging times. I also acknowledge the individuals from the participating organisations in this study, who generously shared their time and insights. Their contributions were vital to the research outcomes.

I want to express my heartfelt thanks to my partner, Camilo, for his patience and support. His encouragement deeply motivated me. I am also grateful to my family and close friends, 'mis amigas del alma,' whose words of reassurance and true belief in my capabilities, even from afar, were crucial to this journey. Lastly, I appreciate the new friends I've made during this process, especially Fiorela, who has been facing every challenge with me from the very first assignment.

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List of Abbreviations

HCD: Human-Centred Design

H+CD: Humanity-Centred Design

P&S: Products and Services

DT: Design Thinking

TE: Transformative Entrepreneurship / Enterprise

1. Introduction

The spectrum of methodologies and components within the design field is vast, continuously evolving, and subject to iterative refinement. Among these, Human-Centred design (HCD) stands out as a prominent framework that has been popularised since the 1980s (Norman and Draper, 1986). HCD has been used to design solutions, products, and services (P&S) with a focus on prioritising end-users and their needs, placing paramount importance on enhancing the user experience (Baker and Moukhliiss, 2020). However, recent discussions have pointed out limitations in HCD's narrow focus on individual desires, often ignoring broader issues like environmental impact, societal effects, and long-term system consequences (Sherwin, 2018). Therefore, a paradigm shift towards a more inclusive framework, Humanity-Centred Design (H+CD), has been proposed by Norman (2023) in his book *Designing for a Better World*. H+CD seeks to broaden the scope of design responsibilities, offering a comprehensive perspective on the transformative potential of design, extending beyond mere P&S usability to foster societal well-being and address global challenges within intricate sociotechnical systems (Norman, 2023).

Although H+CD is a relatively new framework, some organisations and solutions have already embraced its theoretical principles. These organisations address global challenges by creating social and environmental value rather than merely generating profits (Zahra *et al.*, 2009). They are often referred to as Transformative Enterprises (TE) (Dacin, Dacin and Tracey, 2011; Ebrahim, Battilana and Mair, 2014).

While HCD remains crucial for ensuring utility, usability, and desirability—critical elements for optimal customer acquisition in these companies—transformative Enterprises (TEs) are increasingly considering broader contextual factors. They go beyond individual user needs in their design paradigms, incorporating fundamental values to ensure their solutions are meaningful, inclusive, and ethical, emphasising empathy and cooperation (Ceschin and Gaziulusoy, 2019).

Although Human-Centred design (HCD) has been widely explored in practical contexts, the principles of Humanity-Centred design (H+CD) have only recently been introduced to the theoretical level. This study argues that Transformative Enterprises (TE) already apply H+CD principles empirically in their design processes, often without explicitly recognising the emerging framework. However, a limited understanding remains of how these principles are being implemented in practice and how they differ from the established HCD model. To address this gap, it is essential to operationalise practical models that enhance comprehension, application, and scalability. Such models would streamline the design processes of transformative solutions, ultimately increasing their effectiveness and adaptability.

This research aims to understand how Transformative Enterprises (TEs), whose missions are aligned with the paradigm of Humanity-Centred Design (H+CD), are designing their solutions. The objective is to identify how the principles of H+CD, as defined by Norman (2023), are applied in practice by exploring the various methodologies and tools involved in the design process of products and services. The ultimate goal is to operationalise the Humanity-Centred Design (H+CD) framework into a practical model while comprehending its principal variations from the existing HCD model. To achieve these objectives, this study will address the following research question:

RQ: How is Humanity-Centred Design being applied by Transformative Enterprises?

This research endeavour represents a pivotal initial progress towards bridging the gap between the conceptual underpinnings and practical implementation of H+CD in real-world contexts.

To address the research question, this study adopts a multiple case study strategy following the guidelines outlined by Yin (2018). It examines two start-ups considered Transformative Enterprises whose primary mission is combating climate change by reducing CO₂ emissions. These companies aim to shift consumer behaviour toward more eco-conscious lifestyles through the development of their platforms. Using various data collection methods, including participant observation, interviews, and document analysis, this study examines the design processes of these companies' solutions to identify critical activities that align with the principles of Humanity-Centred Design (H+CD).

This dissertation is organised as follows: the next section is the *Literature Review*, which comprehensively explores the existing literature related to design. It defines the concept and significance of design across various contexts, traces the evolution of Human-Centred Design (HCD) theory and principles, and examines the tools and methodologies employed in practical processes. This chapter also identifies the challenges and limitations of the HCD approach. Furthermore, it explores the role of design in addressing global challenges through different frameworks and theories. It discusses the transition from Human-Centred Design to Humanity-Centred Design (H+CD) as an integrative concept, with Transformative Entrepreneurship as a critical enabler.

The following chapter focuses on the *Research Methodology*, outlining the approach to conducting a multiple-case study. It details the criteria for selecting cases, the methods of data collection and analysis, and the overall framework for the study. This section also acknowledges potential limitations and challenges within the research methodology.

Then, the *Empirical Results* are presented, providing individual reports on the design processes of each case study. It includes a deductive thematic analysis, where the principles of H+CD are explored as core themes, followed by an inductive thematic analysis that uncovers additional relevant factors emerging from the data.

The *Discussion* section compares these findings with the existing literature, presents a practical H+CD model, and addresses the core research question. The dissertation concludes with a summary of key insights, a reflection on the study's limitations, and suggestions for future research directions.

2. Literature Review

2.1 Design as a concept

Design is a multifaceted concept which is difficult to define due to its profound impact on the world, civilisation, cultures, and the fabric of life itself. Since its early conceptualisations, design has been recognised as a process applied to navigate complex situations and structures (Hillier and Leaman, 1974). Yet, its essence has also been distilled into succinct terms, such as 'Designing is making sense of things' (Krippendorff, 1989). In contemporary discourse, design has become intertwined with innovation and creativity, heralding its potential as a problem-solving framework to address the myriad challenges faced by individuals, communities, and organisations (Dorst, 2015). Moreover, design is not merely a passive tool for understanding challenges; it is an active process for crafting novel solutions (Baker and Moukhliiss, 2020). Thus, design serves as both a framework to contextualise challenges and a dynamic process to generate transformative solutions, reflecting its essential role in shaping our collective future.

For Instance, in product design, the term 'design paradigm' refers to a comprehensive approach encompassing all stages of bringing a product to market. This includes identifying opportunities, defining product requirements, determining manufacturing and assembly processes, packaging, marketing, distribution, and end-of-life processing (Russell and Buck, 2020). This demonstrates that design is not just an initial step but a dynamic process that continuously accompanies the creation and improvement of solutions.

2.2 From User-Centred Design to Human-Centred Design (HCD)

The fundamental purpose of products is to fulfil human needs, being an integral part of individuals' daily interactions. Initially conceptualised as 'users' within the realm of product design, the foundations of HCD emerged as User-Centred Design (Norman and Draper, 1986). As Norman and Draper (1986) outlined, user-centred design embodies a philosophy rooted in

understanding and addressing users' needs and interests to create usable and understandable products. This emphasis on people transcends the physical product, directing attention towards the interaction process and the emotional dimensions inherent in its design (McDonagh, Bruseberg and Haslam, 2002). Users, in this context, are not passive recipients but rather invaluable resources for informing product design, leading a shift towards what McDonagh, Bruseberg and Haslam (2002) term as 'Empathic Design' influence designers to deepen their understanding beyond surface-level needs and delve into the social, lifestyle, and user needs underlying product usage.

While these concepts initially gained traction within ergonomics and computer science domains, critiques arose regarding their narrow focus on products as standalone tools with predefined functions, thereby overlooking the broader context of services and systems users interact with (Gasson, 2003).

Human-centred design was defined by Walters (2005, p. 230) as 'A creative exploration of human needs, knowledge, and experience which aims to extend human capabilities and improve quality of life'. This design paradigm transcends mere functionality to prioritise the experiential and motivational aspects of the individual (Krippendorff, 2004), underlining the profound impact design can have on people's lives. Moreover, Human-centred design goes beyond simply delivering an outcome; it actively involves people in the creation process itself. The term emphasises designing with humans at the core, focusing on their needs and characteristics. It's an iterative, impact-focused method that addresses issues by involving people at every stage, ensuring the results meet their expectations and needs (IDEO.org, 2015).

Scholars and institutions have developed several principles to encapsulate the essence of HCD. Initially, ISO (1999) defined four main principles to outline the applications of this approach:

1. Involving users to better understand their practices, needs, and preferences.
2. Searching for an appropriate allocation of functions between people and technology.
3. Organising project iterations in conducting the research and generating and evaluating solutions; and
4. Organising multidisciplinary teamwork.

These principles not only focus on outlining the delivery of the solution but also involve internal aspects of the project work.

Furthermore, Giacomini (2014, p. 613) proposed a pyramid model where questions are organised hierarchically, from the 'physical nature of interactions with products, systems, and services to the metaphysical.' Designs that address questions higher up the pyramid are

expected to offer a broader range of affordances and embed themselves more deeply within people's everyday lives and environments, reflecting the holistic approach inherent in HCD.

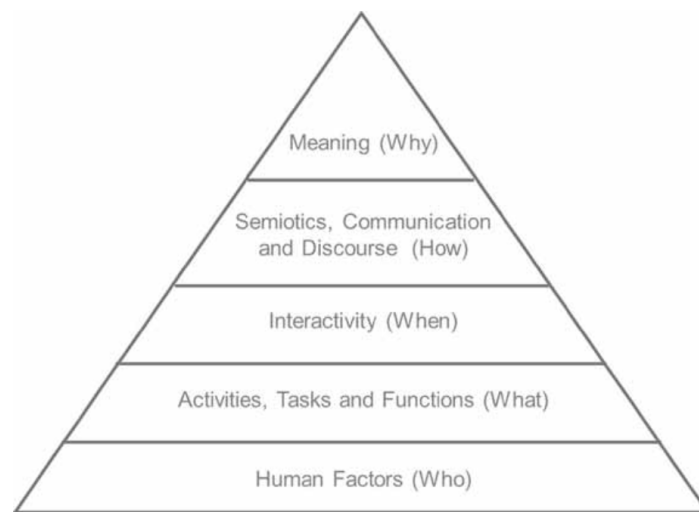


Figure 1. The Human-Centred Design Pyramid. Source (Giacomin, 2014)

These principles guide the concept of Human-Centred Design (HCD). However, various methodological frameworks have been developed to structure its application, making it both implementable and replicable.

2.3 Operationalising Human-Centred Design

While Human-Centred design encompasses a broad framework, it also embraces various tools and methodologies to facilitate its application. One such prominent methodology is Design Thinking (DT). Widely regarded as a 'packaged' version of simplified design practices, DT offers a structured framework for tackling novel challenges across diverse contexts. This 'design process in a box' approach (Baker and Moukhliiss, 2020) has contributed to an increasingly widespread recognition and uptake of the framework across various fields and in response to emerging challenges.

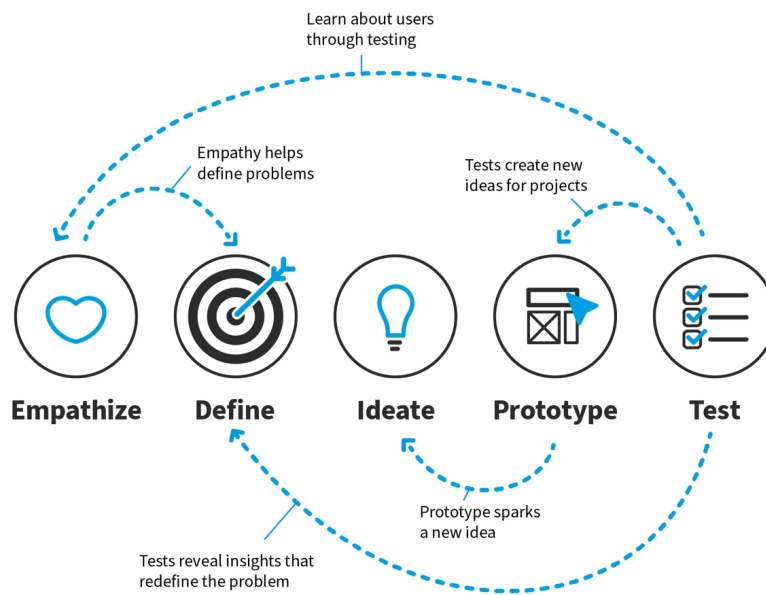


Figure 2. Design Thinking Process. Source (Interaction Design Foundation - IxDF, 2016)

Moreover, the renowned Double Diamond model, which originated in the early 2000s by the British Design Council (Design Council, 2004), is a pivotal tool frequently employed within human-centred design. Its visual clarity enhances comprehension, rendering it indispensable for navigating complex design challenges. Furthermore, the Double Diamond is a universal approach for creatively resolving problems across various domains through design-led innovation.

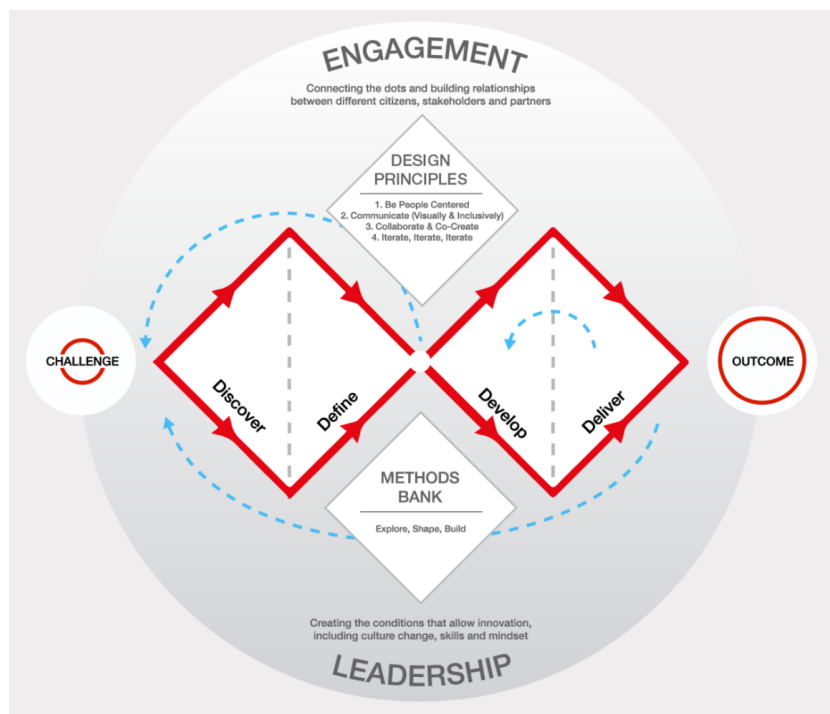


Figure 3. Double Diamond design process. Source (Design Council, 2004)

IDEO.org (2015) has also been refining its model to ensure that all designed solutions meet three fundamental criteria: **desirability, feasibility, and viability**. The process begins by identifying what is desirable, which entails analysing the target users' needs, aspirations, and behaviours for the proposed solution, product, or service. After that, each solution is assessed based on its feasibility, defining whether it is technically and functionally possible, and its viability, determining whether it is economically sustainable.

This approach is carried out through three design phases: inspiration, ideation, and implementation (IDEO.org, 2015), as illustrated in Figure X. These phases are framed within curves of divergence and convergence, similar to those proposed in the Double Diamond Design Process (Design Council, 2004), as seen in Figure 3.

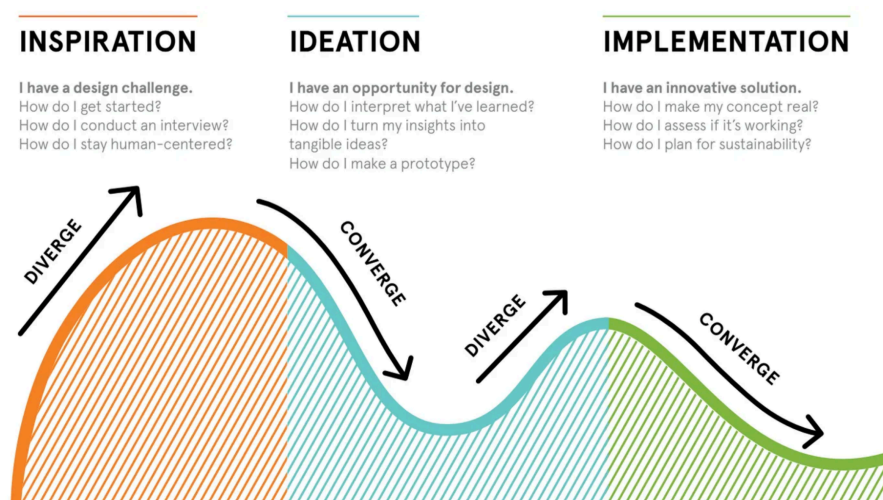


Figure 4. Human-centric design phases. Source (IDEO.org, 2015)

Although the stages' names differ across various tools, they generally aim to address the same core activities and objectives. Some authors have sought to unify these diverse tools to simplify the understanding of the design process. For instance, Grönman and Lindfors (2021) present a consolidated framework that clarifies each stage's main focuses, objectives, and activities (see Appendix 8.2).

2.3.1 Empathise – Discover – Inspiration:

The first step involves closely observing and engaging with the end-user to understand their needs and uncover creative possibilities. The goal is to identify behavioural patterns, pinpoint pain points, and recognise areas where users struggle. Gathering this information creates valuable insights, and practising empathy by putting yourself in the end-user position provides a deeper understanding of their experience and emotions (Grönman and Lindfors, 2021). This approach to 'learning' encourages designers to ask questions rather than make assumptions about the reasons behind certain issues, ensuring that the whole design process is rooted in a thorough understanding of consumer needs (VanderLinden, 2023).

2.3.2 Define – Ideate:

The next step focuses on clarifying the core issues that must be addressed. This begins by analysing what customers want and what they truly need. Through synthesising research data, designers can form valuable insights that highlight key patterns and challenges. From there, the scope of the problems is refined and narrowed down to a clear, actionable problem statement, which serves as the foundation for developing many ideas attempting the solution (Humble, 2020).

2.3.3 Develop – Prototype:

In this stage, the team rapidly constructs a basic prototype of the chosen idea, transforming the defined concept into a tangible form that can be tested with the end-user. This process involves close collaboration and co-creation with stakeholders to ensure their insights are integrated into the design. Hypotheses are formed, and experiments are designed to test and refine the ideas, helping to move the project forward with informed, iterative improvements (Humble, 2020).

2.3.4 Deliver – Test – implementation:

The developed solutions undergo testing and evaluation, incorporating elements such as gathering feedback and making further adjustments based on real-world interactions. Additionally, it is essential to continuously iterate, test, and integrate user feedback in an ongoing cycle. This iterative process ensures that the product evolves with the changing needs of users, staying relevant and up-to-date with the most effective solutions (IDEO.org, 2015).

While these tools and the broader concept of HCD have gained widespread popularity and are now extensively applied globally, the model is imperfect. Several authors have identified key shortcomings, highlighting the need for its revision or modernisation (Gall *et al.*, 2021).

2.4 Human-Centred Design Limitations

The role of design is increasingly demanding, aiming to contribute to shaping global transformation. This role is becoming more pronounced as designers strive to address the multifaceted challenges facing society and the planet, not just individuals. Designers should pioneer innovative solutions that challenge conventional norms. However, in this context, the focus of design solely on individuals is falling short in addressing this new designer role (Acutt, 2022).

Concerns such as the possibility that the focus on individual people or groups might improve conditions for them at the expense of worsening conditions for others or the ecosystem (Norman, 2005) are prompting a reconsideration of the model. Norman (2023, p. 181) reaffirms his position, indicating that 'HCD fails to emphasise the larger concerns and the need

for increased sensitivity to biases and prejudices against certain societal groups'. Another concern Norman (2005) raised is that applications of the model are primarily static, focused on a current need rather than the entire system of activities involved in that need.

Additionally, while having the user at the centre and listening to their needs is crucial, overdoing it can lead to overly complicated solutions, delays in iterations, or even deviations from priorities (Norman, 2005) It is debatable to what extent listening to the user enables us to develop innovative solutions, as not only who we ask but also how we do it can determine the responses (Steen, 2012).

Some authors hold more critical views of Human-Centred Design (HCD), describing it as an incomplete philosophy that overlooks broader responsibilities beyond the immediate needs of the end user (Schweikardt, 2009). They argue that HCD falls short, particularly regarding sustainability, by neglecting other key stakeholders, such as those impacted by packaging waste, unfair labour practices, or pollution caused by manufacturing (Sherwin, 2018).

Moreover, HCD tends to focus on product usability and purchasing stages, often neglecting vital factors like sourcing and end-of-life disposal, which are crucial for sustainable practices. Another significant concern is that HCD prioritises short-term customer preferences, such as convenience and cost, over long-term sustainability objectives. As a result, when the emphasis is placed primarily on customer needs, sustainability goals are frequently excluded from the design process (Sherwin, 2018).

Given these issues, many attempts have been made to update this methodology. However, these changes have mostly focused on increasing efficiency or modifying certain elements of the method. These changes, however, don't fully address the root problem. The real issue is the lack of purpose (Acutt, 2022).

Undoubtedly, the HCD framework has marked a significant design milestone and will remain a cornerstone in solution development. However, exploring additional aspects and perspectives is imperative to expand the scope and enhance the design's global influence (Norman, 2023).

2.5 The Role of Design in a Global Transformative Landscape

In exploring design's role in addressing global challenges and driving transformative change, we encounter various terms and frameworks aimed at broadening the vision and application of design as a tool for change.

2.5.1 *Systemic design:*

This approach contrasts with service or experience design due to its broader scope, social intricacy, and degree of integration. It emphasizes higher-level systems that encompass various subsystems. Both systems theory and design thinking aim to address complex problems by achieving specific outcomes (Acutt, 2022). However, Systems thinking focuses on comprehending complex problems independently of potential solutions, showcasing a more analytical perspective. In contrast, design disciplines prioritise an action-oriented, creative approach to finding solutions, often disregarding in-depth understanding as less relevant to future-oriented changes (Jones, 2014). Although systems theories provide a comprehensive understanding of phenomena beyond the reductionist perspective, they are criticised for lacking methods to improve systems, highlighting opportunities to integrate systems thinking with the design practices used to create products, services, events, buildings, and more (Van der Bijl-Brouwer, 2023).

2.5.2 *Regenerative Design*

This represents the future of developing sustainable solutions. It explores how buildings and products can be designed to reduce their environmental impact and enhance the health of ecosystems. Going beyond traditional sustainability, regenerative design sets a new standard for ecological performance by minimising harm, actively regenerating the natural environment, and enhancing human well-being. This can be applied across various fields, including architecture, product design, and fashion, offering innovative solutions that are both functional and beneficial to both society and the environment (Chetty, 2023).

This development uses a systemic approach that views global problems like climate change as opportunities to encourage cooperation between different cultures and fields for a common goal. It seeks to fix the broken relationship between humans and nature. Instead of just reducing harm or helping nature, it recognises that we are part of nature. Our actions should be designed to benefit the whole system, not just to take resources (Dias, 2018).

Wahl (2016) offers an even more profound perspective in his book *Designing Regenerative Cultures*, showing how regenerative design explores deep questions of meaning and purpose, such as 'Why should we be sustained?' and 'Who are we?'. By exploring these questions, we can catalyse behavioural change and collaboratively foster regenerative cultures. The author promotes a collective narrative that moves beyond economic discussions to embrace a spiritual justification for human survival, encouraging humanity to engage in dialogues about our envisioned future and the essential personal and collective transformations required to achieve it.

2.5.3 *Transitional Design*

This proposes a new domain within design practice, study, and research aimed at steering societal transformation towards sustainable futures. This ambitious reimagining encompasses entire lifestyles and necessitates restructuring infrastructures such as energy, the economy, food systems, healthcare, and education (Irwin, 2015).

At its core, Transition Design advocates for 'cosmopolitan localism' (Irwin, 2015) and lifestyles rooted in specific places and regions yet globally interconnected regarding information and technology exchange. This approach acknowledges the interconnectedness of local and global dynamics in shaping sustainable pathways forward.

Transition design addresses major challenges by incorporating ecological principles into design theory and questioning the systemic structures that contribute to environmental damage. It aims to solve enduring sustainability problems by supporting the ongoing survival of both humanity and biodiversity on Earth (López Reyes, Zwagers and Mulder, 2020). Guided by ecological understanding, Transition Design employs a systems-aware, participatory, collaborative, and nature-aligned approach, fostering responsible design practices (Boehnert, 2019).

2.5.4 *Design as an Enabler of Behaviour Change*

Since HCD places people at the centre of the design, there has been increasing discussion about the importance of behaviour change in achieving real and lasting systemic impacts (Choudhary, 2019). As a result, the fields of design and behavioural change have become more interconnected, leading to the development of new theories and models, such as the Behavioural-Centred Design (Aunger and Curtis, 2016), which integrates scientific and psychological concepts from behaviour change theory into the design process.

In the product and service development context, Wever, Van Kuijk, and Boks (2008) argue that designers can influence user behaviour through the products they create, emphasising that product usability is directly tied to its design. These authors highlight the importance of fostering conscious and sustainable behaviour, asserting that human-centred product development should account for potential adverse environmental effects during the product's use phase. They suggest that the effectiveness of sustainability-centred design can be measured by how well it reduces the adverse side effects of a product's use. (Wever, Van Kuijk and Boks, 2008)

All these design theories and frameworks share a holistic worldview, placing humans as an integral part. There is a growing trend among design theories to reconcile human beings with their environment, emphasising their intrinsic connection. Additionally, modern design

approaches increasingly prioritise shared values and collective thinking over individualistic approaches. The search to articulate a broader, more meaningful purpose has become a central element in these frameworks (Manzini, 2015).

These terms can sometimes be unclear due to their lack of distinct differentiation. Regarding practical methodologies, the approaches are so varied that no single method stands out as a universal guide (Ceschin and Gaziulusoy, 2019). This contrasts with human-centred design, characterised by clearly defined procedural steps, making it easier to implement and contributing to its widespread global use (Baker and Moukhliiss, 2020).

2.6 A Path to Humanity-Centred Design as an Integrative Concept.

Considering the shortcomings of HCD methodologies and acknowledging the evolving role that design is playing within the various defined frameworks, Norman (2023) introduces the concept of Humanity-Centred Design (H+CD). Essentially, this concept aims to expand the scope of design beyond individuals to encompass the entire sociotechnical system in which people belong.

Norman (2023, p. 182) emphasises that ‘design must consider the environmental impact created by the manufacturing, use, and disposal of physical products.’ Additionally, ‘design should address issues of fairness, equity, prejudice, and bias for all products, both physical and nonphysical’. This term seeks to integrate specific principles, paradigms, and design values identified in Systemic design, Regenerative Design, Transitional Design, and others.

Furthermore, this new model does not diminish the use of HCD; instead, it aims to absorb it, becoming an integrative concept that focuses not only on people but also on all living things. ‘Human beings—people—are an integral part of the system called "Earth," where changes in one component can impact every component’ (Norman, 2023, p. 20).

The principles of Humanity-Centred Design (H+CD) defined by Norman (2023, p. 183) are:

1. Solve the core root issues, not just the problem as presented (which is often the symptom, not the cause).
2. Focus on the entire ecosystem of people, all living things, and the physical environment.
3. Take a long-term, systems point of view, realising that most complications result from the interdependencies of the multiple parts and that many of the most damaging impacts on society and the ecosystem reveal themselves only years or even decades later.
4. Continually test and refine the proposed designs to ensure they genuinely meet the concerns of the people and ecosystem they are intended for.

5. Design with the community and, as much as possible, support designs by the community. Professional designers should serve as enablers, facilitators, and resources, aiding community members to meet their concerns.

This research argues that these principles have already been adopted by organisations known as Transformative Enterprises or Transformative Entrepreneurship (TE), which integrate them into their design processes.

2.7 Transformative Entrepreneurship (TE)

While this model proposed by Norman (2023) is recent, it is undeniable that nowadays, there are already companies whose primary mission is to address social and environmental issues that impact entire ecosystems. These initiatives are being studied under 'Transformative Entrepreneurship' or 'Transformative Enterprises'.

The main characteristic of Transformative Enterprises is their mission, which extends beyond mere economic goals to encompass social and/or environmental value creation (Dacin, Dacin and Tracey, 2011; Ebrahim, Battilana and Mair, 2014). These organisations tackle global challenges through entrepreneurial activities, making them more complex than traditional profit-oriented enterprises.

Global challenges are inherently complex, characterised by numerous interactions and nonlinear dynamics. This complexity leads to radical uncertainty, making it difficult for organisations to predict how their efforts will be perceived or valued. Furthermore, these challenges involve multiple criteria of worth beyond economic considerations (Ferraro, Etzion and Gehman, 2015).

In addition to addressing these intricate issues, Transformative Enterprises prioritise their impact on ecosystems and interconnected networks (Khavul and Bruton, 2013). Their entrepreneurial endeavours influence communities, societies, and humanity, focusing on pressing issues such as environmental pollution and sustainability through innovative technologies (Zahra and Wright, 2016). They also draw upon community development theories like Community-based Enterprise (Peredo and Chrisman, 2006), aiming not only at individual benefits but also at transforming intricate sociocultural systems.

Furthermore, Marmer (2012) transformative entrepreneurship seeks to solve the world's most complex problems creatively with scalable, systemic, and sustainable solutions. From these definitions, certain relationships and similarities with the concept and principles of Humanity-Centred Design can be identified, leading to the inference that, even without explicit familiarity with the theoretical framework, these types of companies and

entrepreneurship are empirically applying certain principles described by Norman (2023) to achieve transformative solutions that allow them to fulfil their mission.

3. Research Methods

3.1 Research Strategy

This study's research question is exploratory, aiming to understand how design processes are carried out in transformative enterprises, particularly regarding the application of Humanity-Centred Design (H+CD). A qualitative approach was adopted, utilising the Case Study research method, which is well-suited for in-depth investigations of complex processes that require detailed exploration (Yin, 2018).

Multiple case studies were conducted to gain a comprehensive view, exploring the holistic design process across different solutions. This approach helped identify contrasts and assess the potential for replicating a general model for applying H+CD (Yin, 2018)

3.2 Multiple-Case Study Design

3.2.1 Sampling and Case Selection Criteria:

The sampling method used was purposive, selecting participants based on predefined criteria directly relevant to the research (Gill, 2020). Companies were chosen based on the following conditions: (1) they qualified as Transformative Enterprises, meaning their mission explicitly focused on addressing Grand Challenges or Wicked Problems (Voegtlin *et al.*, 2022) by creating social and environmental value; (2) their product or service was the core mechanism for achieving that mission ; (3) they had already launched at least a minimum viable product, enabling an analysis of the preceding design process: and (4) they were located within the United Kingdom, facilitating data collection through observation methods.

Following these criteria, two start-ups were selected as case studies for in-depth analysis (see Table 1)

Table 1. Overview of Selected Companies and Data Collection Methods. Source: By the author

Company code	Company A (CA)	Company B (CB)	
Location	London	London	
Size	5-10 people	1-5 People	
Company type	Start-up	Start-up	
Year of the product's first launch	2021	2023	
Customer segment	B2C and B2B	B2C and B2B	
Short description	Mobile app that tracks and measures CO2 emissions linked to food consumption and offers alternative purchasing options with a lower carbon footprint.	Web e-commerce for purchasing products that meet rigorous sustainability standards in various areas, including eco-friendly materials, ethical labour practices, transparent supply chains and others.	
Data Collection Methods	Participants observation	Campaign led by the sustainability analyst for direct interaction with university students in the campus cafeteria. 1 hour.	In-person discussion with a group of master's students in entrepreneurship. 1 hour.
	Interviews	3 interviews, with Co-founder/CTO and Sustainability Analyst	2 Interviews with Co-founder/CEO
	Document analysis	*Internal Focus group documentation *Official web site	*Public Blog entries *Official web site

3.3 Data Collection Methods

Following the guidelines described by Yin (2018), various data collection methods were used to gather sufficient evidence for each case to address the research question. Qualitative research requires multiple sources of evidence—at least two—allowing for triangulation and corroboration through diverse data sources and methods (Bowen, 2009). Primary data were obtained through participant observations and semi-structured interviews, while secondary data were derived from document analysis of both private and public reports.

3.3.1 Participant Observation:

The first method applied was participant observation within each organisation. This approach was invaluable for obtaining an in-depth understanding of the contextual factors and the dynamics of individuals in specific scenarios, thus advancing the exploratory objectives of this study (Guest, Namey and Mitchell, 2013). At Company A, the observation was conducted in person for one hour during a “campaign” to engage university students. The focus was to identify students' food consumption patterns. The Sustainability Analyst interacted with

various individuals and groups within the university cafeteria, initiating dialogues about their eating and food-purchasing behaviours.

In Company B, observation occurred during a targeted event—a one-hour session during which the CEO presented his personal narrative, the company's mission, and his entrepreneurial experience in the environmental sector. This was followed by an interaction and discussion session with the attending master's students.

Data were systematically recorded through written notes. This methodological approach provided a foundational understanding that facilitated formulating more relevant questions in subsequent individual interviews (Guest, Namey and Mitchell, 2013).

3.3.2 Interviews:

Semi-structured and in-depth interviews were conducted, employing a flexible set of questions (See Appendix 8.1) to foster more natural and expansive conversations with the interviewees, allowing them to express their perspectives in greater detail (Jamshed, 2014). Two or three interviews were conducted with each company under study. Given the small scale of the ventures, the primary interviewees were founders or CEOs. Additionally, interviews were carried out with individuals closely related to the product design process, such as the Chief Technology Officer (CTO) and those involved in the socio-environmental mission, such as Sustainability Analysts. All participants were directly involved in the product design process and possessed specific expertise relevant to it. The interviews lasted between 40 minutes and one hour and were conducted via Microsoft Teams, which provided automatic transcription. This transcription was then utilised as a dataset for subsequent analysis (Saunders, Lewis and Thornhill, 2023).

3.3.3 Document Analysis:

Secondary data was also gathered through document analysis to examine non-technical literature, specific reports, and written information as empirical data, thereby enriching the case study results (Bowen, 2009). The analysed documents primarily consisted of publicly available information from the organisations' websites and blogs, which provided pertinent details about their mission, history, and the value proposition of their products and services. Additionally, for Company A, a private document was reviewed that detailed the findings from a focus group conducted with users. This document outlined the focus group process and concluded with insights into the needs of individuals in their journey toward eco-conscious purchasing and food consumption.

3.4 Data Analysis

Thematic analysis was adopted as the methodological framework for analysing the empirical data. It was chosen for its flexibility in handling the diverse data sets collected through various methods, allowing data triangulation for this multiple case study (Clarke and Braun, 2014). Deductive and inductive approaches were employed to ensure a comprehensive analysis (Azungah, 2018).

The analysis began with a detailed examination of each case individually (Yin, 2018). This process involved mapping out the chronological steps followed in the product design process for each organisation, guided by the Double Diamond Design Process (Design Council, 2004). The principles of H+CD articulated by Norman (2023) were utilised as a "start list" and incorporated as themes in the thematic analysis (Azungah, 2018). This approach addressed the research question of how these established principles have been applied within the studied companies.

In addition to the deductive approach, an inductive analysis was conducted to uncover additional relevant factors influencing the design of products and services. This ensured a holistic understanding and captured all significant aspects of the analysis (Azungah, 2018).

The analysis followed the procedures outlined by Braun and Clarke (2006). It involved generating codes, which were then organised into subthemes and specific themes (see Appendix 8.3 for an example). These themes were used to report the study's findings (see Chapter 4). NVivo software was primarily employed to manage raw data and code information (Jackson and Bazeley, 2019), while Microsoft Word and Microsoft Excel were used to categorise codes into themes.

The methodological process described here follows the procedure established by Yin (2018, p.85-86) and is depicted in Figure 5.

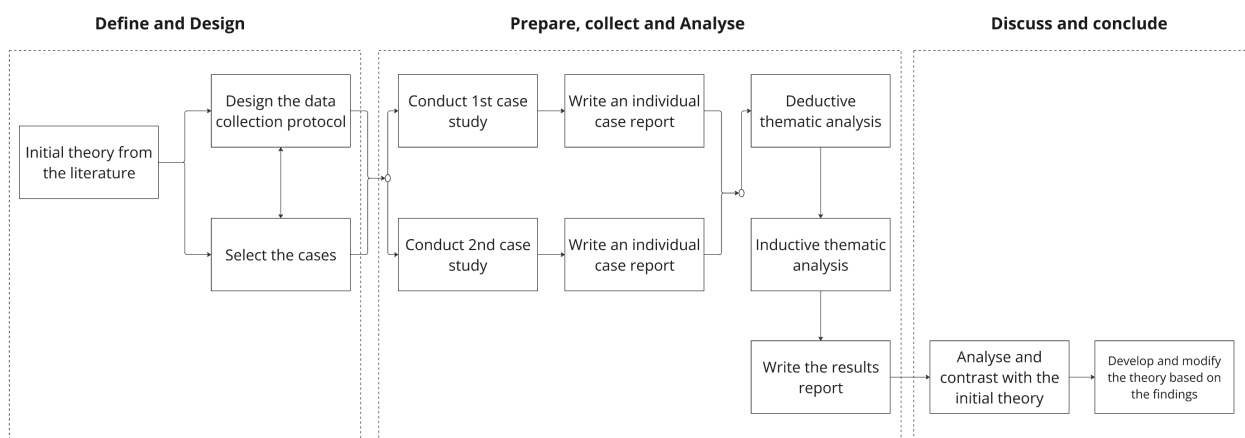


Figure 5. Multiple-Case Study Procedure. Created by the author based on the multiple case study process described in (Yin, 2018)

3.5 Limitations of the Research Methods

Despite utilising a range of data collection methods, the case study approach might have benefited from including a broader array of participants to capture a more comprehensive range of perspectives and thus achieve more accurate results and conclusions (Yin, 2018). However, due to time constraints, some individuals intended for interviews were unable to participate. Additionally, it was challenging to encourage the studied companies to be more open to sharing internal documentation.

Furthermore, participant observation is inherently tied to the researcher's personal perceptions, which can introduce biases into the data and results (Jamshed, 2014). Overall, qualitative research is intrinsically subjective; the collection, analysis, and interpretation of qualitative data are influenced by the researcher's biases (Azungah, 2018).

4. Results and Analysis

This section presents the results and analysis, beginning with a detailed report explaining the design processes of each case study. Following this, a deductive thematic analysis explores the common points across the case studies, focusing on the principles of Humanity-Centred Design as the central themes. The section concludes with an inductive thematic analysis, highlighting additional themes identified through the data.

4.1 Company A (CA)

4.1.1 Context CA

This enterprise is committed to reducing the carbon footprint of food consumption by raising awareness of the environmental impact of each food item through data. It offers a mobile application that measures and tracks CO₂ emissions associated with food and provides purchasing options with lower carbon outputs. The company's mission is to inspire greener consumption by helping people monitor and reduce their dietary carbon footprint, running campaigns that reward participants for making sustainable choices, and empowering consumers to make their grocery shopping cheaper, easier, and more environmentally friendly.

Currently, the application offers five critical features for user interaction. The first feature provides access to various recipes and chefs and an AI-powered tool for recipe search. The second feature enables users to create a personalised meal plan tailored to their time preferences, preferred cuisine, and specific dietary requirements. This plan includes a selection of recipes and the option to purchase ingredients directly through the app. Central

to the application is the ability to track one's personalised carbon footprint, with features that allow users to set a maximum emissions goal or offset their carbon footprint through a tree-planting subscription. Finally, the app incentivises sustainable choices by offering discounts on various brands and food products.

However, to arrive at its present state, this solution's design process has undergone multiple iterations, contributing to its evolution and refinement of its value proposition for both the application's users and the companies supporting its business model.

4.1.2 Design Process CA

Discover: The Genesis of the Idea - CA

The company's CEO and primary founder was a driving force behind the project's early development. His journey began long before this venture, with a rich background in the technology and retail sectors, where he honed his skills in leveraging technology to enhance consumer experiences.

His career took off at a flower delivery subscription service, where he was one of the founding employees. What started as a small start-up quickly became a thriving business, generating around £30 million annually. This success fuelled his passion for innovation, leading him to his next challenge: an app designed to help users identify plants and trees, seamlessly connecting them to retailers where they could purchase them. In this role, he forged strong partnerships with major retailers and garden centres, deepening his understanding of the intersection between technology and consumer needs.

As his experience grew, he saw a significant market opportunity emerging from his past experiences: consumers were increasingly demanding more transparency about the environmental impact of their purchases, yet this information was often hidden or hard to access. Before fully committing to this new path, he enrolled in a university course focused on achieving net-zero emissions in business. This experience deepened his understanding of how companies could contribute to a sustainable future and solidified his resolve to pursue this new venture.

Then, the pandemic hit. As the world reached a standstill, he noticed a shift in people's priorities. Confined to their homes, they became more aware of their impact on the planet as the earth seemed to take a breath. But amid the uncertainty, two popular things surged: home-cooked meals and exercise. Family recipes became a source of comfort while tracking physical activities like steps and bike rides through mobile apps became a daily routine.

These trends sparked the idea of building a platform combining the growing concern for the environment with the desire to eat healthier and live more sustainably. By providing people

with the information to track their food habits and make more informed choices, he aimed to empower them to contribute to a better world—one meal at a time.

Fuelled by this inspiration, the initial steps involved reaching out to food brands and supermarkets to explore their interest in discussing and displaying their products' carbon footprints. At the same time, the team began to outline a potential user base for such a tool, which was informed by relevant previous research on the literature and trends on these emerging concerns.

Define: Focusing on the Problem to Solve - CA

This marked the beginning of a journey with a clear problem to solve: the gap between those who care about the environment and those who take meaningful action to reduce their environmental impact.

Although people aspire to be more sustainable in their daily lives, there are few easy and accessible tools to help them assess their current impact and use that understanding as a baseline for reducing it. This is where company A comes in—it was born from recognising this problem and the opportunity to close that gap. Achieving this requires not only a shift in behaviour but also the right tools to make that transition possible.

‘That's exactly where we started because there wasn't a database that allowed people to actively engage with and analyse their habits, particularly in food and drink, to reduce their impact based on that information. We were among the first companies to coin the phrase 'carbon calories,' making it easier for people to understand and engage with the carbon footprint of their food choices’ (Sustainability Analyst - CA).

Develop and Deliver: Prototyping and Testing - CA

The company team initially focused on building a small MVP (Minimum Viable Product) to test in the market. The first attempt was launched in 2021 with a basic web-based application that the CTO had built in just two days. The goal was simple: proving that the concept could be brought to life.

Starting with a small food and drink product database and their carbon emissions from Mike Berners-Lee's book *How Bad Are Bananas?* The data was lifted directly from the book and put into a web application, creating the first iteration of a carbon tracking tool for consumers.

These first iterations involved the company team testing the application with family and friends, quickly identifying areas for improvement. Without a clear structure or a defined roadmap, the team relied heavily on this informal feedback. However, having a live application made it much easier for the company to gather input from real users and determine whether people were genuinely interested in using this tool.

‘We were getting feedback that the tool was interesting but not engaging enough to be used daily, more like weekly’ (Co-founder/CTO - CA).

Based on that feedback, the company continued to iterate and refine the product.

Evolve: Refining the Value Proposition - CA

With the insights gained from the initial experimentation, the company focused on refining its value proposition for platform users and allied businesses. A pivotal moment that completely transformed the application came during a focus group event. Rather than merely collecting opinions about the app, this session was designed to connect deeply with users' actual needs, jobs, pains, and joys based on their shopping habits and journeys. It also allowed the team to test their initial hypotheses about what users truly valued.

This process was instrumental in co-creating the application's genuine value proposition. The focus shifted from simply addressing the 'lack of a tool' to understanding that users needed a holistic solution that seamlessly integrates into their lives as part of their shopping routine rather than as an additional task.

‘We initially assumed that price would be their biggest concern. The results, however, told a slightly different story. Price remained a major factor, but we didn't anticipate the importance of convenience, which actually emerged as the top priority across the board for our consumers. So, we evolved from just a database providing environmental information to realising that consumers needed a holistic tool that made shopping easier’ (Sustainability Analyst - CA).

Finally, considering all these insights, a second launch took place in 2023. The company moved away from the web application and introduced a mobile app, making it more accessible and convenient for users.

The value proposition for the application's users not only evolved to better align with their shopping habits and address their actual needs, pains, and joys, but the company also advanced its business model. While users remained a central focus, businesses became integral to the platform, mainly regarding financial sustainability. Food and beverage brands, supermarkets, and large retailers were crucial players that enabled the platform's functionality. Despite the challenges of entering a market with a sustainability-focused message, the company seized an opportunity. Businesses are becoming increasingly aware of the growing number of eco-conscious consumers and recognise the need to stay relevant by offering options for these consumers and utilising tools like this platform for effective positioning. The company faced the challenge of integrating these businesses' value propositions into its design process.

‘They want to be able to talk about their eco credentials, but they're just not sure how; they know that the number of eco-conscious consumers is increasing, and they want to be able to speak and communicate with those consumers’ (Sustainability Analyst - CA).

Strategic marketing and communication efforts, in collaboration with major media partners like the BBC, have played a crucial role in engaging with these mainstream businesses. Furthermore, a more direct and personalised relationship strategy featuring one-on-one conversations has significantly enhanced these connections.

‘At the moment, we're trying to talk to the big retailers here in the UK, and retailers as a whole are quite traditional and not very advanced compared to the technology industry because they're brick-and-mortar; they've been around forever. They're very slow moving, don't change as quick as maybe people would like’ (Sustainability Analyst - CA).

Continuous Feedback and Iteration - CA

Feedback is a fundamental and ongoing process for the company, which thrives on a philosophy of fast-tracking and experimentation. They are committed to quickly testing ideas in the market to gain genuine insights into what works and what does not.

‘We're also a small lean start-up, so for us, it's like let's get the minimum viable product out to the customers and see what they say. So it's not the same as the traditional way. We can make those decisions much quicker, maybe in a day or half a day. We're like, OK, we want to do this. If we fail, we fail fast. That's the sort of thing we're going with’ (Co-founder/CTO - CA).

This iterative feedback helped identify issues before they became significant problems and drove innovation by incorporating fresh ideas and perspectives. Constant iterations have enabled the company to make incremental and adaptive adjustments to the application, steadily enhancing its functionality and usability. This approach ensured that the product evolved in response to shifting user needs and emerging challenges, creating a continuous improvement cycle that strengthened market competitiveness and relevance.

‘We provide an easy way for users to share their feedback and thoughts, which is crucial for us. As they interact with the app, they can quickly comment on any missing features or suggest improvements with just a few clicks. This system operates like a community board. We also monitor the adoption of every new feature in the app by tracking how users engage with that; if a feature doesn't gain traction, we have to redesign it and then relaunch a better design to improve user engagement’ (Co-founder/CTO - CA).

4.2 Company B (CB)

4.2.1 Context - CB

This is a transformative enterprise with a value proposition centred on simplifying the online purchase of sustainable products, aiming to revolutionise how consumers engage with eco-friendly options. Through its meticulously curated website, the platform offers an extensive and diverse range of items, including clothing, accessories, beauty and personal care products, household cleaning supplies, and much more. Each product featured undergoes a rigorous "certification" process, ensuring it meets high sustainability standards across multiple dimensions, such as eco-friendly materials, ethical working policies, transparent supply chains, credible accreditations, and contributions to charitable initiatives.

The mission is not just to make sustainable shopping easier but to create an ecosystem where ethical consumption becomes the norm rather than the exception. By providing a single, convenient location for all things sustainable, the platform addresses the common barriers consumers face when making environmentally responsible choices—a lack of knowledge, time constraints, or difficulty accessing trustworthy products. In doing so, it empowers individuals to make informed, responsible purchases without compromising convenience or quality.

4.2.2 Design Process - CB

Discover: The Genesis of the Idea - CB

Company B's journey began with the CEO's deep-rooted experience in the sustainability sector, including Greenpeace. There, they led campaigns urging major consumer brands to overhaul their supply chains, revealing how complex making products sustainable indeed was. It wasn't simply a matter of swapping out materials—transforming entire industries and their interconnected processes was necessary to achieve meaningful change.

Building on this insight, the CEO launched their first venture, focused on reducing consumer product waste at significant events. The company collected and upcycled leftover tents and other waste, transforming them into ethical products. Partnering with other businesses, they developed a range of items from upcycled materials, including clothing, skincare products, umbrellas, and toothbrushes. Their first major project at a festival was a success, with the team recovering over 85% of the abandoned tents and other goods, saving them from the incinerator.

Through this work, the CEO engaged in countless conversations with individuals, uncovering why people discarded perfectly usable items or opted for less sustainable choices. This direct

insight into consumer behaviour became invaluable, highlighting what would truly motivate people to make more eco-conscious decisions.

However, when the pandemic hit in 2020, halting festivals and events, the company had to re-evaluate its mission. This pause led to a pivotal realisation: the core problem wasn't just about managing waste but about changing the way people shopped in the first place. This revelation became the driving force behind the creation of company B.

At this stage, the company conversed with experts and organisations across the eco-friendly product industry, including product verification companies, sustainable businesses, and other key stakeholders. The CEO leveraged their previous connections to access these insights to uncover the industry's most significant shortcomings. The company implemented various strategies to understand better consumer needs, including distributing questionnaires through various reachable networks. They also enlisted polling companies to target specific groups and boost response rates to expand their reach and obtain more reliable data. These combined efforts provided the company with an initial, comprehensive understanding of the industry's challenges and the pain points faced by consumers.

Define: Focusing on the Problem to Solve - CB

Company B identified that shopping sustainably is a complex process with many factors to consider. There are many things to think about—from the materials used in a product and the wages paid to the workers who made it to how it's delivered and how people dispose of it at the end of its life. Each aspect plays a crucial role, making sustainable shopping a daunting task.

One major issue is the problem of 'greenwashing.' The last thing people want is to buy something thinking that is environmentally friendly, only to discover it's not. This practice turns ethical shopping into a minefield, leaving consumers frustrated and distrustful. Additionally, sustainable products are often perceived as more expensive, even though they tend to last longer. This puts them in direct competition with fast-consumer industries, like fast fashion, which prioritise low costs and quick turnover.

All these challenges make it clear that buying sustainable products is often considered confusing, time-consuming, and expensive.

'You shouldn't have to be an expert to know what is or isn't a sustainable product. We all have our own lives to manage, and if shopping sustainably is made harder, it becomes a massive issue in the industry. We must address these three core problems: convenience, knowledge, and cost. If we can tackle these pillars within a single platform, we're far more likely to create something that truly meets users' needs and is based on what people actually want' (Founder/CEO - CB).

Develop and Deliver: Prototyping and Testing - CB

Before the platform's official launch in 2023, several beta testing phases were conducted, where two or three features were developed and made available to a select group of users. These beta periods aimed to gather comprehensive feedback on various aspects of the platform, such as user experience, functionality, and the overall value it provided. By rolling out features incrementally and to a controlled audience, the company could fine-tune the product in response to real-world use, ensuring that each feature genuinely met the needs of its users and added tangible value.

‘When we started building the product, it was based on feedback loops. So, we’d say, “These are the three features that we think would work best in this industry—what do you think?” Then, we’d get feedback on what was good and bad, what could be improved, and any ideas they might have as users or consumers. We could then continuously integrate that feedback into the product design process and future roadmap’ (Founder/CEO - CB).

Simultaneously, the company focused on the business side by designing a comprehensive vetting and evaluation process for the companies and products to be featured on the platform. This was crucial in maintaining the platform's integrity, ensuring that only genuinely ethical and sustainable brands were included.

‘The only barrier to entry for brands wanting to sell on Canopy is that they have to pass our fairly rigorous vetting process to ensure they are ethical or sustainable. This process is part of our onboarding process. But we’re still working with those brands to figure out how we can make it a smoother experience because, at the moment, it’s quite back and forth. They present their claims, we ask for evidence, they send the evidence, and we want it to be a swift onboarding process’ (Founder/CEO - CB).

Evolve: Refining the Value Proposition - CB

The results from the beta testing phases culminated in the official launch of the platform in September 2023. Throughout the design process, which heavily relied on user feedback, the team confirmed several of its initial assumptions. Although the original challenge was framed around three core pillars: convenience, knowledge, and cost, it became increasingly evident through various iterations that convenience was the most crucial element.

‘I was pretty sure that people would be eager to shop sustainably if they had a choice that was just as convenient and affordable without requiring them to be experts. But the more we worked on it, the more I realised that the convenience piece is probably the most important factor. Mainly because we are creatures of habit. Even when there's a better alternative, we tend to stick to what we know’ (Founder/CEO - CB).

In response, the company adapted its business model, introducing subscription options for frequently used products like cleaning supplies. This shift not only reduced the effort required from users but also significantly boosted customer retention rates, a key metric for the business's success.

Additionally, the company's focus expanded to address the issue of greenwashing, driven by insights from market research conducted by Censuswide in 2023, involving 2,002 UK customers. The study revealed that 68% of British shoppers feel frustrated and misled by brands and retailers' green claims. Armed with this data, the company strengthened its value proposition by emphasising consumer convenience, trust, and transparency.¹

The company launched an unconventional marketing campaign to make a bold initial impact. They took to the streets, targeting some of the most well-known and controversial clothing stores notorious for greenwashing. In a protest-style effort, they engaged directly with consumers, using informative signs to raise awareness about the significant environmental damage caused by these brands and the fast fashion industry.

'Guerrilla marketing tactics make us a bit unique and memorable because, of course, we can use all of that material, photos and videos, and put it on social media. But on the day, on the ground, people will ask questions, and they will remember that' (Founder/CEO - CB).

Continuous Feedback and Iteration - CB

A subcontracted development agency originally carried out the initial development phase. However, it quickly became clear that the platform's development process would require numerous rapid iterations as the market tested it. Consequently, the decision was made to transition to an in-house development team, which could respond more swiftly to changing priorities, live testing, and a flexible, evolving roadmap. This shift has enabled the company to test, gather feedback, and make changes more quickly, effectively responding to user and business interactions with the platform.

'We have our own developers, who handle all the development work. This setup gives us more control and flexibility over what we want to build and when, as priorities constantly shift. This fluidity is essential, especially considering the feedback we receive from users.' (CEO - CB).

To ensure continuous feedback, the company has implemented two specific strategies. The first involves testing groups made up of loyal users who believe in the company's mission.

¹ The information described was obtained from the company's website. Due to data protection reasons, the specific website is not disclosed.

These groups gain early access to new platform features and provide their insights and experiences as critical inputs for the company's ongoing development.

‘Our testing groups include a diverse range of people using the platform for various purposes. Their feedback is transparent and candid, which is invaluable’ (Founder/CEO - CB).

The second strategy is to encourage reviews on the platform. These reviews are highly valuable as they provide feedback on the platform and the products offered. This allows the organisation to evaluate its partnerships and make necessary adjustments.

4.3 Thematic Analysis

4.3.1 Deductive Analysis

This section presents an analysis grounded in the themes derived from the principles of Humanity-Centred Design described by Norman (2023) which serve as the primary analytical framework. The objective is to examine how these principles were incorporated into the design processes of the case studies under review.

Theme 1: Solve the Core Root Issues, Not Just the Problem as Presented (Which Is Often the Symptom, Not the Cause)

In both case studies, the foundational mission is to mitigate environmental impact and address climate change. However, climate change represents a multifaceted and expansive challenge, often arising from numerous interconnected actions. The analysis reveals that, despite differing approaches, both companies pinpoint consumer behaviour and habits as a core issue and one of the root causes of negative environmental impact. This recognition has uncovered a significant opportunity: the development of tools aimed at fostering behavioural shifts towards more eco-conscious practices. But what helped them identify the problem?

Previous Experiences and Networks in the Area of Interest: In both case studies, the problem definition was profoundly shaped by the founders' prior experiences, which played a pivotal role in clearly defining the problem and uncovering the opportunity. For Company A, the CEO's strong connections to the tech sector, especially in nature-related areas, combined with their learnings in net-zero companies, were instrumental in engaging with the appropriate stakeholders and actual customers to identify both the problem and the opportunity. In contrast, the CEO of Company B had a background more deeply rooted in climate change rather than technology. Moreover, their experience with their first start-up provided valuable insights that allowed them to redefine the problem from a practical perspective, having already established a network of connections with various stakeholders in the field of

sustainable products and engaging in valuable conversations with people about their consumption habits.

‘I got to speak with thousands of individuals about why they were throwing away perfectly good products or choosing to buy cheap, less sustainable options. It was fascinating and valuable to understand, from a consumer behaviour perspective, how people consume and what would help them live more sustainably generally’ (Founder/CEO - CB).

Based on Previous Research and Data: In both cases, external research and data were critical in evaluating the problem and identifying the opportunity. Company A relied on data highlighting the gap between individuals' environmental concerns and their actual behaviours:

‘There's a significant gap between what people want to do and what they actually do. Around 90% of people are concerned about climate change, yet only around 20% take personal action. So, we're looking at the 70%+ gap that we're trying to address’ (Sustainability Analyst - CA).²

Meanwhile, Company B focused on data related to the growth of eco-conscious consumers and the extent of the greenwashing issue as

‘The market for ethical consumer goods has grown more than 1000% over the last 20 years, according to Co-Op and Ethical Consumer Magazine’s long-running report. Around 50% of UK consumers say they're less likely to shop with a retailer they perceive to be “greenwashing”’ (Blog entry - CB)³

Theme 2: Focus on the entire ecosystem of people, all living things, and the physical environment.

Both case studies demonstrate a significant impact on individuals' lives and a clear contribution to mitigating climate change, a global challenge that affects all of humanity. This dual focus on people and the planet reflects the inherent nature and mission of the organisations involved.

People-Centred Focus: Both cases primarily target individuals' behaviours and habits, aiming to influence them meaningfully. In both instances, convenience emerges as the critical factor driving behavioural change. These companies' design strategies are deeply connected to achieving desirability and adoption by addressing consumers' real needs and pain points.

² The data presented were directly expressed by the interviewee and have not been independently validated by the author.

³ The information described was obtained from the blog section on the company’s website. Due to data protection reasons, the specific website is not disclosed.

Central to this approach is an emphasis on user experience principles, such as usability and accessibility, which are integrated into the development of their platforms.

Company A, which seeks to reduce carbon footprints by promoting the consumption of lower-impact foods, has evolved its design to prioritise user convenience. This evolution has resulted in a tool that simplifies food shopping and meal preparation, adapting to the lifestyles of its users. Although the overarching goal remains reducing environmental impact, the tool has transitioned into a personal shopping and cooking assistant:

‘We're now more of a smart cooking and shopping tool that helps people reduce their carbon footprint without them even realising it. It's not generic. Recommendations and personalisation based on their lifestyle and eating habits are essential to encourage people to shift their consumption patterns’ (Sustainability Analyst - CA).

In contrast, Company B focuses on ensuring that purchasing sustainable products is as convenient and accessible as traditional shopping. Their goal is to create a seamless experience, making it easier for consumers to switch to sustainable options without any additional effort:

‘Our thesis is that if you can make sustainability as convenient as non-sustainable choices, people are far more likely to adopt them because they don't need to make radical changes. They're just changing where or what they buy, but they can still purchase the same types of products’ (Founder/CEO - CB).

To further enhance convenience, Company B has adopted strategies that are gaining traction in e-commerce, such as subscription plans for recurring purchases:

‘We implemented subscriptions across the entire website. You can subscribe to a product and receive it every 1, 2, 3, 4, 5, or 6 months—however long you need. This eliminates the need for reminders, as products are delivered on a rolling basis. This is particularly useful for items like cleaning products and cosmetics, where repeat purchases are common, making it easier to encourage people to switch’ (Founder/CEO - CB).

Mission-Driven Design and Success Metrics: Both companies centre their product design on people, seeking to integrate their solutions into consumers' habits and lifestyles. However, their environmental mission remains inherently linked to the solution itself. The greater the user base, the more significant the reduction in environmental impact. This distinguishes these transformative companies from traditional ones: using their products or services directly contributes to fulfilling their socio-environmental mission. To ensure this alignment, both organisations have established initial filters for project selection and clear metrics for success based on the environmental impact generated, which ultimately defines the company's effectiveness:

‘For every user who’s bought something on the platform, they can see the impact they’re saving, and we can aggregate that to show the impact of the entire Canopy community. For example, buying a product might save 1 kilogram of carbon emissions, 100 litres of water, or 50 grams of plastic. This aggregates into the total Canopy savings so we can continually monitor progress. We've already saved over 500,000 litres of water and more than 5,000 kilograms of carbon emissions, with much more potential as we grow’ (Founder/CEO - CB).

‘Even when we're choosing user experience or tech problems to solve, we only tackle them if they align with the company's mission. If they don’t, we don’t pursue them. This ensures that, from the outset, every task we prioritise aligns with our broader mission of driving green behavioural change. If something doesn't align, we wouldn't prioritise it as a problem or task’ (Co-founder/CTO - CA).

Supply Chain Impact: Despite the positive environmental outcomes generated by these tools, both companies acknowledge that their supply chains also contribute to environmental impact. They recognise the importance of measuring, regulating, and reducing this footprint wherever possible. They employ models such as carbon credits and engage in extensive tree-planting programmes to offset their emissions, reflecting their commitment to minimising their overall environmental impact.

Theme 3: Take a long-term, systems point of view, realising that most complications result from the interdependencies of the multiple parts and that many of the most damaging impacts on society and the ecosystem reveal themselves only years or even decades later.

Ensuring Long-Term Viability Through Systems Prepared for Constant Change: Brands must be able to adapt rapidly to change to remain relevant and competitive in a dynamic market. Both companies demonstrate a systemic and flexible approach, allowing them to quickly test and refine ideas and efficiently assess their positive or negative impact. This agility minimises wasted resources and enables companies to focus on strategies that yield effective results. By integrating adaptability into their design, they enhance their prospects for long-term success, amplifying their capacity for meaningful environmental impact.

Leveraging Stakeholder Collaboration for Greater Impact: In a complex market with many actors, effective positioning is vital, but the ability to collaborate across a broad ecosystem is even more crucial. Both companies recognise that partnering with stakeholders, including competitors, and forming strategic alliances with organisations that share their environmental goals leads to more substantial and enduring results. This collaborative model strengthens the collective effort to address environmental challenges.

‘We are agnostic to many carbons accounting firms, meaning we can work with all of them, even though they cannot necessarily collaborate with each other. This allows us to harmonise the data across the board. While we engage with a wider array of partners, the first step is establishing strategic partnerships. This involves convincing these firms that we are the right partner, even though we also work with their competitors. In reality, we accelerate their business by expanding the collaboration network and drawing in more participants from outside that network. It’s not just about providing a service and receiving something in return, it’s about envisioning the ecosystem ten years from now and starting to build that framework, knowing it will take time’ (Sustainability Analyst - CA).

Behavioural Change as a Long-Term Endeavor: Shifting deeply ingrained consumer habits requires sustained effort and time. However, it should be viewed as a long-term investment rather than a simple action. Both companies adopt a systemic, future-oriented approach by focusing on behavioural change as a critical element in addressing climate change. This focus goes beyond products and material solutions, aiming to reshape consumption patterns and habits to support environmental sustainability over the long term.

Theme 4: Continually test and refine the proposed designs to ensure they genuinely meet the concerns of the people and ecosystem for whom they are intended.

Both case studies, characterised by their technology-driven development models and start-up frameworks, adhere to methodologies such as Lean Start-up. This strategic approach allows them to rapidly introduce ideas to the market, test them in real time, and iteratively refine them based on tangible feedback from both market conditions and environmental factors.

Structured and Continuous Feedback Mechanisms: Feedback processes in both companies are embedded not only in specific testing phases but also in everyday product usage. They leverage platform-integrated tools such as reviews and interactive forums to collect ongoing feedback. Importantly, this feedback is not passively received but actively integrated through a clearly defined prioritisation process. This process is guided by the company’s mission and user-centric focus, ensuring that the most urgent needs are addressed promptly.

‘There’s a clear prioritisation in the feedback we implement. Emergency fixes are obviously at the top, followed by improvements to user experience and the user journey. If the flow isn’t intuitive, those are the changes that take priority because as soon as you get users in the app and they’re not sure what’s going on, you will lose them immediately’ (Co-founder/CTO - CA).

Constant Experimentation as a Driver of Innovation: Both companies recognise that constant experimentation is crucial, particularly in fast-evolving technological landscapes. In this

context, continuous experimentation drives innovation, enhances resource efficiency, and accelerates the implementation of solutions without the fear of failure. This approach cultivates creativity and enables the discovery of new methods and strategies. Regularly testing hypotheses, technologies, and strategies generates invaluable insights that allow for rapid iteration and improvement, thereby maintaining the relevance and competitiveness of their products and services.

Theme 5: Design with the community and, as much as possible, support designs by the community. Professional designers should serve as enablers, facilitators, and resources, aiding community members to meet their concerns.

Designing for Inclusivity: Personalization vs. Segmentation: While market segmentation is a widely accepted strategy in business and marketing used to identify specific user groups and target them efficiently, these case studies challenge that approach due to their sustainability-driven missions. Although segmentation helps identify certain customer traits that align with the solution, the overarching goal is not to focus solely on the "20%" of users already taking environmental action. Instead, the aim is to make the product so universally convenient that it attracts individuals who may not initially fit the target profile or exhibit eco-conscious behaviours.

This broader, more inclusive vision necessitates designing for a wider audience, posing the complex challenge of creating solutions that appeal to everyone. In this context, personalisation becomes crucial—it allows the product to resonate with each user's unique lifestyle. Furthermore, the connection fostered with the brand through personalised service, continuous feedback loops, and events like Company A's focus group is essential for deepening user engagement.

‘The lifetime value of those focus groups lies in building that connection between your end user and the people behind the company. The benefit is that you're not just a robotic app sending out emails which can be cold and impersonal, instead you give your brand and business a feeling of humanity, allowing users to see the people behind it’ (Sustainability Analyst - CA).

Community Building as a Powerful Strategy for Marketing and Engagement: For these companies, success hinges not only on designing with the community in mind but also on building a broader community around the product, brand, and environmental mission. This community-building strategy is vital to reinforcing their identity as sustainable enterprises while serving as an organic driver for marketing and engagement efforts.

‘Creating community is about breaking down barriers and helping people understand that we’re in this together, fostering a more sustainable society. Food is a great starting point because it’s something everyone shares—cultural, emotional, and universal. Getting people to gather at the same table, with family or friends, and have these conversations makes the process more inclusive’ (Co-founder/CTO - CA).

‘We engage in a variety of community activities, from beach clean-ups to tree planting, actively involving local communities in direct environmental action. Although these activities aren't directly tied to Canopy's business model, they help establish a presence, give back to the community, and encourage people across different regions of the UK to do good, even if it’s not related to shopping’ (Founder/CEO - CB).

4.3.2 *Inductive Analysis*

Beyond the principles of H+CD, the analysis revealed some other key factors that the companies considered when designing their solutions.

Theme 6: The Perfection Trap in Sustainability

Both companies identified the "perfection trap" as a significant obstacle in the design, execution, and adoption of their solutions. This concept highlights the tendency for individuals to feel compelled to make perfect, radical changes, but when such ideals seem unreachable, they ultimately make no changes at all. For instance, Company A observed this mindset in discussions around climate action and dietary choices, where many believe that unless they fully embrace a vegan lifestyle, any effort is pointless.

‘Unfortunately, many people view the debate around climate and food choices as an 'all-or-nothing' scenario—either you go fully vegan, or there's no point in changing at all. So, they just stick to their existing behaviours. By labelling consumers as 'plant-based' or 'vegan,' we've unintentionally created a divide. The goal should be to have a billion imperfect activists, rather than a thousand perfect ones because real progress comes from shifting the needle by engaging as many people as possible’ (Sustainability Analyst - CA).

Company B shares this perspective, advocating for progress over perfection with its principle of ‘Focusing on Being Better, Not Best’.

‘We're not perfect. Zero waste. Zero emissions. Negative footprint. These ideas of being perfect only hurt the sustainability movement. So we say, “Don't beat yourself up when you forget your reusable cup. Don't feel guilty when you leave your bag at home and have

to buy a new plastic one. Turn that energy into positivity: what next step – no matter how small – can you take to live more consciously?” (Blog entry – CB)⁴

This shift away from impossible standards promotes a more inclusive and pragmatic approach to sustainability, encouraging small, consistent steps rather than expecting drastic, immediate transformations.

Theme 7: Gamification and Rewards as Catalysts for Adoption

In the design of sustainable solutions, integrating alternative strategies such as rewards and gamification is pivotal for promoting user adoption and enhancing community engagement. These design principles harness psychological incentives to drive user behaviour, making the pursuit of sustainability both enjoyable and rewarding. Through mechanisms such as challenges, achievements, and progress tracking, gamification transforms otherwise routine tasks into engaging experiences, thereby boosting user participation and retention. Additionally, these strategies foster a sense of community, as users feel connected to a shared mission, reinforcing positive behaviours and motivating others to contribute to common environmental objectives.

‘Getting rewards like free coffees is often viewed as the primary benefit, which is why we've seen this shift in the app. The highest engagement comes when people see personal results, with sustainability as a bonus. This is how we anticipate continued growth in engagement. For example, if you save 25% on your next food shop, you'll be more likely to use the tool again because it gave you a personal win. The sustainability aspect follows naturally, but it's the personal benefit that drives repeat use’ (Sustainability Analyst - CA).

Theme 8: Education as a Driver of Trust and Engagement

Integrating educational elements into solution design is essential for facilitating behavioural change. Rather than mandating behaviour shifts, education is a strategic tool to foster trust and position oneself as a knowledgeable ally. This method informs users and engages them on a deeper level, enhancing their confidence and connection to the solution. For example, both companies utilise educational tactics, such as publishing informative blogs, to provide insights into sustainability, climate change, material science, and retail practices. This approach ensures users are aware of the product and educated on broader, relevant issues. Additionally, these companies sustain their engagement with academic and research communities through conference participation and involvement in student networks. Such initiatives bolster their credibility and contribute to a well-informed and engaged user base, functioning as a robust marketing strategy and solidifying their leadership in the sector.

⁴ The information described was obtained from the blog section on the company's website. Due to data protection reasons, the specific website is not disclosed.

5. Discussion

This chapter explores the integration of the empirical data collected, the broader contexts, and a more comprehensive interpretation. It contrasts human-centred and humanity-centred approaches based on the literature and findings. Finally, a practical model for Humanity-Centred Design (H+CD) is provided, addressing the research question that guides this study regarding how transformative enterprises implement this model.

5.1 From Human to Humanity: Evolving Design Paradigms.

The transition from Human-Centred Design (HCD) to Humanity-Centred Design (H+CD) marks an evolution in design. This evolution is driven by the recognition that focusing solely on individual users is insufficient to tackle the larger, interconnected challenges facing humanity (Sherwin, 2018; Russell and Buck, 2020; Gall *et al.*, 2021; Norman, 2023). This research highlights how this shift is demonstrated through transformative entrepreneurship, which plays a crucial role in addressing complex, systemic problems (Marmer, 2012; Burch *et al.*, 2014; Ferraro, Etzion and Gehman, 2015; Zahra and Wright, 2016; Voegtlin *et al.*, 2022).

5.1.1 *The Focus on People Continues to Be Essential in the Design Process.*

The principles of Human-Centred Design (HCD), as articulated by institutions and authors such as ISO (1999), IDEO.org (2015), Interaction Design Foundation - IxDF (2016), *Principles of Human-Centred Design (Don Norman)* (2018), and the Design Council (2024), converge around a central idea: design is fundamentally about solving genuine human problems. Its primary aim is to address specific needs, improve experiences, and offer meaningful solutions. This is accomplished by designing everything that surrounds us, from products and services to the technological tools we use today. A critical aspect of this approach is the direct involvement of users in the design process, fostering collaboration, co-creation, and continuous iteration. Given that human needs are dynamic, this cyclical process ensures that solutions can evolve to meet changing demands.

The findings of this study reinforce the continued relevance of Human-Centred Design for business development. To succeed, businesses must focus on addressing genuine human needs, which is critical to gaining acceptance (VanderLinden, 2023). Even for companies whose core mission is to solve environmental or social issues, as studied in this research, the role of users remains crucial. Without user adoption, the sustainability goals of the organisation become inconsequential. In other words, in the realm of business, no matter how well-intentioned a company's efforts towards sustainability, they hold little value if people are unwilling to engage with their product or service.

Although traditional design processes predominantly focus on the individual, this research suggests that businesses with transformative missions are adopting a broader approach. These organisations aim not merely to meet users' needs but also to inspire **behavioural change**. Understanding the processes that drive the adoption and long-term use of such products and services has given rise to new fields of study, such as sustainability transitions (Irwin, 2015; Boehnert, 2019; López Reyes, Zwagers and Mulder, 2020) . These fields focus on people but emphasise how to facilitate a shift towards more sustainable behaviours and lifestyles. Wever, Van Kuijk and Boks (2008) noted that designers can influence user behaviour through the products they create. Although their research focuses on physical products, this study extends this understanding to technological tools. The design of these tools must not only solve immediate needs but also integrate into daily routines, slightly encouraging more eco-efficient behaviour. This approach avoids the approach for radical behavioural shifts, which are often difficult to achieve and not realistic (Aunger and Curtis, 2016).

These organisations have also implemented vital strategies involving rewards and competition, which, as studied in behavioural sciences, are crucial for promoting motivation—a key factor driving behaviour. As noted by Aunger and Curtis (2016), the reward system provides real-time feedback on progress toward and the achievement of goals, reinforcing the repetition of rewarding behaviours while discouraging the opposite. This concept is integrated into the design processes of both companies and is considered a key factor in attracting and engaging users.

5.1.2 Beyond the Focus on People: Emphasizing the Transformative Mission

While focusing on individuals remains essential, it should not be confined solely to buyers or users. Such a narrow perspective overlooks other crucial stakeholders within the value chain and the broader ecosystem (Sherwin, 2018). In the companies studied, early-stage interaction with diverse stakeholders is a crucial factor to consider for the success of the product. It is not only the end user who is involved; considerable effort was made from the outset to identify key players in the target market and within the field of sustainable solutions, which is expanding due to the growing global need to mitigate climate change. Both organisations emphasised the implementation of established, ongoing processes for strategic monitoring and networking, through which new stakeholders were consistently identified and relationships developed. These relationships have been particularly important in the design process, as the focus extends beyond the end user to incorporate an entire ecosystem of existing or emerging solutions. This approach pursues to create a greater and more impactful response to the shared objective of reducing CO2 emissions.

The term 'ecosystem' in H+CD refers not only to the business and solution ecosystem, but also to the physical environment. Norman (2023, p. 182) articulates 'designers must still follow the principles of human-centred design, but now within the broader context of the entire planet: all living beings; the quality of land, water, and air; species loss; and climate

change. Human beings—people—are integral components of the system called “Earth,” where changes in one element can affect all others. I consider human-centred design a subset of Humanity-Centred Design.’ This redefinition extends the scope of HCD by incorporating spatial-temporal impacts on humans, aligning design with broader social, environmental, and economic dimensions (Russell and Buck, 2020; Gall *et al.*, 2021). For the companies studied, their impact on the physical environment is directly linked to the use of their technological solution. In other words, their product is the primary driver for generating a positive impact on the living ecosystem, primarily through the direct reduction of carbon emissions into the atmosphere. However, they also make significant efforts to promote and carry out alternative activities that raise awareness beyond their product, such as beach clean-ups or tree planting initiatives with the community. These efforts further contribute to the organisation’s overarching objective, generating recognition not only for the product but also for its holistic mission.

The findings of this study indicate that this redefinition is not necessarily achieved through a specific design tool but rather through focusing the design process key activities on the organisation’s overarching mission and objectives. This perspective resonates with Acutt’s (2022) argument that the purpose must first be clearly defined to expand the boundaries of the impact achieved through designed products and services. Through a well-defined mission, organisations transition from merely addressing individual needs to engaging with and influencing complex systems. This approach is further supported by Giacomini’s (2014) design pyramid, which positions meaning and purpose at the apex, underscoring their role as the ultimate goal in achieving a holistic and systemic design vision.

By framing design within the broader context of purpose-driven missions, the transition from human-centred to humanity-centred becomes more than a methodological adjustment—it becomes a strategic shift toward sustainable and transformative impact at both human and ecosystem levels.

5.2 How the Mission of Transformative Entrepreneurship Influences the Design Process

Entrepreneurship plays a significant role in shaping communities, societies, and humanity. Entrepreneurs who address pressing global issues such as food and water shortages, environmental degradation, and sustainability through innovative and accessible technologies extend their impact beyond individual or corporate wealth creation (Zahra and Wright, 2016). Central to their success is the organisation’s mission, which informs every decision and serves as its guiding principle or ‘DNA’ (Ebrahim, Battilana, and Mair, 2014). This mission-driven approach introduces distinct characteristics that influence the design process of their solutions, as observed in the results of this study.

Transformative entrepreneurship, by nature, seeks to address *grand challenges*—complex societal problems such as climate change (Voegtlin *et al.*, 2022). These challenges are

characterised by specific traits that shape the design approach, as highlighted by Ferraro, Etzion and Gehman (2015, pp. 4-5). They note: 'First, grand challenges are complex, involving numerous interactions and emergent understandings, and exhibiting nonlinear dynamics. Additionally, grand challenges confront organisations with radical uncertainty, meaning that actors cannot foresee possible future states. Lastly, these challenges are evaluative, crossing jurisdictional boundaries, invoking diverse criteria of value, and uncovering new concerns even as they are being addressed.'

These complexities align with the principles of H+CD (Norman, 2023), which transformative ventures apply to address the challenges posed by their socio-environmental missions. To tackle this complexity, the companies studied prioritise building adaptable design processes that incorporate mechanisms for experimentation, continuous feedback, and flexibility. Such approaches are essential for effectively responding to the nonlinear and dynamic changes inherent in *grand challenges* like climate change.

For instance, addressing issues such as emissions and climate change requires a long-term perspective. Still, design systems are capable of 'fast-tracking' solutions, as described by Company A. A strong emphasis on collaboration further enhances this adaptability. Transformative businesses recognise the importance of engaging various stakeholders, communities, and partners, establishing direct connections, and involving them in co-creative processes from the earliest stages. This collaborative approach strengthens the design process and ensures that solutions are aligned with the broader systemic impacts that these ventures seek to address, not just the users.

By embedding the mission into every stage of the design process, the studied transformative entrepreneurs can navigate complex and uncertain environments while maintaining a focus on long-term sustainability and societal impact.

5.3 Humanity-Centred Design in Practice

In practical applications, the tools and frameworks employed by the companies studied largely align with established methodologies such as Design Thinking (Interaction Design Foundation - IxDF, 2016) and the Double Diamond Design Process (Design Council, 2004). The primary distinctions observed are not in the procedural steps but in each phase's considerations and focal points.

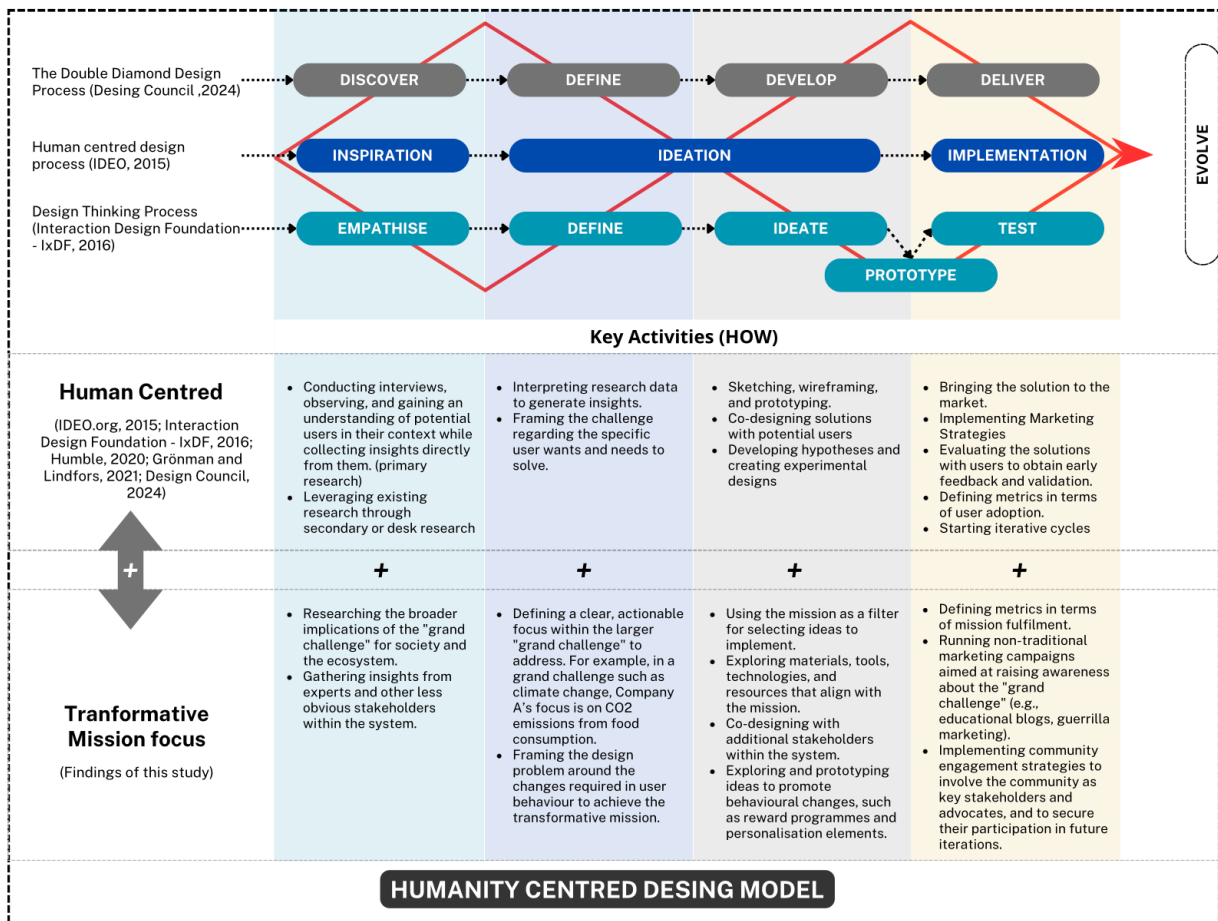


Figure 6. Proposed practical Model for Humanity-Centred design. Source: By the author

Figure 6 proposes an initial practical model of Humanity-Centred Design, outlining key additional activities focused on the transformative mission, extending beyond traditional HCD frameworks. These activities, identified in our findings, are crucial to shift the focus from individual needs to the broader socio-environmental missions of transformative enterprises. This shift expands both the scope and impact of the design process. Moreover, this aligns with the core principles outlined by Norman (2023). However, this model should be seen as a process based on conceptual and empirical frameworks that help map and address complex problems rather than as a precise recipe (Humble, 2020).

6. Conclusion

In conclusion, this research explored how Humanity-Centred Design (H+CD) is being applied by Transformative Enterprises (TEs) to develop solutions to global challenges. Through the analysis of two case studies involving start-ups offering technological solutions for promoting eco-conscious consumption, the study strengthens the hypothesis that TEs are transitioning from traditional Human-Centred Design (HCD) to a more comprehensive and inclusive H+CD

framework. This transition reflects a deeper alignment of the design process with the organisations' broader societal and environmental missions, representing a fundamental reorientation rather than a mere methodological adjustment.

The findings indicate that while core HCD principles, such as user engagement and iterative design, remain crucial, additional activities are required to ensure the design process addresses individual needs and those of the ecosystem and society, as guided by the organisation's mission. These activities involve integrating a more comprehensive range of stakeholders—such as experts and communities—into the design process from the outset and designing for their needs rather than focusing solely on consumers. This inclusive approach fosters community-building and market positioning, emphasising collaboration over competition to drive meaningful global change.

One critical aspect involves identifying the drivers of behavioural change. While addressing user needs remains central, these solutions go beyond influencing lifestyle choices to encourage more eco-conscious habits. This is achieved through mechanisms that boost motivation, such as personalisation, challenges, and rewards. Another essential activity is the establishment of design metrics that extend beyond usability or acceptance, focusing instead on the organisation's transformative mission. These metrics serve as a guiding framework throughout the design process, supporting prioritisation and decision-making. The key activities associated with each stage of the design process are illustrated in Figure 6.

By adopting these practices, TEs create solutions that meet individual needs and inspire sustainable behaviours. Thus, they address systemic global challenges like climate change, aiming for long-term impacts.

6.1 Limitations and Future Research Opportunities

While this study has successfully translated the theory of H+CD into practice, it presents certain limitations that must be acknowledged. Firstly, by focusing exclusively on two case studies with similar characteristics, both belonging to the realm of technology start-ups, the replicability of the findings may be constrained (Cottrell, 2014). This highlights the need for further research involving other types of enterprises, such as those in the productive or non-technological service sectors, to assess the applicability of the H+CD model in diverse contexts.

Additionally, future research could explore how companies without a transformative mission—those primarily focused on economic value creation—might implement the H+CD model and what social and business benefits they could achieve by adopting this more holistic perspective. Such studies would broaden the understanding of H+CD's applicability and potential impact across various sectors and business environments.

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8. Appendix

8.1 Interview guide:

Please note that these questions served as a general guide for the interview. Depending on the responses provided, the interviewer focused more on certain topics and asked additional follow-up questions to ensure a fluid conversation and delve deeper into interesting or relevant points that emerged during the discussion.

Background

- How long have you been with the company? Were you involved in its creation?
- What is your role in the company?
- What are your main responsibilities?
- In your own words, can you share the story of how the company started?
- What is the primary mission of the company?
- When was the first product/app launched in the market, and what was the design process like?
- What is your target customer segment?

Identifying and Addressing Needs

- What specific need is the company trying to address for its users (individuals, companies, environment)?
- How did you identify this need?
- How did you validate the need? Did you talk to people, and if so, who were they?
- How was the process of talking to users and companies?
- What tools did you use for this process? Interviews, surveys, or focus groups?

Value Proposition and Feedback

- How would you define the value proposition of the organisation?
- Tell me about the focus groups you ran. What was the objective, and what hypotheses were you testing?
- Did these focus groups confirm or change your assumptions?
- What was the most valuable takeaway from these focus groups?
- Do you regularly run focus groups or similar sessions?
- How do you typically gather feedback from your customers?

Problem Definition and Stakeholders

- After talking to users and companies, did the initial problem change?
- In your own words, how would you define the root problem that the company solves?

- What systems or stakeholders does the company impact, and how does it impact each?
- Do you think there are any negative impacts, and how do you address them?
- How do you maintain contact with stakeholders, and how frequently?

Ideation and Design Process

- What was the internal ideation process used to develop the solution in the market?
- From your role in sustainability, what was your contribution to this process?
- Who did you get involved with from outside the company in this ideation process?
- Did you involve target users in co-creating or validating the idea? If yes, how did that process go?
- What tools did you use to involve them, and did the final idea change from the initial one?

Sustainability and long -term Impact

- How does the company define sustainability?
- How do you measure the organisation's success in sustainability?
- What general sustainability metrics do you track?
- Did you conduct any environmental or social impact assessments?
- What do you think have been the biggest challenges for the company in terms of sustainability?
- How is the company addressing these challenges?
- What do you believe are the most significant long-term impacts on the company?
- How do you measure the impact of your supply chain?
- What is the long-term vision for the company, and what are your long-term goals?
- How do you plan to achieve these goals?

Community Engagement

- How has the company impacted or planned to impact specific communities?
- How did you involve the community in the product design process?
- Are there examples of aspects of the product that were directly influenced by community feedback?

Prototyping and Iteration

- How detailed are your prototypes, and what factors influence the level of detail included?
- How do you incorporate feedback from stakeholders and users into your prototypes?
- How do you collect and analyse feedback during the testing phase?
- Can you share an example of a significant change you made based on user testing feedback?
- How do you balance user needs with technical constraints and business objectives?

- What role does collaboration play in your design process, and how do you work with other team members?
- How do you prioritise product adjustments or new projects? What are the critical criteria for prioritisation?

Business Model

- What is your current business model, and who pays?
- How often do you make changes? Do you have any new prototypes or improvements in mind?
- How do you measure the impact of your product on the company's mission?

8.2 Unification of Human-Centred Design Methodologies. Source (Grönman and Lindfors, 2021)

Table 2. Unification of Human-Centred Design Methodologies. Source (Grönman and Lindfors, 2021)

PHASE -CATEGORIES		IDEO's Human Centered Design process	HPI's Design Thinking process	Design Council's Double Diamond design process
D I V E R G E N T	A) EMPATHY AND USER FOCUS A1) Primary Research A2) Secondary Research	1. Inspiration A1) Primary Research: - observing and understanding the challenge and the user context - interviewing users (needs, hopes and desires) A2) Secondary research: - researching the existing data	1. Understand A2) Secondary Research - understanding the existing information - conversation with experts 2. Observe A1) Primary research - interviewing and observing - collecting insights about the user's needs	1. Discover A1) Primary Research and A2) Secondary Research - searching for new opportunities, information, trends and insights - understanding instead of assuming - engaging a wider context of the identified opportunity
	B) PROBLEM FRAMING AND DEFINING B1) Reviewing Insights B2) Framing and Defining the design challenge	- open up for creative possibilities	3. Point of View - share the gathered insights - framework of the most promising insights - define a person to be the base of the ideation	2. Define - "filter" to review, select and discard the first insights - project development - project management
D I V E R G E N T	C) CREATING IDEAS AND VISUALIZATION C1) Sharing and Generating Ideas C2) Communicating with sketches and prototypes	2. Ideation - sharing and making sense of collected data - identifying opportunities - generating lots of ideas - getting visual and tangible by sketching and prototyping	4. Ideate - generating numerous ideas - applying creative tools like brainstorm and role-play - silent individual work and energizing teamwork 5. Prototype - making tangible proposals: drawing up ideas and developing prototypes - reaching a consensus of the function of the ideas - presenting the ideas to potential users	3. Develop - developing solutions by using creative tools like brainstorming and scenarios - developing solutions by using DT tools like sketches, renderings and prototypes
	D) EXPERIMENTATION & ITERATION D1) Usability Testing D2) Evaluating, Developing and Iterating D3) Implementing and Delivering	- getting feedback - keep iterating, refining and building until you are ready with your solution 3. Implementation - bringing the solution to life and to market - building partnerships - refining business models - piloting the solution	6. Test - testing every prototype with potential users - testing the form, function, dimension, feasibility and usability of the prototypes - iterative cycles, collecting new feedback every time - improving the prototype to be more realistic, detailed and functional	- Ideas being tested and iterated in multi-disciplinary teams 4. Deliver - taking the final concept through final testing, producing and launching

8.3 Example: Aggrupation of Codes, Subthemes, Themes

Table 3. Aggrupation of Codes, Subthemes, and Themes for Themes 1 and 2

Themes	Subthemes	Codes
Theme 1: Solve the Core Root Issues, Not Just the Problem as Presented (Which Is Often the Symptom, Not the Cause)	Previous Experiences and Networks in the Area of Interest	interviewee Background
		Company Background
		Business Model Description
		Challenges as Start-Ups
		Market Opportunity
		Competitor Analysis
		B2B Value Proposition
		Partners
		Strategic Partnerships
		Competitor Analysis
	Based on Previous Research and Data	Initial Hypothesis
		Discover
		Initial Filter
		Vetting Process
		Feedback Tools
		Customer Feedback
		Focus Group Participants
		Focus Group Results
		Prototyping Tools
		Testing Results
Theme 2: Focus on the entire ecosystem of people, all living things, and the physical environment.	People-Centred Focus	Build Connections with Your Customers
		People’s Needs
		Understanding People’s Needs
		Personalized Contact Offer
		Communication Impact
		Retention
		Community Sense
		Education as Engagement
	Mission-Driven Design and Success Metrics	Mission
		Value Proposition
		Sustainability Definition
		Sustainability Measures - Indicators
		KPIs
		Objectives
		General Impact
		Impact of Customer Decisions
	Supply Chain Impact	Systems Point of View
		Ecosystem Impact
		Ecosystem Impact
		Sustainability Definition
Sustainability Measures - Indicators		
Business Model Description		
Impact of Customer Decisions		
Technical Issues		