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Gemser, Gerda; Calabretta, Giulia; Karpen, Ingo

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Co-creating the future through design thinking: Deconstructing the consumer co-creation process

Gerda Gemser[1] | **Giulia Calabretta**[2] | **Ingo Karpen**[3,4]

[1]Faculty of Business and Economics, The University of Melbourne, Melbourne, Victoria, Australia

[2]Delft University of Technology, Delft, The Netherlands

[3]Service Research Center, Karlstad University, Karlstad, Sweden

[4]Adelaide Business School, The University of Adelaide, Adelaide, South Australia, Australia

Correspondence
Giulia Calabretta, Delft University of Technology, Landbergstraat 15, 2628 Delft, The Netherlands.
Email: g.calabretta@tudelft.nl

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Abstract

Consumer co-creation, an approach in which consumers and organizations jointly innovate, can yield valuable knowledge about consumers' needs and how to satisfy these needs. Yet, innovating with consumers is challenging due to their varying levels of commitment, skills, and motivations. In this research, we focus on challenges we cluster as cognition- and affect-driven and examine how these challenges can be addressed using a design thinking approach. Building on the insights gained from interviews with key co-creation stakeholders ($n = 73$) and three focus groups with experts in design thinking and co-creation, we develop a grounded process model facilitating co-creation with consumers. More specifically, we distill three co-creation phases (labeled as co-creating context, content, and confluence), consisting of eight constituent activities and resulting dynamics that are cognitive or affective in nature. The distilled affective dynamics manifest in ideation confidence, empathy for diverse perspectives, pleasurable engagement, and being creatively inspired; the distilled cognitive dynamics manifest in an expanded knowledge base and an enhanced ability to analyze and evaluate information. Our grounded model is integrative and responds to calls to further examine affective influences within innovation and organization. Furthermore, our research advances the theoretical substance of design thinking by explaining underlying mechanisms at play that make design thinking an effective approach. Finally, our results add to the literature on consumer co-creation by developing a robust process model that leverages design thinking and adopts a multistakeholder approach to optimize consumer co-creation outcomes. In terms of managerial implications, our research presents a structured framework with phases and (micro) activities that will help organizations to actively involve consumers in their innovation process.

KEYWORDS

affect, cognition, consumer co-creation, design thinking, multistakeholder approach

1 | INTRODUCTION

Innovation is an important determinant of firms' survival and growth. However, innovation is risky with new products often failing to become a commercial success (Knudsen et al., 2023). To enhance innovation success and yield valuable knowledge about market needs and how to satisfy them, organizations can actively involve consumers (i.e., end users). Building on prior literature, the active involvement of consumers in an organization's innovation process, with organizational stakeholders and consumers jointly creating new products, is referred to in this paper as consumer co-creation (Gemser & Perks, 2015; Hoyer et al., 2010; Ko et al., 2022; Mahr et al., 2014).

Compared to research on co-creating with business-to-business stakeholders like suppliers or business customers, research on consumer co-creation is less well-developed (Gemser & Perks, 2015; Roberts et al., 2022; Trischler et al., 2018). Research on the use of consumers for innovation tends to focus on (interim) outcomes, including the originality or feasibility of ideas generated (e.g., Kristensson et al., 2004; Magnusson, 2009; Poetz & Schreier, 2012; Trischler et al., 2018), the market's perception of the co-creating organization's innovation capabilities (Schreier et al., 2012), the commercial success of created products (Nishikawa et al., 2013), and how to enhance commercial success through effective marketing communication (Wang et al., 2019). The underlying idea expressed in this literature, implicitly or explicitly, gravitates to competition: who is better at new product creation—consumers or innovation experts? For example, based on a case study of Japanese consumer goods company Muji, Nishikawa et al. (2013: 165) conclude that products based on ideas from users "systematically and substantially outperform their designer-generated counterparts", while Poetz and Schreier (2012: 245) ask whether users can "really compete with professionals in generating new product ideas?" In this paper, we take a different approach. Rather than juxtaposing innovation experts with consumers, we examine how they can co-create together.

We focus specifically on how experts in design thinking can facilitate consumer co-creation. Design thinking is an alternative approach to innovation in which user centeredness and collaborating and integrating diverse perspectives are core tenets (Brown, 2008; Carlgren & BenMahmoud-Jouini, 2022; Micheli et al., 2019; Verganti et al., 2021). Hence, studying how experts in design thinking engage in facilitating consumer co-creation activities may provide valuable insights in how to empower and engage consumers in the innovation process. Facilitation of co-creation is needed since innovating together with consumers can be challenging (Trischler et al., 2018) and requires adjustments to the innovation process (Lifshitz-Assaf, 2018; Roberts et al., 2022).

To complement insights into the management of co-creation at an organizational level (Roberts et al., 2022), we adopt a microfoundational approach. The microfoundational approach is focused on studying underlying individual-level and group-level actions that shape strategy, innovation, and organization and, ultimately, organization-level performance (e.g., Liedtka, 2020; Magistretti et al., 2021; Teece, 2007). More specifically, we aim to deconstruct, on a micro level, activities and interactions to facilitate consumer co-creation and explore how these activities and interactions may benefit the co-creation process. We particularly focus on how design thinking activities and interactions might help tackle co-creation challenges which are due to consumers having varying levels of commitment, skills, and motivations (e.g., Etgar, 2008; Franke & Shah, 2003; Nambisan, 2002; Ordanini & Parasuraman, 2011; Roberts et al., 2014; Trischler et al., 2018).

To explore how a design thinking approach may facilitate consumer co-creation, we collected data from professional designers ($n = 37$) experienced in consumer co-creation, conducting semi-structured interviews and focus group sessions. This data was supplemented and triangulated by additional interviews with managers and consumers who participated in consumer co-creation ($n = 36$ in total) and other relevant data (e.g., project deliverables or blogs). To analyze our data, we used an inductive approach.

Practitioner points

- We have distilled an integrative process model for consumer co-creation, consisting of three distinct phases and constituent (micro)activities. With this process model, we update managers' toolkit for innovation.
- Our research suggests the importance of actively managing both cognition and affect during innovation processes.
- Our research shows the relevance of leveraging design thinking expertise during consumer co-creation.
- Our research shows the relevance of a multi-stakeholder approach for consumer co-creation in which participating consumers and organization stakeholders are carefully curated.

We contribute to the innovation literature and practice in several ways. First, we offer a robust empirical analysis into the micro-foundations of the consumer co-creation process. Based on our findings, we induct a grounded process model for consumer co-creation, distilling and structuring activities into three coherent phases to innovate together with consumers and other key organizational stakeholders. The process model leverages design thinking expertise and is developed based on a rich data set, thereby advancing prior literature on consumer co-creation drawing on small data sets and/or having studied teams that lack design thinking expertise (Roberts et al., 2005, 2022; Roberts & Darler, 2017; Trischler et al., 2018). Second, our grounded model is integrative, covering the phases of co-creating context, content, and confluence, and foregrounds both cognitive and affective underpinnings of innovation behavior. By doing so, this integrative model responds to calls to further examine affective influences within innovation and organization (Adler & Obstfeld, 2007; Huy, 2012; Zietsma et al., 2019). Third, our research responds to calls for more theoretical substance in design thinking research (Verganti et al., 2021), by explaining underlying mechanisms at play that make design thinking an effective approach for consumer co-creation. Finally, our results add to the literature on consumer co-creation by adopting a multi-stakeholder approach that goes beyond consumers, involving the facilitation of interactions with key (internal) organizational actors as well to optimize consumer co-creation outcomes, addressing calls from prior literature (Perks et al., 2012). In terms of managerial implications, our research presents a structured framework with phases and (micro) activities that will help organizations to actively involve consumers in their innovation process.

2 | THEORETICAL BACKGROUND

To improve innovation performance, extant literature suggests particular promise in collaborating with the demand-side (business customers or end consumers) since it can yield valuable knowledge about their current and latent needs and how to satisfy these needs (e.g., Bogers et al., 2010; Chang & Taylor, 2016; Von Hippel, 2001).

To date, research on co-innovating with the demand-side has primarily examined business-to-business contexts (e.g., Chatterji & Fabrizio, 2014; Von Hippel et al., 1999; Zhang et al., 2023), where motivations, skills, and commitment levels may be more aligned than when collaborating with consumers (Trischler et al., 2018). A particularly well-developed research stream explores so-called "user innovation" where users—be they end-users or "intermediate" B2B users—innovate by themselves or within (voluntarily-assembled) user communities without substantive involvement from any organization, resulting in a distributed innovation process (Bogers et al., 2010; Franke & Shah, 2003; Kornberger, 2017). Hence, while organizations may provide some assistance and structure, for example via user toolkits (e.g., Von Hippel, 2001) or hosting digital platforms, these (groups of) user innovators tend to innovate relatively autonomously (Kornberger, 2017).

In this paper, we are, however, interested in how organizations can actively involve consumers in their internal innovation process to *jointly* create new products. More specifically, we are interested in organizations that interactively work together with end users—often in face-to-face encounters—to identify market needs and jointly develop solutions to satisfy those needs in the innovation process (Gemser & Perks, 2015; Hoyer et al., 2010; Ko et al., 2022; Mahr et al., 2014). Hence, with consumer cocreation, need and solution-finding during the innovation process represents a collaborative effort of the organization and consumers rather than being predominantly the responsibility of either the organization or consumers. Consumer co-creation is not about consumers validating the product concepts as generated by the organization, as is traditionally done in focus group-type research settings; it is about elevating consumers to co-innovators and generating and evaluating product concepts jointly, with consumers as active and equal partners in the innovation process (Roberts et al., 2005).

Extant literature on consumer co-creation is underdeveloped (Gemser & Perks, 2015; Roberts et al., 2022; Trischler et al., 2018) and tends to focus on the antecedents and (interim) outcomes of consumer co-creation. Studies have described how consumers or end-users can participate in the innovation process in terms of their potential roles, contributions, and motivations (Etgar, 2008; Hoyer et al., 2010; Roberts et al., 2014). Scholars have also examined organizational outcomes of co-creation with consumers (Schreier et al., 2012; Trischler et al., 2018), including how consumer co-creation might accentuate the effects of decision-making logics (Ko et al., 2022). Finally, there are some insights into antecedent conditions that make consumers more or less prone or suited to engage in an organization's innovation process (Etgar, 2008; Kristensson et al., 2004; Magnusson, 2009).

While extant literature suggests that active involvement of consumers in the innovation process can enhance organizational performance (e.g., Nishikawa et al., 2013; Poetz & Schreier, 2012; Schreier et al., 2012),

prior literature also suggests that innovating together with actors outside traditional organizational boundaries can be challenging due to varying levels of commitment, skills, and motivations (e.g., Etgar, 2008; Franke & Shah, 2003; Nambisan, 2002; Ordanini & Parasuraman, 2011; Roberts et al., 2014). In this research, we cluster these challenges in terms of *cognition-driven challenges* and *affect-driven challenges*. Cognition-driven-challenges emerge due to collaborating with consumers who might lack relevant domain knowledge, for example, of new technology or new market trends; might have limited cognitive understanding of their own latent desires; or lack the cognitive flexibility and skills to 'connect the dots' which influences the originality of generated ideas and resulting innovation (e.g., Magnusson, 2009; Mahr et al., 2014; Nambisan, 2002; Ordanini & Parasuraman, 2011; Verganti, 2011). Affect-driven challenges might result due to working together with consumers who lack confidence or imagination to envision radically different solutions to existing problems (Kelley & Kelley, 2012; Knudsen, 2007); or might feel uncomfortable sharing their ideas or openly interacting with strangers in co-creation settings due to social inhibition (Diehl & Stroebe, 1987); or might be motivated, above all, by a process that is fun and enjoyable rather than efficient and 'rational' (e.g., Etgar, 2008; Franke & Shah, 2003; Hoyer et al., 2010; Roberts et al., 2014). Indeed, co-creating with the demand side may result in conflict with innovation professionals who may operate differently. For example, in a study on seven radical innovation projects, the involvement of business customers and end consumers was considered challenging by innovation professionals because of their perceived 'irrational' and 'illogical' thinking and acting (Veryzer, 1998). Potentially conflicting or different ways of operating between representatives from the demand side and innovation professionals may require that organizations reimagine their innovation process (Lifshitz-Assaf, 2018; Roberts et al., 2022).

Design thinking as an alternative approach to innovation seems particularly helpful to address and manage the challenges when engaged in consumer co-creation. Design thinking has its roots in the design discipline (Brown, 2008; Micheli et al., 2019) and is an approach for creative problem solving to foster innovation (Brown, 2008; Klenner et al., 2022; Liedtka, 2015; Verganti et al., 2021). User centeredness is a core principle of design thinking which relates to a focus on deep understanding and prioritizing the needs of users during innovation (e.g., Brown, 2008; Liedtka, 2015; Micheli et al., 2019; Verganti et al., 2021). This requires empathy and being able to take the perspective of users (e.g., Brown, 2008; Micheli et al., 2019).

Relatedly, researchers have emphasized the collaborative and inclusive nature of design thinking, with a focus on bringing together and integrating diverse perspectives when innovating (e.g., Brown, 2008; Carlgren & BenMahmoud-Jouini, 2022; Liedtka, 2020). Taking diverse perspectives into account can facilitate efficient and effective problem and solution formulations (Carlgren & BenMahmoud-Jouini, 2022; Liedtka, 2020). Next to empathy, design tools and techniques like iterative prototyping and sketching facilitate achieving alignment and engagement across diverse perspectives (Magistretti et al., 2021; Micheli et al., 2019; Verganti et al., 2021). Since the effectiveness of consumer co-creation not only depends on user desirability but also technical feasibility and commercial viability, we assess that design thinking and its focus on collaboration and inclusion of diverse stakeholders can facilitate consumer co-creation.

Even though design thinking and consumer co-creation align in terms of both enhancing organizational innovativeness and both featuring collaboration and user centricity, they also differ and are typically discussed in separate research communities. More specifically, design thinking is broader in scope, focusing on creative problem solving, using designerly ways of thinking and working. Consumer co-creation, on the other hand, focuses on leveraging consumers as co-innovators, with organizational actors and consumers working together to jointly create new products. Furthermore, while design thinking is user-centric, seeking to uncover and fulfill user needs, the way in which this is operationalized may diverge compared to consumer co-creation. Within design thinking, to cite Micheli et al. (2019: 133), "user needs and therefore value cocreation are taken into account in a variety of ways, without necessarily entailing direct user involvement." For example, ethnographic research methods, where consumers may not even be aware of being part of the research, is also part of the toolbox of design thinking to identify user needs (Klenner et al., 2022). Consumer co-creation in an innovation context, on the other hand, is characterized by direct user involvement and active contribution: without this, there is no consumer co-creation.

Overall, while design thinking substantially impacts innovation practice (Verganti et al., 2021), theoretical underpinnings and resulting understanding as to why design thinking might be effective are underdeveloped (Verganti et al., 2021). There are some emerging insights into the micro-foundations of design thinking as a dynamic capability for innovation (Liedtka, 2020; Magistretti et al., 2021). Furthermore, design thinking scholars have conceptually explored how design thinking can address cognitive challenges such as

cognitive bias (Liedtka, 2015; Randhawa et al., 2021). Yet, important questions remain as to how to overcome cognitive barriers that might inhibit consumer co-creation (e.g., lack of domain knowledge or creative potential). Moreover, theoretical and empirical insights lack on how design thinking may facilitate innovation by way of addressing or even leveraging affect-related phenomena. Given its emphasis on empathy and social relationships (Carlgren & BenMahmoud-Jouini, 2022; Liedtka, 2020), design thinking may be particularly suitable to deal with affective challenges in consumer co-creation. Hence, with this study, we aim to examine more in-depth how design thinking as an approach might facilitate consumer co-creation, helping to address key cognition- and affect-driven challenges in innovating together with consumers.

3 | RESEARCH METHOD

We adopted an inductive approach (Gioia et al., 2013) to develop new theoretical insights into facilitating co-creation with consumers, while building on prior theoretical foundations. The focus of our empirical analysis is the process level, that is, the (sequence of) activities needed to develop new products. At this process level, agency is particularly of importance (Cillo & Verona, 2022). Furthermore, we focus on activities to envision novel needs and solutions together since these activities may lead to better recognition of new business opportunities.

3.1 | Informants and data collection process

Our findings are based predominantly on data collected from 73 informants, primarily using in-depth interviews, supplemented by three focus groups (see Table A1 for an overview). We selected informants based on a theoretical sampling approach (Corbin & Strauss, 2008). We chose, in a non-random fashion, those knowledgeable about the phenomenon and with first-hand experience in facilitating consumer co-creation. Our main informants are professional designers ($n = 37$) who generally have habitualized the use of design thinking in their ways of working (Klenner et al., 2022) and tend to be comfortable with ambiguity and manifesting creativity (Michlewski, 2008). Some designers were interviewed multiple times, in different phases of the research, to refine and validate our emerging interpretations. The data collected from professional designers was triangulated with data from other key stakeholders, namely managers and consumers who collaborated with the designers during the co-creation process ($n = 36$ in total). The managers we interviewed normally were included in the process to provide information and insights on technical feasibility and commercial viability, knowledge areas which designers nor consumers tended to excel in. The interview series concluded when we noted repetition and confirmation of co-creation activities and resulting process outcomes, which suggested we had reached theoretical saturation (Corbin & Strauss, 2008).

In the first round of data collection, we interviewed the design professionals. The design professionals interviewed are either working for design consultancies or as in-house design professionals (see Table A1). We examined if there was any difference in how in-house and external design professionals engaged in consumer co-creation and we did not find any major deviation. Since we have been doing research in the design field for years, we first approached experienced designers from our network and asked them about their best practices to facilitate co-creation with consumers when developing new products. We then asked these early informants to provide us with the names of other experienced design colleagues who they normally work with on co-creation projects and approached them as well. The most experienced design professionals in co-creation were interviewed multiple times, in different phases of the research, to refine and validate our emerging interpretations.

In our second round of data collection, we supplemented and triangulated our initial findings with interviews with business professionals involved in the consumer co-creation process and participating consumers (see Table A1). We selected both types of informants from consumer co-creation projects recommended by the designers who facilitated these projects. The sampled business professionals worked at the client company who subcontracted or employed the designers and had low to mid-level manager positions in innovation or marketing related areas. They had been involved in co-creation projects because of their expertise in commercial viability or technical feasibility. The sampled consumers represented ordinary end consumers (not lead users), either actual or potential. We interviewed more business professionals than consumers, because of their larger expertise in innovation and co-creation and because of data saturation considerations.

Next to the interview rounds, we conducted three focus groups with design professionals to deepen and refine emerging findings. Each focus group lasted approximately 3 h and each had 4–5 participants. Of all the participants, five had been interviewed in the first round of data collection; the rest was not yet interviewed and was

added based on recommendations from designers we interviewed in the first round of data collection. Informants were presented with a preliminary list of consumer co-creation activities derived from our interviews. They were then invited to supplement this list and discuss, in depth, subsets of identified co-creation activities with the aim of elaborating on whether and how these activities were considered helpful for facilitation of consumer co-creation, how they were enacted, and to further explore the resulting affective and cognitive dynamics, challenges, and outcomes.

In addition to the interviews and the focus groups, we read blogs written by designers on codesign and participated in various design conferences and events to monitor designers' conversations on effective co-creation.

3.2 | Data collection method

All interviews were semi-structured, open-ended, lasted from 30 to 120 min (averaging 60 min), audio-recorded and transcribed verbatim. At the start of each interview, we ensured interviewees that their (personal/organizational) identity would not be revealed when reporting research outcomes. While our conversations with interviewees were relatively open-ended, during the interview we did probe specifically about the activities involved to facilitate consumer co-creation, and their sequence, who was involved in the process, how they were involved, what seemed to work well, what things could have been done differently, and the outcomes of the co-creation process. While prior research suggests that consumer co-creation may be supported by means of digital technology (Hoyer et al., 2010; Roberts & Darler, 2017), the designers in our sample discussed predominantly the facilitation of consumer co-creation through in-person activities and tools. From a qualitative, systematic examination of these descriptions, we extracted lessons or 'best practices' about the elements thought to be important to successful facilitation of consumer co-creation (for a similar approach, see e.g., Dutton et al., 2001). Consumer co-creation was considered successful if it resulted in the identification of one or more product/ market opportunities, developed further by the organization involved.

Since our data collection effort relied on retrospective interviews, we followed the suggestions of Miller et al. (1997) and implemented certain precautionary and corrective actions to increase the trustworthiness of the informants' claims. First, we asked the informants to contextualize their answers by referring to a specific project that had concluded no longer than 1 year prior to data collection. Second, we encouraged free reporting, allowing informants not to answer a question if they did not remember clearly. Third, we triangulated the interview data by asking the same questions to different types of informants (i.e., design professionals, business professionals, end consumers). In terms of activities for consumer co-creation, we only kept those that we could corroborate across multiple informants. We also used this triangulation approach to determine the common sequence and potential iteration of activities over time. However, we did not adopt this triangulation approach when examining cognitive and affective process dynamics as we expected these to be different dependent on informants involved. Fourth, we integrated the interview data with secondary data, during and after the interview. For instance, we asked for project presentations and other (interim) deliverables (e.g., style books, consumer journey maps, stakeholder maps, and rough prototypes) during the interviews, not only to help informants recall the innovation process but also to analyze the usefulness of the deliverables themselves in supporting the innovation process. We further triangulated interviews by participating in various consumer co-creation sessions, either as passive observers or active participants. We were not given permission to record these sessions but took extensive field notes. Overall, the use of qualitative methods including interviews and observation, as used in this study, is relatively common to capture emotions (Kouamé & Liu, 2021).

3.3 | Data analysis

Our data analysis followed an iterative coding approach, in which we structured our data from first-order categories to second-order themes to aggregate dimensions as elaborated by Gioia et al. (2013). This methodological approach enables researchers to induct theoretical insights in a systematic fashion. Our data analysis resulted in the development of a theoretical framework with eight co-creation activities and resulting cognitive and affective dynamics, clustered into three co-creation phases (see Figure 2). Our inductive approach consisted of the following steps.

Step 1: Open coding and first-order categories. The first and second authors immersed themselves in the empirical data, reading the transcribed interviews carefully and combining them with field notes and secondary data, where available (Corbin & Strauss, 2008). The first and second authors performed an open coding process separately to identify statements referring to specific co-creation activities and the process outcomes of these activities, in terms of cognition and affect. As for the activities, examples are statements on visualization activities where consumers were asked to express their ideas in 2D or 3D format ('we visualized via the business model

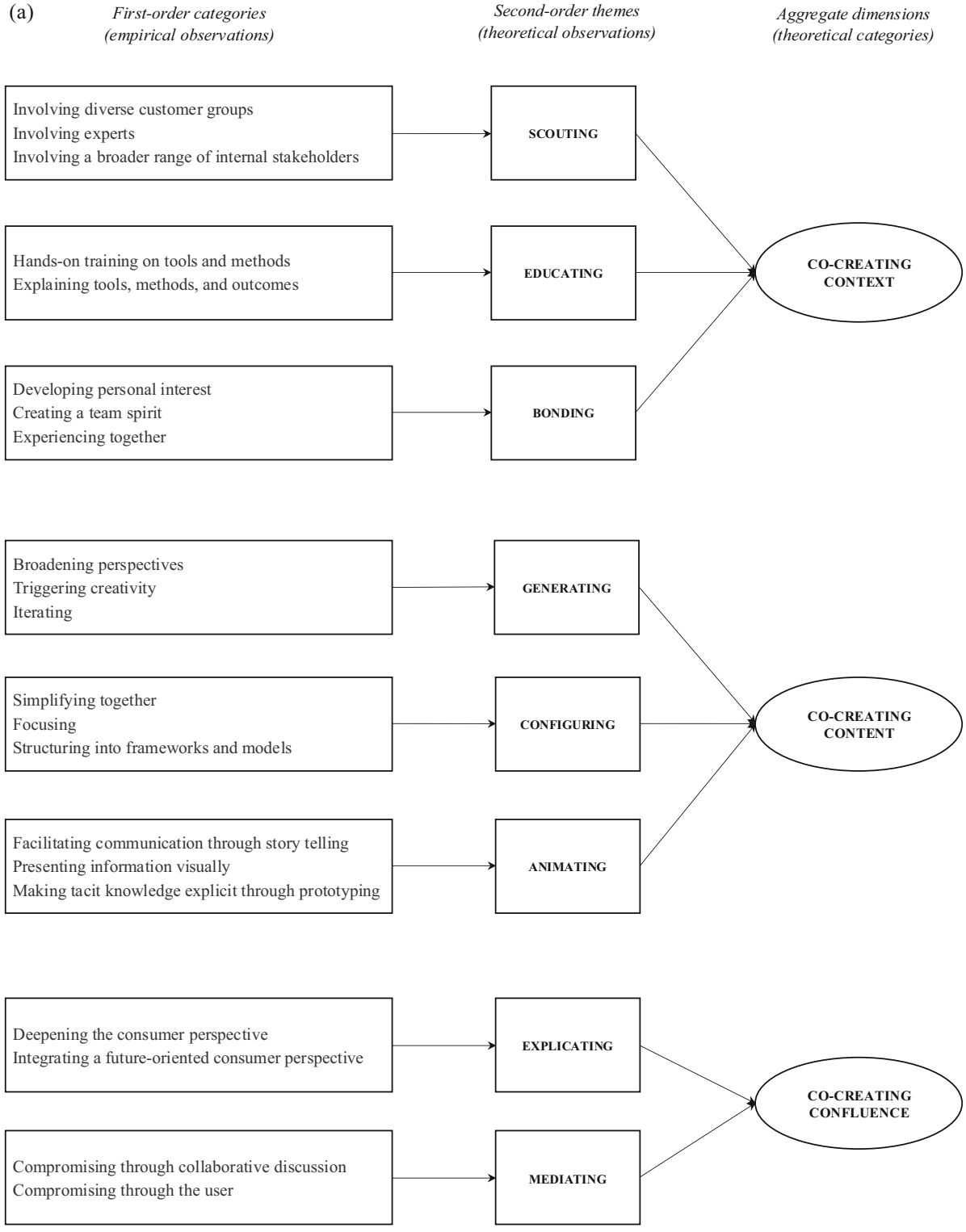

FIGURE 1 Data structure (activities). (b) Data structure (process outcomes).

canvas'), or statements describing the discussions leading to a choice within the solution space ('Does the consumer want it, and why?'). As for the process outcomes, we used the basic distinction of Giorgi (2017), with cognition related to 'thinking' and affect related to 'feeling'. Specifically, for affective dynamics we followed componential theories on emotions (e.g., Russell, 2003; Scherer, 2005) and focused on statements expressing an emotion ('it was fun'; 'it felt safe'), a state of arousal ('we could not wait for the next steps'), or an emotion-driven

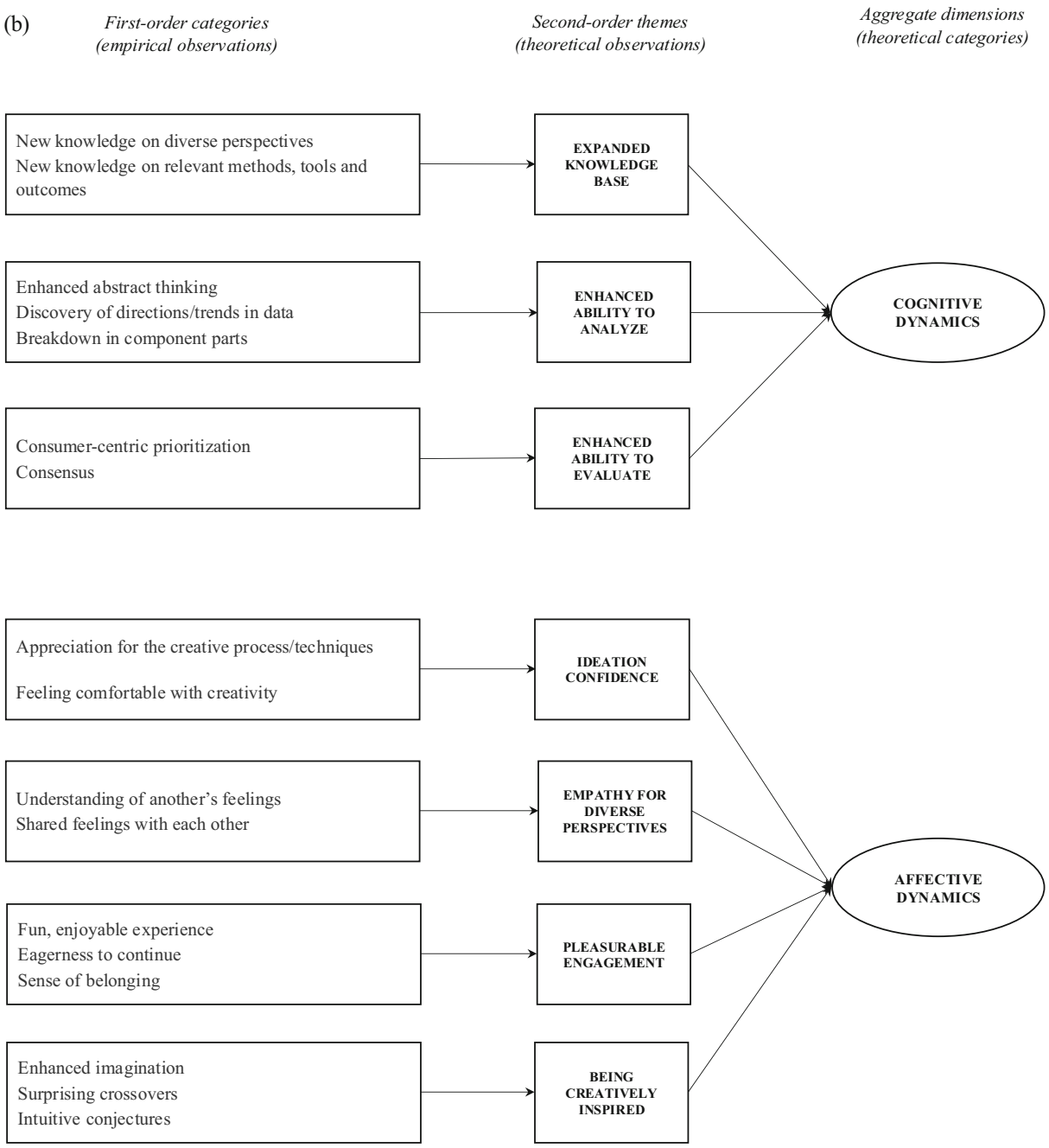

FIGURE 1 (Continued)

action or processing ('we dared to think out of the box'; 'the proposed idea felt right') as a result of a consumer co-creation activity. We coded the emotions as expressed by our informants into negative emotions (such as being doubtful, anxious, or feeling shame) or positive emotions (such as feeling courageous, joyful, or being interested) using existing typologies (Desmet, 2012; Desmet & Schifferstein, 2008; Lazarus, 1991). When examining the process outcomes, we, however, particularly examined process activities resulting in emotions with positive valence considering our interest in how designers might harness and facilitate effective consumer co-creation (cf. Giorgi, 2017). For cognitive dynamics, we selected statements that express positive change in rational (analytical, logical, causal, and systematic) processing and outcomes (Epstein et al., 1996), including an increase in knowledge ('I understand user research better'), or an extended ability to analyze or evaluate information because of co-creation practices ('easier to make a choice'). The identified statements were coded 'in vivo' by directly representing the language used by the informants.

TABLE 1 An overview of phases, activities, and dynamics.

Phase	Activity	Cognitive and affective dynamics and addressed challenges	Main supporting micro-activities[a]
Co-creating context Phase to activate appropriate cognitive and affective dynamics that help participants to confidently start co-creating with each other	*Scouting* Activities to select appropriate consumers and other context-relevant participants to involve	• *Expand* the *knowledge base* available and reduce cognitive bias through the inclusion of diverse participants with alternative perspectives (cognitive dynamics) • Provide participants a *pleasurable engagement* to cater to their intrinsic motivations for participation, such as 'having fun', or 'making new social connections' (affective dynamics)	• Determine the need for and recruit representative and/or nonrepresentative consumers • Have intake interviews to assess motivations and align on strived-after outcomes • Determine the need for and recruit (industry) experts to supplement knowledge on trends and developments from a meso/macro perspective • Determine the need for and recruit organizational stakeholders to supplement knowledge on commercial viability and technological feasibility
	Educating Activities to provide relevant information and hands-on training on co-creation to participants	• *Expand the knowledge base* to overcome participants' lack of skills in the co-creation process and related tools and techniques (cognitive dynamics) • Enhance *ideation confidence* and make participants feel more comfortable with being creative and using related tools and techniques (affective dynamics)	• Assess prior knowledge on co-creation of participants • Supply needed information at the start of the process and repeat, if needed, during the process, about the co-creation process and tools (to be) used, plus the ultimate aims of the process and the different activities being performed. • Provide hands-on training of tools and techniques to be used in the co-creation process
	Bonding Activities to create personal connections between participants	• Reduce potential social inhibition or self-consciousness and boost participants' *ideation confidence*, making them feel more comfortable to share their problems, needs, and/or ideas (affective dynamics) • *Stimulate empathy for diverse perspectives* to facilitate communication and reduce conflict among the participants (affective dynamics) • Provide a *pleasurable engagement* during co-creation activities, to cater to participants' intrinsic motivations for partaking, such as 'having fun', or 'making new social connections' (affective dynamics)	• Select an appropriate and dedicated location for project meetings and workshops, cultivating a relaxed atmosphere through, for example, color use and furniture placement. • Provide ice-breaker exercises at the start of the project where participants share personal stories with each other. • Complete group exercises together to create 'team spirit' (e.g., filling in a consumer journey map together). • Allow for time to connect informally, scheduling breaks (e.g., provide for frequent coffee and lunch breaks)
Co-creating content Phase to leverage and extend cognitive and affective dynamics that help participants to identify and develop relevant problem and solution spaces	*Generating* Activities to enhance participants' ability to use their imagination to generate new ideas and unique perspectives when framing problems and possible solutions	• Reduce the cognitive difficulty of thinking outside the box by stimulating analogous thinking—analogous thinking, in turn, results in an *enhanced ability to analyze* information and find unusual associations (cognitive dynamics) • Help dissolve possible creative blocks and get participants *creatively inspired* by helping them 'dream' about possible futures, guided by emotions and intuition, rather than rational thought (affective dynamics)	• Activities to "broaden perspectives", going beyond the 'here and now', and, instead, thinking or dreaming "what could be", imagining future scenarios • Activities to help participants to temporarily defer rational thinking and be guided (more) by emotions and feelings • Iterating and probing, not settling for the first ideas, ideating repeatedly • Using creativity techniques such as brainstorming, the use of analogical thinking, or metaphorical thinking. • Having co-creative sessions in inspiring (off-campus or on-campus) locations

TABLE 1 (Continued)

Phase	Activity	Cognitive and affective dynamics and addressed challenges	Main supporting micro-activities[a]
		• Keep participants motivated by making the co-creation process *pleasantly engaging* (affective dynamics)	
	Configuring Activities to condense, connect, and integrate information in a coherent and parsimonious manner together with the participants	• Provide participants with an *enhanced ability to analyze* extensive and complex information to overcome cognitive overload when attempting to move from ideas to solutions (cognitive dynamics) • Help participants in *being creatively inspired* to make novel connections between seemingly unrelated phenomena, helping them to think outside the box (affective dynamics)	• Activities to stimulate pattern recognition and further abstraction • Structuring complex information into coherent frameworks and models • Looking for surprising crossovers between different industries, trends, and perspectives • Clustering information into more abstract concepts
	Animating Activities to present data, information, and emerging problem and solution spaces in a tangible way, together with the participants	• Create *empathy for diverse perspectives* to enable participants to deeply connect with consumers' needs and experiences (affective dynamics) • Foster *pleasurable engagement* in co-creation to overcome participants' fluctuations in motivation and inspiration (affective dynamics) • *Expand the knowledge base* to overcome participants' limited ability to understand and communicate their perspectives to each other (cognitive dynamics)	• Translating' information into 2D visuals like drawings, sketches • Creating 3D prototypes together (e.g., using LEGO), in an iterative manner • Encouraging and enabling all participants to express themselves through visuals • Creating stories (narratives) together and sharing those (story telling), for example, via the creation (narrative) of a fictional persona
Co-creating confluence Phase to consolidate cognitive and affective dynamics and help participants to embrace consumer-centric outcomes	*Explicating* Activities to evaluate and further develop knowledge and insights in a consumer centric manner, together with participants	• Maintain *empathy for diverse perspectives* to prevent participants' disengagement with the consumer perspective and the co-creation process in general (affective dynamics) • *Enhance participants' ability to evaluate* and address possible tendencies to de-prioritize consumer needs over organizational needs (cognitive dynamics) • *Enhance participants' ability to analyze* by helping them to probe deep and truly understand consumer needs, both in a reflective and prospective way (cognitive dynamics)	• Deepening the consumer perspective (in terms of understanding thoroughly what drives consumers—their motivates, behaviors, needed outcomes) • Make sure consumer needs keep a prominent role in the process (do not 'get lost in translation' due to considerations of technical feasibility or financial viability) by continuously referring back to the consumer perspective • Stimulate participants to embrace a future-oriented perspective, going beyond the past and present and envisioning consumers and their needs in the near future
	Mediating Activities to align participants' perspectives in a consumer-centric way when prioritizing and making decisions together	• *Enhance participants' ability to evaluate* by enabling them to understand and reconcile possible diverse and/or conflictual cognitive frames (cognitive dynamics) • Create *pleasurable engagement* to alleviate possible tensions deriving from participants' diverse/ conflicting interests and the need to find a compromise (affective dynamics)	• Broadening individual perspectives through collaborative dialogue. • Using collaborative creative techniques to help align participants and their views (e.g., jointly rate generated ideas, via sticky notes) • Compromising by leveraging the consumer perspective

[a]The micro-activities are derived from the first-order categories as specified in Figure 1a.

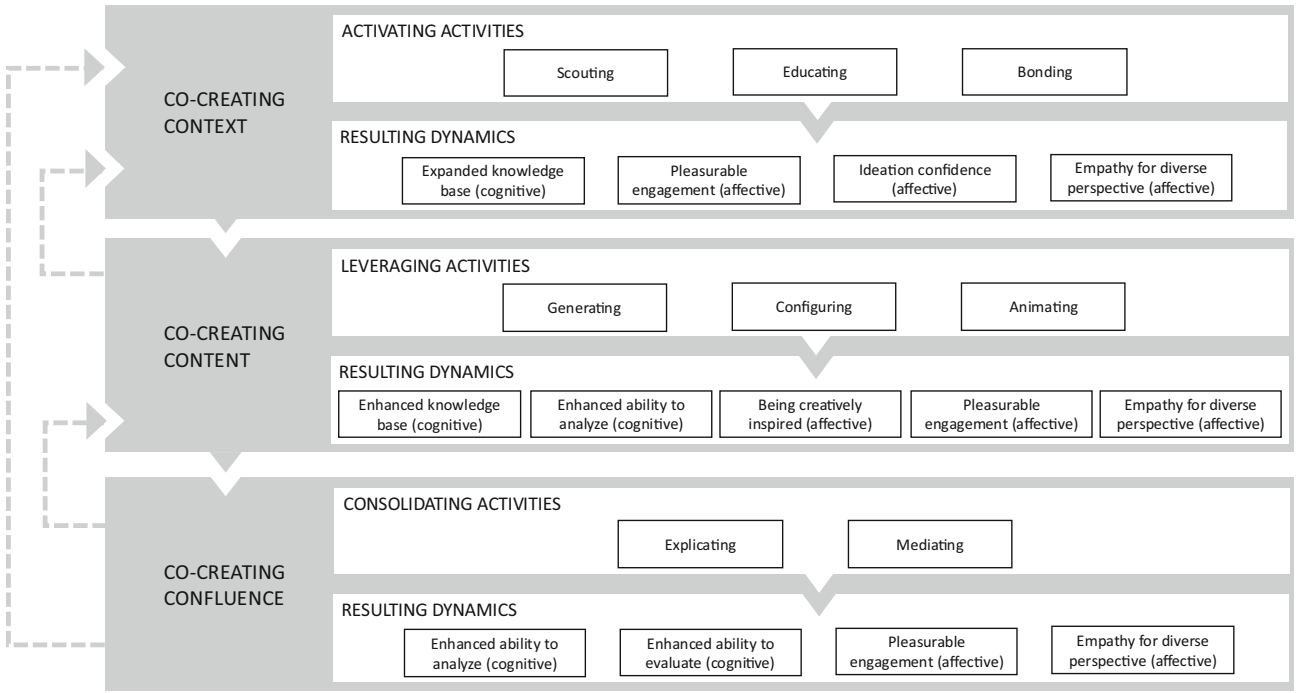

FIGURE 2 A process model for consumer co-creation.

Subsequently, the first and second authors grouped the in vivo codes into first-order categories. Field notes were used to support and refine our interpretation of the emerging categories. During our discussions, we compared outcomes and addressed any disagreements by developing consensual decision rules on how to reconcile diverging interpretations. For instance, we developed working definitions on what constitutes co-creation activities and what constitutes process outcomes. This iteration between data, emerging categories, and decision rules resulted in splitting categories into activities and (process) outcomes, combining similar categories, and redefining unclear categories. The process was concluded when we reached a set of first-order categories that would comprehensively capture the entire data set (see Figure 1a and 1b).

Step 2: Second-order themes. In a subsequent round of coding, all the authors independently grouped first-order categories into second-order themes representing coherent sets of activities or outcomes. This second step, as well as the third step (see below), is one where we, as researchers, try to 'lift' the informant-centric codes to a more conceptual level in order to describe and explain the phenomena we are observing (Gioia et al., 2013). Divergent interpretations were reconciled through multiple discussions, while iterating with relevant theoretical lenses. One of the ways we used prior literature was to help us cluster process outcomes into specific cognition- or affect-driven themes. During this analysis phase, we also repeatedly disaggregated and re-aggregated some of the emerging second-order themes to ascertain construct validity and to address deviant cases. For example, initially we had labeled 'story making' and 'animating' as two separate activities. After further discussions and literature consultation, we determined that co-creating inspiring narratives is but one method for making information more tangible, and thus we decided to cluster story making under the activity of animating. Furthermore, we clustered the identified process outcomes of the co-creation activities according to whether they contributed predominantly to addressing cognition-driven or affect-driven challenges as identified in prior literature. Cognition-driven challenges—conceptualized as challenges rooted in thinking in an analytical, logical, causal and systematic way—include, for example, consumers' limited cognitive abilities. Affect-driven challenges—conceptualized as those driven by feeling states (including transient emotions and more persistent moods)—include, for example, feeling embarrassed to share 'wild ideas'. In the rest of the paper, the cognitive and affect-driven process outcomes that help to overcome consumer co-creation challenges and unlock the co-creation potential of non-experts in consumer co-creation are indicated in shorthand as 'cognitive dynamics' or 'affective dynamics'. Affective dynamics address, for example, negative emotions resulting from lack of creative confidence; and cognitive dynamics address, for example, cognitive bias (see Table 1 for an overview of challenges being addressed).

Step 3: Building a theoretical framework. All authors subsequently met multiple times to discuss how to cluster the second-order themes into emerging aggregate dimensions, clustering the identified eight key activities and resulting cognitive and affective dynamics into three aggregate dimensions according to their overarching purpose. The first-order categories, second-order themes, and aggregate dimensions resulting from our analysis process are presented in Figure 1a and 1b.

4 | ACTIVITIES AND DYNAMICS WITHIN CONSUMER CO-CREATION

Our research uncovered eight bundles of recurrent and routinized activities—also known as practices (Orlikowski, 2002)—used by the sampled designers to facilitate consumer co-creation. Our research furthermore uncovered cognitive and affective process outcomes resulting from these activities (labeled as cognitive and affective dynamics below). We clustered the eight practices and resulting dynamics into three core phases with each phase having a distinct purpose for consumer co-creation: *co-creating context*, *co-creating content*, or *co-creating confluence*.

As discussed in the literature review, there are challenges that negatively influence the consumer co-creation process and its outcomes, such as lacking knowledge and skills. Our findings suggest that these challenges are associated with negative affective states. For example, a consumer informant involved in the co-creation of a new educational service, indicated that she initially was hesitant to contribute because of "this illogical, small fear of being wrong, or being judged." Another consumer informant participating in the same co-creation project mentioned a sense of confusion at the start of the project due to lack of knowledge of "what exactly we were supposed to do." Lack of hands-on experience or knowledge on consumer co-creation also tended to result in initial doubt or reluctance when being engaged in more atypical activities such as thinking in a more metaphorical way ("[the project team was] fighting against the abstract") or visualizing process outcomes. The phases address these challenges in ways we will discuss more in depth below. In Table 1, we have provided a summary of the phases and their constituent (micro) activities, and affective and cognitive dynamics that address core challenges for consumer co-creation.

In the sections below, we discuss the information as summarized in Table 1 in more detail. Normally, consumer co-creation was done in project teams consisting of participating consumers and relevant organizational stakeholders, with the project being facilitated by designers. The facilitating role of designers implied that the designers tended not to be active contributors during the consumer co-creation process, but, instead, focussed on helping the consumers and other team members to contribute and draw insights. When we present our findings in the narrative below, we provide verbatim examples of both consumers, organizational stakeholders, and designers. Additional representative quotations of our informants can be found in Table A2. We also give theoretical underpinnings for the identified activities and supportive cognitive and affective dynamics. In Table 1, the sections below, and Table A2, the eight identified co-creation activities and supportive cognitive and affective dynamics for consumer co-creation (i.e., our second-order themes, as visualized in Figure 1a) are formatted in italics.

4.1 | Co-creating context

Co-creating context comprises the activities of *scouting*, *educating*, and *bonding*. These activities create a conducive context for consumer co-innovation, activating supportive cognitive and affective dynamics. The phase helps to address challenges that relate, in particular, to aligning motivations to participate, cognitive bias, and lack of relevant knowledge.

Scouting refers to activities to select consumers and other context-relevant actors to involve in the co-creation activities. Prior research has suggested that determining which type of consumers to include is a key question to answer to enhance success (Hoffman et al., 2010; Hoyer et al., 2010; Roberts & Darler, 2017). The designers we sampled consciously selected both representative consumers at the center of companies' current target markets and more atypical consumers from disregarded or apparently unrelated target markets. Indeed, the designers did not strive to be representative but rather selective when *scouting*; they looked for consumers who could provide the organization with new, fresh insights. When selecting consumers, the designers would normally explain to potential participants the strived-after outcomes (generally, identifying new product/market opportunities). However, this did not preclude consumers from having their own intrinsic motivations to participate, such as wanting 'to have some fun' (e.g., Hoyer et al., 2010; Roberts et al., 2014). The designers in our sample did not necessarily focus on selecting lead users with needs that go far beyond those of the average user (Trischler et al., 2018; Von Hippel et al., 1999), as lead users tend to be hard to identify (Roberts & Darler, 2017). However, they sometimes did complement consumers' knowledge with the knowledge of different kinds of experts—for

example, anthropologists, sociologists, psychologists. As a service designer in a large health tech firm observed, such experts "can better interpret consumer behaviors and underlying motives," thus providing valuable context information. Design professionals also scouted for organizational stakeholders who could provide relevant information on technical feasibility and commercial viability, as they felt this would facilitate ultimate implementation of consumer co-creation outcomes.

In terms of specific cognitive and affective dynamics triggered by *scouting*, having people with diverse perspectives contributed to an *expanded knowledge base* and facilitated cognitive bias reduction (Liedtka, 2015). Actively bringing together consumers who normally would not interact also resulted in *pleasurable engagement*, offering, for example, opportunities for new social connections. A consumer informant, involved in co-creating a new educational service, suggested that participating in the co-creation project, while unpaid, was still valuable because of the "diversity in points of view" which she considered as "enriching." Also organizational stakeholders involved in the consumer co-creation project tended to appreciate being connected with the participating consumers. An innovation manager in a large B2B firm, involved for the first time in a co-creation project, recalls:

> Yes, I really liked this [co-creation] project! We normally work on projects where we are only working on one small piece of technology. In this project, I am still involved in technology, but I also have a lot of contact with the business partners and with potential consumers. I really like that.

The second set of activities in the co-creating context phase is *educating*, consisting of a set of activities to provide relevant information and hands-on training, in particular on the co-creation process, relevant tools, and potential outcomes. For many of the organizations involved, consumer co-creation was a relatively new approach to innovation. Thus, when engaged in *educating*, design professionals often provided information and training not only to participating consumers but also to participating organizational actors to optimize project outcomes. This finding lends support to prior case study research in fast-moving consumer goods industry which also suggested a need to train both consumers and managers involved in co-creation to make them more comfortable to work with different types of people and unknown tools and techniques (Roberts et al., 2005; Roberts & Darler, 2017). Our research indicated that *educating* goes beyond an exchange of information, involving a 'learning-by-doing' approach with hands-on tasks. *Educating* was a recurring activity and normally did not solely happen at the start of the co-creation process: every time design professionals engaged in a specific co-creation activity, like a workshop for idea generation, for example, they tended to explain what the activity entails, how it fits within the overall process and pointers how to engage in it.

Educating resulted in an *expanded knowledge base*, with consumers and organizational stakeholders enhancing their knowledge on the co-creation process, tools, and techniques. Expanding the knowledge base did not only assist in a more effective co-creation process; it also catered to those consumers and organizational stakeholders having an intrinsic motivation to learn and satisfy their own inner curiosity (Hoyer et al., 2010; Roberts et al., 2014), which, in turn, facilitates commitment to the process. Furthermore, by progressively gaining familiarity with novel activities, tools and techniques and by hands-on learning to master them, consumers and organizational stakeholders attained a degree of appreciation and mastery over them which, in turn, assisted in gaining *ideation confidence*, helping them feel comfortable to be creative. A project manager from a large healthcare provider made the following observation on the use of co-creation visualization tools:

> One of my colleagues said: 'I don't believe in drawings for sharing and discussing ideas.' Then he attended the drawing workshop, and saw how everybody reacted to it, and he was convinced. And now he is the person who is using it the most. Because he really felt that it creates more affinity with the project (...) and relevant user needs.

The third set of activities to set the stage for consumer co-creation is *bonding*, which is aimed at creating personal connections among participating consumers and among participating consumers and involved organizational stakeholders. In prior research on innovation, *bonding* emerged as a core activity to open up organizational stakeholders to different ways of working (Calabretta et al., 2017). As a consumer informant recalls, the initial stages of a co-creation project are "challenging because the first thing is you have to find a common point. You have to connect with people in order to work on something together. Or else we just do a hearing like the parliament does—unknown individuals say something." As also suggested in prior research, individuals may potentially be socially inhibited or be apprehensive to share their desires, feelings, and ideas with relative strangers due to fear of getting negative reactions

(Diehl & Stroebe, 1987). *Bonding* includes activities that tend to be playful and light-hearted in nature. A sampled designer described, for example, a board game as developed by her design agency that she would normally use to kick off the co-creation process. The game focused on understanding and sharing the different needs or 'irritations' experienced by the project participants in a playful manner. In her words: 'By being part of a board game [people] feel much freer; they develop a different mindset and dare to say much more.' *Bonding* activities thus trigger *ideation confidence*, helping to feel comfortable and safe with sharing desires, feelings, and ideas.

As prior research suggests, designers and their tools and techniques seem particularly suited to facilitate individuals' confidence to be creative (Kelley & Kelley, 2012). A senior designer suggested a need to create an "open, friendly atmosphere (...) to the point where people open up about their emotions and their preferences and tell you stories." A consumer informant indicated that a playful icebreaker activity at the start of the co-creation session helped in "homogenizing the atmosphere", stop thinking in specific (professional) roles, and enabled everyone to "think in terms of people." Prior research suggests that creating an organizational climate where people feel safe to share ideas and problems with each other, value each other's contributions, and value teamwork, has a positive effect on team learning (Edmondson, 1999) and stimulates being creative at the individual level (Amabile et al., 2005) and the team level (Barczak et al., 2010). To create such an organizational climate playful bonding activities helped. One consumer informant, for example, suggested that, after having engaged in a playful icebreaker activity, "(...) there was this motivation to do well, because you are part of this team." Bonding activities helped project team members to get to know each other and develop a personal connection, assisting in gaining *empathy for diverse perspectives*. During one co-creation workshop, for example, the facilitating designer asked participants to bring pictures of books they possessed and considered of interest (so-called 'shelfies') to discuss at the start of the session. According to a consumer informant, this allowed him to see how 'everybody is different but also very much the same in certain aspects'. Another consumer who participated in the same exercise, observed: 'Understanding who you're talking to will help with the interaction later on.' Due to their playful nature, bonding activities were in general perceived as 'fun', providing *pleasurable engagement*:

> It was the sharing that made me happy. This thing about the group. So, having the possibility to share with the group, exchanging ideas with people who are so different, and at the same time trying to understand them and they were trying to understand me back, the connection was really good. And you can actually see things growing from there; like ideas, they blossom. (Consumer$_8$).

The *bonding* practice hence tended to trigger positive emotions. Individuals experiencing positive emotions tend to be more willing to make concessions (Baron, 1990) and be more creative, suggesting creative acts to be affectively charged events (Amabile et al., 2005).

4.2 | Co-creating content

The second co-creation phase we distilled is co-creating content, which includes the activities of *generating, configuring*, and *animating*. These activities aim at leveraging the cognitive and affective dynamics activated in the prior phase to identify and further develop relevant problem (or, alternatively, opportunity) and solution spaces. The phase addresses in particular challenges related to the difficulty of being creative, constraints on cognitive load, and remaining engaged with the co-creation process.

The *generating* practice includes activities to enhance the ability of consumers and participating organizational stakeholders to use their imagination when framing problems and possible solutions. Being creative requires extensive and effortful cognitive processing (Amabile, 1996) and many experience difficulty to think 'outside the box'. As one designer noted: '[E]verybody comes up with similar ideas.' Next to brainstorming, another core technique used by the professional designers to stimulate out-of-the-box thinking and generate novel ideas was analogical thinking (Dahl & Moreau, 2002); by using analogical thinking (a cognition-based technique), the sampled designers aimed at providing *an enhanced ability to analyze* information and transfer information of familiar, known categories (i.e., base domains) for use in constructing new ideas (i.e., the target domain) (Dahl & Moreau, 2002). A consumer informant recounted how, initially, some of the "non creatives" in the co-creation team tended to "go straight into the product [solution]", "fighting against the abstract." To help imagine more abstract visions of the future, one senior designer from a small design agency asked project participants to think of a 'happy place' and describe what it would look like. He subsequently asked them to think of how to translate features of that 'happy place' to patient healthcare. This helped

with identifying what underlies a (perceived) lack of patient healthcare and how to improve upon it in a unique way.

Design professionals also used more affect-driven techniques to help consumers and other members of the co-creation project team *being creatively inspired*. One design technique described by some of our informants shifted consumers and participating organizational stakeholders outside their everyday perspectives by literally taking them 'out of the box': creative sessions that took place in inspiring locations—offsite or in office spaces decorated with bean bags, Post-it Notes, mood boards, half-finished prototypes—which helped to generate novel ideas. Another core technique was to go beyond the 'here and now', dreaming what 'could be', and asking them to defer judgment or evaluation of ideas to enhance ideation fluency (Basadur et al., 2000). A project manager for a large healthcare provider for example, observed that his default setting was to be 'very structured,' but that during the co-creation sessions, techniques were used so that he 'felt OK to have fantasies and imagination'. In a similar vein, a consumer noted that during the co-creation session for an event services organization, 'we had to leave our day job behind and find new horizons as to where we could be going to, as people'. Being able to actually generate (many) creative ideas and scenarios resulted in feelings of pride and process enjoyment (*pleasurable engagement*). One consumer noted, for example, "It is cool to see how creative we could be." And a manager expressed his pride ('it was well done') after a creative session in which the facilitating designer pushed the co-creation project team not to settle for the first few scenarios that were generated but to explore how users might use their products in the future:

> "So, we were discussing future uses. And then [we] came up with user scenarios, 11 or 12, if I'm not mistaken, or 13, 14, something like that. It was well done."
>
> ($Manager_8$)

Overall, our findings subscribe to the findings of Amabile et al. (2005) that there is a virtuous cycle between creativity and positive affect: positive affect (like being proud of your accomplishment, or having fun) stimulates creativity, which in turn stimulates positive affect.

Configuring is the second set of activities in the co-creating content phase and represents activities that help to condense, connect, and integrate information in a meaningful and parsimonious manner. Previous research suggests that the development of novel outcomes requires structuring collected information in a logical way, next to exploring connections in a more intuitive way (Calabretta et al., 2017). Especially when moving from generating ideas to identifying solution spaces, consumer co-creation has the potential to overwhelm participants with large amounts of unstructured and unconnected information (Hoyer et al., 2010), particularly if the information relates to relatively complex issues like new technological possibilities or irregular behavioral patterns. In more generic terms, individuals normally only have a limited amount of working memory, that is, cognitive load, that can be used at a certain moment in time (Garbuio & Lin, 2021). To decrease cognitive load and free up more 'space' to generate insights, design professionals in our sample helped participating consumers and other project members to structure and synthesize information in a logical manner, using pattern recognition and abstraction. One first step is to simplify information, together. For example, a consumer informant, engaged in the design of a new education service, described how the co-creation team members were encouraged to "saying out loud our thoughts, even though they might be stupid" to then "narrowing them down" together, as a team. This guided and collaborative process helps to decrease cognitive load and results in an *enhanced ability to analyze* the information and identify solution spaces. The following quote by a senior strategic designer from a design agency illustrates the process:

> Clustering all that information—that is an important step. We look for commonalities. And, each time, we try to adopt a higher abstraction level. We try to reduce complexity basically to zero, even though that is never possible. Some complexity always remains, but that complexity is often the foundation for a framework to differentiate or segment consumer behavior.

The *configuring* activities did not only focus on identifying logical patterns across information and ideas, but also on recognizing and developing novel connections between previously unrelated concepts. Previous literature suggests that a positive affective state is a powerful context factor for such a creative way of organizing information (Harvey, 2014). In line with this, design professionals in our sample encouraged and guided consumers and other project participants in *being creatively inspired* by stimulating them to 'connect the dots' in unexpected ways and by fully embracing different perspectives. For example, a senior strategic designer from a medium design agency, who worked on a co-creation project to renew the exhibition experience for a museum, explained that they looked for 'surprising crossovers' between

different knowledge areas, different trends, and/or different industries. As a result, the project team combined the trend of personalization, the museum's vision of democratizing art, and the designers' experience in developing digital products to move from the initial task of redesigning the physical experience to the creation of a new digital product where the museum gives free access to digital pictures of its artworks and lets consumers create their own digital art collections.

Configuring activities, as enacted by our design informants, tend to be a collaborative creative effort, rather than an individual activity. One designer declared: 'Never synthesize alone, you need to synthesize together with the people involved—to prevent bias and to help them understand how messy things were to begin with.' Jointly synthesizing information not only addresses possible cognitive bias but also creates commitment, both to the process and its outcomes (Harvey, 2014).

Animating refers to activities aimed at presenting data, information, and emerging problem and solution spaces in a tangible way. Animating includes the creation and use of 2D and 3D tangible artifacts, such as sketches, drawings, and foam or plastic-based prototypes. *Animating* also refers to storytelling where information is presented via narratives. Due to lack of experience and the complexity of some innovation projects, non-innovation experts like consumers might have difficulties in clearly articulating their own views, and in fully understanding and retaining the experiences and perspectives of others (Liedtka, 2015). This might result in a reduced ability and willingness to contribute to the consumer co-creation process. Materializing and visualizing information can help to overcome these challenges by leveraging their tangibility and vividness to support effective communication, better grounded discussions, and joint decision making (Stigliani & Ravasi, 2012). Our findings highlight different ways in which animating activities achieve these results by activating both affective and cognitive dynamics.

Exposure to a physical artifact, like visualizations, has been described as "an affective event" that provokes a process of affective reactions (Rafaeli & Vilnai-Yavetz, 2004). As our findings suggest, bringing information or ideas to life by making them part of compelling narratives activates affective engagement by creating *empathy for diverse perspectives*. For instance, one way in which designers facilitated conversations around possible problem solutions was through the creation of personas: visual and textual descriptions of fictional characters representing user types. A persona makes the potential consumer 'vivid and alive' and helps to imagine how these potential consumers would use the solution in their daily lives. Making information more concrete by means of *animating* may also deliver *pleasurable engagement*, making co-creation a fun, enjoyable process and, in doing so, mitigating the fluctuations in motivation that non-expert actors may encounter throughout the co-creation project. For example, one consumer involved in a co-creation session about renewing the services of a fast-food restaurant reflected on the task in which project participants were asked to make their ideas more tangible as follows:

> Everyone was like, really involved with this. I think people really had fun. The way that everyone had to create something, an idea. They gave us colored pencils, we could create... [They asked us] to express our idea, by means of drawing or building something with Lego.

Animating activities also have cognitive benefits by making complex and tacit knowledge accessible and transferable (Eppler & Platts, 2009). In our findings this results in making each others' perspectives more understandable and memorable, and thus *expanding the knowledge base* that participating consumers and organizational stakeholders need to contribute to the co-creation process. As one of our sampled consumers recalls:

> [The designer] was facilitating it, so that we could brainstorm, build on each other's ideas, but at the same time the ideas were put straight on the whiteboard. So, you could see the process (...) It helped as a visual support. It was very helpful to remember. It helped me to learn from the others.

4.3 | Co-creating confluence

The third phase emerged from our empirical analysis is co-creating confluence and it includes *explicating* and *mediating* activities. These activities aim at consolidating the cognitive and affective dynamics as emerged in the prior phases to help the realization of specific consumer-centric outcomes and align possible diverging views and assumptions regarding co-created problem and solution spaces. In this phase, challenges primarily stem from remaining engaged with the appropriate consumer perspective, and transcending pre-existing cognitive frames and conflicting interests to find agreement around co-creation outcomes.

Explicating relates to activities aimed at evaluating and further developing knowledge and insights in a

consumer-centric manner. When taking part in innovation processes, individuals tend to rely mostly on their own cognitive frames, which are based on their background, experiences and understanding of the organizational environment (Raffaelli et al., 2019). Therefore, during consumer co-creation it might be difficult to maintain a cognitive and affective connection with the appropriate consumer perspective. By emphasizing the consumer perspective strived after, the *explicating* practice facilitates the consolidation of a central goal of consumer co-creation: fulfillment of needs and wishes specific segments of consumers have. *Explicating* activities use consumer-centric tools to maintain *empathy for diverse perspectives* and discuss with them the extent to which they consider the appropriate consumer perspective as a core driver in their choices. For instance, by using probes related to a specific persona—like 'Would Anna want it?' or 'You can suggest this, but Anna doesn't actually want this.'— designers keep consumers and other project members emotionally engaged with a specific consumer type. One consumer informant, engaged in co-creating a new fast-food concept for a specific consumer segment, recounted how consumer journey maps, created by designers, facilitated "the immersion" and "to think deeper" about how to make the intended users "feel more comfortable and stay longer" in fast-food restaurants. *Explicating* activities also provides an *enhanced ability to evaluate* alternatives, transitioning from evaluating information based on technical feasibility and financial viability, to explicitly including a specific consumer perspective. For example, a manager from a large health tech firm, involved in a consumer co-creation project on developing solutions for improving driving safety, noted the following:

> It is always a technology perspective that we [the company] offer. What we are now trying to do, in this project, is to see what the drivers of satisfactory [product] experiences are from the perspective of the end users [we will target]. To have that consumer-centered view is really good. I really like that, and I think we benefit a lot from it.

Furthermore, *explicating* includes activities to 'rise above' the immediate data and *enhance the ability to analyze* information by, for instance, exploring solutions that do not simply extrapolate from the 'present' but will shape the future. The activity thus helps to expand cognitive boundaries (Nambisan, 2002), so that novel and unexpected solutions are more likely to be further pursued (Harvey, 2014). One of the consumers involved in co-creating new fast-food restaurant services noted that, during the workshop, the process was such that 'it was not like taking our ideas [literally]. It was more like: 'Oh okay, so this idea, maybe we can adjust it like that'. For instance, some of the designers engaged the consumer co-creation team in a specific design method where participants collaboratively developed a vision on the future context in which the consumers of the company would live. Together, they selected and combined behavioral, social, economic, and technological factors into a coherent future scenario, for which they subsequently developed a mission statement of what the project team wanted to accomplish with the to-be-developed product. The project manager actively involved in the co-creation project confirmed that the co-created interpretation of future human behavior helped the company nurture innovation plans that are 'human-inspired' and 'sustainable in the longer term.'

Mediating is the second set of activities in the co-creating confluence phase. *Mediating* is focused on aligning perspectives in a specific consumer-centric way when prioritizing and making decisions aimed at implementing co-created, consumer-centric, outcomes. Several of the designers noted that particularly when selecting among identified solution spaces and concrete product features and functions of solutions generated, conflicting interests would (re-)emerge. Research indicates that, in collective creative processes, while group diversity is beneficial in the divergent phases of the creative processes, it can impair confluence toward a shared outcome due to the difficulties in conciliating different, at times contrasting, cognitive frames (Harvey & Kou, 2013). *Mediating* activities support the creation of a shared understanding of an appropriate consumer perspective, transcending contrasting cognitive frames and enabling shared decision making. As prior research also suggests, idea implementation requires a shared understanding of a valued outcome, as this increases group commitment (Perry-Smith & Mannucci, 2017). In our research, user centricity as an outcome to strive proved to be particularly helpful when seeking group consensus. For example, a marketing director working with the co-creation team to develop a new digital product for public transport indicated that, by putting the traveler at the center of their discussions related to implementation, everyone involved was able to subscribe to the proposed solution, and ultimately compromise on their individual interests.

Mediating activities use creative and collaborative techniques to *enhance the ability to evaluate* by first uncovering potentially diverging individual priorities and objectives, and to subsequently aligning them through discussions. A consumer in our sample described one of these creative techniques, where participants in a co-

creation workshop had to jointly rate generated ideas, which resulted in prioritization and consensus:

> And then we had to pick the best ideas. We had to align those ideas with each other perspectives and priorities (...) As a group, we stood in front of that selection of ideas [written down on Post-it Notes and stuck on the white board], and we had to give points based on which ideas we liked best, in order to give directions to scope, as a group (...) And by giving scores [to the different ideas], we collaborated to determine what was important and what wasn't.

Seeking alignment through collaborative discussions and creative techniques also helps in maintaining *pleasurable engagement* with each other and with the consumer co-creation process. Because the *mediating* activities tend to be embedded in hands-on activities triggering positive affective reactions like fun and enjoyment, interpersonal tensions can be more easily released (Baron, 1990; Eppler & Platts, 2009) with a favorable effect on the ability to jointly innovate. For instance, the innovation manager of a bicycle accessory firm describes the consequences of a more collaborative alignment process in the following way:

> [Due to the co-creation sessions] we work in a more friendly way. This helps us a lot.
>
> This is the reason why we speeded up the development process in the last year.
>
> Because everybody likes working like this. (...) In the past, we offered three new products during the [product] show. But last year, it was 12 to 15. So really fast product development.

4.4 | A process model for consumer co-creation

Based on our findings, discussed above, a grounded process model emerged for consumer co-creation (see Figure 2) that will help manage cognitive and affective challenges during consumer co-creation. As visualized in Figure 2, each of the three phases we distilled builds on the next one: a conducive context for consumer co-creation sets the stage for effective co-creation of content, which in turn facilitates co-creating confluence. This interdependence is also valid for the constituent (activating, leveraging, and consolidating) activities and resulting cognitive and affective dynamics that make up the phases. While the distilled activities are unique to a particular phase, the identified cognitive and affective dynamics are not necessarily unique to a phase and hence might reappear in different phases, being reinforced or reinvigorated by other activities. For example, the *mediating* activity during the co-creating confluence phase seeks to build and further develop the *empathy for diverse perspectives*, as created through the *bonding* activity in the co-creating context phase.

While Figure 2 visualizes the relationships between the activities and resulting cognitive and affective dynamics at the phase level (i.e., the phase of co-creating context, content, or confluence), Table 1 is more fine-grained, zooming into these relationships at the activity level. As visualized in Figure 2, the whole co-creation process may go through a number of iterations to optimize outcomes. Furthermore, while each of the three phases builds on each others' outcomes, they are also iterative. After a cycle of co-creating content, for example, there may be a need to go back to co-creating context rather than enter the phase of co-creating confluence because there may be a need to involve different types of consumers. Or, after a cycle of co-creating confluence, the consumer co-creation team may have to engage in co-creating content again if confluence on the proposed concepts cannot be reached.

5 | DISCUSSION AND CONCLUSION

5.1 | Summary

In this research, we studied how to leverage design thinking expertise to facilitate consumer co-creation. By actively involving consumers in the innovation process, valuable insights can be gained regarding possible problems (or opportunities) and effective solutions to address those problems. However, due to cognition- and affect-driven challenges, co-creation with consumers needs facilitation and structure. Based on extensive data gathered from professionals with design thinking expertise facilitating co-creation, next to consumers and managers who participated in consumer co-creation, we developed a grounded process model that helps to unlock consumers' co-creation potential. More specifically, we identified eight sets of activities (and related micro-actions), representing recurrent and routinized patterns of behavior used by professionals with design thinking expertise to facilitate consumer co-creation. We clustered the eight activities and their resulting cognitive and affective

dynamics in three core phases, based on their overarching purpose: co-creating context, co-creating content, and co-creating confluence. As our findings suggest, the process model and the resulting cognitive and affect-driven process outcomes help to overcome co-creation challenges and unlock the co-creation potential of non-experts in innovation to the fullest.

5.2 | Theoretical contributions

Prior research suggests a need for organizations to actively manage affect and affect-driven phenomena in the innovation process for positive outcomes (e.g., Choi et al., 2011; Eling et al., 2014; Hodgkinson & Healey, 2014; Raffaelli et al., 2019; Vuori & Huy, 2016). Also the well-developed stream of research on creativity (in terms of generating new ideas) argues that, all things being equal, positive emotions and moods are conducive to creativity (e.g., Amabile, 1996; Amabile et al., 2005; Isen et al., 1987). Regardless of this research, both scholars and practitioners still tend to conceptualize and manage organizational processes like innovation as predominantly structured, rational, and cognition-driven (Zietsma et al., 2019). The emphasis on the cognitive side and the neglect for affect has created an imbalance in theorizing, limiting the explanatory power of current innovation models (Adler & Obstfeld, 2007; Hodgkinson & Healey, 2014). This is particularly problematic when innovating with consumers who operate outside the organization's boundaries who may have diverse motivations, abilities, and commitment levels for consumer co-creation. With our process model, leveraging design thinking and incorporating both cognition and affect, we provide a richer and more realistic view of human behavior and co-creation than models rooted purely in rationalist and structuralist accounts.

Our research is rooted in microfoundations of innovation and organization (e.g., Liedtka, 2020; Magistretti et al., 2021; Teece, 2007), with a distilled process model that emphases individuals and resulting affective and cognitive dynamics for co-creative innovation. More specifically, our research suggests co-creation activities that influence individuals' affective states and cognition in a positive way. Affect and cognition-based challenges in consumer co-creation (as listed in Table 1) may be accompanied by negative emotions such as anxiety, boredom, or frustration. The activities or practices included in our distilled process model aim to mitigate negative emotions and replace them with positive affective states to optimize consumer co-creation outcomes. For example, activities to enhance creative confidence help to counter possible negative emotions such as being apprehensive, anxious or self-conscious about the need to be creative. And activities to create "empathy for diverse perspectives" help to address negative emotions such as apathy or indifference toward other perspectives.

The process model we distilled is characterized by interdependence between the three core phases, with each phase of the process model setting the stage for the next one. In the co-creating content phase, appropriate affective and cognitive dynamics are activated to establish a conducive context for consumer co-creation; this, in turn, allows to leverage these dynamics for facilitating the co-creation of content in Phase Two; the same dynamics need to be maintained to create confluence in Phase Three around the innovation directions which emerged in the previous phase. Hence, with our process model, we respond to research suggesting that the outcomes of routinized sets of activities (i.e., practices) vary according to the presence or absence of other practices and that practices should be analyzed as bundles rather than singly (Jarzabkowski et al., 2016). While our process model for co-creation has a temporal sequence, it is, however, also iterative in nature; an organization may need to engage in multiple cycles of either the process model in full or one core phase in specific to come up with relevant product/market opportunities, together with consumers. The iterative nature of our process model is in concordance with the iterative, flexible approach of extant design thinking process models (e.g., Ball, 2019; Brown, 2008; Stanford d. School, n.d.). There is no agreement on the specific phases within the design thinking process and, hence, different models have been proposed (see e.g., Ball, 2019; Brown, 2008; Liedtka & Ogilvie, 2011; Stanford d. School, n.d.). Nonetheless, identified stages or activities in extant design thinking models normally cover activities such as understanding and defining problem spaces holistically, exploring and defining solution spaces by ideating and using low-fidelity prototyping, and materializing solution spaces by testing and implementing. Our consumer co-creation process model is particularly of value in the design thinking stages with activities to understand, explore and define problem and solution spaces, and provides insights into how to do so effectively from a consumer perspective.

Some of the (micro) activities and process outcomes we distilled have already been identified in prior literature, as discussed in the prior section. However, our study enriches and extends this literature by overcoming isolated insights and bringing such together in an integrative framework that incorporates creating context, content, and confluence and resulting process outcomes, leveraging design thinking expertise. Unpacking the co-creative process in terms of specific activities, their

sequence, and their process outcomes is important to deepen our understanding of how organizations can facilitate consumer co-creation. Our research was comprehensive in nature, with the resulting framework being derived from interviewing 73 key stakeholders representing both the supply and demand side and representing different industry contexts.

Our process model explicitly addresses co-creation challenges as identified in prior literature by codifying key activities that result in cognitive and affective dynamics facilitating effective consumer co-creation output. Cognition and affect are different processes (Zajonc, 1980) but complementary—mutually constitutive rather than opposing—and should thus each not be neglected when co-creating (Forgas, 2008; Giorgi, 2017). Hence, our process model is composed of three phases that each trigger both cognitive and affective dynamics needed for successful innovation output. While affective and cognitive dynamics are triggered in each of the three phases of our consumer co-creation model, our findings do suggest that affective dynamics are of particular relevance when co-creating context and content. This confirms research in which positive affect and supportive, collaborative relationships are found to be the cornerstone for creativity (e.g., Amabile et al., 2005; Gilson & Shalley, 2004; Madjar et al., 2002).

The process model is derived from data gathered from actors representing both the demand and supply side for consumer co-creation. Our process model thereby responds to calls for research on how to effectively engage in consumer co-creation by including a relatively diverse set of actors throughout the co-creation process (Gemser & Perks, 2015). Our findings also confirm extant design thinking literature suggesting the importance of collaboration and the inclusion of diverse perspectives (e.g., Brown, 2008; Carlgren & BenMahmoud-Jouini, 2022; Liedtka, 2020).

Overall, with our process model we contribute to the design thinking literature by adding further theoretical understanding as to how and why design thinking is an effective alternative approach to stimulate and implement innovation (Verganti et al., 2021). More specifically, with our research, we highlight how design thinking can be put into practice, showing 'how and why it works' in a consumer co-creation setting, which, to our knowledge, has not yet been done before.

Prior research points to the role of design thinking in addressing cognitive challenges such as bias and cognitive load (Liedtka, 2015; Randhawa et al., 2021). Our empirical research advances this literature by further deconstructing the influence of design thinking on cognition-driven challenges during consumer co-creation, in terms of available knowledge base and ability to analyze and evaluate information. Furthermore, our research has deconstructed how, next to cognitive challenges, design thinking can address important affect-driven challenges, such as lack of creative confidence or lack of empathy for diverse perspectives, with practices such as *bonding*, *generating*, and *mediating*. Our research thereby contributes to recent literature on design thinking as 'social technology' (Liedtka, 2020) in which the human aspect of innovation is put on center stage.

Furthermore, our research responds to calls to assess the value and outcomes of design thinking in a more nuanced way (Elsbach & Stigliani, 2018; Jaskyte & Liedtka, 2022). There is a plea to supplement standard output-driven measures with measures to assess the 'soft', more intangible value or benefits of design thinking (Elsbach & Stigliani, 2018; Jaskyte & Liedtka, 2022). Indeed, recent research suggests the positive impact of design thinking on a diverse array of intermediate, more intangible outcomes including, for example, individual psychological benefits and trust building (Jaskyte & Liedtka, 2022). We contribute to this emergent research stream on the positive, intermediate outcomes of design thinking by decoding how design thinking activities during consumer co-creation positively influences individuals' cognition and affect.

5.3 | Managerial implications

This study has important practical implications for managers. With our integrative process model for consumer co-creation, we update an organization's toolkit for innovation, something which Cillo and Verona (2022) identified as needed. Indeed, we offer managers a clear set of actionable guidelines for consumer co-creation and ultimately becoming more user-centric and socially inclusive in their innovation approach. More specifically, our process model is composed of three phases that each help to trigger both cognitive and affective dynamics needed for successful innovation output. Taken together, the three phases of our process model provide an empirically derived example of how to manage a dynamic, iterative co-innovation process, where the affective and cognitive engagement of the involved actors is regulated depending on the tasks at hand: from creating a context (activating), to creating content (leveraging), to creating confluence (consolidating). In Table 1, we offer management a systematic overview of relevant activities and related micro-actions aimed to co-create context, content, and confluence, facilitating consumer co-creation. Management can accordingly benefit and build expertise that enables the effective execution of the identified co-creation process model.

With our integrative consumer co-creation process model, we encourage managers to embrace complexity, rather than reducing it, accepting and accommodating for cognition *and* affect, instead of only cognition—since both contribute to successful consumer co-creation. Accepting and accommodating for cognition and affect, being opposing forces that are interdependent and cannot necessarily be resolved, may require of management to adopt paradoxical thinking in which the tension is reframed into an opportunity of 'both/and' rather than 'either/or' in the innovation process (Miron-Spektor et al., 2018). Consumer co-creation for more effective innovation can thus challenge existing mental belief structures, whereby organization's need to embrace the often more complex reality of interacting with human beings for innovation purposes and needs to adjust its innovation process (Lifshitz-Assaf, 2018; Roberts et al., 2022).

5.4 | Future research and concluding remarks

The process model we propose consists of three core phases, and the outcomes of each phase can help to successfully enact the next phase. Future research could examine more extensively how these phases and underlying activities specifically build on each other in terms of cognition and affect. For example, research on cognition- and affect-based trust argues that when a certain baseline of cognition-based trust is met, people more readily form the kind of emotional attachments with co-workers that represents affect-based trust (McAllister, 1995). Perhaps the same is true of consumer co-creation activities and their resulting dynamics: at least some cognitive understanding of co-creation may, for example, be needed before the activities focused on addressing affect-based challenges and motivations have their true impact. Or, alternatively cognitive and affective dynamics might amplify each other. For example, prior research suggests that positive affect enhances problem solving (e.g., Isen, 2001). While we as yet lack insight into the specific levels of cognition or affect needed before enacting the next co-creation phase, our research does suggest the importance of addressing cognition and affect-based factors throughout the consumer co-creation process.

Future research may also examine the effectiveness of the framework we generated compared to other, alternative approaches such as the Synectics creative problem-solving model (Gordon, 1961). While the latter framework is not specifically developed to facilitate consumer co-creation, and our framework is, there is some initial case study evidence that it could facilitate consumer co-creation as well, in terms of generating new product concepts (Roberts et al., 2005).

Our research is qualitative in nature: while it has identified relationships between co-creation activities and process outcomes, it does not test the strengths of these relationships nor demonstrate causation. Future research using, for example, an experimental research design, might address this limitation of our study.

While the consumer co-creation activities we identified are derived from studying the facilitation by professional designers and their tools and techniques, the activities may be enacted by other types of practitioners such as those trained in marketing (e.g., Roberts & Darler, 2017). Designers seem, however, to be particularly suited to help enact the generated process model due to their human-centered attitude and being comfortable with ambiguity and manifesting creativity (Michlewski, 2008). The designers in our sample are mostly senior designers with much expertise in facilitating the co-creation process. This allowed us to distill best practices. However, expertise might also hinder learning and result in cognitive entrenchment (Zhang et al., 2022). Hence, further research on practitioner effects is needed, also because practiced activities and the practitioners who enact these are mutually constitutive, but not often studied together when evaluating effects (Jarzabkowski et al., 2016). Furthermore, while our research identified activities which designers use for consumer co-creation (i.e., business-to-consumer co-creation), the co-creation-activities we distilled might also be of use for co-creation with suppliers or customers, that is, in business-to-business co-creation settings. This could be examined further in future research.

In our study, we focussed in particular on direct, face-to-face consumer co-creation, which is an underdeveloped research stream (Roberts & Darler, 2017). Future research could explore, in more depth, how digital technology could support direct interactions between the organization and consumers, while maintaining beneficial cognitive and affective process outcomes. Stimulated by the Covid-19 pandemic, performing creative activities together like brainstorming via computer-mediated communication tools (like Zoom or Webex) have become more common, even though its effectiveness seems, similar to in-person group creativity, dependent on effective facilitation (e.g., Thompson, 2021).

In conclusion, our research provides for an integrative process model for consumer co-creation, based on design thinking expertise and catering to diverse motivations, challenges, and commitment levels. The research enables a more granular picture about facilitating consumer co-creation. It illuminates activities and their resulting cognitive and affective process outcomes that, ultimately,

result in the identification of user-centric innovations. We invite others to further explore how to help organizations to change and grow by leveraging consumers as an external resource for innovation.

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ORCID

Gerda Gemser https://orcid.org/0000-0002-8467-092X
Giulia Calabretta https://orcid.org/0000-0002-9651-2400
Ingo Karpen https://orcid.org/0000-0003-0700-0495

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AUTHOR BIOGRAPHIES

Gerda Gemser, PhD, is Full Professor and Chair of (Corporate) Entrepreneurship at the University of Melbourne (Australia). She enjoys working together with industry professionals to generate relevant work on the management of design, entrepreneurship, and innovation. She teaches and gives workshops in these areas, next to publishing academic papers and books. She has published in leading academic journals such as *Academy of Management Journal, Organization Science, Organization Studies, Journal of Management*, and *Journal of Product Innovation Management*, among others. One of her recent publications is a co-authored book on effective design leadership, published by Stanford University Press (2022).

Giulia Calabretta, PhD, is an Associate Professor at the Faculty of Industrial Design Engineering at Delft University of Technology. Her research focuses on the intersection of design, management, and innovation, with publications in leading academic journals. Giulia is currently involved in various funded research projects with public and private sector partners, exploring ways to enhance ecosystem innovation capabilities and harness design for business and societal impact. An award-winning educator, she brings extensive experience in teaching strategic design and innovation management in universities and executive programs around the world.

Ingo O. Karpen, PhD, is a Full Professor at CTF Service Research Center at Karlstad University, Sweden and The University of Adelaide Business School, Australia. Focusing on the nexus of business and design, Ingo's interdisciplinary research revolves around designerly ways of thinking, working and being, and how this enables organizations to better serve people and their ecosystems alike. His research and education have been internationally awarded, and his publications have appeared in leading academic journals. For his ongoing work on service innovation, Ingo has won prestigious research council and industry funding, while he also collaborates with organizations as a strategic designer.

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APPENDIX A

TABLE A1 Informants and number of interviews/focus group participation.

Informant	Organization	Informant position	Data
Designer 1	F1: medium design agency	Snr strategic designer/partner	3 interviews; 1 fg
Designer 2	F1: medium design agency	Strategic designer	3 interviews
Designer 3	F1: medium design agency	Project manager	1 interview
Designer 4	F1: medium design agency	Strategic designer/partner	1 interview
Designer 5	F1: medium design agency	Creative director	1 interview
Designer 6	F1: medium design agency	Interaction designer	1 interview
Designer 7	F1: medium design agency	Service designer	1 interview
Designer 8	F1: medium design agency	Strategic designer/partner	1 interview
Designer 9	F1: medium design agency	Snr strategic designer	1 interview; 1 fg
Designer 10	F2: small design agency	Strategic designer/partner	3 interviews
Designer 11	F2: small design agency	Strategic designer/partner	2 interviews
Designer 12	F2: small design agency	Snr strategic designer	3 interviews; 1 fg
Designer 13	F3: medium design agency	Strategic designer/partner	1 interview
Designer 14	F3: medium design agency	Snr product designer/partner	1 interview
Designer 15	F3: medium design agency	Strategic designer	2 interviews
Designer 16	F3: medium design agency	Product designer	1 interview
Designer 17	F3: medium design agency	Snr product designer/partner	1 interview
Designer 18	F3: medium design agency	Project manager	1 interview
Designer 19	F3: medium design agency	Service designer	1 fg
Designer 20	F4: large health tech firm	Strategic designer	1 interview
Designer 21	F4: large health tech firm	Service designer	2 interviews
Designer 22	F5: small design agency	Snr product designer/partner	2 interviews; 1 fg
Designer 23	F5: small design agency	Snr product designer/partner	2 interviews
Designer 24	F5: small design agency	Snr product designer	1 fg
Designer 25	F6: small design agency	Snr service designer/founder	3 interviews; 1 fg
Designer 26	F7: large B2B equipment firm	Snr product designer	2 interviews
Designer 27	F7: large B2B equipment firm	Senior product designer	1 interview
Designer 28	F7: large B2B equipment firm	Product designer	1 interview
Designer 29	F7: large B2B equipment firm	Service designer	1 fg
Designer 30	F8: medium design agency	Service designer	1 fg
Designer 31	F9: large telecom. firm	Service designer	1 fg
Designer 32	F10: medium design agency	Service designer	1 fg
Designer 33	F11: small design agency	Service designer/founder	1 fg
Designer 34	F12: large high.educ. institution	Interaction designer	1 fg
Designer 35	F13: medium design agency	Strategic designer	1 fg
Designer 36	F14: small design agency	Service designer	1 fg
Designer 37	F15: medium design agency	Snr strategic designer/partner	1 interview; 1 fg
		Total no. interviews	43 interviews; 3 fg
Manager 1	F16: small public transport suppl.	Project manager	1 interview
Manager 2	F16: small public transport suppl.	Marketing director	1 interview
Manager 3	F17: medium cultural institution	Marketing director	1 interview

(Continues)

TABLE A1 (Continued)

Informant	Organization	Informant position	Data
Manager 4	F17: medium cultural institution	Brand manager	1 interview
Manager 5	F17: medium cultural institution	Service manager	1 interview
Manager 6	F4: large health tech firm	Project manager	1 interview
Manager 7	F4: large health tech firm	Innovation manager	1 interview
Manager 8	F4: large health tech firm	Innovation manager	1 interview
Manager 9	F4: large health tech firm	Brand manager	1 interview
Manager 10	F4: large health tech firm	Project manager	1 interview
Manager 11	F4: large health tech firm	Project manager	1 interview
Manager 12	F18: medium bicycle accessory firm	Innovation manager	1 interview
Manager 13	F18: medium bicycle accessory firm	R&D manager	1 interview
Manager 14	F19: municipality of a large city	Project manager	1 interview
Manager 15	F20: large public transportation firm	Project manager	1 interview
Manager 16	F20: large public transportation firm	Marketing manager	1 interview
Manager 17	F21: small social innovation start-up	General manager	1 interview
Manager 18	F22: large healthcare provider	Project manager	1 interview
Manager 19	F22: large healthcare provider	Product manager	1 interview
Manager 20	F22: large healthcare provider	Marketing manager	1 interview
Manager 21	F7: large B2B equipment firm	Service manager	1 interview
Manager 22	F7: large B2B equipment firm	Business unit manager	1 interview
Manager 23	F7: large B2B equipment firm	R&D manager	1 interview
		Total no. interviews	23 interviews
Consumer 1	F23: large event services company		1 interview
Consumer 2	F12: large high. educ institution		1 interview
Consumer 3	F12: large high. educ institution		1 interview
Consumer 4	F12: large high. educ institution		1 interview
Consumer 5	F12: large high. educ institution		1 interview
Consumer 6	F24: large fast-food restaurant		1 interview
Consumer 7	F24: large fast-food restaurant		1 interview
Consumer 8	F24: large fast-food restaurant		1 interview
Consumer 9	F25: medium outdoor gear firm		1 interview
Consumer 10	F25: medium outdoor gear firm		1 interview
Consumer 11	F25: medium outdoor gear firm		1 interview
Consumer 12	F26: small education institution		1 interview
Consumer 13	F26: small education institution		1 interview
		Total no. interviews	13 interviews

TABLE A2 Consumer co-creation activities and cognitive and affective dynamics: illustrative quotations.

Consumer co-creation activities	Illustrative quotes (content in brackets indicates the cognitive or affective dynamics being illustrated)
	Co-creating context
Scouting	[In the co-creation workshop] there were people from everywhere, like from Hungary, Romania, Luxemburg, and Poland. So, all these were different peoples. But, in the end, we were speaking about the same subject. It was really fun. The atmosphere was really pleasant. ($Consumer_7$) (*pleasurable engagement*—affective dynamics) When we did a project for rail catering, we interviewed this sociologist who did a study on how people in trains behave, and what kind of sociological principles play a part in this mini-context of a train. If you ask regular people what they are doing, how they feel, what they are looking for, they often will not tell you, because they simply do not know why they behave in a certain way. ($Designer_{12}$) (*expanded knowledge base*—cognitive dynamics)
Educating	We put together an internal team with stakeholders—a design team. I guide them through the process, let's say, so this team can work with collaborative design tools. For instance, I educate them to do interviews with consumers themselves... there's a lot of hands-on education [during which they experience] how to interact with consumers, how to generate insights, so that they—at the end of the day—have a deep appreciation of the value of the tools and why we choose them. ($Designer_{25}$) (*ideation confidence*—affective dynamics) Well, I learned things, widening my own knowledge base, so to speak. (...) It made my brain work and it was a different kind of work, which really is good for my brain. Even if I don't see any specific use right now of what I heard or experienced there [during the workshop], the moment may come one day when I can return to these resources. So, I am building them, stocking them somewhere in my long-term memory. ($Consumer_{12}$) (*expanded knowledge base*—cognitive dynamics)
Bonding	I think the main, most impactful input from the approach was to let the team experience what women have to do every day and do every day for their beauty care. I think it immediately gave [the co-creation team] a different perspective. ($Manager_{10}$) (*empathy for diverse perspective*—affective dynamics) Maybe because it was like a meetup, so people were 'This is not that serious,' also because we had pizza, we could drink some beers. ($Consumer_8$) (*pleasurable engagement—affective dynamics*)
	Co-creating content
Generating	Initially, people [being part of the co-creation session] would go straight to the product [solution]. They were fighting against the abstract. (...) When we were creating this person type [i.e., persona] and talked about this [persona] during the brainstorm, they wanted to align it directly with the product [solution]. ($Consumer_8$) (*enhanced ability to analyze*—cognitive dynamics) (...) doing those creative sessions with [the designer] ... Of course, I liked the relaxed atmosphere which helped [us] to be creative. And then the way [the designer] kept on going further and further and always challenging us to come up with additional ideas. ($Manager_{19}$) (*being creatively inspired*—affective dynamics)
Configuring	Sometimes it is also a big wall with the ideas, and one of us would say: 'I like some parts from this and some from that.' Then they [the involved designers] combined it and then they make some new proposals. And then we say 'OK, this one!' ($Manager_{12}$) (*being creatively inspired*—affective dynamics) I felt [the facilitating designer] really took an effort to give everyone time and space to give their input. And then summarized it, neatly and concisely. She was able to filter out the white noise but still putting everything down that was said. ($Consumer_2$) (*enhanced ability to analyze*—cognitive dynamics)
Animating	So, we use prototypes to present innovative ideas; then the business has to decide if they want to adopt. We give them a tangible artifact of: 'Imagine if it was like this.' So, it means we help them imagine a product before they have to go through the whole product-creating process of putting it in the market. It's a very short loop of building a new product without having to commit to having the market launch etc. ($Designer_{20}$) (*being creatively inspired*—affective dynamics) A week after our storytelling session, the CEO dropped by and referred to the [fictional] names that we mentioned in the story. He understood our personas—he was joking about them, but in a positive way. We did not give a dull presentation. It was like telling a story to a child, but because we did so, it stuck in the minds [of the Board of Directors]. It was convincing to the Board, and they said to me, "Please continue with the ideas. This is the budget, please continue" ($Manager_{18}$) (*empathy for diverse perspectives*—affective dynamics)

(Continues)

TABLE A2 (Continued)

Consumer co-creation activities	Illustrative quotes (content in brackets indicates the cognitive or affective dynamics being illustrated)
	Co-creating confluence
Explicating	(...) by means of that hackathon we discovered pockets of consumer value around the [product] concept that helped us to increase the whole value of the project for the user. So, these activities helped us to do that, to see the consumer value sooner and also to take that into the project sooner. ($Manager_9$) (*enhanced ability to evaluate*—cognitive dynamics) What we tried to bring in was what the user wants, what people want, instead of what [the company] can deliver. Thus, moving from focusing on the basic functionalities and the technicalities to understanding what people want, what would really help people for the coming years. ($Designer_{21}$). (*empathy for diverse perspectives*—affective dynamics)
Mediating	[The design professional] insisted that all three parties work together during this process—no arguments. We have issues, of course, and we had to put them on the table. These were good conversations, we really started talking, all three parties, together with [the design professional], and afterwards we came to a mutual understanding. ($Manager_{15}$) (*pleasurable engagement*—affective dynamics) [Talking about a design tool consisting of visually mapping stakeholder interests] Because in its center, there's the user. It's not about: 'Where do my trucks drive? How much does distribution cost? What does the marketing department do?' You can bring a lot of people from different parts of the organization together and have them focus on the user perspective [using that particular design tool] to come to an agreement. ($Designer_4$) (*enhanced ability to analyze*—cognitive dynamics)