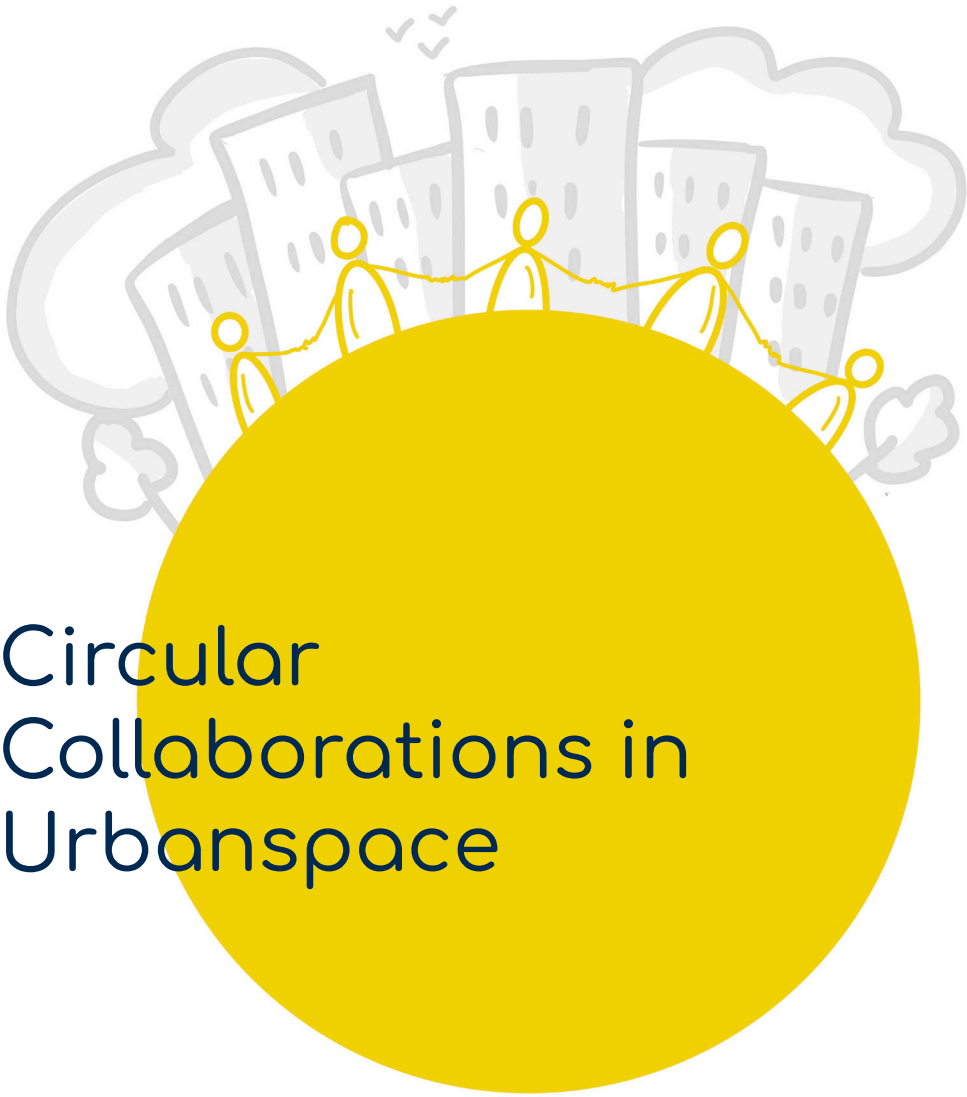

Circular Collaborations in Urbanspace

A tool-kit for scaling through engagement

Master Thesis

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Participatory City Making Lab (PCM)
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by
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Executive Summary

A circular economy is a means to an end of achieving a sustainable world, a lot of traction has been gained in the recent years into the concept of a circular economy and many new products and business models have been created around the concept. But most of the exploration of the concept lies in the possibilities of new product and market opportunities, this makes the concept difficult to move towards a societal level change, where circular economy becomes the norm. To enable this societal level change, ecosystem level innovations are important and collaborations play a key role in enabling eco-system innovation. This is what this project tries to explore, collaborations for a circular economy. Apart from the collaborations, cities play a key role in the transition to the circular economy, as they are responsible for consumption of about 80 % of the global resources making it a hotbed for material flows to take place. They also act as hubs of innovation for organisations operating in the urbanspace, making them ideal to explore how organisations present in them innovate for a circular economy. The cities form the context of the project, setting the exploration of the project into Circular collaborations in urbanspace. The project is conducted in collaboration with the Participatory city making lab and the Designscapes project.

Exploration:
Within ecosystem innovation for a circular economy and circular collaborations, the importance of having a shared vision to collaborate is mentioned, but how to create a shared vision and pursue innovation based on it is not known. This is what this project initially starts to explores, how can organisations operating in the urbanspace create and operationalize a shared vision to help create circular oriented innovation.

From the initial exploration in the ideas around circular collaborations, ecosystem innovation and circular oriented innovation a few gaps in literature were identified which would help answer how do organisations operationalize innovation in the urbanspace. These gaps were then pursued through qualitative analysis of various organisations operating the urbanspace to understand how organisations actually operationalize innovation and what would be the role of a shared vision in them.

Findings:
The findings suggested that a shared vision is important for collaboration to take place but the organisations did not actively pursue for having a shared vision and values with their various collaborators, instead the thing that they focused on for operationalizing their innovation was engagement. They focused on engagement to showcase the value of their organisation's offering beyond the end product. As they increased their visibility in the urbanspace and increased their ways and number of engagements, the organisations grew and people with similar values collaborated with the organisations. They scaled through engagement. Scaling through engagement is a mindset for growth of the organisation based on engagement as opposed to the linear model of thinking of making more.

The final design, tried to enable organisations operating in the urbanspace to scale through engagement. This was pursued by creation of an online tool-kit for circular organisations operating in the urbanspace, which aimed at creating awareness into the concept of scaling through engagement, it's relating ideas and also help organisations create ideas around scaling through engagement for their own organisation. The tool-kit consists of 6 different major steps with tools present at each step to enable awarenesss of the concept and create ideas around engagement.

The tool was also tested with various organisations in the urbanspace, the testing of the tool-kit showed merit in the usefulness of the tool for achieving it's goals as well as ease of use. However there are certain limitation to the project, the tool-kit was tested with only individual people and not in teams of members from the organisations.

In conclusion, this project is a step in the right direction away from scaling by making more and towards scaling through engagement. Apart from the tool-kit, the findings from the research add valuable insights into how circular organisations operating in the urbanspace innovate and collaborate in a circular economy. On a broader perspective, this project gives a glimpse into how societal level transitions for a circular economy could take place and what it would mean in practice.

Table of content

01

Context & Approach

This chapter introduces the project background, the topic of exploration and the context of exploration leading to the project set-up and assignment. It also introduces the methodology of the project, the various activities of the project and the tools of use.

1.1 Project Background

The world around us has material flows all over them, each object that you see and use in your everyday life was once a raw material and probably has taken a long journey to come to you. The problem with a linear economic model of taking more materials and making more products, is that the journey of the object that you see and use at most times stops with you as an end consumer or in your dustbin, which eventually creates more waste. A circular economy tries to oppose this model of taking, making, and wasting more, by having intentionally designed regenerative and restorative systems, where products are reused, repaired, re-manufactured, or in the very least recycled. It essentially tries to close the loop and reduce waste (See Figure.1).

Innovation for a circular economy

When trying to move from a linear to a circular economy, it is not just a change in the products that we use but in the systems that we live in. Hence innovation is key in moving towards a circular economy, requiring innovation at all levels starting from the product level, business model, and on a systemic level (Konietzko et al., 2020).

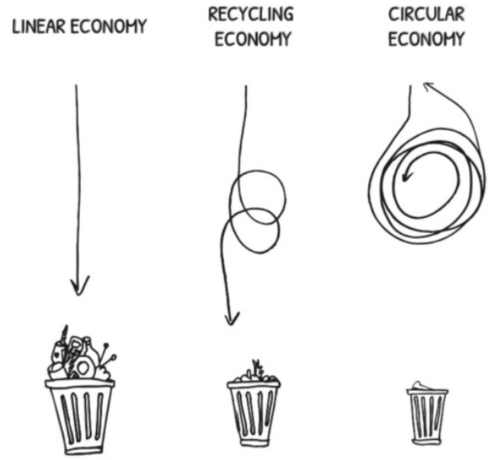


Figure 1: Visual Illustration of a circular economy

Collaboration in a circular economy

A circular economy is indeed a problem of material flow, but the material flow does not happen by itself, it requires people to enable the material flows. In redirecting the material flows from linear to circular systems, it is not only the materials that are being redirected but the people who use/handle the materials as well. So the people and their relations are also important, and to enable them collaboration is necessary within organizations and between organizations, at both intra and inter-organizational levels (Fernandez et al., 2016; Sarkis 2012).

Shared vision for a circular economy

When it comes to innovation for a circular economy, the collaborations that lie on a higher level have the potential to enable systemic level changes for a circular economy which in turn could have higher potential for sustainability impacts (see figure.2).

When organizations that contribute towards a circular economy are creating such collaborations, a common/shared understanding of CE vision across potential collaborating partners is necessary to have a successful collaboration(Brown et al., 2019) and how to manage these collaborative networks while moving towards operationalizing the innovation from the collaboration remains one of the key Challenges for a circular economy (Korhonen et al., 2018).

Context of exploration

The context of exploration for circular collaborations are urban spaces or cities, considering that the circular economy tries to solve a material problem - urban spaces consume about 70-75 % of the global resources. Cities are where most materials are used and wasted, and also where buildings, vehicles, and products are consistently under-used. Apart from the material aspect, they provide Cities provide an ideal environment for innovation and collaboration as they offer proximity, density and variety (Athey et al. 2008).

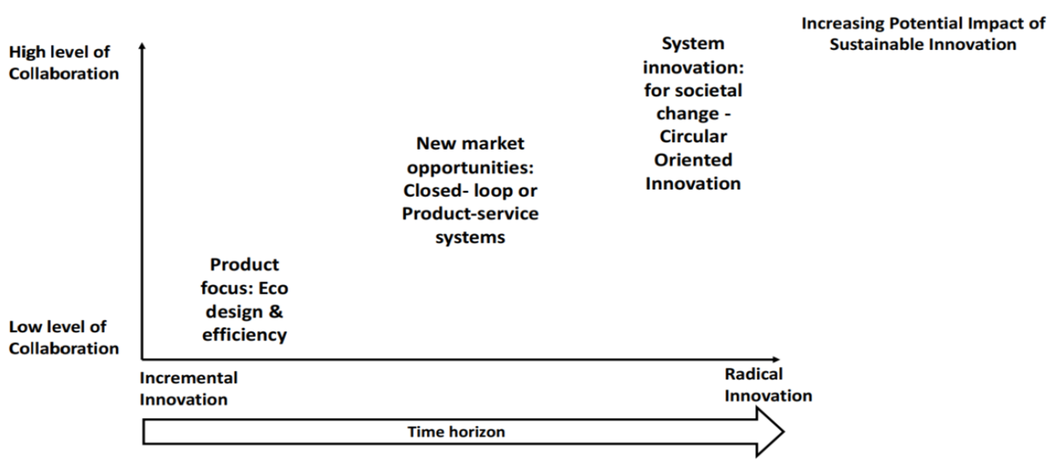


Figure 2: Evolution of Sustainable Oriented Innovation and Collaboration (Brown et al., 2019)

Project Set-up

The graduation project is part of the Delft Design Lab (DDL) Participatory City Making Lab at Industrial Design Engineering Faculty at TU Delft, which focuses on participation activities in the public realm and the H2020 research project DESIGNSCAPES in particular. Designscapes aims to achieve a better uptake, further enhancement and up scaling, of Design-enabled Innovation in Europe, through direct financial support to flagship and innovation generating initiatives as well as a huge capacity building effort targeting multiple stakeholder groups (citizens, researchers, practitioners, innovators and policy makers). The circular initiatives in the designscapes projects would also be a focus of study in this project, these start-ups operate in the urbanspace and use the urbanspace as a possible innovation hub for to create and operationalize their innovation and collaboration.

Assignment

The assignment consists two parts,
The first part is exploring the context of circular collaborations in a circular economy through an initial literature review and case-studies of multiple different circular organisations, to understand how circular initiatives collaborate in the urbanspace and the second part of the assignment aims to enable these organisations to create and operationalize a shared vision which would help in creating circular oriented innovation.
The main design question this assignment tries to answer is as follows,

How to create and operationalize a shared vision which would help organizations in the urban space to create circular oriented innovation?

1.2 Methodology

The methodology explains the various steps that were taken during the course of the project, it gives a brief account of the overall process in the project.

1. Discover the system

This step relates to exploration of the context, and it's relating elements. The main purpose of this step is research into the context to know what is out there and then the gaps present to identify what kinds of information would be necessary for the project.

Relating parts in the report:

Literature review
Research Set-up

Activities performed:

Literature Review
Multiple case-study interview

2. Understand the system

Once the information was gathered, a systemic lens to the information was applied, this was done to get a holistic view of the happenings in the systems. The reason behind the use of systems thinking in this project is explained in depth, in the systems thinking for analysis chapter. The various steps taken for analysis of the information and the tools of use are also explained in depth in the chapter.

Relating parts in the report:

System Analysis (Appendix E)
Research Results

Activities performed:

Braindump
Identifying feedback loops
Creating system map
Behaviour over time graph
Ice-berg Model
Identification of Leverage points

3. Reframe

Reframing relates to redefining the initial design direction based on the information analysed and synthesized while understanding the systems activities. This helps refocus the project based on the evidence from the research.

Relating parts in the report:

Reframe

Activities performed:

Redefining initial problem and design question

4. Desired future state

After redefining the initial problem statement, a leap needs to made from the research to the design phase to enable this leap to take place a desired future is envisioned to understand how the future would be with regard to the redefined design question.

Relating parts in the report:

Future story

Activities performed:

Creating a future story

5. Defining Design

The desired future state helps in getting an idea of what the future might look like but to enable this transition towards the desired future state, a design direction is required to know what points of the existing system should be enabled towards the future direction. In addition to the design direction, to ensure the design actually enables movement towards the direction - design requirements are created.

Relating parts in the report:

Design Direction
Design Requirements

Activities performed:

Creation of Design direction
Creation of Design requirements

6. Ideation & Design:

Ideas are created based on the design direction created while defining design. This relates to creation of the final concept based on the ideas created. Ideas are chosen based on the relation to the design requirements and the overall alignment to the design direction created.

Relating parts in the report:

Ideation
Final Concept

Activities performed:

Individual ideation
Final Concept creation

7. Test & Re-Design:

Once the design is created it is tested with the various people it is designed for to validate the concept. To test the concept evaluation guidelines are created based on the design direction, improvements are captured based on the testing performed and then the concept is refined further.

Relating parts in the report:

Evaluation
Concept iteration

Activities performed:

Creation of Evaluation guidelines
Analysis of evaluation
Concept Iteration

02

Literature review

This chapter provides an overview of the literature. It introduces the ideas of circular economy(CE) in this project, dives into innovation in a circular economy, ecosystem innovation, circular collaboration and finally circular economy and cities. Throughout exploration of each section a few knowledge gaps are identified which help in forming the research study in the next chapter.

2.1 Circular Economy

The focus of this project is around the concept of a circular economy; though it has gained a lot of traction in recent years, the definitions of use are plenty and varied. Hence we'll be taking a brief introduction towards the idea of a circular economy, it's various definitions, and how this project views a circular economy.

2.1.1 Why a Circular Economy ?

The global population will continue to grow, the UN (Martin, n.d.) projects the world population to reach 8.5 billion by 2030. This is putting enormous stress on our environment and our resources, which are becoming more difficult to extract. Our myopic focus on producing and consuming as cheaply as possible has created a linear economy in which objects are briefly used and then discarded as waste. For all the good our linear economy has brought us based on the idea of taking making and wasting more, it has made us pushing the boundaries of our planet and reaching the limits of growth.

To prevent reaching the limits of planet requires a new way of organising, we needn't look far farther but in nature where waste is produced and where value is inherently present in all forms of waste that is being generated. Nothing is waste anymore, everything is a resource. This is referred to as a circular economy (we'll get to the definition below). Apart from the environmental and moral arguments for a circular economy, the transition to a circular economy is also a financial one, The Ellen Macartur foundation estimates a Trillion US dollars in business opportunities which includes material savings, increased productivity and new jobs, and possibly new product and business categories.

Considering the focus of the project is on circular collaborations in the urbanspace, society needs to play an active role, too. We need to shift from optimizing on the lowest initial cost towards maximizing the total value and total cost of ownership, while at the same time taking the health and well-being of people into account. Governments should change their tendering processes and implement requirements for circularity that can drive demand for new solutions. Customers and consumers should change their consumption patterns and move from owning to using products and since the circular economy is inherently systemic where every resource is connected, it can only succeed if all stakeholders co-design, co-create and co-own. (Why We Need a Circular Economy, n.d.)

2.1.2 What is a circular economy ?

More than 100 different definitions of circular economy are used in scientific literature and professional journals. There are so many different definitions in use, because the concept is applied by a diverse group of researchers and professionals (Kirchherr et al., 2017). A reason for this is CE as a concept is being pre-paradigmatic, where no single paradigm exists, with guidance and consensus still forming (Ghisellini et al., 2016).

To overcome this challenge, Masi et al. (2017) deviate focus from the specific antecedents(previous fields of research and exploration)and definitions to the interconnecting goals and principles that are central to support a common CE vision. They include:

- Replacing linear systems with intentionally designed regenerative and restorative circular systems.
- Decoupling economic growth from non-renewable material throughput and environmental degradation.
- Increasing system resilience
- Maximising value creation, capture and recovery across economic, social and ecological values.

This project views a circular economy according to the above definition as it moves focus away from a particular field of enquiry into overarching principles and goals

2.2 Circular Economy Strategies

Strategies for a circular economy support the goals and principles for a circular economy as discussed in section 2.1.2 which help to reduce the consumption of natural resources and materials, and minimise the production of waste.

There are a lot of strategies that are proposed for a circular economy, but the focus has largely lied on the product design side of the strategies and not much on the business model front, and even less on the ecosystem level where higher level of collaborations take place, which this project focuses on as we'll see in section 2.3.2.

To get a more expansive view for the project, with innovation perspectives from product,business model and ecosystem levels; a framework of circular strategies (narrow, slow, close, regenerate, inform) is used for this project (Konietzko et al., 2020). The explanation of each strategy is mentioned in Figure 3.

Each strategy mentioned has corresponding principles with perspectives across product, business model, and ecosystem-level innovation, examples of each perspective for each strategy is detailed in Appendix A.

Though this view of a circular economy is quite expansive and the corresponding examples are presented by (Konietzko et al., 2020) on various innovation perspectives. They do not take into account the institutional and social dimensions necessary which might be necessary for societal transitions to a CE (Moreau et al., 2017). This include, for example, the need to price carbon emissions or other forms of externalities, as well as the need to explore more participatory and redistributive forms of government that can safeguard and improve the quality of work and equity within an emerging circular economy.

The social and institutional principles would also be relevant in addressing the current challenge for Circular oriented innovation; to move from the level of new market opportunities and closed-loop exploration to the generation of societal changes, through novel larger-scale collaborations (Brown et al., 2019).

Narrow Narrowing loops is about reducing resource use associated with the product and production process. (Bocken et al., 2016)
Slow The aim of slowing resource loops is to extend the utilization period of products (Bocken et al., 2016)
Close Closing refers to a activity that brings post-consumer waste back into the economic cycle (Bocken et al., 2016)
Regenerate Regenerating refers to a business activity that manages and sustains natural ecosystem services, uses renewable and non-toxic materials, and is powered by renewable energy (Cowes,2015;Braungart & McDonough,2010)
Inform Informing refers to using information technology as a support strategy for the circular economy for example, Artificial intelligence, big data or online platforms. It is therefore important to highlight that information technology needs to be viewed as a means to an end (in this case circularity), and not as an end in itself. (Konietzko et al., 2020)

Figure 3: Strategies for a circular economy

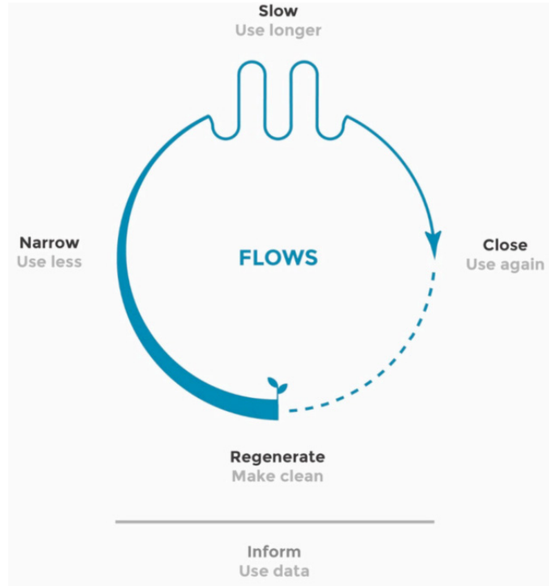


Figure 4: Visual representation of the strategies for a circular economy (Konietzko et al., 2020)

In summary, this section explains the view of CE strategies that this project takes and also explains the gaps in knowledge of the strategies in taking social and institutional principles into account, which is relevant when exploring collaborations for a circular economy.

2.3 Circular Oriented Innovation

As this project, tries to explore how to operationalize innovation for a CE, this section explores into Circular Oriented Innovation (COI).

2.3.1 What is Innovation ?

Innovation is a multidimensional concept that includes varied meanings and definitions from the perspective of different disciplines, some of them co-exist in emergent fields such as innovation studies (IS) (Fagerberg & Verspagen, 2009). There are numerous definitions present and debated across but the core idea across many definitions remains somewhat the same with a focus on the implementation of idea,

innovation is the implementation of that creativity—that is the introduction of that "new" (idea, solution, process, product, service…) into the real world(Gutzmer, 2016).

2.3.2 Circular Oriented Innovation

Circular Oriented Innovation(COI) is a field of research with links to innovation for sustainability ; COI are innovations that contribute towards creating developments for a Circular Economy (Brown et al., 2019). The dominant view is that the concepts within CE are not new in themselves, but it is their specific combination and scope that creates challenges to present a unified vision and implementation.(Blomsma, 2017.), Hence there is a need to look at COI as separate from existing views on similar concepts in other innovation arenas.

COI takes place in three different levels: product, business model, and value networks or ecosystems (Konietzko et al., 2020) (See figure 5). In addition, there can be types of interplay between the product design, business model, and supply chain configurations (value networks) (Brown et al., 2019) - which means that changes at the ecosystem level will possibly affect the product level and business model as well.

When it comes to the sustainability impacts of COI, (Ceschin & Gaziulusoy, 2016) identified that increased potential sustainability impacts are linked to increased systemic innovation, which means when we move from product configurations to eco-system configurations - the sustainability impacts will be higher.

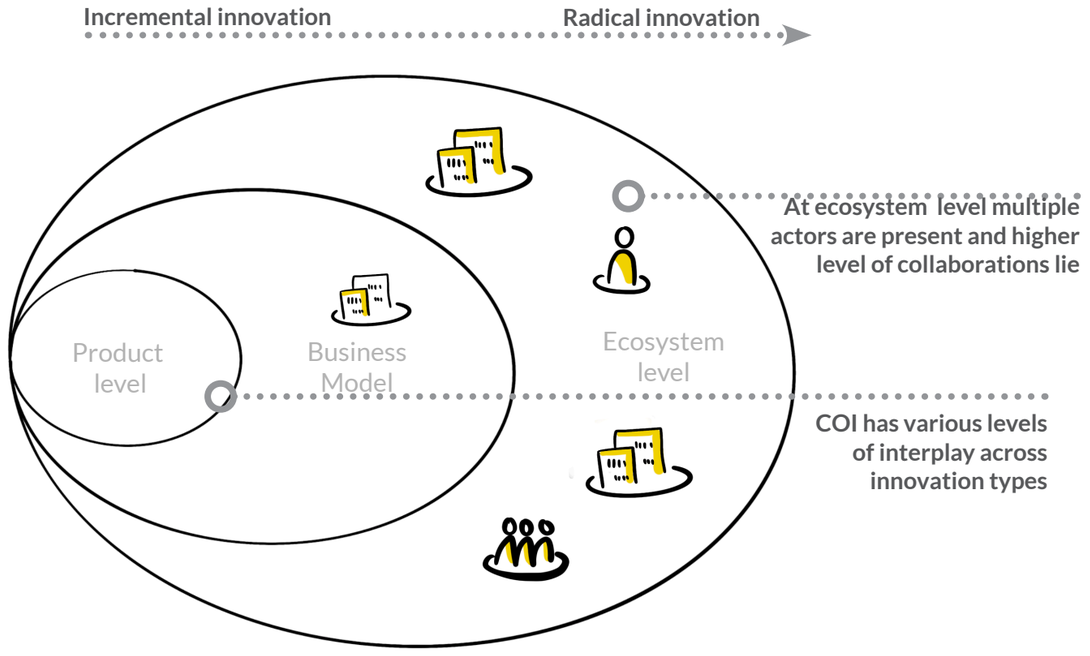


Figure 5: An Ecosystem Perspective (adapted from Konietzko et al., 2020)

Another aspect is the type of innovation; they could be incremental or radical, radical innovation has a higher potential for influencing sustainable development across industries and systems(Brown et al., 2019).

In contrast to incremental innovation, radical innovation "changes the rules of the game" and occurs outside the familiar realms of standardized. Incremental innovation refers to the maintenance of a product or service in a market, e.g. certain technology, through relative incremental developments or improvements . While incremental innovation exploits "the existing," radical innovation is exploratory and operates with higher levels of uncertainties (Edwards-Schachter, 2018).

Another aspect of a radical innovation is in terms of changes in meaning (through experience of a product or service) in addition to changes in the functions (through the product or service), this would then be related to design-driven innovation where innovation relates to changes in meaning (Verganti, 2009).

Most research on circular oriented innovation takes a product or business model perspective (Konietzko et al., 2020). An ecosystem perspective is underdeveloped when it comes to creating ideas around a circular economy and strategies for taking an ecosystem perspective on the circular economy is important for achieving higher levels of circularity.

2.4 Ecosystem Innovation

Considering the potential of eco-system innovation for sustainability impacts as from section 2.3.2 and the lack of strategies present for ecosystem in a circular economy, we take a look into what an ecosystem is first and foremost and then what is ecosystem innovation.

2.4.1 What is an ecosystem ?

Ecosystems are comprised of any set of actors—producers, suppliers, service providers, end users, regulators, and civil society organizations—that contribute to a collective outcome (Jacobides et al., 2018; Talmar et al., 2018). Ecosystems have the following characteristics. They

(1) consist of multiple locally, regionally or globally distributed entities that do not belong to a single organization,

(2) involve dynamic, collaborative and competitive relationships,

(3) imply flows of data, services, and money,

(4) often involve complementary products, services and capabilities,

(5)evolve as actors constantly redefine their capabilities and relations to others (Jacobides et al., 2018; Reeves, n.d.)

2.4.2 Ecosystem Innovation

There are many types of ecosystem innovation present which is described in detail in the appendix C but in general Ecosystem innovation aims at changing how actors relate to each other, and how they interact to achieve a desired outcome.

An ecosystem entails collaboration and the various relationships between them as one of the necessary characteristics from the five characteristics from 2.4.1. Hence collaboration is key when trying to pursue ecosystem innovation; and strategies need to be created and pursued intentionally. Research also clearly indicates collaborative innovation is necessary within CE (Brown et al., 2018), in terms of circular ecosystem innovation as well - there is a lot of focus on the principles required for collaboration, indicating it's importance for ecosystem innovation (Konietzko et al., 2020b)

(Takey & Carvalho, 2016), state ecosystem innovations only generate value if accompanied by complementary innovations(E.g.. The value of smartphones when combined with apps), and highlight how this is linked to open innovation concepts (where innovation occurs intentionally outside the boundaries of the organization), where producing innovations requires increased collaboration across company boundaries (Chesbrough & Appleyard, 2007). Hence literature from open innovation concepts might be valuable to explore as to how collaborations take place there.

In summary, this section explains the ecosystem perspective discussed in section 2.3 and the importance of collaboration in ecosystem innovation and circular economy. It also briefly touches on the relation between ecosystem innovation and open innovation, where collaboration again is an important factor.

2.5 Circular Collaboration

Collaboration as a term is quite broad with no common consensus on a specific definition or a concept, However, most scholars agree that collaborations basic characteristics incorporate trust and communication, shared decision-making, goals, vision and a balance of power, which distinguishes it from other forms of interaction (Brown,2018).

2.5.1 Role of a vision in Circular Collaborations

Having an explicit vision is proposed as being primary and central to initiating a company's pursuit of CE strategies and subsequent Circular Business Models (Bocken et al. 2016). Explicitly stating a committed vision is suggested to act as a rallying call and performance enhancer to potential collaborative activities (Luzzini et al. 2015; Rohrbeck et al. 2013; Witjes & Lozano 2016). Hence a vision helps an organization in pursuing goals for itself and beyond the organization.

In terms of circular ecosystem innovation as well, being open about individual interests, and aligning them towards a shared vision is an important principle (Konietzko et al., 2020b)

2.5.2 Barriers and drivers of Circular Collaboration

A study by Brown.et al (2019) on why circular organizations collaborate looks into the barriers faced by different companies and relates it back to the Hard(market and technical) and soft barrier(social and institutional). These barriers can help understand the social and institutional principles required to pursue ecosystem innovation in a circular economy as highlighted in section 2.3.2, apart from these barriers there are also various dilemmas present in open innovation (Hautz et al., 2017) which relate to ecosystem innovation, as we saw in the previous chapter on ecosystem innovation (See Appendix B for detail account of the various barriers and dilemmas)

A common/shared understanding of a CE vision across collaborating partners and internal motivations, is also mentioned as a barrier from the above study, in addition to the shared vision there were many different barriers and drivers as well.

However information from initiation to implementation to specify how companies collaborate throughout the entire process and how these barriers and drivers change across the process, is not known yet from the studies, understanding this can offer insights into the effectiveness of current collaborative processes and agreements with the aim to propose normative changes to stimulate increased radical COI activities. (Brown et al., 2020), apart from this as we saw in that in an ecosystem(where collaboration is key) actors evolve constantly redefine their capabilities and relations to others (Jacobides et al., 2018; Reeves, n.d.).

Understanding how collaboration changes happen across a period of time can give insights into how these organisations create shared vision, adapt them and more importantly how they operationalize their innovation, with the help of a shared vision.

2.5.3 Actors and levels of involvement

Ecosystems as we've seen before comprised of any set of actors—producers, suppliers, service providers, end users, regulators, and civil society organizations—that contribute to a collective outcome; however ecosystems are also dynamic in nature because of which the roles of different actors and levels of involvement in the project changes over time as well.

In addition, changes/renegotiations in collaborative dynamics (roles, responsibilities) increases flexibility to adapt to emerging factors from the collaborative process and increases the potential for successful collaborations (Clarke & Fuller, 2010; Majchrzak et al., 2014).

Hence considering how in ecosystem innovation many different actors collaborating towards a collective outcome in a dynamic environment, where successful collaborations are the ones adapting to emergent factors it would prove useful to investigate how the roles of various actors change over time as well.

In summary, this section introduces the ideas around collaboration and the importance of a shared vision in ecosystem innovation and for collaboration. However, how these organisations collaborate over a period of time and how their roles change over the period is not known - which is important in operationalizing innovation

2.6 Implementation Gaps

This section tries to give an idea of the difference in pursuit of innovation from product, business model against ecosystem innovation.

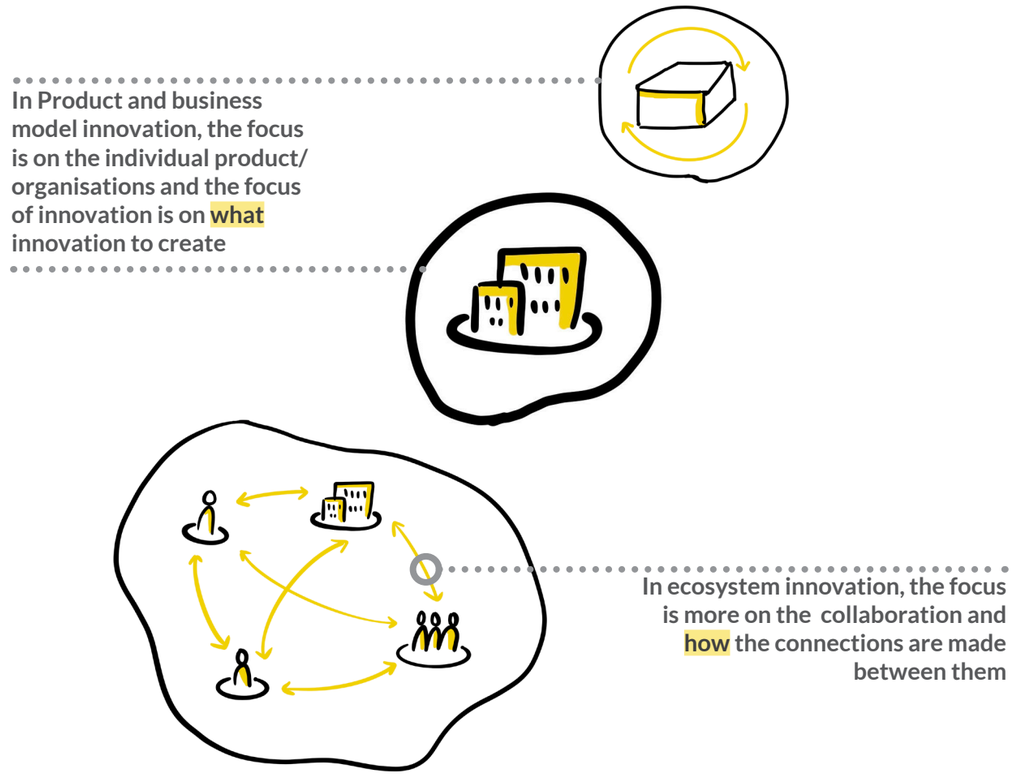


Figure 6: The focus on how in ecosystem innovation

2.6.1 Knowledge-Implementation gap

The move from innovation on product, business model level to ecosystem level, there is a difference apart from the collaborative aspect of the outcome; which is on the innovation itself. As we saw in section 2.3.1, innovation is the implementation of the idea; In COI, implementation of ideas in product and business model cases are related to individual product and business solutions, they more often deal with questions of what to do and what innovation to create

But in innovation ecosystems where the outcomes are based on collective value creation (Ritala et al., 2013), implementation of collaboration plays a key role more than the idea itself, this is because it is not about the idea but the connections in the system to enable integration of the idea into the system - which essentially is about collaboration and implementation.

With regard to this, there is a lack of empirical investigation, especially into the collaborative aspects of COI(Brown et al., 2020). This in essence causes a knowledge-implementation gap, where we know what kind of ideas we want to implement but how to implement and operationalize innovation is not known - which is key when going for ecosystem innovation.

2.6.2 Design-Implementation gap

Apart from the ecosystem perspective on the importance of collaboration and the knowledge-implementation gap, there also exists a design-implementation gap within the tools for a circular economy. A review and evaluation of circular business model tools by Bocken.et al(2019) across all generic phases of innovation; ideate, implement and evaluate explains that majority of them focus on ideation phase. A deeper analysis shows that while most of these tools fit into multiple categories at the same time, with a prominent focus on ideation, none of them focuses on how to bridge the design-implementation gap(Baldassarre et al., 2020).

In summary, there is less empirical evidence on the collaborative aspects of COI and also there lies a design-implementation gap in the tools that are present which help enable the transition to a circular economy

2.7 Circular Economy in Cities

Cities are the context in which the collaborations take place. This section explores into cities in the light of innovation and circularity.

2.6.1 Why Cities

Cities are the centre of human activity. Today, over 55% of the global population lives in cities(Ritchie & Roser, 2018) , generating 80% of global GDP. As the 21st Century progresses, the majority of global population growth is expected to occur in cities. By 2050, the share of people living in cities is expected to reach 68%. Without effective management, this rapid growth of cities can aggregate and aggravate key societal challenges, from unemployment and inequality, to pollution and climate change.

Despite occupying just 2% of the Earth's surface, the impact of cities spans far beyond their boundaries. Approximately 70-75% of global resources are
Consumed by urban activities while accounting for 70% of global greenhouse gas emissions. With global urban populations expected to increase by a further 2.5 billion people by 2050 and continued improvements to living standards, it is estimated that resource consumption of cities will more than double by the middle of the Century. Yet, with a mere 9% of resources in the global economy currently circulated, cities are in a dangerous position to widen the global circularity gap(The Weight of Cities | Resource Panel, n.d.).

2.6.2 Cities as hubs of Innovation

What is a city ?

Cities are a complex and dynamic framework that includes people, relationships, values, processes, tools and technological, physical and financial infrastructure. It is therefore the ability of the system as a whole to produce new knowledge and cope with change that defines its innovation performance (Johnson 2008).

Why are cities hubs of innovation ?

Cities are considered key environments for the emergence of innovative interactions and relationships: creative and innovative industries tend to localize in or in proximity of urban environments, thus taking advantage of shared knowledge and a density of specialised and potential customers, suppliers, designers, experts and workers to create new tools, technologies, methods, instruments, products, processes, policies and services (Concilio et al., 2019). Cities provide an ideal environment for innovation as they offer proximity, density and variety (Athey et al. 2008).

Circularity and Cities

Cities face urgent needs to expand and advance CE adoption and sustainability-oriented practices due to growing concerns over climate change, environmental pollution, and the inequitable distribution and allocation of resources in the linear economy (Nogueira et al., 2020). They present unique opportunities for CE interventions as they are places where human populations are concentrated and where multiple natural (ecological) and man-made (social and technical) systems intersect, diverse human and non-human agents interact, and different types of resources are created, transformed, circulated, used, and wasted (Markolf et al., 2018).However, many CE practices within urban environments often remain novelties at the meso- or niche-level and are unable to scale as they attempt to activate and mobilize multiple resources through pathways that counter the linear logic underlying the design of these infrastructures (Nogueira et al., 2020).

Infrastructures carry a system of offerings (e.g., people, objects, environments, messages, and services) and affordances that standardize the circulation and allocation of resources, as well as how the infrastructure is used. Instead of approaching infrastructure as an element "which runs underneath actual structures", they suggested individuals and organizations recognize them as relational elements "upon which something else rides, or works, a platform of sorts" (Star & Ruhleder, 1996). Such an approach is particularly useful for CE initiatives happening within cities, where new technologies and new dynamics of daily life are rapidly changing and the fairly stable, technical elements of the 20th-century infrastructure are posing significant barriers to progress towards overcoming 21st-century sustainability and equity challenges (Nogueira et al., 2020).

These infrastructures are external emergent factors that are present in the city which influence the circular organisations . These could also influence the collaboration that take place in cities, and when it comes to collaboration those which adapt to these emergent factors are the ones that are successful in the long term (Majchrzak et al., 2014).

In summary, this section explains the role of the city as an innovation hub and it's importance in the CE agenda. It is also seen that there could be infrastructure in the cities acting as emergent factors in the city which influence the collaborations.

2.8 Summary & Conclusions

This chapter discusses the key terms and contexts in which this project is set on. Many different ideas around circular oriented innovation, ecosystem innovation, collaboration and circular economy in cities have been discussed in the chapter. Each section also provided knowledge which helped in exploration of further chapters in the literature review.

From the literature review on circular oriented innovation, we understand most research on COI takes a product or business model perspective (Konietzko et al., 2020) and an ecosystem perspective is underdeveloped which is important for achieving higher levels of circularity.

With regard to circular collaborations we also saw that the various drivers and barriers of circularity are not present across a time-line(from initiation to implementation); understanding this can offer insights into the effectiveness of current collaborative processes and agreements with the aim to propose normative changes to stimulate increased radical COI activities (Brown et al., 2020), which in turn can offer higher levels of circularity and may require higher levels of collaboration.

We also saw with regard to ecosystem innovation, where many different actors collaborate towards a collective outcome in a dynamic environment , successful collaborations are the ones adapting to emergent factors (Clarke & Fuller, 2010; Majchrzak et al., 2014). Considering this, how the roles of various collaborators change over time is not known from the literature study,

The context in which the above knowledge is set to explore is in cities where there are different infrastructure elements which influence the circular organisations and their collaborations, and when it comes to collaboration those which adapt to these emergent factors are the ones that are successful in the long term (Majchrzak et al., 2014). Apart from the emergent factors not much is known from the literature on the various barriers and drivers of circular collaboration in cities in specific and a significant gap remains to connect conceptual and ideological discourses of CE practices in cities (Nogueira et al., 2020). Hence, considering the focus points summarized from each section of this Chapter, the research study in the next chapter will try to explore circular collaborations between organisations in cities, with a focus on

- Barriers and drivers of collaboration for over a timeline(initiation to implementation),
- The changing role of actors/collaborators over a time-line
- Influence of external factors in cities on organisations and collaborations.

The reason for exploration into these gaps is mainly to understand how organisations in the urbanspace collaborate and innovate together. Strategies predominantly focus on the what to do for a circular economy but how strategic decisions and knowledge management approaches are selected and conducted for collaborative innovation (needed to integrate and implement CE product and business model innovations within a system) is nascent (Brown.et,al 2020). These gaps if explored help better understand how the collaborations evolve over time and the effect of the urbanspace on them.

The knowledge gaps could not be studied/ addressed extensively as each knowledge gap would require its own research project, and a larger time-line as well. For this design project, these aspects were taken into consideration as possible starting points of research into the initiatives to get an overarching view on the context of circular collaborations in the urbanspace which are going to be studied in the research phase.

03

Research set-up

At the end of chapter 2, a few gaps were identified which could help answer how to operationalize innovation for a circular economy. This chapter introduces the research questions to address these gaps, it also states how this is analysed through the research method and how organisations were selected for the semi-structured interviews.

3.1 Research Questions

As discussed in Chapter 2.8, there are various points of focus to explore during the research phase which are informed from the literature review, these are related understanding how circular collaborations between organisations in cities take place. The identified gaps are as follows,

- Barriers and drivers of collaboration for over a time-line (initiation to implementation),
- The changing role of actors/collaborators over a time-line
- Influence of external factors in cities on organisations and collaborations.

Based on knowledge gaps identified which would inform the research of the study, the following three questions were created,

- How are the barriers and drivers of collaboration for circular organisations in an urban space distributed across a time-line?
- How do the various levels of involvement of the stakeholders in a circular oriented project across a time-line?
- How do the external factors in cities influence the circular organisations and their potential collaborations ?

3.2 Research Method

To answer the research questions framed, several organisations were investigated through a multiple case-study interviews, this is used for the purpose of this research as it allows for comparison between different circular organizations. Furthermore, multiple case studies enable the replication of findings across cases, improving the reliability and generalizability of a study (Baxter & Jack,2008) which is important as this project is not done for a single organisation - but rather circular organisations in urbanspace in general.

3.2.1 Interview

The main goal of the interviews is to explore further the 3 main research questions. The interviews were semi-structured to give the interviewer the freedom to add or adapt questions if necessary (Patton, 2016). Furthermore, semi-structured interviews give the opportunity to gain reflective knowledge and at the same time ongoing information about the research topic (Gioia et al., 2013). The focus of the questions was guided by the 4 subtopics in the interview guide, each subtopic relates back to the research questions.

Subtopic 1: Barriers and Drivers of Collaboration

- What organizations do you work with?
- How do you start your collaborations with these organizations?
- How long would you say your collaborations with these organizations are?
- What would you say are the barriers that you face when collaborating with these organizations?
- What would you say are the drivers that you face when collaborating with these organizations?
- Are there any tools that you used to collaborate?

Subtopic 2: Level of collaboration

- How did you select the partners for collaboration?
- How do you deal with conflicts among partners?
- How close would you say the collaborations are with the various collaborators?

Subtopic 3: Responsibilities in collaborations

- How were the responsibilities in the collaborations distributed?
- Did some partners have more responsibilities than others?
- How is power distributed?

Subtopic 4: Emergent factors influence on the project in the City

- Are there any external factors that influenced your organization's capabilities?
- Are there any external factors that influenced your collaboration with the other organizations?

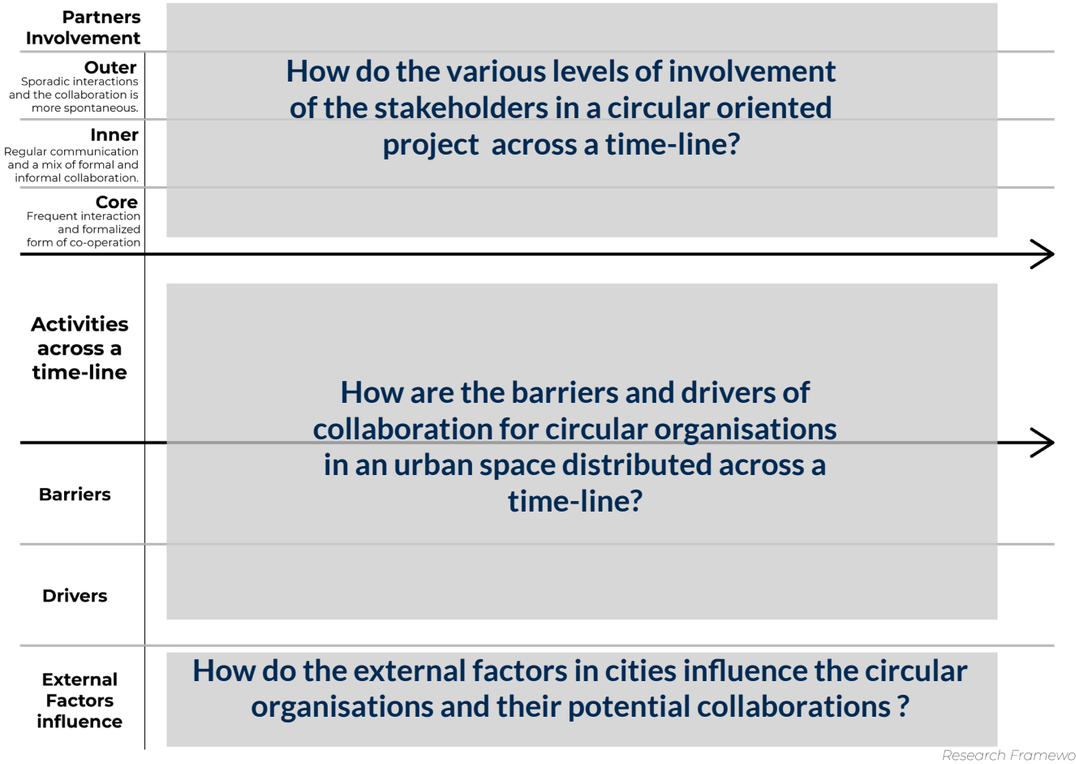


Figure 7: Research framework used in interviews with participants

3.2.2 Research framework

An initial framework was created based on questions framed during the initial part of the research. This framework was used to guide the conversation and was a research tool to help the people reflect on activities across a time-line ,corresponding barriers, drivers, types of partners and external influences in the project.

3.2.2 Framework details

The framework consisted of three different parts to it, each of which tried to answer the three research questions. The details of each part of the framework corresponding to each research question is in figure 5. To categorize the various levels of involvement the various co-creation levels mentioned in (Puerari et al., 2018) was used to categorize the various levels of involvement, as this indicates the co-creation activities during collaboration and the types of collaboration accordingly at various stages and also provides a way to see gauge how roles of various stakeholders changed over time.

Usage of research framework

The framework was filled by the interviewer as the interviewee talked through the process of the organisation. The interviews being a digital session - the knowledge of the interviewees on the usage of the online tool was a reason for this decision. The interviewee commented on the whole framework as it was filled up by the interviewer while answering the questions.

3.3 Organisation Selection

Organization number	Organization description	CE Strategy
Organization 1	Intends to use electrical barges in the city for better recycling process.	Close, Inform, Regenerate
Organization 2	Intends to create circular furniture through regenerating plastics and through up-cycling practices	Close, Inform
Organization 3	Intends to regenerate plastic waste into various different plastic artifacts.	Close, Inform
Organization 4	Intends to regenerate plastic waste into a brick for creating houses in developing nations. The bricks could be reused again.	Close
Organization 5	Intends to create knowledge for plastic recycling and creating plastic artifacts for alternate purposes.	Close, Regenerate Inform,regenerate
Organization 6	Intends to promote sharing of toys between students in schools through use of a product made from old cut down trees in the city	Slow

Figure 8: List of Organisations interviewed

There were multiple organization profiles selected for the scope of the case studies, these organizations were also selected based on the type of strategy (as in Chapter2.2) their organization pursued. The reason the selection based on the different strategies is to enable generalizability of the study across organizations.

Also, all the organisations interviewed were beyond the design phase and were at least in the implementation phase. This was because this could help in understanding how these organizations operationalize their innovation and address the implementation gaps mentioned in section 2.6.

Apart from this the organisations were at various levels of maturity, this was to understand the drivers and barriers across a time-line, and organisations working at multiple timelines could provide insight into their struggles more deeper at their current maturity level.

3.4 Summary and conclusion

The chapter introduces the formation of the research questions based on the initial literature gaps identified which would be necessary to understand circular collaborations in the urban space, the following research questions were framed,

- How are the barriers and drivers of collaboration for circular organizations in an urban space distributed across a time-line?
- What are the various levels of involvement of the stakeholders in a circular oriented project?
- How do the external factors in cities influence circular organizations and their potential collaborations?

After the initial research questions were set, the research method for the multiple case study is introduced, which is followed by the case selection for the case study interviews. The outputs from the research from this section provided the data necessary for the analysis of information in the next chapter.

04

Research Results

This chapter presents the results of the research that was performed in the previous chapter.

4.1 Analysis Method

The phenomenon that is being explored is circular collaborations in the urban space. There are multiple different actors (individual consumer, organization, a network of organizations and cities) who are present across many different levels of exploration (individual needs, organizational goals, and aspirations of cities). This makes the understanding of the phenomena much more complex to comprehend and even more difficult to see the interconnections between them.

The data gathered from the initial research set-up in the previous chapter was analysed through a systems thinking lens to get a more holistic view of circular collaborations and to view it from many different perspectives. Systems thinking is used to both analyse a system as well as identify possibilities to change a system to satisfy the needs of a specific group.

There were many different tools from systems thinking that was used for analysis and synthesis of the information. The overall process of analysis with the various steps and system's tools is elaborated in Appendix E.

Traditional analysis breaks down the studied topic into different elements to understand the system. This works well in understanding elements of a system but not the system as a whole. They also help in understanding open problems, where there are multiple causes and phenomena occurring at the same time.

System thinking focuses on how the parts interact. Instead of isolating and studying smaller parts of the system, system thinking expands its view (Aronson, 1996), similarly, this study tends to understand how the various parts in a circular system in cities collaborate with each other and what this means for the system as a whole.

Hence, systems thinking is considered as an appropriate means of analysis of the information for this project.

The system boundary

“ Circular collaboration in cities from the perspective of start-ups/initiatives contributing towards a circular economy ”

Before analysis of the available information, a system boundary (Valerdi, 2011) was set - a system boundary helps in setting the boundary within which the information would be looked at. The scope of the research was set in the initial research itself but the information received from the interviews and literature might not be bounded by the initial scope, so in order to have a boundary to hang on to, a system boundary was consciously set.

4.2 Key Insights: System map

The system map is a visual representation of the various different research outputs that were derived from the literature and the interviews. It is both an analysis and synthesis tool where it helps to understand the available information as well as create new knowledge from the relations between the various different available information. Additional details on the creation of the system map are in Appendix E and F.
The key insights relevant for the project from the system map are presented here.

4.2.1 Visibility of the organisation

The visibility of the organization played a central role for the organizations. The more visible the organization became the more the number of collaborators joined the organization, leading to more collaborators in the urban space contributing by needs. It also helped increase the awareness of the organization leading to more funding for the organization as well. The feedback loop in fig shows how the visibility of the organization played out in helping the organization.

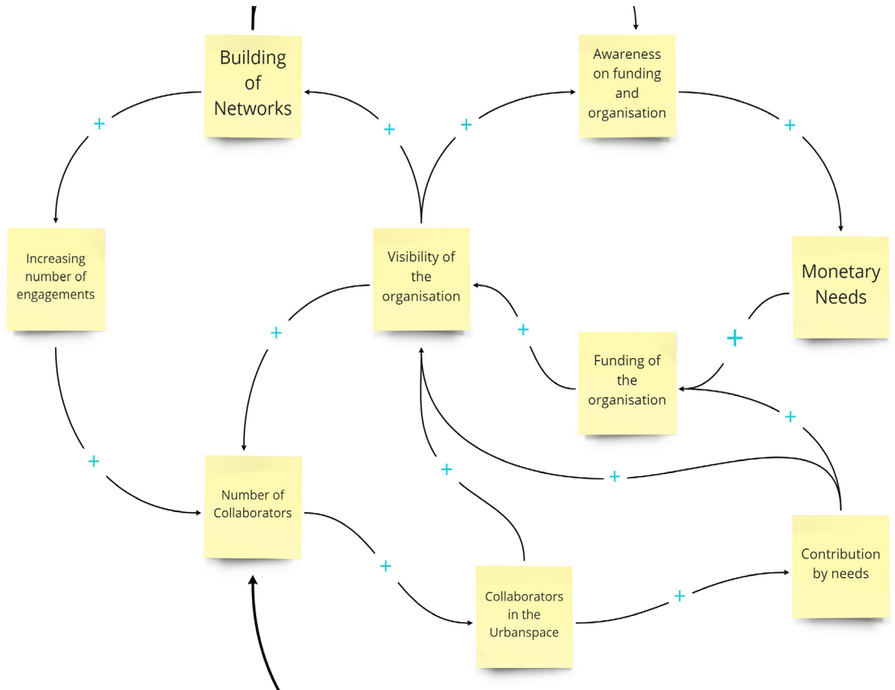


Figure 9: Feedback loops part of the system map(appendix F) showing the importance of visibility

4.2.2 Dual Role of Organisations

The organizations are engaging customers/ collaborators in two different ways, both in terms of informing them and creating something for them.

Creating relates to organizations creating artifacts that help to directly contribute towards a circular economy. (Eg. Creating a recycled phone case)

In this case, organizations are informing for behaviour change in the people they are collaborating with and informing their customers/collaborates as to how they can be actively involved in this participation towards a circular future, beyond the base product/service offering. (Eg. Enabling other people in creating a recycled phone case)

Both of these roles are complementary and each activity of the organization was a combination of creating and informing. However the level of informing and creating may vary.

"...Apart from so these were these were not sort of the technical developments. So not the machines but things around machines. And then we also wanted to grow sort of the platform. You know, we launched like a map to find people in your area, too..."

4.2.3 Value over the artifact

Though on the surface level it might seem like the organisations are selling a product/ service, the focus of the organisation is much more on the core purpose that they try to stand for. For the organizations, it is not a great product / service that they are trying to sell but rather a value. It is also true for the people who use the product/service of the organization where the core value overcomes the importance of the product.

" ….So I think that's sort of the deeper layer I think the sharing is, is just a means to to accomplish it. And the display itself is also just a means to this bigger goal of making sharing normal…. "

So always give them a card with and they say wine or beer was in the barrel before?! So they know and yeah, people just love that story. Yes.

4.2.4 Focus on engagement

Because the organizations are trying to sell value and not a product (see section), engagement with the various people they are involved with becomes a more crucial part. Organizations tend to create more ways of engagement to showcase the value they are offering. The type of engagement the organizations tries to achieve also differs from the traditional ways of engagement where they try to actively engage the people involved more than just using their product/ service. They try to involve the customers in more than one way and create possibilities in which people can contribute towards the core value they are offering.

"….Yeah, these could be bought off machines that were difficult to find or things that were made from recycled plastic. Mm hmm. So, yeah, these it was more of a complete package. Also, like more background information on plastics,…"

4.2.5 Existing market infrastructure

When organisations make a product/ service they are trying to create - it is not possible for them to sell in the existing market infrastructure. There are two reasons for this, the existing market works on a linear material flow and has stock of materials whereas it is not possible to mass produce circular products due to availability of materials. The second reason is these organisations cannot compete with the existing products, because these organisations sell value more than the end product itself. It is like one of the interviewees said - You cannot just call two or three companies and see for the price and decide, the products are not comparable on similar lines. These organisations then tend to find/create different mediums of selling their products than using the existing market infrastructure. This also reflects on their focus on engagement.

"....No. Yeah. I have a I have a client who sell all over the world in international. Yeah, he is He sell this kind of product . But if I if I sold him this product(upcycled circular furniture), he he will thought that I am mad. No, he's these kind of companies. The regular companies in are very traditional..."

"....And we started a bazar to buy and sell the (organisations) items..."

"...one of all barriers not now with the same but after after that is how, how, by how to buy this product because it's not the regular way to call a two or three companies and as for the price and after decide divide No Yeah.."

4.2.6 Aligned/Shared values for a circular economy

Having shared values help organizations in creating and sustaining collaborations. The common values go across the financial interests of the organization and the contribution towards the organization takes place in terms of needs and capabilities. In some cases, the financial interest is not even a driver for these collaborations.

On the other hand, when potential collaborators only want a transactional approach to the dealing of the materials or knowledge this leads to emphasis only on the financial aspects of the projects which might not be lucrative for the collaboration to take place at the moment. It goes so far that if the values don't match the collaborations themselves fail.

'....Um, and then yeah, we thought that's really nice and it has a really nice story. So we really wanted to use that(the collaborators values). And then we were also looking for our social workspace. Because we also wanted to produce it in a way that it fits our mission. Yeah. So we got in touch with them(the supplier)...."

"....Yeah, yeah. So I wasn't the one going to the market but yeah, yeah, they(collaborator) knew like what we did and what we stand for and they wanted to help us with our project. And we wanted to help them. ...."

"....Yeah, but right now we had some issues with them because they didn't really believe in our products, especially the way we used to work because it's can easily sort of tear and yeah, that doesn't really work..."

"...A container company and his only interest is to get rid of the containers, not to find a business (of recycled materials)..."

4.3 Key Insights: Behaviour over time

The information in the system map only gave information in a static manner and did not inform how these collaborations take place over a period of time and how they change over time. To do this the initial collaborators were clustered and then mapped to each based on their changing and evolving roles. They were then mapped across time based on the activities they perform. The behaviour over-time graph tried to understand how the collaborators changed over time. The behaviour over time graph can be found in appendix G. The following insights were derived from analysing the map,

4.3.1 Previous Collaborations influence future collaborations

Collaborations which are already existing from previous network with similar interests help and influence the creation of the collaborations . Though this also on the flip side limits the organization from going for different kinds of partners. This also remained true for collaborations during the course of the project where the initial collaborations influenced the future collaborations and the number of new collaborations decreased over time.

"..Yeah yeah yeah okay we knew it's it's especially in general but with the former european projects we knew each other....."

4.3.2 Role of Collaborators Change

Once the collaborations were formed initially, the role of the collaborators also changed as the organisation changed and most of the collaborators stayed with the organisation with changes in their roles. The roles of the collaborators were changing as the project moved on,For example, initial funding organisation became suppliers, initial problem owners become collaborators etc

4.3.3 Customers are collaborators

When seen across a time-line, the customers sometimes start as collaborators, they then take a role in shaping the collaboration and actively shape the end result together. Customers are not really customers anymore but rather collaborators of the organization. The organisations almost try to co-create with the various collaborators on the end-result they are trying to contribute towards.

"...Is he is our partner or customer and in this case, so in this case this is is that but we are is is mix to .....we are building together the experience you know..."

4.4
The iceberg model

The Iceberg Model is a systems thinking tool(Goodman,2002) that shows how the most obvious part of the system, the tip of the iceberg, is held up by the non-obvious weight of the iceberg that is hidden under the waterline. The insights that were obtained from the previous steps were at many different levels of influence and abstraction. The iceberg model helped to arrange the information according to the various levels to get a better idea of what types of influences each key insight from the previous insight had on the other.

Not all insights were used for the iceberg, the system boundary was used as a guide for creating the iceberg. Another reason is because not all events informed the activities performed.

The events:

What is happening out there?

There are two main events that are happening in the ice-berg model:

The first event is related to the fact that customers are becoming collaborators in a circular economy, they are actively involved in creation of the end product/service.

The second event is relating to the actions performed by the organisations due to the existing market infrastructure, where the products/services that are made by the organizations are not sold in the traditional market and organisations seem to use different forms of engagement and market infrastructure than traditional market. Eg. They don't use the

Relating Key-Insights:

Customers are collaborators

Existing Market Infrastructure

The behaviour patterns:

What behaviours in the system enable the above events to take place ?

The behaviour pattern of the organizations that lead to the above-mentioned events are because of the dual role of the organization, where they are constantly trying to inform as well as create for a circular economy, due to which organizations not only create the end products but pursue how can people contribute towards a circular economy- which causes the customers to become collaborators in a circular economy and engage in a different manner than in a traditional manner.

Relating Key-Insight:

Dual Role of Organisations

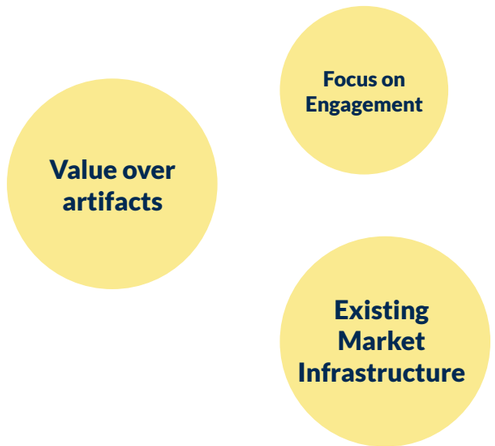
Underlying structure

How are things organised, the framework within which the organisations operate ?

The underlying structure of the organizations that lead to the dual role of the organization is because of three different reasons,

- Organizations tend to sell the value over the product/service itself, hence it becomes important for them to play the dual role.
- Since the organizations sell value over the core product/service itself, it becomes evident that they need to engage people in a different manner than before
- Another contributing factor for having a dual role is the existing market infrastructure - Organizations cannot compete with the existing market infrastructure products because the value then provided by these organizations become invisible

Relating Key-Insights:



Mental Model

What assumptions, beliefs and values do people hold about the system ? What beliefs keep the system in place ?

When looking at the mental model level of why all of these events seem to happen; it goes to the core values in a linear economy that some of these organizations seem to oppose implicitly and how organizations grow in a circular economy.

In a linear economy, organizations grow by Taking,making and wasting more - this mental model is being opposed by these organizations; but it is done implicitly at most times. Some fail to recognize this and try to promote just the core artifact they are creating. But it is not possible to scale by making more artifacts for organisations working in a circular economy, because the existing market infrastructure allows it to scale only by “making more”; and “making more” opposes the core principles of a circular economy.

Since these organisations try to achieve a circular economy they cannot scale by making more,but they can scale on a different means by having a focus on engagement - which is what successful circular organisations actually focus on rather than the end artifacts they create. Circular organisations can scale through engagement.

The underlying mental model that is helpful for these organizations in a circular economy is a mindset of scaling through engagement.

What is Scaling through Engagement ?

Scaling through engagement as an idea has the basis on the activities of the organisations focus on engagement but in fact it is different from just engagement activities. The reason is because of scaling (or growth) of organisations in this manner, because in essence focuses on is the growth of the organisation based on engagement and not just organisations doing engagement activities. Engagement is just an activity - whereas scaling through engagement is a mindset for growth based on engagement.

Scaling through engagement consists of two different ways, by increasing the number of engagements and increasing the ways of engagement.

Increasing ways of Engagement:
This is by increasing the number of ways in which a particular collaborator is involved in the project, this could by expanding the number of products or services to include people in different ways with the organization.

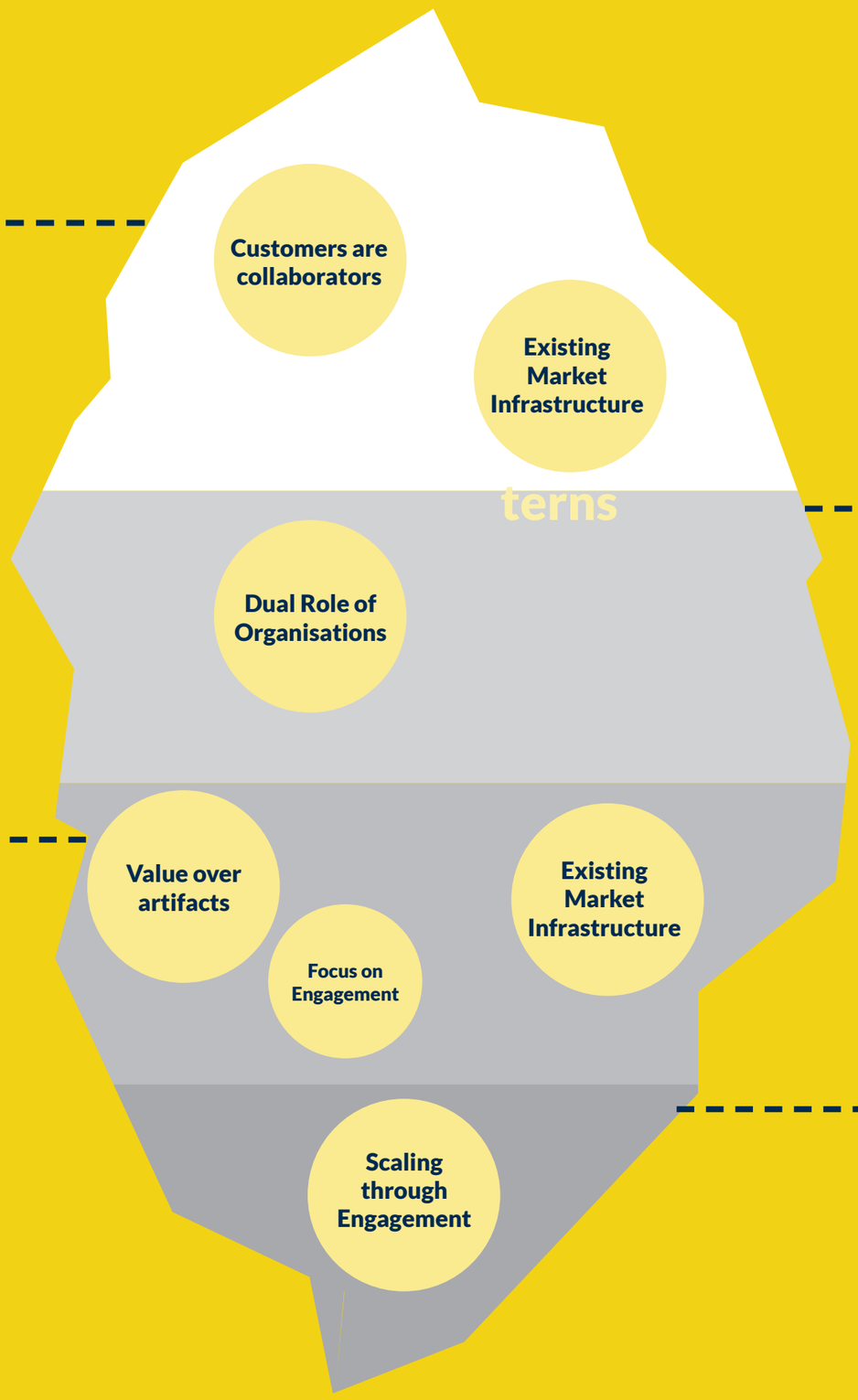
Increasing number of engagement:
This is pursuing an increase in number of engagements, this is like creating strategies open enough that many people can engage with the organisation or contribute towards the organisation’s core purpose.

Iceberg Model

Events

The customers are becoming collaborators, the are no longer just end consumers.

Organisations use different means to sell their product/service other than the existing market infrastructure.



Behaviour Pat-

Organisations are playing a dual role of creating and informing. They create artifacts which contribute directly to a circular economy and inform people by enabling others to contribute towards a circular economy

Underlying Structure

Organisations sell value over the product/ service.

Since they sell value over artifact they focus on engagement.

Organisations cannot compete with existing market products as the value becomes invisible

Mental Model

Organisations are opposing the mental model of the linear economy of taking,making and wasting more, The mental model beneficial based on their activities is to think of growth in terms of engagement. They scale through engagement.

4.5 Leverage Points

Leverage points are places in a system where relatively minor interventions can lead to relatively major changes in certain outcomes (Meadows,1999).

The end of a system analysis is to identify a possible leverage point as a point of intervention, there are multiple possible leverage points across the system to intervene but the leverage points have an increasing order of effect (see appendix E).

When looking at the ice-berg model there are multiple different points of intervention, each intervention lies at various different points of influence. Apart from the ice-berg model there are also various leverage points from the system map and behaviour over time graph.

The goal of the system moving towards scaling through engagement is chosen as a possible leverage point. The reason for the choice is the level of influence rises as we go up the chain in the leverage point and goals of the system are at higher levels of influence and impact. Apart from the higher level of influence and impact, when the goal of a system is changed the leverage points at the various levels also change accordingly, which is where the other leverage points lied at in this case, at various levels of abstraction in the iceberg model.

Moving the goal of the system towards scaling through engagement is chosen as a leverage point

4.6 Discussion

The importance of the city:

The city though seemed to be away from the insights discussed in the previous sections, it, in fact, formed the basis in which for the activities presented in the insights to take place. They provided the proximity for the organizations to identify new partners, density for a continuous supply of materials and variety so that the organizations were able to change their ways of engagement accordingly as needed; it indeed acts like an innovation hub providing the necessary soft(policies, networks) and hard infrastructures (workspaces, housing, funding, buildings) for the organizations operating in the urban space.

It is also important to notice the open nature of the cities for allowing such activities and engagements to take place. It is the inherent openness of the cities and it's supporting structures within which these engagements take place.

Role of collaborators change over time:

The finding related to role of collaborators change over time (see section 4.3.2) was related to the dynamic nature of an ecosystem mentioned in section 2.4. The nature of the collaborations did change but a pattern did not arise based on the behaviour time-graph as to how the partnerships evolved over time more studies and interviews maybe required to analyse if indeed there is a pattern to the changing collaboration types.

Aligned/Shared values for a circular economy

The finding relates to the aligned/shared values for a circular economy (see section 4.2.6) was related to the importance on the role of the vision 2.5.1. However during the interviews, it was also noted that these organisations did not create an explicit vision with the other people, though it is a driver and a barrier for collaborations to occur, collaborations do not start based on creating a shared vision.

4.7
Summary and conclusion:

This chapter provided insights gathered from the research conducted with various different circular organizations operating in the urban space. There were many insights that were made from the system map as well as the behaviour over-time graph.

These insights were at various different levels of abstraction and the insights were mapped onto the iceberg model to make sense of the insights. This helped in identifying the mental model which is favourable for these organizations in the urban space to grow bigger. The mental model identified was scaling through engagement.

Finally, the leverage point of scaling through engagement was chosen as a possible point of intervention as it changes the goal of the system from making more towards engaging more - which is more favourable for a circular economy.

Apart from these insights, the information from research provided valuable information which led to the reframing of the initial design question, which will be discussed in the next chapter.

05

Research to Design

This chapter moves the project from the research phase into the design phase, it re-frames the initial design question and identifies possible design direction based on the a future story

5.1
Reframe

Reframing of the initial design question was reframed based on the research findings, reframing is done to enable movement towards the design based on findings.

How to create and operationalize a shared vision which would help organizations in creating circular oriented innovation?

(Initial design question)

When exploring the context of circular collaborations in the cities it became clear with key insight from the system map on Aligned values for a circular economy that shared values and vision of CE/Sustainability goals across partners was important for these organizations to collaborate, this became even more evident when the collaboration without a shared value these organizations failed to collaborate if it was just a transactional partnership.

When exploring further into how the network of these organizations grew and how these organizations were able to collaborate with many different organizations and how the collaborations were sustained, the way they engage with the various people/organizations were more important. This also reflected in how they created and operationalized a shared vision and innovation, they created and operationalized their innovation with a focus on engagement and on the visibility of the organization, rather than just creating a shared vision with the various organizations. As visibility and ways of engagement increased in the urban space, people with similar values engaged and collaborated with the organizations. The partners also sustained over a period even if their roles changed because the engagements were beyond a transactional partnership and the engagements were based on values over the end artifacts that were created.

In almost all the cases, the organizations had created successful ways of operationalizing their innovation by focusing on engagement and increasing their visibility.

(Reason to Reframe)

How to help organizations scale through engagement in a circular economy?

(Reframed design question)

Why reframe to scale through engagement and not just focus on engagement?

Circular organisations operating in the urban-space are able to operationalize their innovation and sustain their innovation by focusing on engagement and increasing their visibility. But focusing on engagement is a one time activity but scaling through engagement is mindset of growth based on engagement. Which alters how organisations pursue innovation, they pursue innovation through engagement and continuous engagement, this in turn affects how these organisations scale in a circular economy, they scale through engagement. The circular organisations which are successful in their innovation over time are ones which focus on engagement over and over and scale through engagement.

5.2
Future Story

Once the initial design question was reframed based on the research, a leap needed to be made from the research part towards design.

The goal, current situation and the problems are clear, But what are we actually working towards when designing an intervention? What does the future look like if the urbanspace look like if people are scaling through engagement ? What roles are they playing in an ideal scenario ?

The reason for calling this a leap is because, we tried to understand the current system and looked at a point which we would need to change but how do we get to the research results, what would it look like if scaling through engagement became the norm. It is like moving

Past Insights

Customers are collaborators

Dual Role of Organisations

Value over artifacts

Focus on Engagement

Visibility of the organisation

The city has become circular where every product has inherent value in them for another person and nothing goes to waste, regular people have become part of the supply chain. Customers are no longer customers and this has caused them to take different roles in the supply chain - making it more of a social economy in addition to a circular economy of material flow. Organizations played a key role in this transition, they created artifacts that helped the push towards a circular economy but also informed how the community can contribute towards it. They did this through focusing of engagement with the various people and organizations they want to be involved with, they focused beyond the artifact and focused on the core values they were offering and were always questioning how more people can be a part of their organization. This mindset came because they realized that becoming a big organization in a CE does not mean taking more materials or creating more artifacts but creating ways of engagement with the various people; they understood and adapted their business towards impacting the community they wished to serve and creating ways of engagement to in the domain they were working on. Due to this, the visibility of these organizations increased within their domain and community, as they created possibilities for collaboration, other organizations with similar values sought to do collaborations with them and create new ways of working in the domain as well.

Elements from key insights

Future Possibilities

The city has become circular where every product has inherent value in them for another person and nothing goes to waste, regular people have become part of the supply chain. Customers are no longer customers and this has caused them to take different roles in the supply chain - making it more of a social economy in addition to a circular economy of material flow. Organizations played a key role in this transition, they created artifacts that helped the push towards a circular economy but also informed how the community can contribute towards it. They did this through focusing of engagement with the various people and organizations they want to be involved with, they focused beyond the artifact and focused on the core values they were offering and were always questioning how more people can be a part of their organization. This mindset came because they realized that becoming a big organization in a CE does not mean taking more materials or creating more artifacts but creating ways of engagement with the various people, they understood and adapted their business towards impacting the community they wished to serve and creating ways of engagement to in the domain they were working on. Due to this, the visibility of these organizations increased within their domain and community, as they created possibilities for collaboration, other organizations with similar values sought to do collaborations with them and create new ways of working in the domain as well.

Change in mindset in organisations on how they scale in a circular economy

They actively created ideas for scaling through engagement

Elements for design direction

One story, two tales

5.3 Design Direction

A design direction helps in moving the system into a desired state, they state the points in the system (or people/ organisations) to design for and the aim of the design to enable the points to move towards the desired future state.

Based on the future story, the direction which would be effective for circular organisations in the urban-space would be:

Design direction 1

To become aware of how organisations can scale through engagement in a circular economy

The reason to focus on awareness is because the change that is being proposed while going for scaling through engagement is a change in mindset from current practices. To enable the change in mindset an initial awareness on the topic helps the organisations to think differently on the topic.

The focus of the project lies with circular organisations operating in the urbanspace hence elements from the future story were chosen for them in specific.

Design direction 2

In addition to becoming aware, they would need to create strategies which would enable to them scale through engagement.

Currently some organisations do actions that are focused on engagement but most often they do it implicitly - they do not have specific ways of creating strategies on engagement.

There are two parts to the design the first is the awareness part which preludes the creating strategies part.

5.4 Design Requirements

The previous section explains the direction circular organizations need to take towards the future of scaling through engagement. If the design is to enable the organizations to move towards in this direction, what requirements would the design need to have to ensure organizations moving in the desired design direction? That is what this section tries to answer through a list of design requirements.

The following design requirements are taken from the key insights from the research results as they provided information into how organizations scale through engagement and the various corresponding activities they performed.

Design requirements based on: Awareness on Scaling through Engagement:

Scaling through engagement though seems like a singular phenomenon to be aware of; as we see in the iceberg model, there are various levels of activities that take place and organizations apart from knowing the overall idea behind scaling through engagement need to be aware of how they are able to contribute to it.

1. Organizations understand the importance of engagement in a circular economy

This relates back to the key insight of focus on engagement from section - where organizations focus on engagement with other people more than their core artifact they are offering.

2. Organizations understand the dual role of creating and informing they play when moving towards scaling through

This relates back to the key insight of the Dual role of the organization from section - where organizations create artifacts that organizations can contribute directly towards a circular economy and inform by looking at how they can enable others.

3. Organizations are able to understand the core value they provide to the people they engage with

This relates back to the key insight of value over artifacts - where for organizations it is not a great product/service that they are trying to sell but rather a value.

Design requirements based on: creating ideas for scaling for scaling through engagement

1. Organizations are able to create ideas based on the value of their organization

This relates back to the key insight of value over artifacts - organizations create ideas based on the core value they offer.

2. Organizations are able to see the alignment of ideas based on their organizations engagement.

The reason for alignment is because, the design is not going to be made for a particular organization but various different organizations, hence the strategies need to align with every organization that uses the design.

3. Organizations are able to understand the core value they provide to the people they collaborate with

This relates to the design-implementation gap present in literature - where there is a lack of information on how to make the ideas come to reality.

Limitations to Design:

Since this project was performed during COVID-19, the final design was decided early on to be in an online format due to the remote working situation

5.5
Ideation

In order to move from the directions and requirements to the solution space, some creativity techniques mentioned in the Delft Design Guide (Boeijen & Daalhuizen, 2017) were used to create ideas. Creativity techniques are useful tools that can be used as inspiration or starting points in order to generate a large number of ideas. One of the techniques used was the formulation of “How to” or “How might we” questions in order to start ideation. Such questions help to reformulate the way we look at the problem and allow for easy idea generation (Boeijen & Daalhuizen, 2017).

Also, techniques from (Heijne & van der meer, 2019) to understand the core-problem of each design-goal and to frame it in a how-to question to generate ideas. Other similar techniques from the book on H2’s, brainwriting, 5W1H, the ladder of abstraction and brain sketching were used to identify various different ideas and linking paths between various different ideas generated., see appendix H for snippets of the ideation process.

Ideas created from the previous tools were at various levels of use, they were ideas for the overall process, individual design directions, requirements and for connecting elements between them.

The ideas were mapped according to the design directions and the corresponding requirements.

Finally an online collaborative tool-kit was chosen and created with elements from many different ideas. The reason choices behind each element of the tool-kit is explained in the chapter 6 in the final concept.

For the overarching process an online collaboration tool-kit was selected,

- It helps address the two parts of the design direction on awareness of scaling through engagement and creating ideas in a single idea
- It helps in addressing the various requirements individually and helps in creating connecting elements between them, therefore making it more a process more than achieving individual goals.
- Due to the above step it also reinforces certain ideas to users and clarifies concepts on different levels (conceptual to practical).
- Organisations did not use any particular tools for engagement or collaboration in general.

06

Final Concept

This chapter elaborates on the final concept “ A Tool-kit for scaling through engagement”. The Overall tool-kit consists of 7 different main steps that users go through and an overall process with connecting elements between each step which help organisations in scaling through engagement.

6.1 Tool-kit for Scaling through Engagement

Why this tool-kit ?

Based on the reframed design question of “ How to increase visibility and help organisations scale through engagement in a circular economy?”, this tool-kit is a first step towards answering this question and moving in the design direction of raising awareness on scaling through engagement and creating ideas for it.

What is the tool-kit about ?

The overall tool-kit is about helping circular organisations in cities to scale through engagement. The tool-kit helps organisations in cities become aware of how they scale in a circular economy. In addition to becoming aware, it also helps them in creating ideas on how they can scale through engagement. It helps think beyond conventional scaling by making more, towards scaling through engagement. More than just creating ideas it also helps them in understanding the implementation intention of the ideas. It is achieved through the 6 individual design requirements based on the design direction mentioned in section 5.4.

Who will use the tool-kit ?

The tool-kit is meant for use by individuals /groups of people working in the circular organisations in the urbanspace. The tool-kit suits best for organisations who are beyond the prototyping phase of their project and in the implementation and scaling phases of the project. This is because the tool-kit builds on the core purposes of an organisation and the ideas generated are meant to complement the existing activities of an organisation.

How is the tool-kit used ?

The tool-kit is meant to be self-explanatory without any guidance necessary from a facilitator, the reason for this is because organisations do not necessarily always have an expert on the topic available within their organisation. Though a facilitator isn’t necessary the tool itself facilitates actions throughout the process with guiding instructions present in each step.

6.2 Structure

The structure of the online tool consists three parts, the initial set-up of the tool-kit , the tool-kit and auxiliary elements.

The Set-up:

The set-up acts like a preparation for using the tool-kit. Though, the content itself does not require any preparation - the online tool being used may require some preparation.

It consists of two different aspects,

1. An introduction to the tool-kit.

2. A brief introduction to using miro.

Auxiliary elements:

These are elements present within the tool-kit which help facilitate the process but don't affect the tools present within the tool-kit. These are present in section 6.8 of the tool-kit

Link to the online tool-kit:

https://miro.com/app/board/o9J_kmvvBXY=/

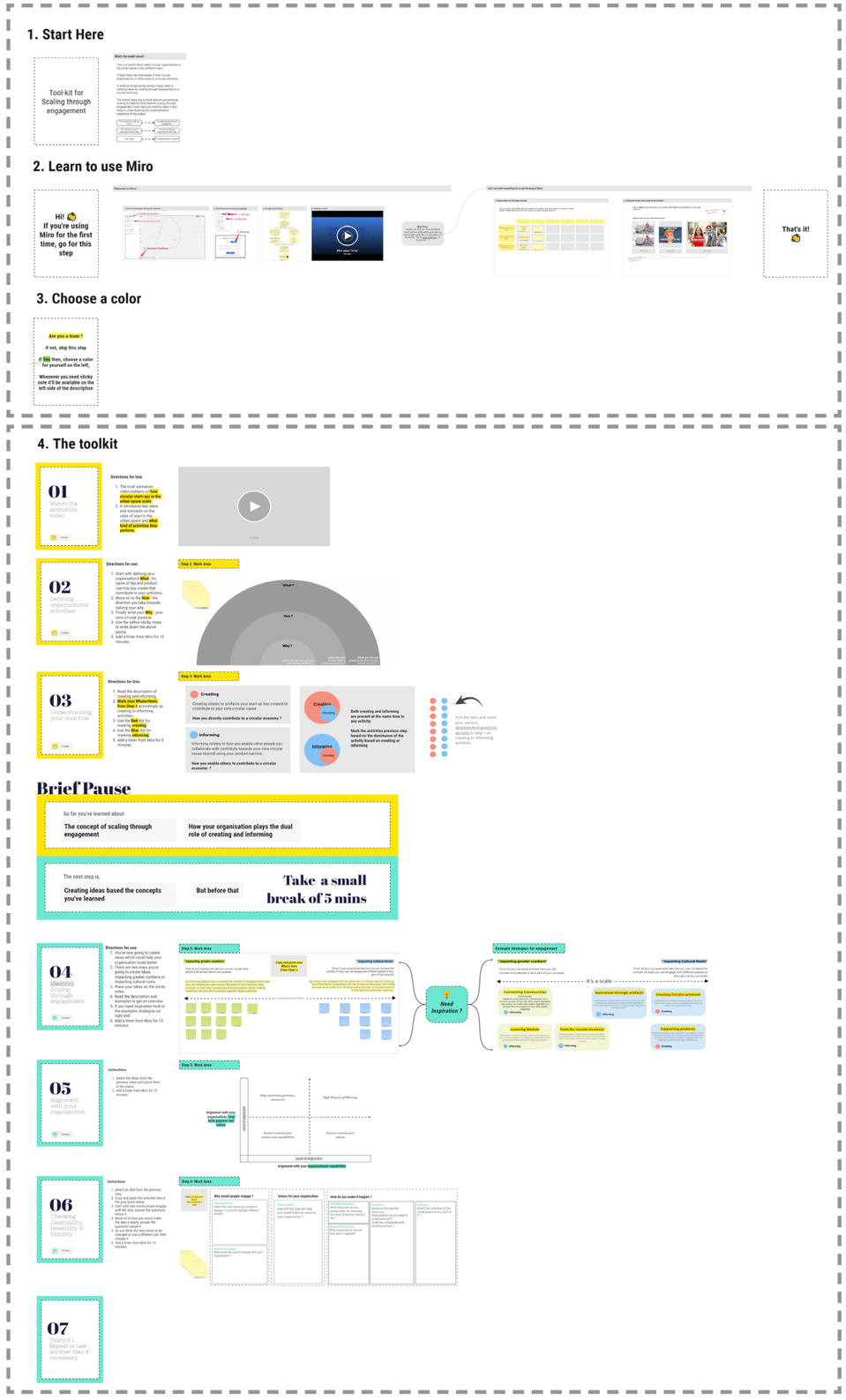
The Tool-kit:

The Tool-kit itself consists of 6 main steps. Each step is meant to be done stepwise and not in random order. The seven steps are as follows:

1. Watching the animation video
2. Defining organisation activities
3. Understanding your dual role
4. Ideation: Scaling through engagement
5. Alignment with your organisation
6. Checking desirability,feasibility and viability
7. Repeat,if necessary

Apart from the individual steps, there are elements from each step relating to future steps making it a process more than individual steps and tools in each step.

The Set-up



The Tool-kit

6.3
The set-up

The structure of the online tool consists two parts, the initial set-up of the tool-kit and the tool-kit itself.

The Introduction:

Before the tool-kit is being used, an initial introduction phase is present.

It consists of an introductory description to the tool-kit and states the purpose and goals of the tool-kit.

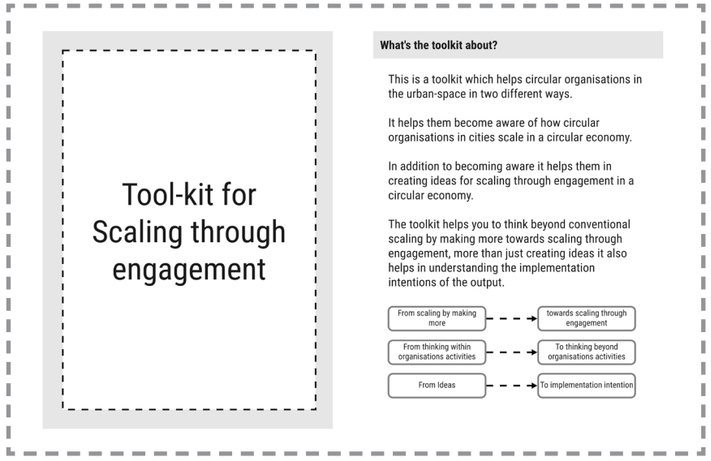
Learning to use miro:

This part of the tool-kit where if people are not familiar with the online collaboration tool (Miro), they could use this step to learn the basic steps for navigating the software. This particular step was made because some people in the initial research phase were not familiar with the software and since the tool-kit was made to be used without the need of a facilitator - this step was added to get people used to the software before using the tool-kit.

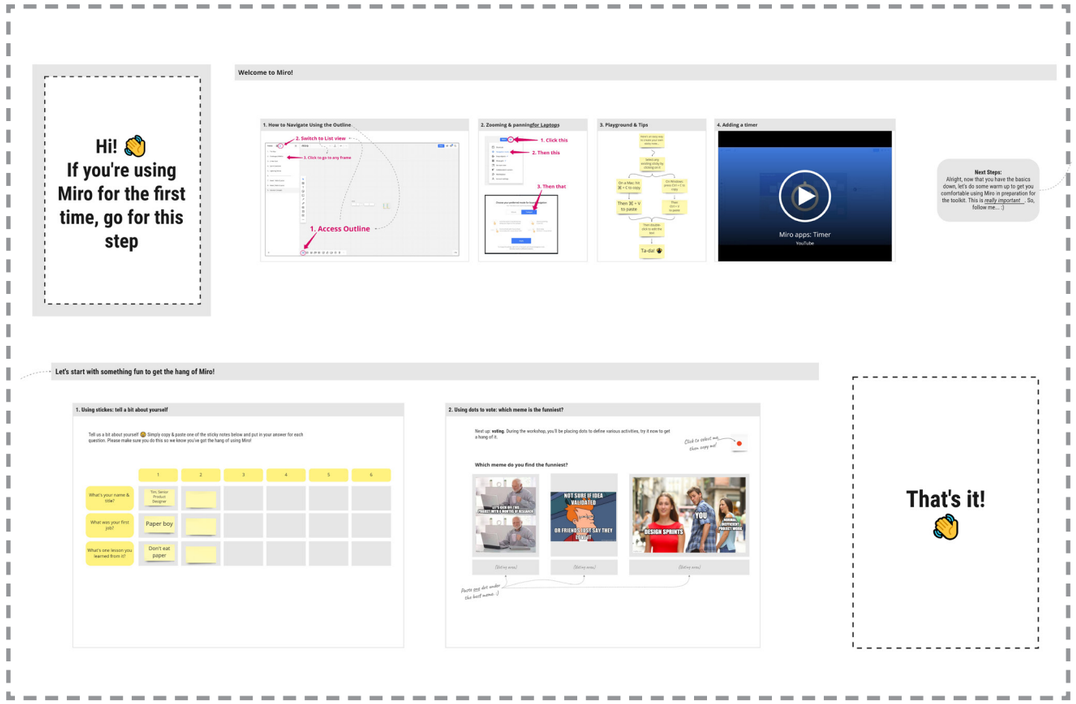
Why Miro ?

Miro is an online collaborative whiteboarding platform that enables distributed teams to work effectively together, from brainstorming with digital sticky notes to planning and managing workflows. Due to the software capabilities and current remote working circumstances miro was used as a platform for the tool-kit.

The Introduction



Learning to use Miro



6.3
Watch the Animation video (Step 1)

What is this step?

The animation video is aimed to introduce to the user of the tool-kit, the ideas of scaling through engagement and dual role of organisations (see section 4.4 & 4.2.2) in an easy to understand manner.

Video link of animation video:

https://youtu.be/qjzB7oQQ_XE

Why introduce scaling through engagement and the dual role ?

The main purpose of the tool-kit is to enable organisations to scale through engagement, the concept of scaling through engagement would be new for the start-ups as it is a mental model that came out of the research conducted with the organisations and explicit mentions of it were not present during the initial interviews.

Apart from the concept of scaling through engagement, the organisations would also need to know what kind of activities they would perform for scaling through engagement - these are explained through the dual role of creating and informing

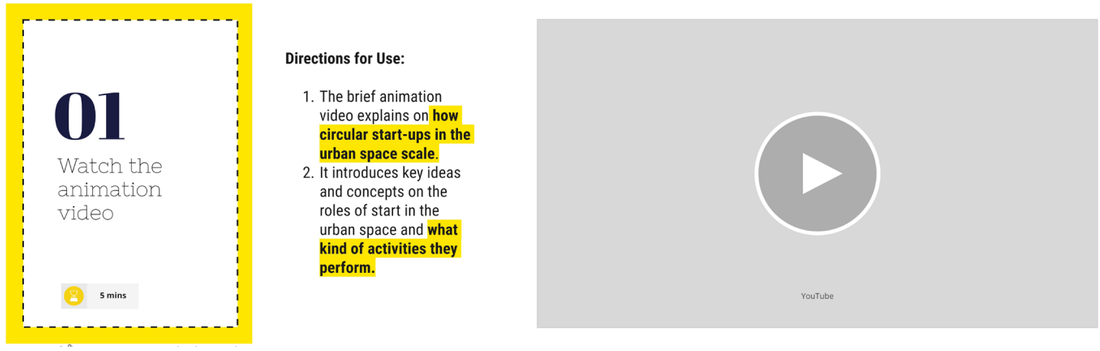
Also, the concepts of creating and informing come back while performing step 3 of the tool-kit and the video acts as a relational link between scaling through engagement and creating and informing.

Relation to the design requirements:

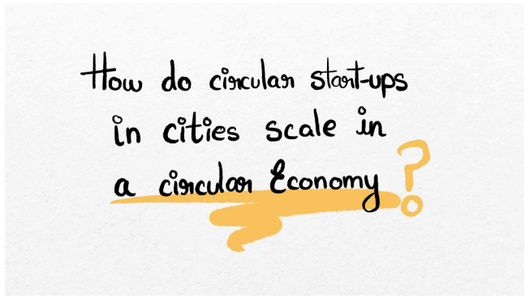
Organizations understand the importance of engagement in a circular economy

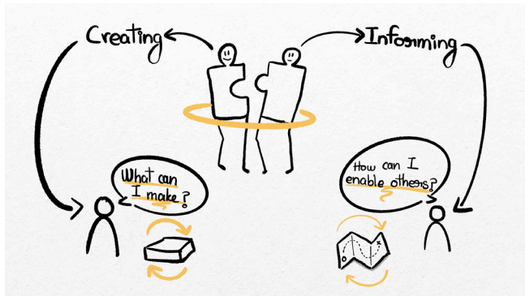
Organizations understand the dual role of creating and informing they play when moving towards scaling through engagement.

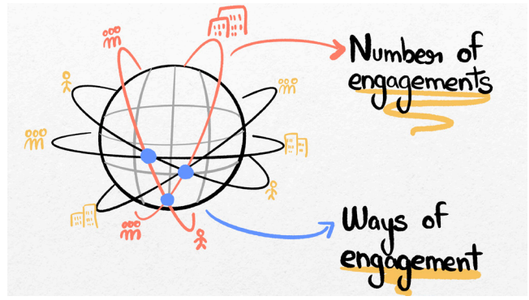
How it looks like in the tool-kit

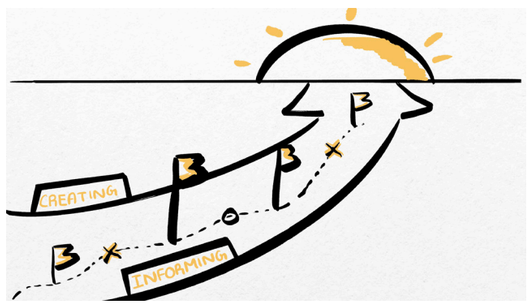


Example frames from the video









6.3 Defining Organisations activities (Step 2)

Aim of the step

The main aim of this step is to enable organisations to map the various activities they perform and the core values they offer. The golden circle by Sinek (2009), is adapted and used as a tool for achieving the goal - the reason for using the golden circle is that it is a simple and widely known tool and provides an easy way to map the organization's activities.

Why map organisations activities ?

The purpose of mapping the organisations activities is as follows,

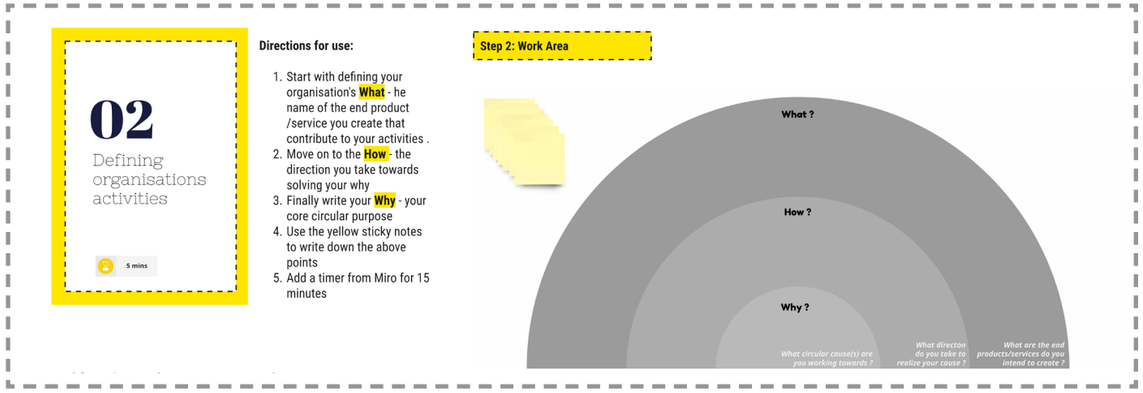
- It helps in preparation of step 3 where people map the various activities of the organisation as creating or informing activities, which helps organisation in understanding their dual role which helps them scale through engagement.
- It helps the organisation to think about their core circular purpose which would again be used in step 4 and 5 of the tool-kit for creating of ideas. This relates to the underlying structure in the iceberg model (see section 4.4) where the value that is provided by the organisation is more valuable than the end result of their artifacts.

Relation to the design requirements:

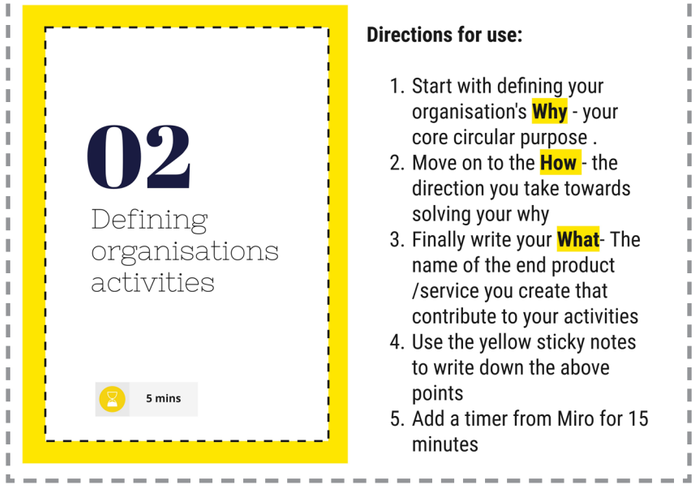
Organizations understand the importance of engagement in a circular economy

Organizations understand the dual role of creating and informing they play when moving towards scaling through engagement.

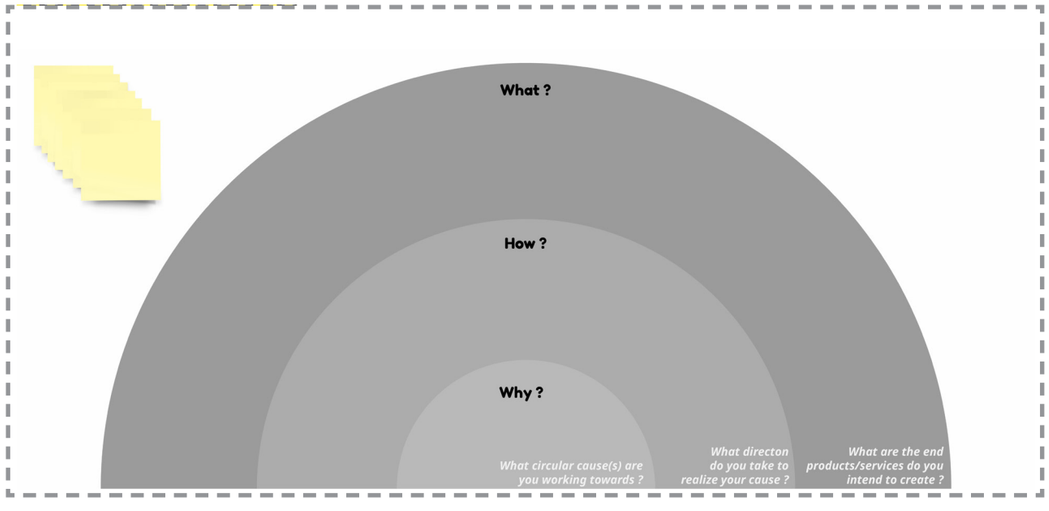
Step 2: Defining organisation activities



Directions for Use:



The Tool:



6.4 Understanding your dual role (Step 3)

Aim of the step:

The main aim of the step is for people to mark the various What's and How's of the previous step as informing or creating activities (see figure for description), and to understand the dual role organisations are performing.

Why understand the dual role ?

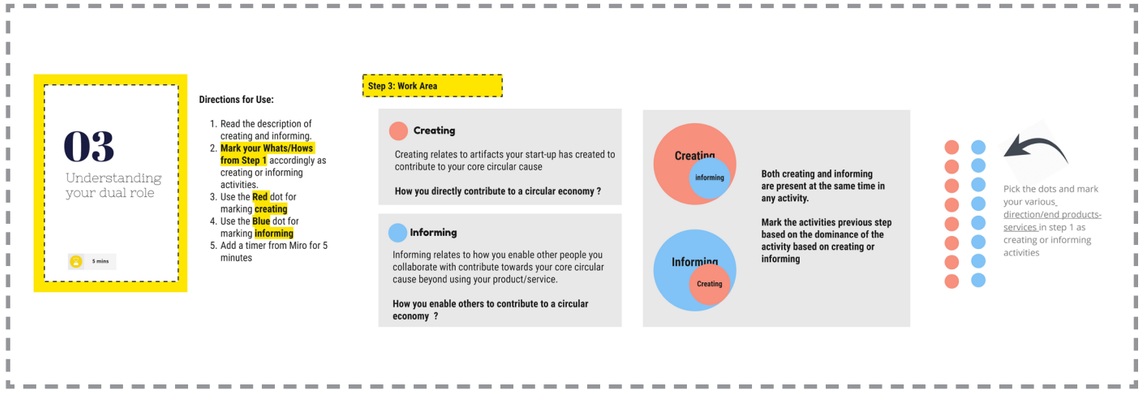
For scaling through engagement, organisations play a dual role of creating and informing as we saw in the iceberg model. Though organisations already play a dual role, their focus lies more on creating and not much on informing at times, by mapping their organisations activities as both informing and creating activities they might understand how they perform the dual role in their organisation.

Apart from this, it helps in preparation for Step 4 where there are example strategies present, which are marked as either (primarily) creating or informing activities

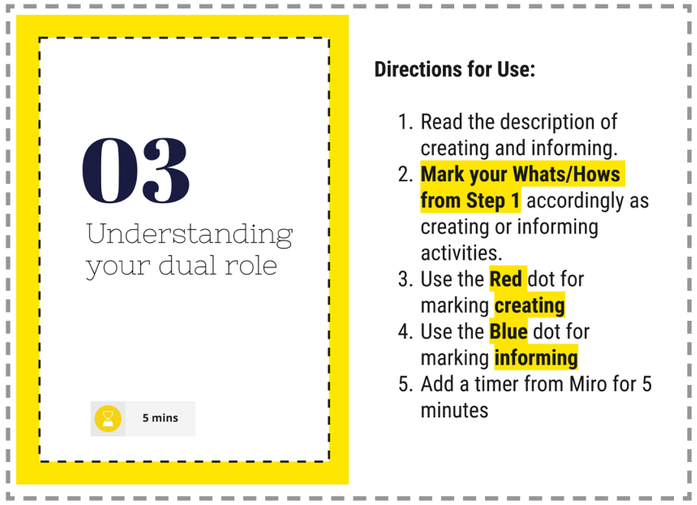
Relation to the design requirements:

Organizations understand the dual role of creating and informing they play when moving towards scaling through engagement.

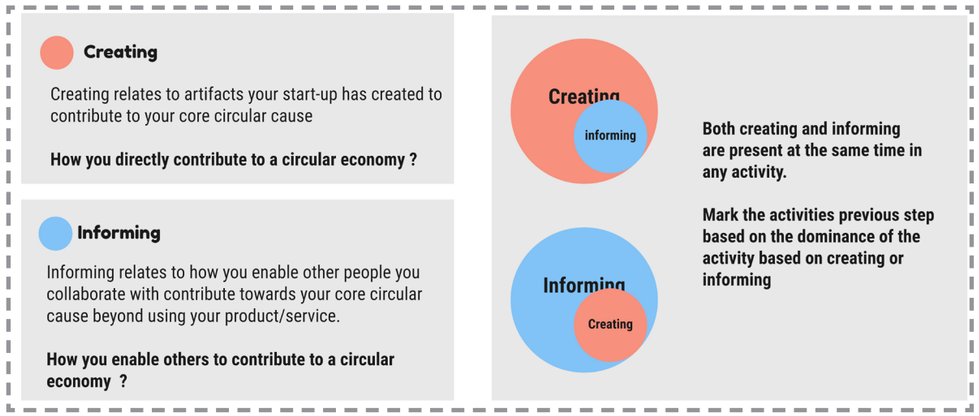
Step 3: Understanding your dual role



Directions for Use:



Descriptions of creating and informing



6.5 Ideation: Scaling through engagement (Step 4)

Aim of the Step:

The main aim of this step is to enable organisations to create ideas on scaling through engagement based on their core purpose. From the definition of scaling through engagement that was defined in the there are two ways of scaling that was mentioned(see section 4.4) by creating more number of engagements and creating more ways of engagement. A similar concept is present on scaling out and scaling deep (Moore et al., 2015) from social innovation. This concept of scaling out and deep, relates to scaling in terms of engagement though this is not a tool but it was translated into a tool enable people to ideate on prompts relating to scaling through engagement.

Scaling out relates to creating greater numbers, relating to increasing the number of engagement.

Scaling deep relates to creating cultural impact, relating to increasing ways of engagement

Why create ideas for scaling through engagement and based on core purpose ?

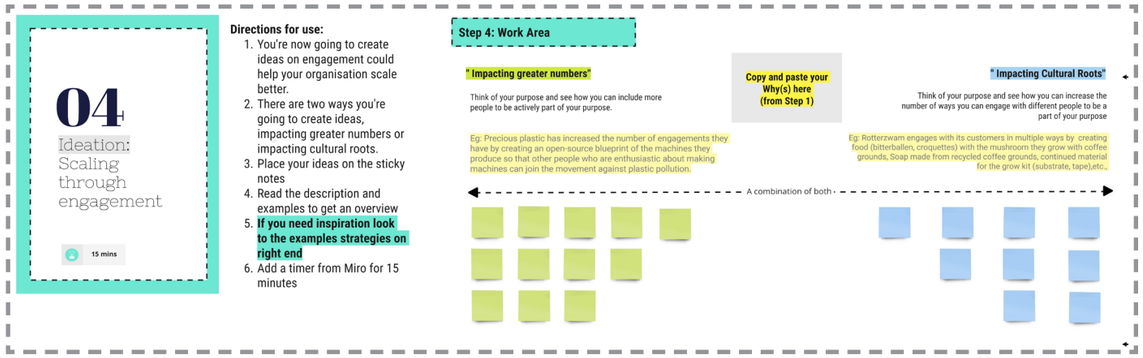
The purpose of the creating ideas is to enable organisations to move from the awareness on scaling through engagement towards seeing how it translates into real world scenario and how this can happen for their organisation. It essentially tries to move from awareness to action.

The ideas are meant to be created based on the core purpose, the reason is because - the value offered by these organisations is more important than the end artifact. Another reason is, the core purpose acts as a problem statement based on which the organisations can ideate on.

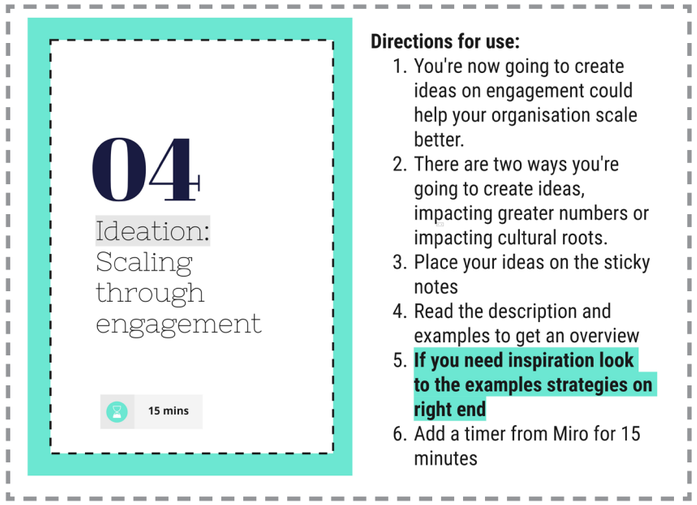
Relation to the design requirements:

Organizations are able to create ideas based on the value of their organizations

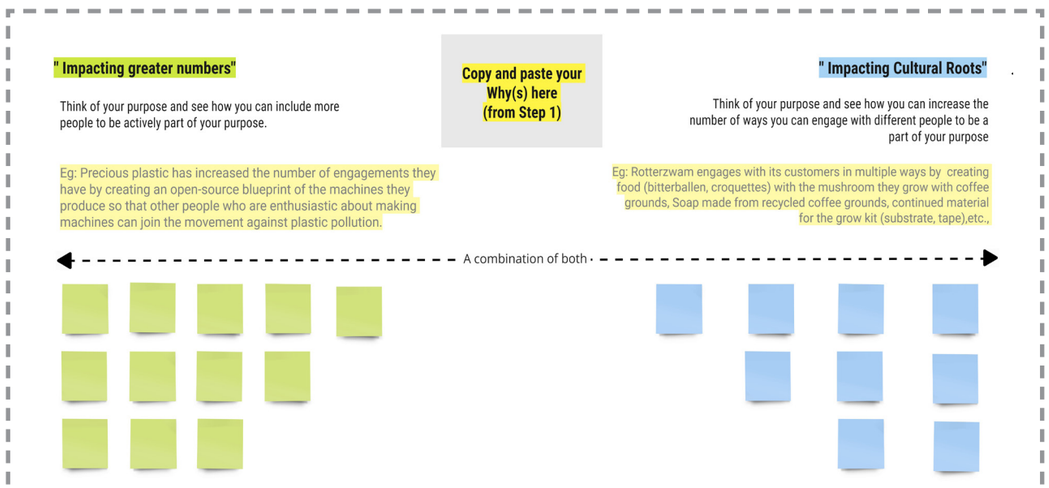
Step 4: Ideation:Scaling through engagement



Directions for Use:



The Tool:



6.7 Example Strategies

Aim of the step:

When creating ideas, if people require inspiration they can look to this board of example strategies to get some example strategies of how other organisations in the urbanspace impact greater numbers and impact cultural roots.

Why example strategies ?

Since the concept of scaling through engagement is new for organisations, they might be not be primed enough to think in terms of creating ideas for impacting greater numbers and impacting cultural roots. Examples can give them an idea as to what sort of ideas fall where.

It also plays a role of giving organisations information as to what kind of activities are informing and what sort of activities are creating, and where do they lie on the spectrum of impacting cultural roots and impacting greater numbers (see section 6.5 for definition).

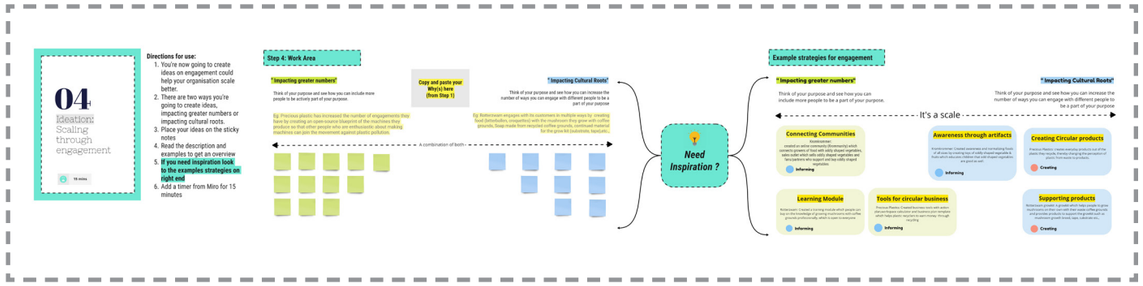
How were they created ?

Various different successful organisations operating in the urban-space and contributing towards a circular economy were selected. The activities they performed were categorised as primarily creating or informing activities and then they were mapped as impacting greater numbers or impacting cultural roots activities

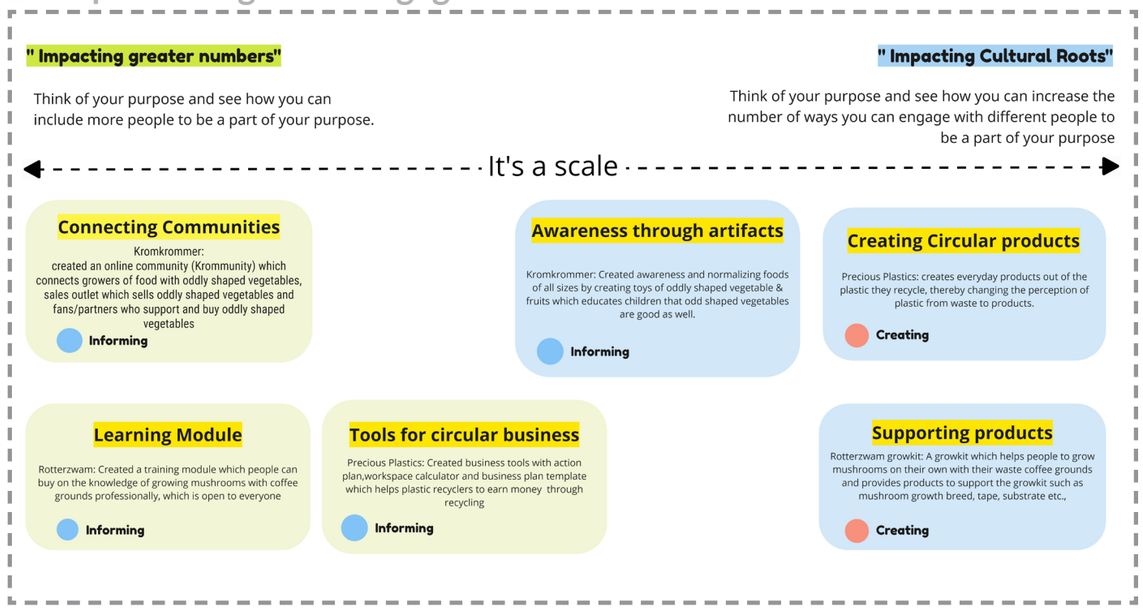
Relation to the design requirements:

Organizations understand the dual role of creating and informing they play when moving towards scaling through engagement.

Example strategies in the tool-kit



Example strategies for engagement



6.6 Alignment with your organisation (Step 5)

Aim of the Step:

The main aim of this step is to check the alignment of the ideas generated from Step 4 with regard to the organization. The matrix from (Varcoe et al., 2016) is used as a tool for achieving this goal - as the tool aims to check strategic alignment of organisations with respect to the organisation's long term purpose and capabilities. The long term purpose part of the tool also fits with the value over artifact part of the iceberg model which emphasizes the purpose and values of the organisation.

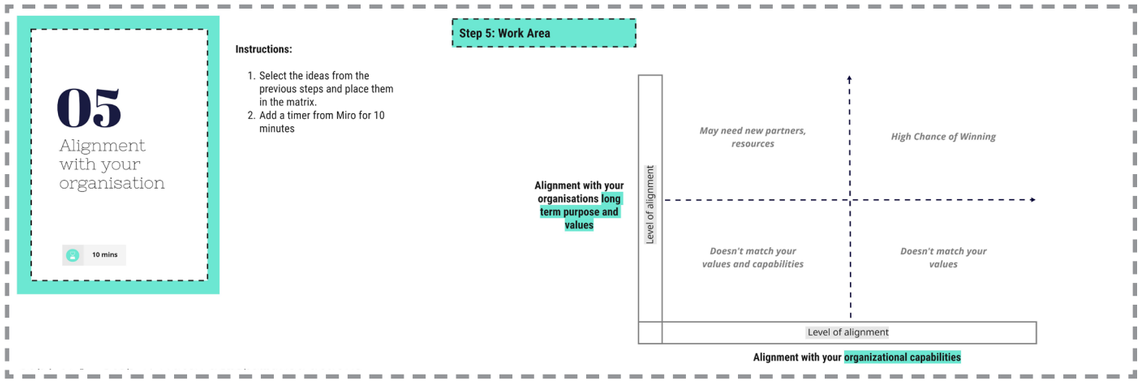
Why check alignment of ideas with organisation ?

The ideas created from the previous step though created based on the core purpose of the organisation, they do not say much about the organisations capabilities. Checking alignment of the ideas with the organisations core values and capabilities helps organisations see what kind of ideas they have and helps in making a choice while moving forward for step 6.

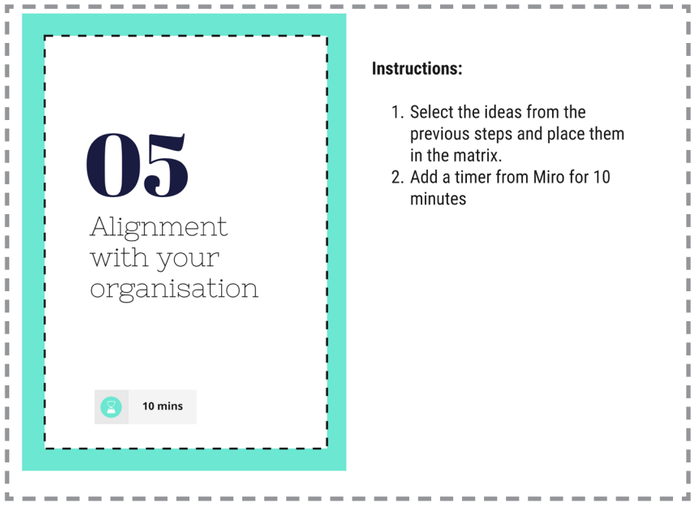
Relation to the design requirements:

Organizations are able to see the alignment of ideas based on their organizations

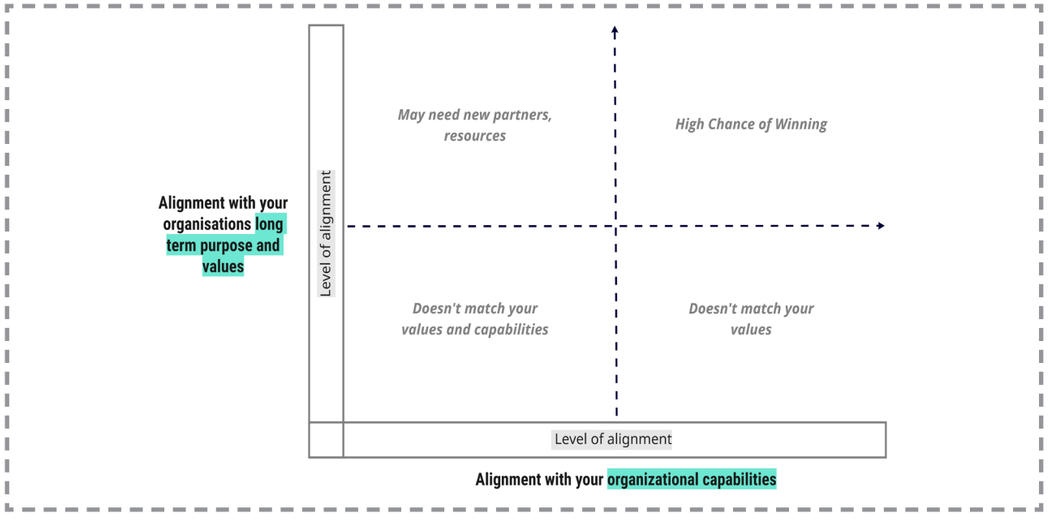
Step 2: Defining organisation activities



Directions for Use:



The Tool:



6.7 Checking desirability, feasibility and viability (Step 6)

Aim of the step:

The main aim of this step is to create implementation intentions beyond the initial ideas. The concepts behind desirability,feasibility and viability from strategic design is used, as balancing desirability, feasibility, and viability in view of systems is key to effectively implementing new products, services, and the business models around them (Calabretta et al., 2016; Karpen et al., 2017), along with this elements from Baldassarre et al.(2020) work are adapted, which helps address the design-implementation gap mentioned in literature research are used in creation of the tool.

Why check desirability,feasibility and viability ?

The purpose behind checking desirability, feasibility and viability is to create implementation intentions beyond the initial creation of the ideas.

The desirability (Why would people engage ?) of the ideas is to check whom the idea tries to engage with and tries to provide value for, this relates to organisations focus on engagement while scaling through engagement, where organisations tend to engage with people and create engagement based on values. This prompts users to think beyond the initial ideas and based on values for the people they try to engage with.

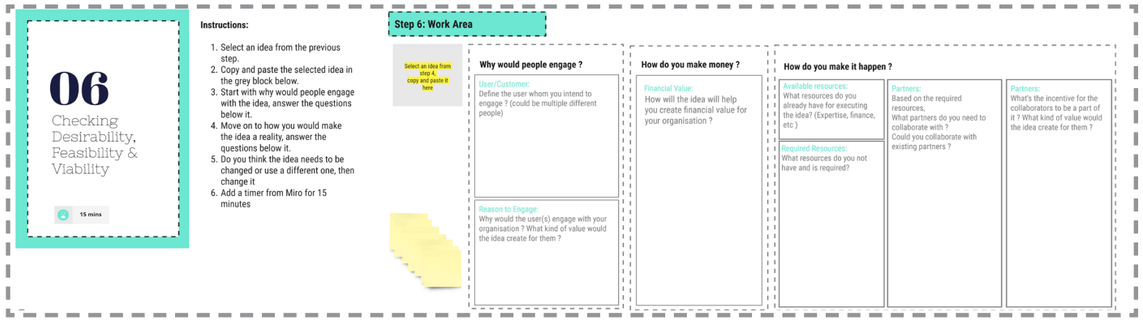
The feasibility (How do you make it happen ?) of the ideas is to check what resources are required and what kind of partners do you require to make it happen. The initial parts of available resources and required resources act as a set-up to help people think about the partners they require to make it happen, from the key insights of previous collaborations and role of collaborators change this step was created. Prompts ask could you collaborate with existing collaborators to see if previous collaborations can be used and how their roles can change, prompts also ask what kind of value would it create for them as a case of desirability of the partners to be a part of the idea

The viability (How do you make money ?) of the ideas is to added to the design, as users were reflecting on how do you make money during the testing phase(see section) and also asked whether there could be some critical questions(relating to financial and risks with partners) which might be important questions while creating the ideas.

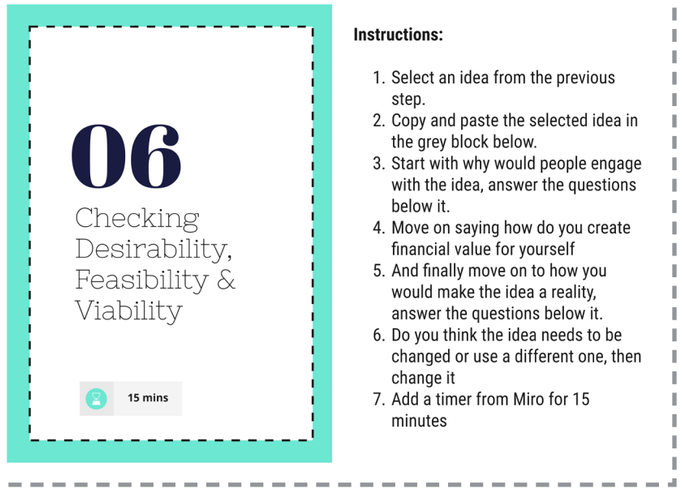
Relation to the design requirements:

Organizations are able to create implementation intentions beyond the initial creation of ideas

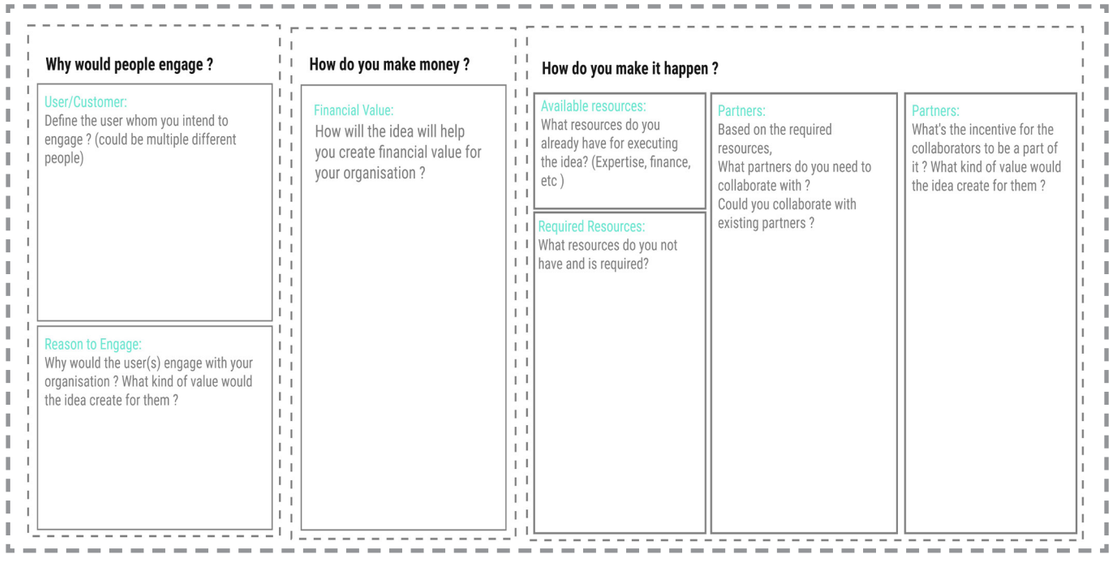
Step 6: Checking desirability,feasibility and viability



Directions for Use:



The Tool:



6.8 Auxiliary elements of tool-kit

Auxiliary element: Brief pause

Aim of the element :

The aim of the element is to enable a change in mindset in moving from awareness to action when creating ideas and give a brief pause in between the steps and phases.

Why a change in mindset ?

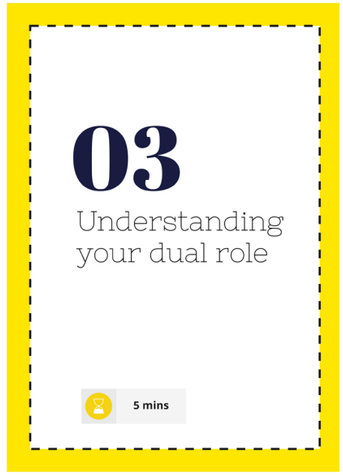
When testing the tool-kit, users noted that they were quite bound by thinking about their organisation (see section), as they just mapped their own organisations activities (see step 3) and this prevented them from thinking about crazy or radical ideas(see section 2.3) beyond the scope of their organisation, which might important when going for ecosystem innovation.

How is the change showcased ?

The change is in two different parts,

1. A brief pause is added to the tool-kit for users, so that there is a transition from Step 3 to Step 4.

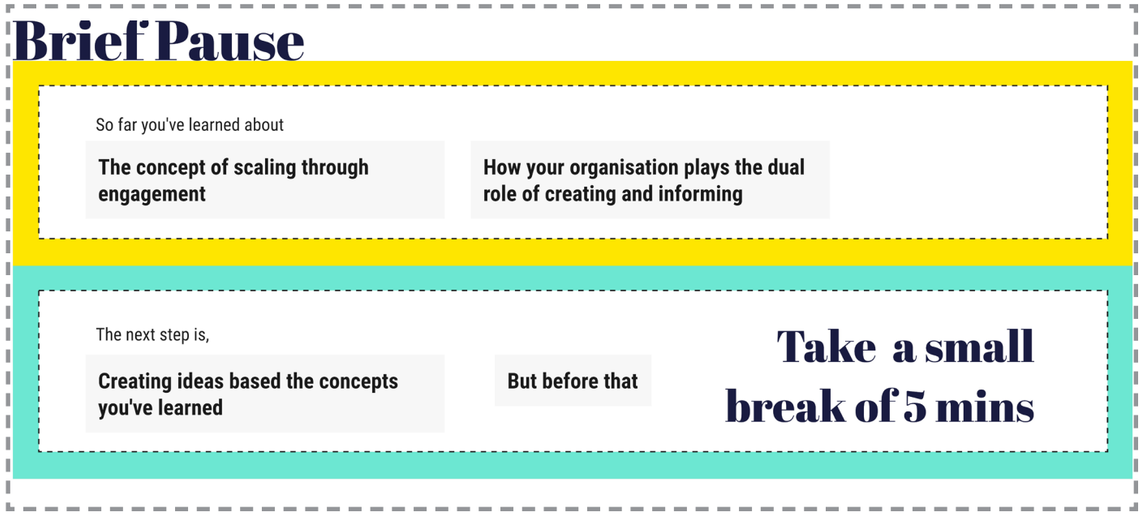
2. Visually as well, there is a color change in the tool-kit indicating it was a different phase they were going to start working on.



Directions for Use:

1. Read the description of creating and informing.
2. **Mark your Whats/Hows from Step 1** accordingly as creating or informing activities.
3. Use the **Red** dot for marking **creating**
4. Use the **Blue** dot for marking **informing**
5. Add a timer from Miro for 5 minutes

Present in transition between step 3 & 4



Directions for use:

1. You're now going to create ideas on engagement could help your organisation scale better.
2. There are two ways you're going to create ideas, impacting greater numbers or impacting cultural roots.
3. Place your ideas on the sticky notes
4. Read the description and examples to get an overview
5. **If you need inspiration look to the examples strategies on right end**
6. Add a timer from Miro for 15 minutes

Auxiliary element: Tool for a team

Aim of the element :

The aim of the element is enable multiple people work on the board at the same time with ease.

Why multiple people ?

When testing the tool-kit, nearly all users mentioned that it was difficult to ideate on their and it took some time to ideate.

How is the change showcased ?

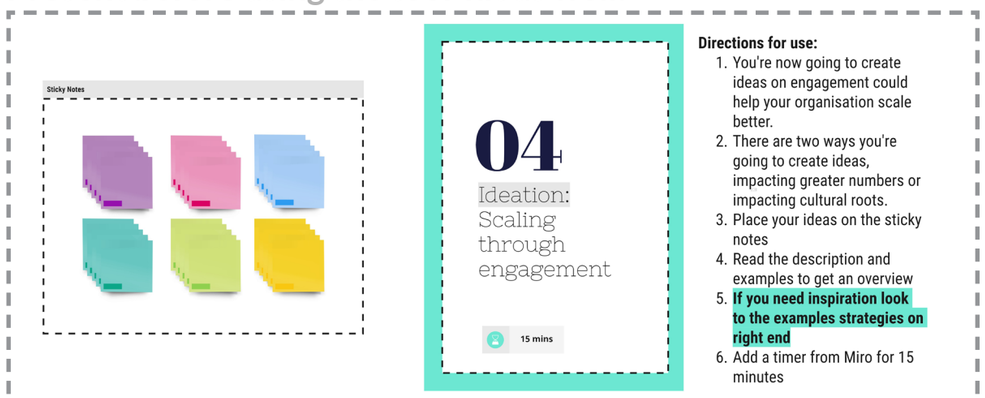
The change is in two different parts,

1. if there are multiple people, they asked to choose a color for themselves before starting on the tool-kit, apart from the color, each stick note they've chosen also has a participant number.

2. Similar sticky notes with different colors and participant numbers are present at each part of the tool-kit where there would be

Directions for use(present before step 1 of tool-kit) :

Present before using the tool-kit as well:



Auxiliary element: Additional workspaces

Aim of the element :

To create implementation intention of multiple ideas.

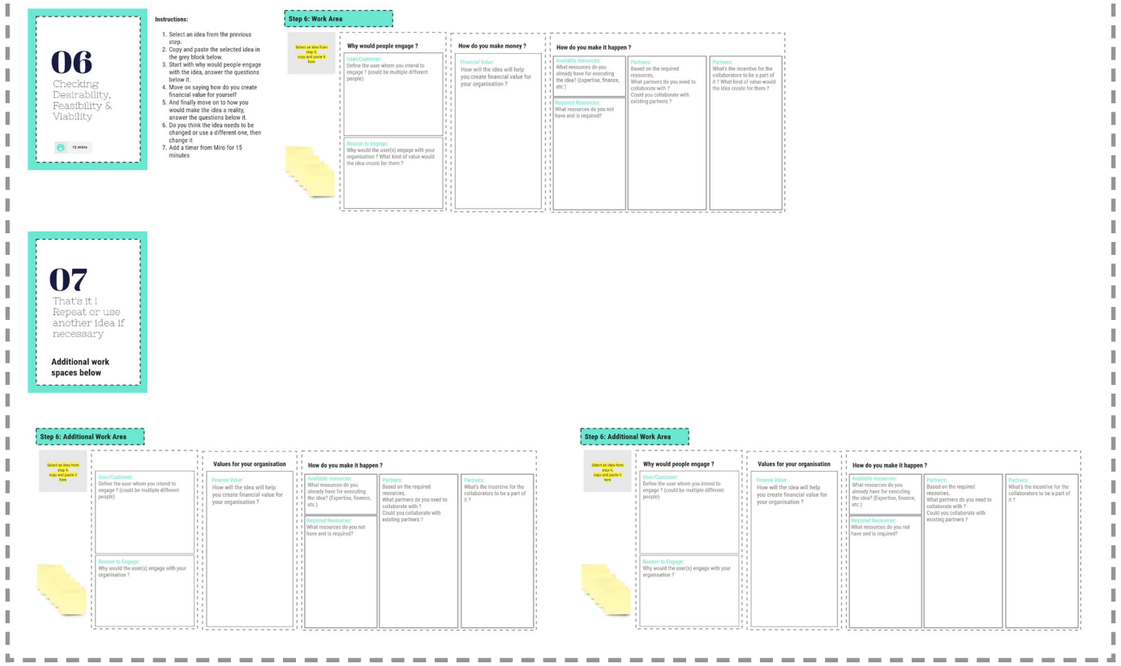
Why multiple ideas ?

When testing the tool-kit, there was a request of another workspace of the tool in step 6 as they wanted to try for another idea.

How is the change showcased ?

Additional workspaces of checking desirability, feasibility and viability are added below step 6

Where the additional workspaces are present in the tool-kit



Additional workspaces at the bottom of the tool-kit

Auxiliary element: Timing in the tool-kit

Aim of the element :

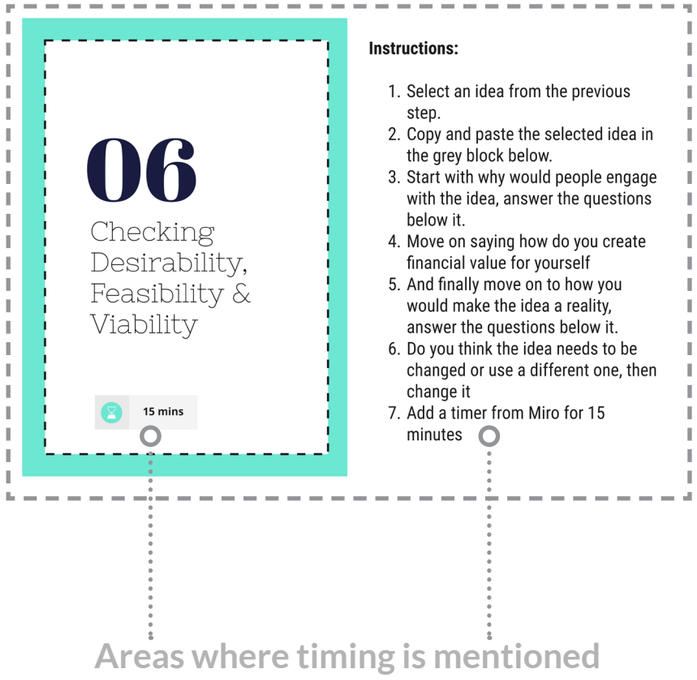
To give a general idea of much time it would take to complete the step

How was the timing determined ?

The timing was determined through two soft tests that were initially conducted to determine how long it would take for a person without any knowledge of the tool-kit to use it. See section 6.2 for details on the internal soft test.

Where is the timing present ?

The timing is present in the directions of use as well as the



07

Design Evaluation

This chapter introduces how the design was evaluated and tested with the various users

6.1 Evaluation set-up

This section discusses the set-up of the evaluation of the tool-kit and the various metrics for evaluation

Goal of the tool-kit:

The overarching goal of the tool-kit is to help organisations scale through engagement in a circular economy, this tool-kit is a first step towards achieving this by moving in the design direction by raising awareness for organisations on scaling through engagement and enabling them to creating ideas for scaling through.

How to know if the design helps the organisation move towards the design directions ?

To know whether the design would help organisations in moving towards the design direction, the design requirements were created. Each design direction contributes towards various steps designed in the tool-kit (it is also mentioned in the design part of the report). So to know whether the organisations are indeed moving in the design direction, the corresponding design requirements are evaluated at each step of the tool-kit.

Who is the design tested with ?

The testing of the design is done by testing it with people part of organisations contributing to a circular economy present in the urban space. These are organisations who were initially investigated in the research phase (see section 3.3). These designs were tested with individual people part of organisation.

What are the methods of evaluation ?

The evaluation of the design is done by three methods,

- An evaluation form at the end of the use of the tool-kit.
- Observations(by the researcher)/ Questions asked (by user) during the use of the tool-kit.
- A short interview at the end of the session based on the observations.

Overall Metrics

The evaluation form is the main evaluation tool as it consists of key metrics to measure based on the design requirements at each step of the tool.

Overall though for each step of the tool-kit it may differ, the evaluation form measures two parts,

1. Usefulness of the tool (with regard to purpose of the tool and relating design requirements)
2. Ease of use of the tool (with regard to usage of the tool-kit)

Apart from the above metric, other questions on the key learnings and insights from using the tool and remarks on improving the tool were present.

Elements of testing

There were seven different elements of testing in the tool-kit.

- Step 1: Watch the animation video
- Step 2: Defining organization's activities
- Step 3: Understanding your dual role
- Step 4: Ideation: scaling through engagement
- Step 5: Alignment with organization
- Step 6: Checking Desirability and feasibility
- Overall process of the tool-kit

An example of the evaluation questions for step 1 is showcased in the next page.

The reason behind using the evaluation form is also mentioned in appendix I

An example of the questions in the evaluation form and it's relation to the design requirements and corresponding design direction

Step 1: Watch the animation video

Questions for evaluation:

1. How helpful was the information in the video in understanding the concepts scaling through engagement, creating and informing ?
   a. (Rate from 1-7)
   b. Please explain your answer
2. The information in the video is easily understandable
   a. (Rate from 1- 7)
   b. Please explain your answer
3. The key learning from the video are..
4. Did your understanding change of how circular organizations scale in cities ? Please explain your answer
5. Any Remarks on improving the video ?
6. Any other remarks ?

Usefulness of the tool

Ease of use of the tool

Design requirements being evaluated

- Organizations understand the importance of engagement in a circular economy
- Organizations understand the dual role of creating and informing they play

Questions of usefulness of tool created with regard to design requirements

Relating design direction:

- Awareness on Scaling through Engagement

See Appendix I for all the evaluation questions for each step and the overall process

6.2 Tool-kit Testing

There were two tests done with the tool-kit. There were initial internal soft test with fellow students and an external test with various circular organisations operating in the urbanspace.

Internal soft-test:

Goal of the internal soft-test:

The goal of the internal soft test is not to see if the design requirements were met but rather,

- To understand how long would the tool-kit take to perform and how long would be required for each step. This was done to get an estimation of how long would it take to the use the tool-kit when testing with various organisations in real world scenarios.
- To understand if people, found the tool easy to use and if there were any elements of the tool-kit that needed refining.
- To understand if people who were new to the concepts of scaling through engagement and creating and informing, were able to understand the concepts easily.

Who is it internally tested with ?

The design is tested with 2 fellow-students who were new to the concepts of scaling through engagement. One of the participants were chosen without the knowledge of miro (the online collaboration tool in which the tool-kit is made), this was see how people would use the tool-kit if they did not have any previous knowledge of the online tool and how long it would take for them.

How was it set-up ?

The session was set-up as it were an actual session to evaluate the tool-kit, but an initial discussion of 10 minutes was present to create a dummy case with which people can fill-up the tool-kit.

Participant Number	Description of Organisation	Role in Organisation
Participant 1	Intends to promote sharing of toys between students in schools through use of a product made from old cut down trees in the city	Co-Founder
Participant 2	Intends to create knowledge for plastic recycling and creating plastic artifacts for alternate purposes.	Team member / Product Designer
Participant 3	Intends to use electrical barges in the city for better recycling process.	Researcher / Strategist

Figure 11: Overview of participants for external test

External test with organisations:

Goal of the External test:

The goal of the external test is to test the tool-kit with various organisations operating in the urban-space to see if the tool-kit helps the organisations to become aware on the concepts of scaling through engagement and create ideas for scaling through engagement.

How was it set-up ?

Being a self-explanatory tool, there was not much set-up with the tool-kit itself. The various participants, were given access to the tool-kit; their activities were observed and recorded in real-time in a secondary tool-kit(open in another window) which was filled up by the researcher based on the actions by the participant and remarks made by the user.

Apart from this the audio was also recorded during the session to capture any remarks by the participant while the tool-kit was filled in. Finally a form with evaluation questions was sent to the participants to evaluate the tool

Who is it tested with ?

The organisations that were tested with were the same organisations that were initially researched on, the people that were tested with were also the same. However, it was tested only with three of the initial organisations. The description of the participants is present in the above figure. Also, the tool-kit was tested with individuals and not with a team of people with each organisation.

7.2 Concept Iteration

The iterated version of the concept is already presented in chapter 6, here I mention the different iterations (changes) made to the design based on the testing of the design.

These changes were based on the external test with the participants from the organisations.

1. Confusion on creating and informing activities

In step 3, when marking the various organisations activities as informing or creating participants were finding it hard to separate them . This created some confusion within them whether some activities were creating or not. This was because, there was not an explicit mention that activities could be a combination as well where you could have a creating centered activity which informs.

It does create some awareness, but it was challenging to really separate.

Participant 2

Iteration:

A small visual was added to showcase that creating activities could be informing and vice-versa

Related step in tool:

Step 3: Understanding the dual role

2. Difficultly in creating new innovative ideas

The participants also noted it was difficult to create new ideas, when further probed as to why this was the case, at the end of the session - they said that they had just reflected on their own organisations activities and it was difficult to think about

I think it worked quite well, but I struggled to come up with really new/innovative/crazy ideas.

Participant 1

Iteration:

A brief pause was added between step 3 and 4 to enable people to have a transition between thinking about their own organisations, visually as well there was a change and separation was made between the steps.

Relation to step in tool:

Auxiliary elements: Brief Pause

3. Wording unclear in the matrix

The participants noted they were also a bit doubtful of the initial wording used to define the quadrants in step 4, it took them some time to understand the wording on the matrix.

Assignment was clear but the names of the quadrents confused me

Participant 2

Iteration:

The wordings were changed to more be more easily understandable.

Relation to step in tool

Step 5: Alignment with organization (section)

4. Critical questions on implementation within the organisation was missing

The participants also asked whether there could be some critical questions (relating to financial risks with partners), these questions they asked were related to their own organisation and current structure of organisation, they reflected on the questions by themselves when creating implementation intentions but the initial design was missing the organisation part and focused only on the external organisation and users with questions on implementation intentions.

I couldn't see where i could have done that (check risks of idea) otherwise

Participant 3

Iteration:

There were additional parts on financial value for the organisation added to the tool-kit.

Relation to step in tool:

Step 6: Checking Desirability, Viability and feasibility

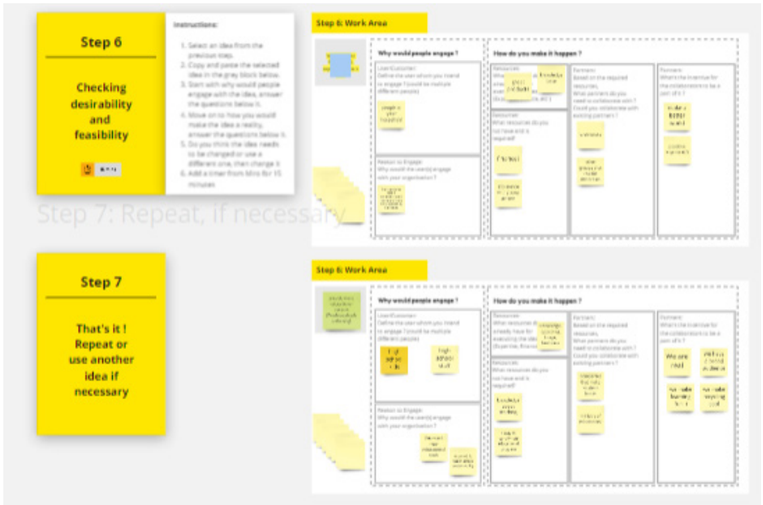


Figure 12: Participant 2 - Workspace added after request from participant during testing

5. Additional Workspaces

While finishing the tool-kit the participant wanted an additional workspace of Step 6 to try out another idea on the tool, but there were not additional workspaces present which the person could work on.

Iteration:

Additional workspaces are present at the end of the tool-kit for participants to try.

Relation to step in tool:

Auxiliary elements: Additional workspace

6. Collaborative elements

During the whole process, the participants reflected that it was difficult to perform the various steps alone without a team member to challenge their assumptions initially when reflecting on their organisation's activities and later on when creating ideas. Though this point that the tool-kit would be difficult to use alone was aware when initially testing, the comments by the participants made it more explicit.

I think the tool has a clear structure but it is hard to achieve maximum results if there is no one to challenge you.

Participant 3

Iteration:

Though the tool-kit could have used as a team, to enable it further different sticky notes were added to enable the collaborative process

Relation to step in tool:

Auxiliary elements: Tool for a team

Recommendations for design:

Recommendations are feedback from the users which have been not been implemented yet due to the time constraints in the project and/or due to the availability of knowledge present outside the scope of the project in improving the design.

Recommendation 1:
In step 1 of the animation video
People liked the video and it also helped them understand the concepts of scaling through engagement, however,some people found it difficult to understand how the concepts would relate back to real case scenarios.

Adding examples and exploring other interactive means to showcase the concepts of scaling through engagement would help the organisation in becoming more aware.

I liked the message above (key learnings), but it was still a bit abstract for me to really understand what it would mean in practice.

Participant 1

Recommendation 2:
This relates back to the 5th iteration feedback on critical questions on implementation within the organisation was missing, there were few critical factors mentioned by the participant when probed further.

But these were beyond the scope of testing the tool, though the financial value part was added in the final tool-kit, as similar observations were present across all tests- there are other risks within the organisation could be facing and this would need to be studied further and designed for.

6.2 Design Discussion

This section discusses the various parts of the tool-kit with relation to design requirements to see whether the tool-kit served as a step in moving the organisations in the direction of creating awareness on scaling through engagement and enable them to the create ideas for scaling through engagement.

Design direction	Corresponding Design requirements
Awareness on Scaling through Engagement:	**Organizations understand the importance of engagement in a circular economy** **Organizations understand the dual role of creating and informing they play when moving towards scaling through engagement.** **Organizations are able to understand the core value they provide to the people they collaborate with**

The design tried to achieve the individual requirements at various step of the tool-kit; with regard to awareness it was interesting to see where people understood the concepts and what did they learn from it.

The design overall did achieve it's awareness goal by showing people the importance of scaling through engagement and the dual role of the organisations in the various steps. Even if the people did not completely initially(during step 1) they became aware of it at the end of using the tool-kit.

Apart from this they were able to map their organisations activities act this helped them reflect on their own activities as an organisation through the lens of creating and informing.

During the process, it was also observed that people reflected on the core value they were offering to the end consumers, during the various steps - they were able to write down their core purpose and use it effectively across the various parts of the tool-kit, they also understood it was important to think in terms of long term values as well.

Great explanation that a circular economy is not just a closed loop. Companies need to do more than just produce, they also need to interact with the user and inform them. One cannot just produce more but you need more users, and specifically users that understand the thoughts behind your circular product.

Participant 3

My key learning was that we focus a lot on informing, because we see it really as a tool to inform people, it's not so much about the product itself (it's a means)

Participant 1

The video gives a better sense of a circular economy. Some of the concepts become clearer once the tool is used.

Participant 3

Design direction	Corresponding Design requirements
Create Ideas for scaling through engagement:	**Organizations are able to create ideas for scaling through engagement based on the value of their organizations** **Organizations are able to see the alignment of ideas based on their organizations** **Organizations are able to create implementation intentions beyond the initial creation of ideas**

The design tried to achieve the individual requirements at various step of the tool-kit; with regard to creating ideas it was interesting to see what kind of ideas people created around engagement.

The design overall did achieve it's requirement of creating ideas of engagement for a circular economy. The examples and prompts helped them in creating ideas for engagement, however there are some shortcomings. The matrix(step 4) did act as a way to choose ideas but alignment with organisation but it was hard to judge whether organisations really did align the ideas with their organisations specific mission or capabilities because it was not made explicit anywhere in the design to mention them.

With regard to the implementation intention(see recommendation 2 for shortcomings), the organisations were able to think about and create implementation intentions beyond their initial ideas.

It was challenging to separate the ideas in the two categories(impacting cultural roots and impacting greater numbers), but also inspiring to have some examples and some direction for the ideas through the two categories.

Participant 1

It became more concrete, I started to think about how I could reach the parents(a partner part of the idea) ,which is I think the main challenge when implementing this idea, so that was really nice.

Participant 1

Limitation to evaluation of design:

The design was tested with only one individual and not a group of individual which might change how the tool-kit is being and also the amount of time it would take to use the tool-kit.

Though the information with regard ratings of each step of the tool gave a general idea of how people perceived the tool, it did not itself provide any insights into improvements but just a general sense of how they perceived the usefulness and ease of use of the tool and the tool-kit.

Also, initially the testing was planned for six different organisations and to make the analysis of the information easier an evaluation form was decided but since only three organisations were tested with; the outcomes of the ratings were not analysed with regard to the tool but only their feedback.

08

Conclusions

8.1 Limitations and future explorations

Tool-kit and research limitations:

- The tool-kit was designed and tested with a limited number of organizations, however, more testing can be performed for further iteration on the design.
- The project was not associated with any specific circular organization operating in the urban space, which would make the outcome of the project generic, and thus additional research would need to be considered to modify the tool-kit to meet the needs of a specific organization, though the tool-kit tried to achieve this by seeing alignment of ideas generated with organisational capabilities - the tool-kit itself did not address this.
- The organisations researched on and tested with were only start-ups operating in the urban-space, hence as of now it's meant only for start-ups as other bigger organisations operating in the urbanspace were not explored.

Analysis limitations:

- The analysis of the information gathered from the research phase was done through a systems perspective, the system map, the behaviour over-time graph and the ice-berg model were created by the designer based on the information gathered during initial interviews and have not been not been created with the users, in an ideal case these als o would have been created with or at least tested with the users continuously, but owing to the time-line of the project this was not possible. Such participatory activities could have given even more insights into the various engagement activities of the organisations.
- The initial boundary set within the system analysis with regard to circular organisations in the urbanspace was also another limiting factor due to the time where further explorations could have yielded more valuable insights, especially with regard to urbanspace infrastructures which affect the collaborations taking

Future explorations:

To the concept:

- An exploration into the various different strategies of engagement that organisations pursue could be a good starting point to further explore further tools based on scaling through engagement. This has been briefly touched upon in the example strategies of the tool-kit but overarching common principles have not been identified, which could further help in creating ideas around engagement.

Circular collaborations in the urbanspace

- The Role of urban infrastructures on circular organisations: Though the organisations operating the urbanspace were studied in this research the effect of urbanspace infrastructures on the circular organisations was not studied but the importance of the city for the collaboration has been discussed in chapter 4.6.
- Longitudinal studies : Though this project tried to understand how organisations innovate across a time-line in the urbanspace, this was done in retrospect and longitudinal studies could uncover further insights into how these collaborations happen.

8.2 Contributions

Contributions to new knowledge

The research initially started to investigate how to create and operationalize a shared vision for creating circular oriented innovation for organisations operating the urbanspace.

The exploration of this led to some gaps in literature present with regard to the knowledge of understanding how do organisations operationalize their innovation especially in cities.

The exploration into the gaps identified led to some interesting insights on how organisations operationalize innovation in the urbanspace and how this helps them collaborate with various partners. The concept of scaling through engagement and the ideas surrounding it are new to circular oriented innovation literature and relate to ideas of the social and institutional principles necessary for societal level transitions to take place in a circular economy. Apart from this, the dual role played by the organisations of creating and informing showcased empirical evidence as to the roles played by the organsiations when trying to operationalize for a circular economy. In addition, all the key insights identified relating to focus on engagement, existing market infrastructure, Role of visibility, dual role of organisations and value over artifact (see section 4.2) contribute towards the underexplored context of circular collaborations in the urbanspace.

Though not explored in the scope of the project, the importance of infrastructures in cities towards the organisations is a briefly discussed but valuable addition to see the influence of cities on collaborations happening in the urbanspace enabling engagements to take place.

Contributions to practice

The translation of the new knowledge gained from the research on scaling through engagement into a tool-kit is a contribution to the design practice. Within the tool-kit itself, some existing tools have been used but concepts from other field of social innovation have also been translated into designs contributes to design practice as well.

8.3 Personal Reflection

When i first started this project, i did not fully comprehend the complexity of the project that i had taken on, there were many different shifts in thinking that were required during the course of the project, one of which was to think in terms of an organisation centric point of view, another similar struggle was with regard to the intangibility aspect of the ideas being explored. But as I read more and researched more organisations it became easier with time to comprehend such abstract terms of exploration.

I also observed the times I most enjoyed the project was during the analysis, research and subsequent evaluation of the design. The analysis part with using the various systems tools was also a part where I found myself to be in my element.

When I initially formed the brief I wanted to pursue participatory methods during the course of the project, but owing to the amount of time it took me to comprehend the research and analyse the information gathered from the field research it was difficult for me to pursue participatory activities.

I also found myself being an intuitive thinker, It takes much more time for me to make my choices explicit to others. This made writing this report with all it's reasoning s making it a herculean task for me.

But overall, though i struggled a lot during the project - I also found myself to be learning a lot about myself and this project gave me the fertile ground to learn more about myself as a designer and as a person.

Finally, I'm happy not because this project ended but I'm happy because I learned, failed and grew from it.

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Master Thesis

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