Opportunities for engaging users in co-design of circular offers through games

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Abstract

Previous research emphasises the importance of actor engagement in circular business model innovation processes. Both co-design and serious games have been advocated as approaches to engage with end-users. However, there is limited research focused on applying these approaches to circular business model innovation. This paper therefore explores the role users can play in co-design of circular business models and how games could be used to support such co-design. First, roles users can play in co-design of circular business models are identified through company interviews. Several characteristics for games that can support co-design of circular business models are then offered. Finally, four game concepts are presented to illustrate how games could facilitate co-design of circular business models.

The results suggest that by engaging with users in co-design, companies could gain insights which could serve as inputs to circular business model development. This includes learning about users' needs, preferences, and product use patterns. Users can also be invited to take part in ideating, testing, and validating existing and new products and services so that companies can identify opportunities for desirable and attractive offers. Furthermore, the differing directions of the presented game concepts show there are several ways to engage with users through game approaches. As the paper presents possible roles for users in co-design of circular economy and illustrates various ways this could be approached using games, the findings are expected to be relevant to researchers and practitioners who are interested to engage users in circular business model innovation.

Keywords

Business model innovation, Circular business model, Co-design, Serious game, Sustainable business model

1. Introduction

Previous research emphasizes the importance of actor engagement in circular business model (CBM) innovation processes. Creating a circular business model requires collaboration between multiple stakeholders in the business ecosystem (Brown et al., 2021; Konietzko et al., 2020) and it is argued that engaging with customers is crucial as it can help make circular value propositions more attractive to people (Baines et al., 2007; Beuren et al., 2013; Lofthouse & Prendeville, 2018; Selvefors et al., 2019; Tunn et al., 2019). However, research focusing on how customers can be included in CBM design is limited (Salvador et al., 2020) and research is lacking regarding what tools and methods that can be used to include customers in the development of CBMs (Bocken & Konietzko, 2022).

One approach for inviting multiple actors including users to contribute to the design of CBMs is co-design. Co-design is described as a participatory approach challenging the traditional user-centered design approach (Sanders & Stappers, 2008). Co-design proponents advocate that users can be invited to participate in the informing, ideating, and conceptualizing activities in the design development process. Facilitating such collective creativity can support the development of solutions more fit for the future users of the designs. Despite its potential, Lofthouse & Prendeville (2018) point out that co-design is still underutilized when it comes to the development of circular offerings, although one recent exception is van Dam et al. (2021) who facilitate an in-person, co-design process with washing machine users.

An emerging area of research explores the potential of using games to engage companies and users in co-design activities for CBM innovation. Game-based approaches such as gamification (i.e., applying game elements to non-game scenarios) and serious games (i.e., standalone games played for purposes other than amusement) can help stimulate interaction, engagement, and critical thinking (Whalen et al., 2022). Selvefors et al. (2023) suggest that games have high potential to support co-design of circular value propositions and experimentation with circular business models. They identified 26 recommendations for future development of games for co-design. These include providing game elements that represent circular challenges and opportunities in a realistic and dynamic way and creating bridges from the game to the real world.

Although games have potential for supporting co-design of circular value propositions and CBMs, few have explored how games can help facilitate co-design and the role users can play in co-design of CBMs. Therefore, as a first step, this paper explores what user insights

companies may find beneficial for CBM development, what roles companies see that users can play in co-design of CBMs, and what types of games could be used in such co-design. The paper summarizes insights gained from interviews with 13 companies, highlights possibilities for games, and presents four game concepts that illustrates how games could be used to facilitate co-design of CBMs.

2. Method

The research method is three-fold. The first step focuses on investigating how companies see the role that users can play in the co-design of CBMs as understanding this can help inform game characteristics. The second step then builds on these company investigations as well as previous game design literature, resulting in a proposed list of possible design characteristics for circular co-creation games. The third step centers on developing several game concepts based on the proposed list of design characteristics.

Step 1: Company interviews

Representatives from 13 companies were interviewed using a semi-structured interview approach (see Selvefors et al. (2024) for more details about the study and sample). The chosen companies had a range in size, maturity within circularity, and experience with user involvement. Topics covered in the interviews included the companies' current approaches to co-design of CBMs with users and their roles as well as future possibilities for co-design of CBMs with users and their roles. Following the interviews, recordings and transcriptions were reviewed to identify the types of user insight that the companies deemed valuable and examples of how users could play a role in co-design of CBMs. The data was inductively clustered and coded by two researchers in an iterative process. This resulted in identifying five key overarching themes related to how the interviewed companies perceive that users can contribute to co-design of CBMs and the roles they can play. These results are presented in Section 3.

Step 2: Design characteristics

Prior work (e.g., Selvefors et al., 2023) has provided recommendations that may be construed as criteria or requirements for games intended to support co-design of CBMs. However, these guidelines lack the specificity required for game development. Therefore, a list of possible design characteristics for CBM co-design games was created by merging the five overarching themes from Step 1 with game characteristics collected from game design literature. See Section 4 for more details.

Step 3: Concept development

Several concepts for games that could facilitate co-design of CBMs were developed using the roles identified from Step 1 and game characteristics from Step 2 to support the process. Overall, the game concept development was characterized by a diverging and

converging design process with stepwise refinement of concepts. Initially, the authors conducted numerous brainstorming sessions, with at least one session dedicated to each of the five themes identified in Step 1. Multiple game ideas were therefore generated for each of the five identified user roles in the co-design of CBMs. A total of 11 game ideas were generated, with two ideas for each of the five user roles except for one, which had three.

Next, each of the initial game ideas was evaluated against the game characteristics identified in Step 2. From this evaluation, four game ideas were chosen for further development, prioritizing diversity among the concepts to ensure a broad representation of different game characteristics. This emphasis on diversity aligns with the study's objective of exploring various game approaches for engaging users in co-design of CBMs.

The selected game ideas were then developed into concepts and iteratively refined to maximize their distinctiveness from one another and to encompass all identified game characteristics. Particular attention was paid to the four types of player motivation presented in Table 2. This ensured that the generated concepts also addressed various types of motivation, which previous research has highlighted as important when engaging users in co-design (Selvefors et al., 2023). All concepts were developed to be played digitally. Each concept was visualized in 4-5 still frames using Figma. The four game concepts are presented in Section 5.

3. Company insights

Five main roles that users could play in co-design of CBMs were identified from the interviews with companies. Table 1 presents the five overarching themes and the different types of insight they can provide. Each user role was given a descriptive title. It is important to note that these themes are not mutually exclusive. Companies may have expressed interest in more than one theme.

Table 1. User roles in co-design identified by the companies.

User role	Description of role	How companies can engage users	How companies can use this information	Example questions these insights could address
Routine Revealer	Users share their preferences, behaviors, and habits.	Learn about consumer preferences and behavior/habits through approaches such as ethnographic practices.	Gain a better understanding of user needs. Companies may also be able to interpret insights about users' realities into "actual" needs (that users might not even be aware of). These insights can be used as a basis for ideation by companies. Could be used to provide insights into how to increase utilization and prolong life.	What can make users prolong product lifetimes? How can users be encouraged to keep products longer? What can make users use something more? What can make users circulate something to another user? What new circular offerings could add value to a current part of users' lives?
Product Patron	Current product/service customers offer insight and feedback on existing offerings.	Survey or observe existing customers.	Improve existing products/services. Generate ideas for new circular business offerings.	How is the product/service used throughout its lifecycle? What is the user behavior like? What is the user interaction with the product like over its lifetime? How do users use the product in ways companies can't anticipate/predetermine?
Future Foreseer	Users share their ideas of the future.	Invite users to generate future scenarios and visions for the future.	Generate ideas for new circular business offerings; provide insight on who could do what in a circular flow (i.e. users, main provider & other providers)	What role could various stakeholders play in the future? Who is responsible for product/service at various points in the product lifecycle? What role do users want to have? What could users do?
Brainstorm Buddy	Users provide idea input.	Involve users in ideation activities and support them to share their ideas and suggestions for new products, services and business model concepts.	Generate ideas for new circular business offerings.	What are current pain points in users' lives that need solving? What new circular offerings could target these pain points?
Concept Confirmer	Users validate desirability of ideas and concepts for new business models.	Test product/service prototypes and concepts with users.	Assess potential market demand and test assumptions about the consumer and new circular business model concepts. Understand drivers and barriers for service/product adoption.	What circular products and services do users prefer? What price are users willing to pay for this service offering? Why users do or do not adopt services/products? How can companies incentivize users to contribute to circular flows?

4. Game characteristics

A list of possible game characteristics for CBM co-design games is shown in Table 2. This list was created by first collecting game characteristics from game design literature (i.e., Adamou, 2018). These game characteristics were then merged with the five overarching themes from Step 1 and used in the game development process as previously stated in Step 3.

Table 2. Game characteristics used as input in the development of the four game concepts. Adapted from Adamou (2018).

Characteristics	***Sub-characteristics***
When do users play the game?	• Set time of day • Free play (whenever they want)
How long and how often do they play?	• One time • Rolling (i.e. continuous over a longer time frame)
Does the game have a narrative or story?	• Fantasy narrative • Realistic/ no narrative
How do people engage with the game?	• Passive (minimum engagement such as swiping) • Active (need to do something and contribute)
Do people play together or alone?	• Alone • Group
What level of information is collected?	• What people say • What people do • What people know, feel, dream
What is the information about?	• Personal preferences/information • Society
Where does the game take place?	• Some physical (Exploration of real environment needed) • All virtual
What motivates players to play?	• Knowledge (players gain information) • Narrative (players are driven by the storytelling) • Self-discovery (players learn about themselves) • Transcendence (players feel like they contribute)
What are the design requirements? (complexity of the game world)	• Solely text-based • Simple platform/app • More complex digital world/simulation
What role(s) do the users play? (from Section 3)	• Routine Revealer • Product Patron • Future Foreseer • Brainstorm Buddy • Concept Confirmer

5. Game concepts

The resulting four game concepts are summarized as follows:

Concept I. ***Problem Pitcher*****:** A platform where players upload problems and vote on problems that other players have uploaded. Once a player has gained a certain level of points they are invited to give input on providers suggestions for solutions (see Figure 1).

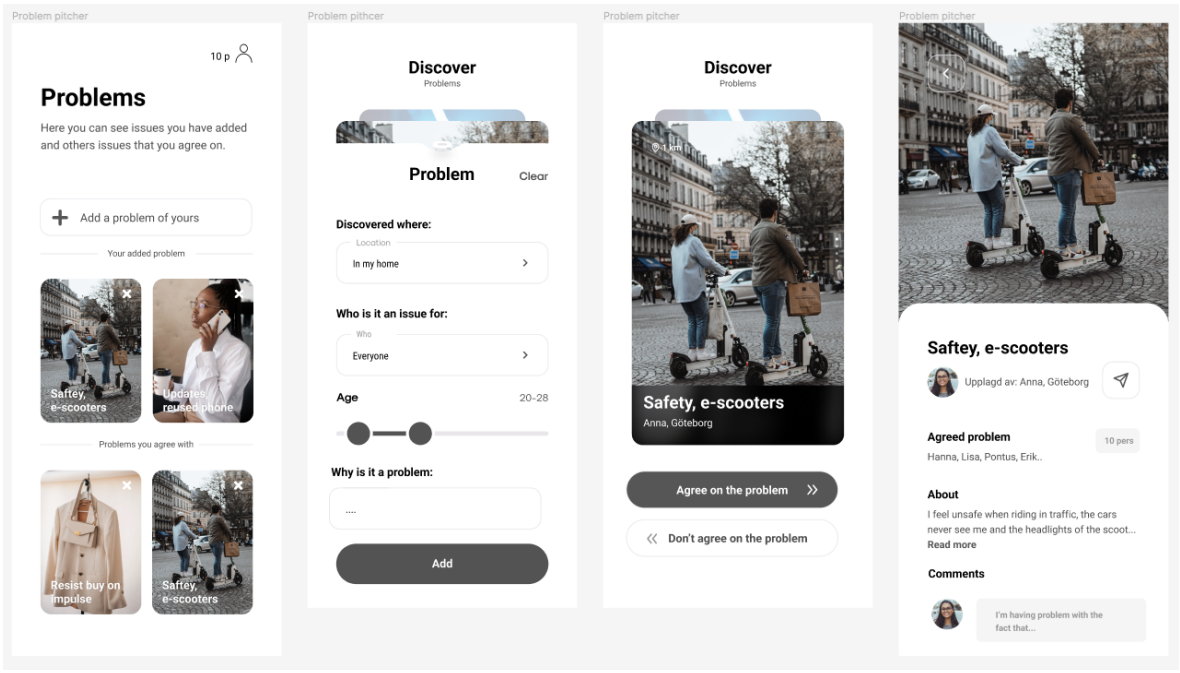

Figure 1. Visualization of the 'Problem Pitcher' game concept.

Concept II. ***Moving Planets*:** A game within a fictional scenario prompting users to consider and share their relationship to things in their home (see Figure 2).

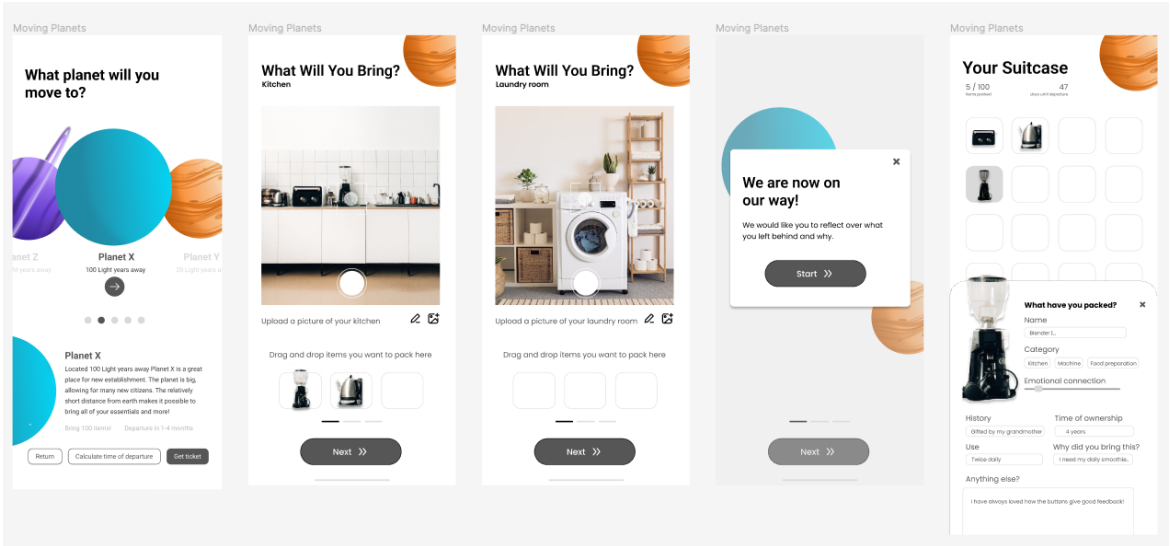

Figure 2. Visualization of the 'Moving Planets' game concept.

Concept III. ***Neighborhood Detective*:** A game where players in teams compete to collect clues and insights within their own neighborhood (see Figure 3).

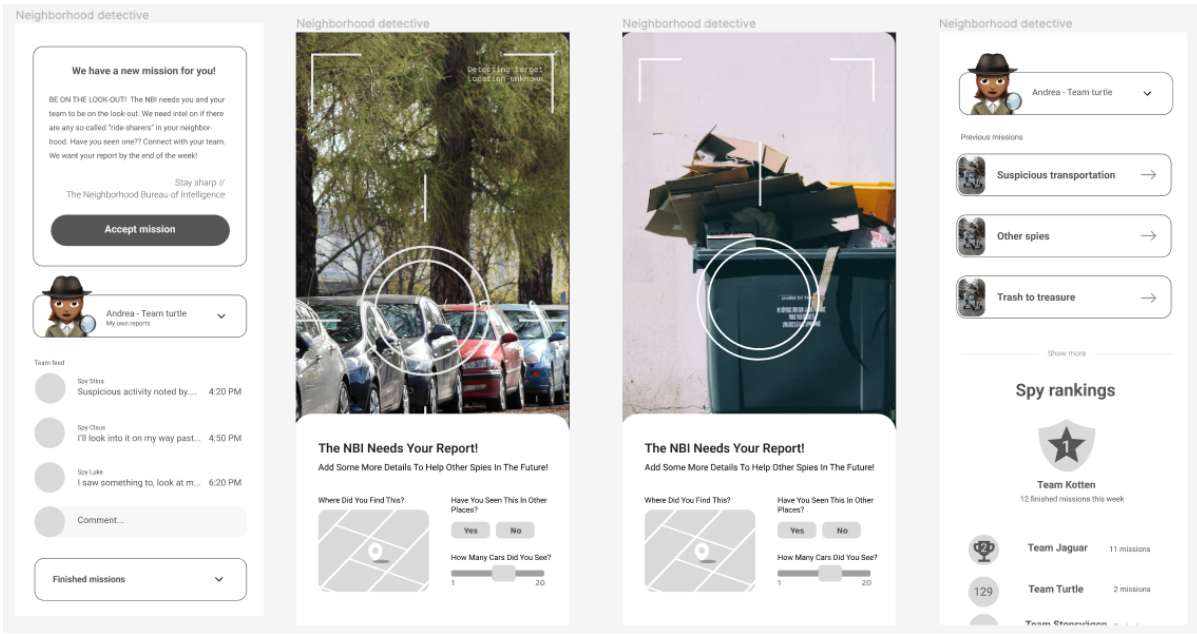

Figure 3. Visualization of the 'Neighborhood Detective' game concept.

Concept IV. ***Futurocracy: Ruler´s Dilemma:*** A choose your own adventure game where players make decisions for how to build a future society (see Figure 4).

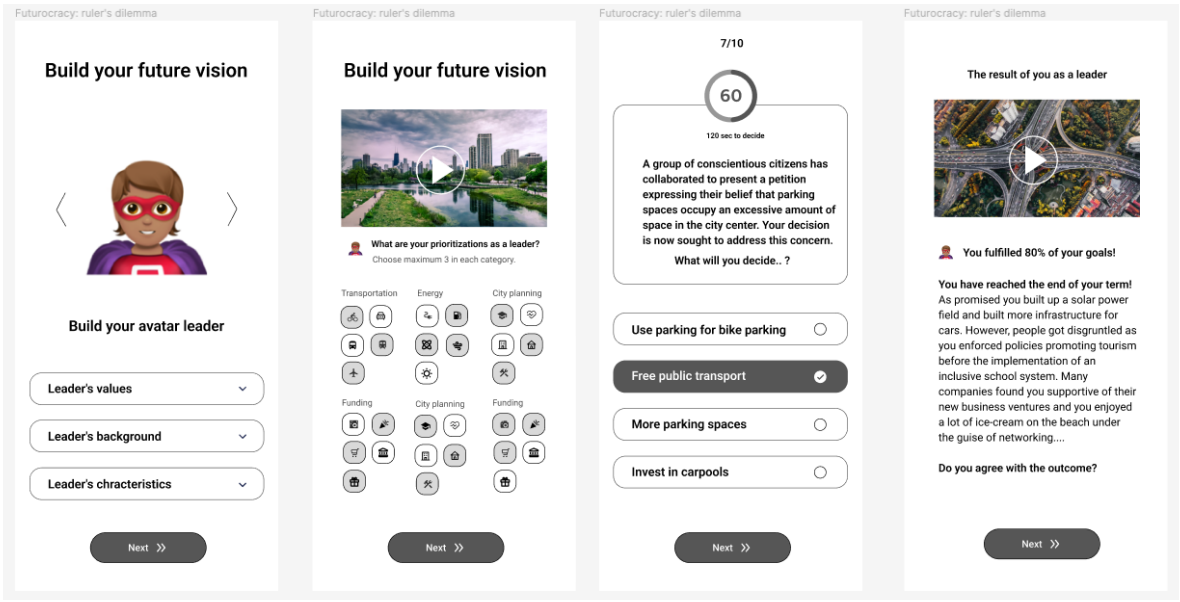

Figure 4. Visualization of the 'Futurocracy: Ruler´s Dilemma' game concept.

Table 3 presents an overview of the characteristics for each of the developed game concepts and illustrates that numerous different characteristics are represented. However, all concepts provided ways to elicit personal or contextual information from the users.

Table 3. The four game concepts and their main characteristics.

Characteristics	***Sub-characteristics***	***PROBLEM PITCHER***	***MOVING PLANETS***	***NEIGHBORHOOD DETECTIVE***	***FUTUROCRACY: RULER´S DILEMMA***
When do users play the game?	Set time of day	*(X)**		*(X)*	
	Free play (whenever they want)	*X*	*X*	*X*	*X*
How long and how often do they play?	One time		*X*		*X*
	Rolling (i.e., continuous over a longer time frame)	*X*		*X*	
Does the game have a narrative or story?	Fantasy narrative		*X*	*(X)*	*X*
	Realistic/ no narrative	*X*		*X*	
How do people engage with the game?	Passive (minimum engagement such as swiping)	*X*			*X*
	Active (need to do something and contribute)	*(X)*	*X*	*X*	
Do people play together or alone?	Alone	*X*	*X*		*X*
	Group			*X*	
What level of information is collected?	What people say	*X*			*X*
	What people do		*X*	*X*	
	What people know, feel, dream				*X*
What is the information about?	Personal preferences/information		*X*	*X*	
	Society	*X*	*X*		*X*
Where does the game take place?	Some physical (Exploration of physical environment necessary)		*X*	*X*	
	All virtual	*X*			*X*
What are the design requirements? (complexity of the game world)	Solely text-based				*X*
	Simple platform/app	*X*		*X*	
	More complex digital world/simulation		*X*		
What motivates players to play?	Knowledge (players gain information)	*X*		*X*	*X*
	Narrative (players are driven by the storytelling)		*X*	*X*	*X*
	Self-discovery (players learn about themselves)		*X*		*X*
	Transcendence (players feel like they contribute)	*X*		*X*	*X*
What role(s) do the users play?	Routine Revealer		*X*	*X*	
	Product Patron	*(X)*	*X*		
	Future Foreseer		*X*		*X*
	Brainstorm Buddy	*X*		*X*	
	Concept Confirmer	*X*			*X*

*(X) denotes the possibility for the concept to include this characteristic.

5. Concluding Remarks

The identified themes from the interviews with the companies presented in Table 1 show that users can play different roles and contribute to co-design of CBMs in multiple ways. Companies can engage with users in co-design to learn about their needs, preferences, use patterns and behaviors that can serve as input to CBM development. Users can also be invited to take part in ideating, testing and validating existing and new products and services so that companies can identify opportunities for desirable and attractive offers, which is essential when developing CBMs. These findings reinforce existing literature on CBM innovation and co-design (e.g., Clark et al. (2020), Harmer et al. (2019)), which illustrates that users can contribute to CBM innovation in a variety of ways.

Furthermore, the findings identify several ways to engage with users by making use of game approaches as shown by the differing directions of the presented game concepts. Depending on the purpose that the company sets for engaging the users in co-design, one or multiple game concepts might be of more relevance than others during different stages of CBM development. For instance, whereas *Problem Pitcher* can help generate insights on user's pain points, *Moving Planets* and *Neighborhood Detective* can be more applicable for understanding user's needs, lifestyles, and priorities. *Futurocracy: Ruler´s Dilemma* can provide valuable input on the users' visions of the future. The four game concepts could be used individually or in combination with one another as they carry similarities and differences in their main characteristics.

One limitation of this paper is its lack of extensive comparison between the identified user roles and existing literature on co-design of CBMs. Have additional roles been identified? Are all roles equally relevant? Previous research suggests prioritizing the 'Brainstorm Buddy' role over the 'Concept Confirmer', as van Dam et al. (2021) advocate for co-designing with users primarily for ideation rather than validation. Therefore, further investigation into the identified user roles is warranted.

Follow-up research could explore how the initial approach to concept development shapes the resulting game concepts. Presently, the games were developed starting from the identified user roles. Thus, the concepts are influenced by what companies state they seek to learn from users in the co-design process. Alternative approaches to creating a game for co-design of CBMs are conceivable. For instance, one could begin by brainstorming ways to motivate users to engage in co-design. Game ideas resulting from different starting points could then be compared to the four game concepts presented in this paper.

The existing concepts can also be enhanced by integrating recommendations from Sevelfors et al. (2023), who compiled a list of guidelines for developing games for circular offerings and co-designing circular offerings with partners or users. While these recommendations provide general criteria for game development, the current game concepts serve as more detailed examples of potential ways to fulfill these criteria.

Therefore, future work aiming to expand and develop the concepts into tools for CBM innovation should ensure alignment with the criteria outlined by Sevelfors et al. (2023).

As the next step, we plan to test the four game concepts in user focus groups to better understand their applicability in different CBM contexts, and in relation to different user groups and demographics. Future research can also investigate different incentive mechanisms for users to play games for co-design of CBMs. Finally, we recommend exploring ways to apply the findings, especially regarding user roles, beyond game design to facilitate CBM innovation. While originally designed to illustrate how companies can involve users in co-design practices, the game concepts could also serve as tools for general CBM co-design activities and facilitate dialogue to engage users in early idea generation and testing of circular offerings.

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