

Sharing Economy Design Cards

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ABSTRACT

Sharing economy services have become increasingly popular. In addition to various well-known for-profit activities in this space (e.g., ride and apartment sharing), many community groups and non-profit organizations offer collections of shared things (e.g., books, tools) that explicitly aim to benefit local communities. We expect that both non-profit and for-profit approaches will see an increased use in the future. To support designers in devising new sharing economy services, we developed the Sharing Economy Design Cards, a design toolkit in the form of a card deck. We present two deployments of the cards: (1) in individual interviews with 16 designers and sharing economy domain experts; and (2) in two workshops with 5 participants each. Our findings show that the use of the cards not only facilitates the creation of future sharing platforms and services in a collaborative setting, but also helps to evaluate existing sharing economy services as an individual activity.

CCS CONCEPTS

• **Human-centered computing** → **Interaction design**

KEYWORDS

Sharing Economy; Collaborative Workshop; Design Process.

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1 INTRODUCTION

The emergence and rapid adoption of social and economic models for shared use, known as collaborative consump-

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tion [5] or sharing economy, have enabled people to coordinate, acquire, distribute, and temporarily use many kinds of resources with the help of digital platforms. In addition to commercial services such as Airbnb or Uber, an increasing amount of community groups and organizations have established cooperatives (e.g., libraries of equipment) that often prioritize environmental, social, and cultural values within their local communities. Scholz has called this emergent phenomenon “platform cooperativism” [42]. In his recent book “Ours to hack and to own” [43] he provides a number of examples of such co-ops, including online market places (e.g., Fairmondo, Stocksy United), financial services (e.g., FairCoop, Robin Hood Collective), swapping platforms (e.g., TimesFree), music streaming services (e.g., Resonate) and more. We envision increased use of such platforms in the future, as users realize their value and their benefits to support local communities. Correspondingly, designers will need adequate tools to devise novel sharing economy services in general, and platform co-ops in particular.

Prior work in the HCI literature has highlighted a key need to support designers in the sharing economy [11], owing to the growing body of knowledge in the area [9]. However, design practitioners often do not adapt this type of research knowledge since they find it too abstract, too difficult to use, and too hard to locate [38,40]. Driven by the goal to understand how designers of online sharing platforms and services could both improve existing sharing economy platforms and create new ones, we have sought inspiration in *translational resources* [6] such as design toolkits, which have shown promise in effectively transferring knowledge between design research and practice [8].

We have developed a 24-cards deck called the Sharing Economy Design Cards (SEDC), which provides domain-specific insights for designers on the diversity of shared content, users’ motivations to share, audience management, privacy & trust issues, and user experience requirements – all in the context of the sharing economy. We initially deployed the cards with 16 design practitioners and sharing economy domain experts to gather their individual feedback on the content, possible applications, and usefulness of the cards for evaluating existing sharing

economy services. We also deployed the cards in two design workshops with 5 participants each to explore their use in a collaborative setting.

Our work addresses the following research questions:

RQ1: What are opportunities and challenges when using the SEDC in a designer’s creative process?

RQ2: In which stages of the design process can SEDC be used, and how?

This paper makes two contributions. First, it provides insights gathered in the context of two deployment settings of the cards (individual and group) and discusses how they help advance both design practice and research in the context of the sharing economy. Second, it presents the SEDC themselves and the corresponding design methodology.

2 RELATED WORK

Our work lies at the intersection of two research areas: (1) the socio-technical design aspects of the sharing economy and (2) the design cards as a genre of design toolkits.

2.1 Socio-Technical Design in the Sharing Economy

Prior work has described practices and motivations for the sharing of apartments [17,19], cars [1,17], tools [29,44], toys [39], personal devices [20], everyday objects [21], as well as peer-to-peer service exchanges [2,25]. Furthermore, Dillahunt and colleagues [9] conducted an extensive literature review of the sharing economy in computing and identified several underexplored directions for future research including environmental sustainability, the coverage of non-US contexts, policy implications, as well as pre-sharing economy platforms and practices. Another survey of the sharing economy in the HCI literature [11] contrasted technology-mediated practices of both sharing physical and digital artifacts, and in turn discussed the design implications with a view towards supporting platform co-ops. Drawing on Dillahunt et al.’s study [9] we have selected non-US contexts as sites of deployments of our cards. Fedosov et al.’s [11] study informed the selection of five thematic areas of our cards: **Content, Audience, Motivations** to share, **Privacy & Trust**, and **User Experience** requirements.

Prior work has examined numerous issues that sharing economy services face (e.g., transience among and anonymity of membership) [1] and examined technical limitations (e.g. account sharing) of existing sharing economy platforms [26]. Researchers have also identified attendant challenges of platform co-ops, such as lack public profile and long-term funding, compared with multinational corporations [43]; discussed emergent issues of trust and rec-

iprocity within membership and supporting online exchange platforms [25]; emphasized the value of social ties in sustaining online sharing communities [24]; outlined considerable efforts that can occur in terms of creating and nurturing new instances of local communities if social ties and trust are weak [24,33]; and discussed challenges to clearly convey social and personal benefits of participation [2]. A key contribution of this body of prior work has been design strategies for better sustaining sharing practices in local communities and collectives [28]. In light of this prior research, our work facilitates the transfer of knowledge from design research to design practice through cards – a familiar toolkit among practitioners – and explores their use within established design methods such as thinking aloud critique [37] and collaborative workshops [16].

2.2 Design Cards as a Genre of Design Toolkits

Design cards have been created and evaluated in various contexts. To name a few, cards have been suggested to facilitate the conceptualization of Internet-of-Things applications [35], to raise awareness of emergent data protection regulations [34], to support the design of information systems for international justice [30] and to design interactive artifacts for ageing populations [36]. Others have targeted more abstract human qualities such as values [13], resourcefulness [36], playfulness [31], and creativity [32] as part of the design process. We aim to extend these ideas in the context of the sharing economy, with a particular view towards supporting the design of platform co-ops.

Prior research has shown that cards can support various design activities: understanding a phenomenon at hand [7], collaborative [13] and playful ideation [31], co-design (e.g., [32]), formative evaluation of design concepts [8], and advocacy [6]. In our work, we are interested in understanding if design cards can be also used in individual summative evaluation activities akin to heuristic evaluations to surface design issues with existing sharing economy platforms.

Prior work has also outlined techniques aimed at better supporting designers and researchers to create their own design cards [16] and supporting materials such as design worksheets [30] and canvases [35] to guide cards’ use. Drawing on these efforts we have developed a corresponding design methodology to facilitate design cards use in a collaborative setting.

In summary, prior research suggested various techniques and methods to apply design cards to support the creation of interactive systems within different application

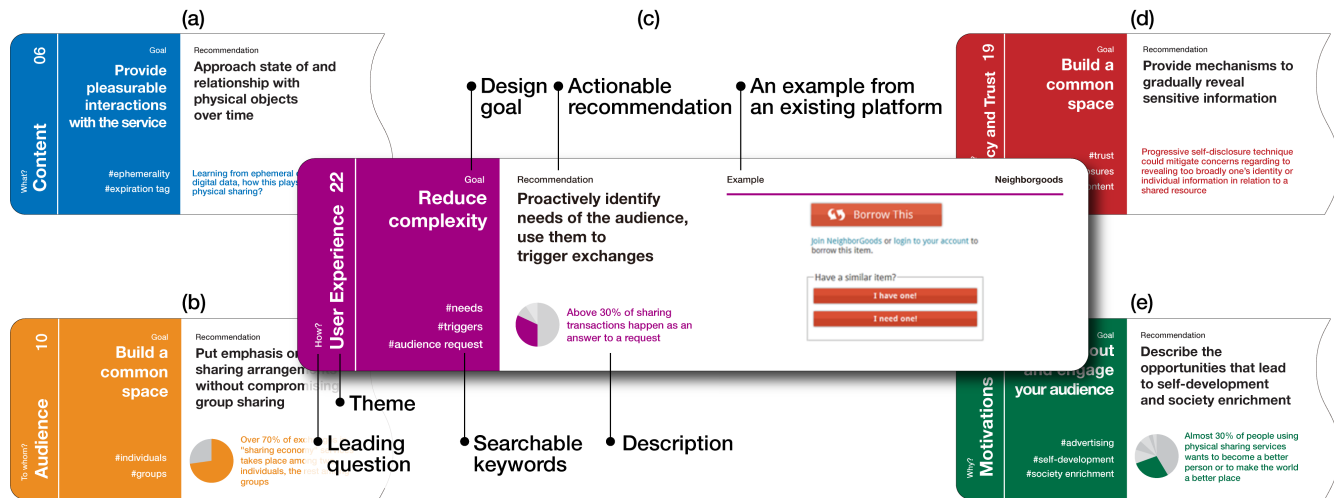


Figure 1. The SEDC examples for each theme: (a) Content; (b) Audience; (c) UX; (d) Privacy & Trust; (e) Motivations

domains. Our work builds on this prior research to explore how our SEDC can be leveraged in different stages of the design process, and in various settings (e.g., group and individual design activities), all in the context of the sharing economy.

3 SHARING ECONOMY DESIGN CARDS

Drawing on recent surveys of the sharing economy in the computing literature [9,11] we have elicited a set of design recommendations to support designers with domain-specific knowledge. Given the difficulty of having this type of design research knowledge adapted by practitioners [40], our goal was to aid designers in operationalizing the research knowledge in the context of sharing economy. The recent work of Colusso et al. [6] calls for more practitioner-oriented translational resources, which could be used to engage designers to adapt the knowledge produced by design researchers in their practices. Following their work, we developed the SEDC and tailored them for service and UX design practitioners by providing actionable recommendations, genuine examples, and simplified search through keywords. We specifically chose the focus our research inquiry on design cards since this genre of design toolkits can provide an adequate level of details to inform the design (e.g., UI), and proved useful in combination to familiar design methodologies (e.g., the design sprint) [7].

Figure 1 shows the face of one card (out of 24) in a SEDC deck as an example (plus 4 partially hidden cards)¹.

3.1 The Card's Composition

In terms of visual representation and layout, our cards were in part inspired by the Tiles IoT Toolkit [35] and the IDEO Method Cards [18]. Specifically, from the former toolkit we took inspiration in distinctly-colored decks to ensure the ease of referencing, browsing and sorting cards, while from the latter one we were encouraged to add succinct descriptions to further inform and inspire designers. We adapted the structure of the cards from a mockup suggested by Colusso et al. [6], which is grounded to their empirical research on design toolkits and based on multiple iterations with UX designers. Drawing on their most recent work on behavioral change cards [7], we decided to include existing design examples in the form of screenshots of user interfaces, which were found extremely useful by their participants.

We have divided the front side of each card into seven “sections” (see Figure 1c), namely (1) a card’s theme, (2) a leading question, (3) a design goal; (4) searchable keywords; (5) an actionable recommendation; (6) a detailed description; and (7) an example from an existing service. We have used bold and light typefaces to create a visual structure to the cards and to aid their readability. The **goal** and the **recommendation** are placed next to each other to quickly understand their relation among each other (following the Gestalt law of proximity). The **examples** have been chosen from existing sharing economy platforms and have been placed on the right side of the **recommendation**, offering its interpretation on the user interface level. We envision the cards to be printed in a minimum format of 10.6 by 2.8 inches with rounded corners to ensure comfortable use around a collaborative working area (e.g., a desk, a board). The back of each card

¹ The full set is available at <http://sharing.inf.usi.ch/sec>

has a recurrent pattern featuring the name of the theme on the correspondingly colored background.

3.2 Themes of the Sharing Economy Design Cards

The SEDC deck aims to explore design opportunities characterizing different angles of a sharing economy platform or service. The cards' themes were drawn from a systematic literature review of technology-mediated sharing practices of both physical and digital artifacts [11]. The deck details five themes (each represented with a colored suit, see Figure 1), which allow a designer to identify and describe specific characteristics of a service/tool at hand: **Content** (Blue), **Audience** (Orange), **Motivations** (Green), **Privacy & Trust** (Red), and **User Experience** (Purple). Themes set the foundation to answer a set of core questions (see "Leading question" label, Figure 1) that support creating a comprehensive account of a service's sharing practices [10].

The **content** theme (see Figure 1a) addresses the question "What is being shared?". Content here refers to the type of a physical object and associated data. A shared object can be a car, an apartment, a bicycle or any other domestic artifact etc. The **audience** theme (see Figure 1b) addresses the question "To whom is the content being shared?" – the recipients of the shared content. Audiences include individuals, family members, friends, known or unknown groups of people. The **motivations** theme (see Figure 1e) looks into "Why is the content being shared?" Motivations drive people to share. These can span from utilitarian needs to altruistic activities, as well can be driven by reciprocity [11,17]. The **privacy & trust** theme (see Figure 1d) focused on how users feel about privacy and trust issues when deciding to share, and how does it affect their sharing choices. Finally, the **user experience** theme (see Figure 1c) draws on the relations among a service, the user, and the context where sharing takes place, and is concerned with the question "How is the sharing taking place?" This theme aims to provide a pleasurable interaction and reduce complexity of a sharing service. Note that the themes and the recommendations are neither exhaustive nor expected to be the orthogonal to each other. They are developed based on a qualitative account of a limited number of papers [11]. However, to minimize this limitation we have deployed the SEDC with a total of 26 participants to seek their feedback on the cards' content and to evaluate their use within designers' creative processes. Additionally, for each theme we have added a blank card, such that participants could formulate their own recommendation and suggest an example based on their own expertise.

4 FIELD DEPLOYMENTS

In order to understand the opportunities and difficulties using the SEDC in the designers' creative practices (RQ1), and to detail their use in different phases of the design process (RQ2) we conducted two initial user studies. We hypothesized that the SEDC can be used not only during early stages of the design such as initial ideation or concept development (as suggested by the prior art), but also support the evaluation of existing platforms and tools with the goal to find usability issues and to improve overall user experience. What is more, we envisioned cards to be used during individual activities akin to heuristic critique or expert interviews, as well as in group design activities drawing on participatory [4] and co-design [41] methodology. That is why we, first, conducted a study with individual participants, and then organized two collaborative workshops in a group setting. During both deployment settings, participants provided us their feedback on the cards as well reflected on their use. While our initial deployments did not explicitly engage with participants at their place of work [40], we nonetheless see the value of adopting this approach to map this emergent design space. Wider dissemination of the cards marks a salient opportunity to further explore the extensibility of their value for professional design practice [15].

4.1 Study 1: Individual Interviews

At the outset we individually engaged with 5 sharing economy domain experts and 11 design practitioners (16 people in total, 11 were female, all used sharing economy services actively) in semi-structured interviews. The average age of participants was 31.3 years old ($SD=3.6$), they held various occupations including UX designer, graphic designer, interaction designer, start-up founder, academics (with backgrounds in statistics, sociology and economics) who conduct research in the sharing economy area. The participants' average job experience at the current position was 6.1 years ($SD=4.6$). Most of our participants live in Western and Central Europe, five of them were from Argentina, one from China and one from the US. We particularly wanted to focus on non-US context since researchers suggested that those populations were less explored in the area of sharing economy [9]. The goal of this deployment was twofold: (1) to elicit participants' professional reflections about the SEDC themselves and (2) to understand whether and how the cards can be used for evaluating an existing sharing economy platform that is most familiar to them.

The participants were initially recruited through the authors' extensive professional networks; we then employed

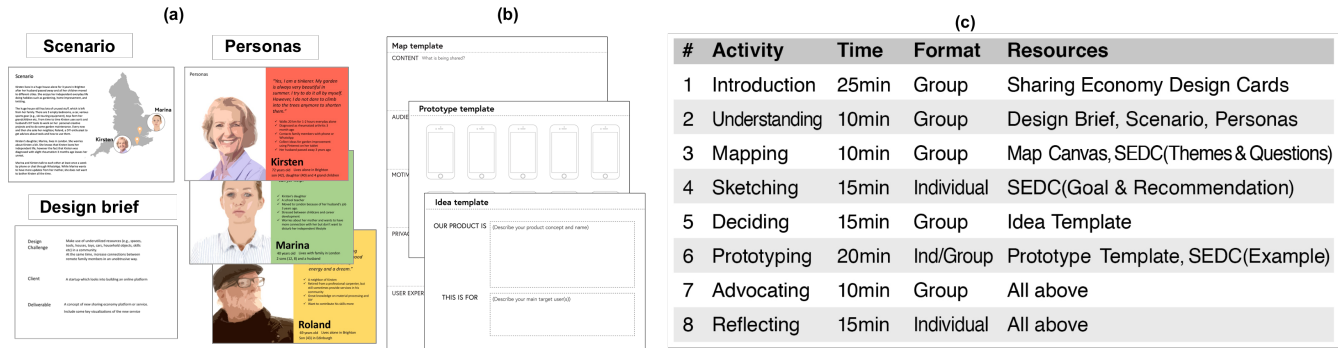


Figure 2. The Sharing Economy Design Sprint: (a) input materials; (b) worksheets; (c) activities

a snowball sampling strategy to reach out to more participants. We sent a PDF document featuring the SEDC deck and an introductory note (outlining the purpose of the interview) to participants a few days prior the scheduled interview in order for them to get familiar with the cards. During the interview we asked each participant to interpret at least two cards (we always picked different cards to ensure the coverage of the whole deck). We then inquired about one sharing economy service that participants have had most experience with. Later, we engaged participants in a think aloud session [37]: using their offered interpretation we asked them to reflect on the sharing economy service they have selected. We challenged designers to discuss the content of a UX report with the goal to identify shortcomings and opportunity areas of *this* sharing economy service. For example, we asked them “How do you think the cards played out in those conclusions?” For the five sharing economy experts we asked more detailed feedback on the content and the structure of the cards. For instance, we inquired “What aspect of the card (see Figure 1c) have you found most useful when thinking about *this* service?” and “What does *that* card (see Figure 1d) prompt you to do?” to elicit a critical reflection on a service at hand.

Each interview session lasted approximately 60 minutes, was audio recorded and transcribed verbatim. We conducted interviews either in person or over Skype and took extensive field notes; findings after each interview were captured immediately in reflective field memos [14], which we reviewed throughout our analysis.

4.2 Study 2: Collaborative Workshops

In order to better understand the usage of the cards in a group settings, we have organized two practitioner-oriented workshops, drawing on collaborative design events such as the Inspiration Card Workshop [16] and design sprints [7,22]. Study participants were recruited by distributing a study invitation within various online

communities, including user experience and front-end development meetup groups, local designers’ Slack channels, email distribution lists, and through authors’ social media accounts.

In total, 10 participants participated in our study. We conducted two 2-hour workshops with 5 participants each. We tried to evenly distribute them based on their background and work experience. Similar to Study 1 we recruited participants from both design and sharing economy communities. The average age of participants was 33.1 years (SD=8.4), 6 of them were female. They all live in a Western European country and have worked at their current position for on average 6.0 years (SD=4.9).

The goal of the workshops was to assess the potential value of the SEDC in the process of creating value-added sharing economy services. More specifically, we aimed to understand whether and how participants would find the card deck helpful when devising new sharing economy services. We also put a particular focus on exploring the design of platform co-ops. We adapted the Google design sprint format – that is mapping, sketching, deciding and prototyping activities [22] – since it is one of the most widely used approaches in professional practice and was familiar to our participants.

Sharing Economy Design Sprint

In contrast to Study 1, participants were not able to spend much time reflecting on the SEDC. We specifically chose the sprint format as being close to industry demands, where designers have to make decisions within a limited time and with limited resources [40]. We took inspiration from the Behavior Change Design Sprint process [7], while modifying several activities that its authors found problematic. Figure 2a presents the input resources for the design sprint, namely: a design brief, the models of personas and a scenario. In addition to employing the SEDC we developed three supporting templates: (1) a map canvas



Figure 3. (a) The sharing economy design sprint setting. (b) The example of the produced materials during the sprint.

vas, (2) an idea template and (3) the prototype templates, which we have used during the sprint (see Figure 2b)².

The Sharing Economy Design Sprint lasted for 120 minutes and contained eight individual and group activities (see Figure 2c). We video-recorded all sessions (see Figure 3a) and then transcribed the parts that were relevant to our research questions. In addition to that, we took the field notes during the workshop and photographed the materials that participants produced during the sprint (see Figure 3b).

4.3 Data Analysis

Our data analysis draws on various sources from our fieldwork: participant observations from two workshops, analysis of the video data, participants' reports produced during the workshops, and semi-structured interviews. We used affinity diagramming [3] to understand the collected data thematically and to model similarities and differences across participants. We held weekly meetings among the researchers to establish a common coding strategy, and later to discuss emergent findings. We followed an iterative process, going back and forth between the data, the researchers' notes, and the emerging structure of empirical categories, which we developed through recurrent reading of the material [14]. We also held meetings with researchers outside of the project to challenge our assumptions and to corroborate the themes. We distilled four sets of results that reveal at which stage of the design process, and how, the SEDC can be used in both individual and group activities. In the following sections, we present examples that help capture these themes and support them with participants' quotes from both our

studies. In the remainder of the paper, we use pseudonyms to describe study participants.

5 RESULTS

We elicited a range of reflections and reactions on the SEDC and their use from designers and sharing economy domain experts – from perceptions of the cards' usefulness, to considerations on the use of the cards in their own work, to prospective adaptation of the cards in different stages of service development process, to recommendations on how to improve the cards further.

5.1 Perceptions of the Cards

Our participants reflected on the structure of the cards and commented on each individual section with respect to its usefulness for their creative processes. Blanca, while browsing a card, outlined the value of the **Recommendation** section for the designers: “Recommendations are more specific than Goals, I found them more useful. What’s in the Recommendation is a [set of] sub-goals that are often what a designer must deal with, it is more relevant for a designer. Connecting recommendations to big goals, as you have done, makes sense to me.” This comment illustrates that the **Recommendation** worked as an instrument to achieve the **Goal**. Furthermore, Aubry and Emma noticed its reflective qualities. Emma further suggested to formulate it in the form of the question to trigger this process “because something poses a question on the card makes you think”.

Our participants felt that one of the most informative parts of a card was its **Description**. “[This] statement (see **Description** on Figure 1c) suggests a study behind it. It feels trustworthy, it helps to convey the Goal “Reduce complexity”. It felt bulletproof, it made me believe that this goal is useful, and that I should stick to it because there are studies showing that it works” (Pierre). This quote illustrates the value of statistical and other empirical information in

² All of these resources can be accessed in high-resolution format at <http://sharing.inf.usi.ch/sedc>

the designer’s activity when it comes to advocating their designs to a group of stakeholders. One of the most discussed section of the card was the **Example**. It not only served the purpose of stimulating alternative designs, but was also regarded as eye-catching, inspirational, and clarifying the content of the card at large. Rebecca reaffirmed the latter: *“Examples clarify a lot what the card is trying to say, they are really useful, especially because the example are things that people can understand – at least I understand what they refer to [...] They are good practices of products that achieve the goal”*. This quote refers to a practical example taken from a famous sharing economy service, which allowed the designers to relate the problem to their own work. It provided them both “legitimacy” and intuition that this UI pattern works in practice, hence could be considered reliable and trustworthy.

Danny proposed to use the **Keywords** section to allow searching for design patterns: *“I can see that search is a big problem for designers, they do not know where to look for those cards”*. In a handful of cases, the **Keywords** also acted as a signifier summarizing the whole content of the cards, especially in the collaborative activities during the sprint, when lots of workshop materials were on the table at the same time (see Figure 3a).

The majority of our participants agreed that the **Motivation**, **Content**, and **Audience** themes of the cards were rather important at the initial stages of the development of new design concepts, while **User Experience** and **Privacy & Trust** would come at later stages of the development. Conversely, Adam mentioned that some of the themes, such as **Privacy & Trust**, were often overlooked in the early stages of the design of a new service: *“Privacy is often left [out] in the design stage, usually the solution [architect] tries to add this at a later stage and designers don’t think about it. [The card] (see Figure 1d) just reminds them that they have to bring this issue [up], which is very good”*.

What is more, participants related the non-hierarchical structure of the themes with fluid boundaries among them: *“Maybe because I am an interaction designer, [when] thinking about UX, we extend it to all the other topics. Privacy & Trust, and Motivation are parts of my experience. It [may] not [be] the same for people with different background”* (Toby). This instance illustrates that the **UX** theme can be perceived as a broader umbrella that incorporate other dimensions. Gladys developed this idea: *“Some cards like [No.] 6 (see Figure 1a) and [No.] 21 share the same Goal “Provide pleasurable interactions”, I think they can be combined and connected in different ways since there are some overlaps exists in them. One strategy, I think,*

is to make designers explore those connections and references while they are playing them”. As a matter of fact, we observed that some of our workshop participants used several cards at once to sketch-out their ideas in order to meet the suggested “call to action”. See Figure 3a, where two participants on the right have several cards spread out around them during the prototyping exercise.

Most of the participants agreed that the **Motivation** theme can be seen as a nucleus of any service design. *“The motivation in my opinion is most important to understand what you are really doing. I like a lot the emphasis on the desirable values, quality and convenience of the service. It is the core [...] it is what you are selling. If you don’t have great value and a great way to engage [people] and [to] create social relationship based on reciprocity [...] these kinds of things are really crucial when it comes to a sharing economy platform [...] like authenticity in [the] case of Airbnb”* (Aubry). Notably, in this instance Aubry adapted the same vocabulary that we used in the cards, which suggests the informative and educational value of the card deck at large.

Collectively, these reflections illustrate how our participants attributed importance to the different sections of the SEDC, and how these provoked discussions on the fuzzy boundaries between the cards’ thematic areas. In the following section, we provide further details about the challenges and opportunities participants raised within our two studies.

5.2 The Opportunities and Difficulties of Adapting Cards

Participants reflected on the opportunities and difficulties of adapting our cards in their own creative processes, and saw a potential to use the design cards beyond the sharing economy.

Participants discussed the value of the cards to support both existing and new instances of sharing economy services and argued on the importance of looking beyond profit-driven aspirations. *“Sharing economy platforms are a rather new [phenomena]. There are many of them now – you pay and then get a service. The cards let a designer step back and look at the bigger picture, to slow down a bit and to think how we can improve [a service] in different ways beyond [an] economic [point of view]”* (Gladys). This quote illustrates the potential of the cards to mobilize the values of collaboration and participation – the cornerstones of platform cooperativism. Pierre argued that the content of the card could partially replace a human expert when it comes to acquiring the domain knowledge: *“I can imagine it is like a suggestion from an expert, instead of sitting and booking someone’s time, I can use the cards and try to help*

myself as a designer without professional [domain expertise]”.

With reference to the challenges in adapting cards in the sprint format, Sarah explained that more time is required to process the **recommendations** given in the cards, which can be difficult in a high-paced design process: *“You have to be there, read a lot. It takes some time to understand. The [card’s] Goal and [the] Example were more direct”* (see e.g., Figure 1c). Another challenge that emerged from the data is related to the cards’ **examples**. *“Those examples make me focus and comply to the goal in a way that may limit my imagination... [however] it may be good for those who struggle to interpret a goal”* (Pierre). This instance illustrates that even though the **examples** were regarded as very informative and clarifying, they also raised concerns of being too specific. Nevertheless, participants found them to be especially beneficial for less experienced designers or even non-designers. Similarly, the **Keywords** section of the cards helped non-designers to make sense of the cards, like in the case of Josepha: *“The goal is a bit vague to me, the keywords helps you to clarify the goal. Without the keywords I would not know [how to interpret] the goal ‘Reduce complexity (see Figure 1c)”*.

Several study participants suggested applications for the SEDC beyond the context of sharing economy. Given the broadly formulated cards’ design goals and the themes, participants suggested their use in various areas, for instance product strategy, educational technology, e-commerce, games development, designing online platforms for fitness tracking and creating social media apps. Blanca explained: *“[Cards] provide some ideas for design goals that I should pay attention, [it] can be useful to incorporate those into interviews within my own field of work with users. [The] Goals are quite broad such as ‘Create value’ for the sure, ‘Reduce complexity’ (see e.g., Figure 1c). They are [also hold] true in my domain, that is e-commerce, as well when it comes to the user [research]”*. Worden also saw the value of cards in his teaching and research activities: *“cards stimulate thinking of the practices and platforms in a systematic way, also it could be a good brainstorming tool even for researcher to coming up with new research ideas and projects”*.

Collectively, there reflections help to anticipate designers’ opportunities and challenges when using the cards in their creative processes. Furthermore, the SEDC provoked reflective thinking on possible applications of the cards in design of online platforms and services, where people share their personal digital information (e.g., captured from the wearable devices).

5.3 Serving Different Stages of a Design Process

From the participants observations and the video analysis, we have quickly discovered that our participants have used cards on the different stages of the sprint, as well during individual interviews. Morten outlined: *“First of all, it gives a quite nice overview on the different themes/factors that affect design of a service [as represented by] higher-level themes Content, Audience, Motivations etc as a bigger building blocks of the whole UX of the service. Also, by picking any of these cards up you can use [it as] a checking point whether the particular recommendation is taken into account in the [current] design or even generating idea[s] for new features that the service does not yet have. I see value in both evaluation and designing new features”*. From our field data we have elicited five main stages of the design process where the SEDC have been used including, namely: (1) focused brainstorming, (2) prototyping, (3) communicating, (4) refining, and (5) evaluating.

5.3.1 Focused Brainstorming. The cards helped participants to initiate and engaged in focused brainstorming sessions during the sprint. Participants were prompted by the cards’ **Goal**, **Keywords** and **Recommendation** to start developing and discussing their ideas. Participants used not only individual cards to reflect upon their content but also the combinations of cards looking for similar threads. Aubry explained: *“[I was] going deeper and dipper within a single goal per [theme] and expanded it to the extreme in order to see how this goal could be implemented on the Content, Audience, Privacy & Trust etc. That drives the design in all these different aspects. One can focus on one specific goal and that could be seen or interpreted [through] different layers [of] Content, Motivations, UX in order to build a coherent story”*. What is more, the SEDC guided participants brainstorming process by revealing the underlying domain-specific issues that designers may not be aware of. *“I think the cards could be used at the start of developing/designing a platform. They are easy to use and following them at early stages perhaps could contribute quicker to the [overall project] success. People behind the platform should be informed about those issues [the] cards bring up”* (Dacie). This instance demonstrates the value of the cards in informing about the prospective challenges that designers may want to anticipate in the context of sharing economy.

5.3.2 Prototyping and Sketching. As expected the cards were widely used during sketching and prototyping activities. In particular, cards’ **Goal** and **Recommendation** part was useful to quickly outline some ideas on the post-it notes during the sprint, while the **Example** parts were heavily used during creating low-fidelity prototypes to

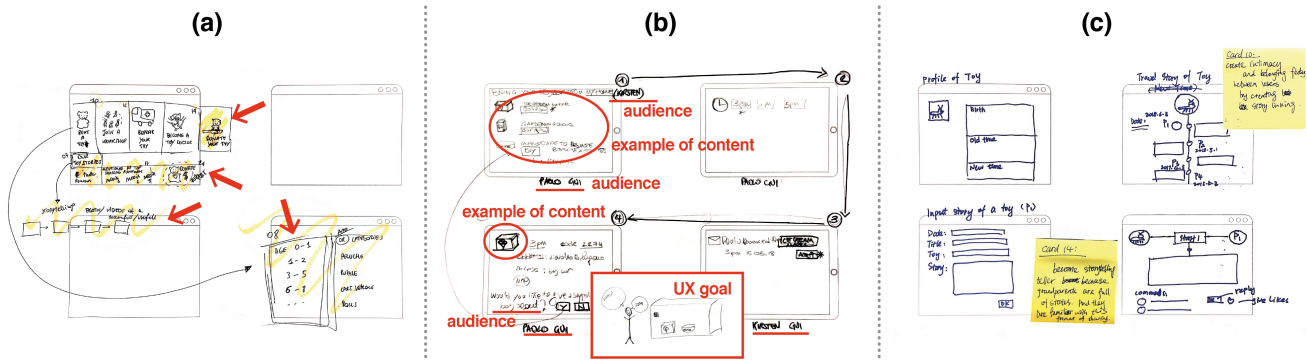


Figure 4. Design materials produced at the sprint: (a) value-added features based on the cards highlighted in yellow with red arrows; (b) user flows, examples of content, target audiences, and UX goals; (c) wireframes and their relation to the cards.

flesh out some ideas from the existing platforms and services. Toby explained: “I think in the prototyping phase, they were particularly useful. I think the Example [part] was one of that gave us more insights, more inspirations to draw something”. Figure 3a shows the participants during the prototyping phase, some participant worked in pairs, while others reviewed the cards individually to develop their designs.

5.3.3 Communicating. Both interview participants as well as the workshop participants reported beneficial to use the cards to advocate their designs to their colleagues or to a group of stakeholders. Emma detailed that the **Description** part of the card was crucial during this phase: “I also like images and a little stats that you have here in the card (see **Description** on Figure 1c). That is the one of the first things that we mentioned because if you are going to present to your client, which is a new startup, [in] this deliverable you can use these cards as a kind of give yourself some credibility, advocating particular design [decisions]”.

5.3.4 Refining. Figure 4a shows that participants used the cards to refine and evaluate their own design concepts. In this particular figure Diana explained: “The features I added here thanks to the cards were the donate [option], age selection and storytelling”. What is more, participants reported that cards helped them to understand some design issues that they have not anticipated earlier. Jehanna explained: “The card (see Figure 1d) helped me to notice a problem I didn't take into consideration [...]. Even though I didn't find a solution to the issue just now, the card helped me to approach the problem”.

5.3.5 Evaluating. The majority of our participants agreed that the cards can be used as a guiding tool to evaluate the existing platforms and services. Like in the case of Delora: “I see these card deck as a guidebook. For me as an owner of the [sharing economy] service facing some issues with

community-building cards provide some ideas to identify particular issues with my audiences. I found for instance, in [the card No.] 12 (see Figure 1e), [the] goal ‘Reach out and engage your audience’ helpful and [the card] provides a clear recommendation how to [attend] it”. This instance illustrates that the SEDC can be perceived as a checklist featuring best practices, which can be cross-checked against platforms’ designs. Morten spelled it out in further details: “For example, picking out one of these cards and checking that the goal is already designed/implemented in the service or there will be more work to do. Also after that moving to the right side of the card (see **Example** on Figure 1c) and checking some concrete examples how to manifest these kind of goals to the UI level”.

The SEDC facilitated our participants to identify existing design flaws, Julie mentioned: “I believe Airbnb are doing quite the opposite to what the card recommends, here [this card] (see Figure 1c) suggests to identify the needs of the users and to trigger things to improve the service with them, but I don't receive good recommendations of things I'm interested in. I just opened the app and I don't see any of the places I searched before, they [Airbnb] show me these fancy houses I'm not going to rent because they are too expensive”. Furthermore, the cards offered potential design solutions for those problems: “for an average user is it hard to say often whether [rating] 4.2 is good or bad, Airbnb could provide some contextual information, such as average ratings in certain city, explain what this rating mean. Like if you click on “Accuracy” it can be described for those who opt-in to learn more about it” (Worden).

In addition to that, the SEDC provided necessary resources to our participants to develop the protocols for future user studies as in the case of Blanca: “if you want to understand how people perceive a platform it makes total sense to me [using the cards], it gives me good examples of what to ask and what you should not miss [...] if you need to

focus on the Content you need all the Examples and all the Recommendations of those [...] it helps you to go straight to the point". Finally, several participants contemplated that the cards can be used to structure their design feedback and critique. *"I do not have to think about the process. The card is a hint for me to use within my expert feedback. The colored [themes] are helping me to structure my thoughts and the overall documentation from different perspectives. There are some ready-made suggestions that I can communicate to a client. It provides me a certain confidence, even [when it comes] to naming sections of the report"* (Pierre).

Collectively, these reflections confirm that the cards could be used in the different stages of the design process from assisting in initial ideation sessions to facilitating the reporting to the stakeholders. In what immediately follows, we detail how the SEDC played out in different stages of the service/platform design.

5.4 Developing Design Material Using the Cards

From the collected data we have observed that the SEDC can generate various design materials to create or improve a service. Our Study 1 participants used the cards to inform the structure and the content of a UX report including user flows, customer journey maps, and propose adjustments to the UI. Pierre detailed this while evaluating an existing platform: *"I have built up a state-map of functions to decompose the UI into the basic functions of different components and I am trying to find inconsistencies between certain [application] logics, which failed [within a service], and [to spot any] misleading components"*. Furthermore, Bobby elaborated that he used the cards to uncover platform shortcomings and to support their reporting: *"I guess a good way to show it would be [...] to take the card (see e.g., Figure 1c) and replace the example with the exact block from [our own service]. If I can do that, then we have to be doing things right, but if the example doesn't fit, that means we're failing in this aspect"*.

During our Study 2, participants used the cards to develop concrete service designs. For example, Figure 3b shows the filled idea template (and corresponding prototyping templates), which describes a design concept of a local toy bank and its target audiences, that is parents and orphanages. Specifically, the participants proposed an online service that would support the renting and sharing of upcycled toys. The cards not only facilitated the generation of various concepts, but also served to develop and to refine the ideas on the user interface level (see highlighted content on Figure 4a). The cards also helped participants mindfully attend to the design goal by incorpo-

rating new functionalities like storytelling, or attending to emotional aspects of belonging and intimacy. In particular, Figure 4c illustrates how Amy placed the explanatory notes next to her prototypes, summarizing the role of a particular card in her design decisions. In this instance, Amy demonstrated her interpretation (on the UI level) of the card's **Goal** "Build a common space" (see Figure 1b) for platform's users by affording them to create personal stories and to link them to the shared toys. Sarah illustrated (see Figure 4b) that the cards helped her to not only establish the UX goals of the service (e.g., enhance sociability), but also assisted her in the process of wireframing, establishing an interactive flow, and the creation of examples of the shared artifacts and the target audiences for it, stemming from the **Content** and **Audience** themes of the cards.

Collectively, these reflections help to illustrate that the cards were instrumental in different parts of a design process: from detailing nuances at the present design idea, to fostering interactive scenarios, to helping to identify and report design flaws in existing sharing economy services.

6 DISCUSSION

Our findings show that the SEDC enabled speculation on the role of the UX in the service development, provided hands-on guidance on different parts of the design process, facilitated creating new design material to inform the decision-making, and enabled speculation on future-looking opportunities of cards' use beyond devising sharing economy services. In what immediately follows, we discuss how the SEDC help advance the design practice and design research in the context of sharing economy.

6.1 Supporting the Design Processes

Despite our work focusing on studying designers in design workshops outside of their usual place of practice, we have ensured that the exercises we have performed with designers are situated around their core activities at work, that is collaboration and communication [40]. Those activities were implicitly included in the stages of the design sprint, namely Deciding and Advocating phases (see Figure 2c). In the former activity participants have to synthesize their design ideas, establish a group consensus, and eventually pick 1-2 design alternatives, while in the latter one the participants were required to advocate their designs to the set of (imagined) stakeholders. While numerous prior studies of design cards (e.g., [31,35]) have actively supported the divergence steps of the design process, our research highlights key value in better enabling convergence activities.

Following the recent work of Colusso et al. [7], we have adapted the design sprint process in our Study 2 in the context of sharing economy. While, several of our participants felt that more time is required to reflect on cards' **recommendations**, we specifically chose this high-paced approach to account for the ongoing issues of limited time and resources during the design process, which practitioners face in the real-life product development projects [40]. To address this concern, we believe that exposing the cards to participants prior to any design activity can be beneficial. Therefore, in order to ensure we would receive adequate feedback on the cards' content, we have accommodated an individual activity with designers and sharing economy experts in Study 1. In contrast to prior work [7], where participants were struggled to reflect on theoretical frames brought by the design cards, this time-unbound activity allowed us to elicit deeper reflections on the sharing economy concepts.

Our findings revealed that some of the design ideas that emerged during the sprint were attributed to the continuous interaction among participants (see Figure 3a). Yet, similarly to [7], our participants were able to further advance and expand their designs using the cards' **examples** and **recommendations** (see Figure 4a).

Finally, individual use of design toolkits, such as cards, are rarely described in the design research literature, perhaps, due to the collaborative nature of the design process at large. Friedman et al. [13] suggested that card-based design toolkits can be used as "an analytic technique tool", which our research supports and helps extend through an empirical case. Our SEDC were used not only in supporting groupwork to create new design concepts of sharing economy services, but also in the individual activity akin to expert critique to identify design issues of the existing sharing economy platforms.

6.2 Designing for Sharing Economy Services and Beyond

The SEDC extended and mobilized design strategies suggested by Light and Miskelly [28], which aim promote different dimensions of sustainability in sharing and exchange communities: environmental, social and economic. In particular, they highlight the importance of the community cohesion as a prerequisite to bring these strands together. Similarly, researchers discussed the value of community-fostering in emergent platform co-ops and predicted how interactive systems can support it [12]. Delora and other participants discussed aspects tied to community-building while reviewing the cards. In this, they acknowledged that the **recommendations** that our cards provide prompted them to approach the problem from a

new angle had not yet anticipated. We have also incorporated the **user experience** dimension as one of the cards' themes in the service of supporting community engagement early in the design process. With the rapid emergence of personal and mobile technologies, we envision that designers of future platform cooperatives may want to revisit the role of the UX in their value proposition. While some platforms co-ops (e.g. Stocksy, FairMondo) offer mobile-tailored (i.e. responsive) website designs to access their services, they are hardly competitive to design-driven sharing economy organizations with significant resources like Airbnb. Perhaps focusing on clearly *communicating* their commitments to cultural and community values [11] at different points of interaction with a platform may be beneficial to engage and retain users.

Our findings revealed that the SEDC can also be successful to surface opportunities for incorporating added privacy dimensions in the design process, known as "privacy by design" [27], which is often overlooked in the early stages of product development, as highlighted by Adam. Participants also regarded that understanding the motivation behind the service is a prerequisite to start any design process. While researchers have struggled to engage designers to see the motivation behind the design briefs during the sprint [7], we enabled participants to consider the **Motivation** theme early in the process. This worked not only to generate empathy among our participants in the given design challenge, but also to provided scaffolding for participants to detail their designs with reference to the various motives to participate in the sharing economy.

Looking at the particular distinction among profit-driven and non-profit approaches of the sharing economy [29], the SEDC can productively support designers in exploring this space from different perspectives. For example, Gladys, while evaluating a profit-driven bike sharing service, mentioned that the SEDC encouraged her to reconsider the value of social ties through reciprocity, cooperation and participation. For non-profit organizations the SEDC illustrated design opportunities to address the attendant challenges of platform co-ops – most notably to improve trust within their communities and supporting online platforms [24,25]. Following prior research highlighting specific characteristics of local and global context of the sharing economy [28,29], our work highlights the need for future empirical research to examine the role of platform design (e.g., functionalities and their enabling mechanisms) in greater detail.

Ultimately, our findings suggested that the breadth of themes covered in the card deck may be applied to various social sharing platforms (e.g. Endomondo for sharing per-

sonal workout data). This suggests an opportunity for future work to explore the extensibility of the cards to different, yet related areas of the sharing economy such as e-commerce, or online sharing services and apps.

6.3 Comparing the SEDC with Other Design Toolkits

Similar to other design cards, the SEDC enabled creative thinking [32,35], engaged non-experts in generating domain-specific ideas [34,35], facilitated prototyping [16,31], and described previously unknown concepts [7,34]. Following existing card-based approaches to facilitate the design exploration in particular application domains (e.g., Internet-of-Things [35], data privacy [34], behavioral change technologies [7]), our design of the SEDC integrated domain-specific knowledge to inform and inspire the design process. The SEDC surfaced ongoing challenges in the emerging sharing economy design space and provided actionable recommendations on how to address them. We see this as a main differentiator across other all-purpose design toolkits (e.g., platformdesigntoolkit.com) and broader approaches to design research (e.g., qualitative contextual inquiries). The SEDC incorporated both a “what-to” and “how-to” toolkit, which offers concrete frames of references to help designers (like Gladys and Pierre, see Section 5.2) navigate specifics of the sharing economy and to enable them to develop their ideas in this space. This can be especially beneficial to actual design teams, which often have to deal with practical challenges such as working within limited time and resources [40].

In contrast to many card-based design toolkits, the SEDC provided examples of interface designs of existing successful online sharing (economy) platforms. Pierre, along with few other participants, explicitly mentioned that while such examples may limit designer’s imagination, they nevertheless offer clarification and interpretation of the design goal, which can be particularly valuable for junior designers. These findings suggest an opportunity for exploring how those inspirational examples could play a role in supporting designers’ creativity in professional practice [23].

The SEDC can be seen akin to platform-specific interface guidelines (e.g., Apple Human Interface Guidelines [45]) as they feature a great level of detail and can be considered as self-contained design instruments [34]. Many of our participants described and used them as “checklists”, which can particularly be useful in evaluating existing sharing economy platforms and services. We see the SEDC as *translational resources* [6] that can facilitate knowledge transfer between design research and design

practice [8] by offering the adequate amount of detail tailored to different stages of the design process.

7 CONCLUSION AND FUTURE WORK

Our paper offers two main contributions. First, it presents the Sharing Economy Design Cards and the corresponding framework for their use in a collaborative workshop. Second, it provides insights and findings that surfaced during the two deployment settings of the cards with 26 participants and discusses how they help advance the design practice and design research in the context of sharing economy. Our participants have found cards useful not only in collaborative activities to create new sharing economy design concepts, but also in individual activities to provide structured design critique on the well-known existing platforms. Moreover, we demonstrated that the SEDC can be a versatile design tool suitable for the different stages of the design process: from initial ideation, to prototyping and evaluating designs, to reporting them to the stakeholders.

A wider dissemination of the SEDC would allow us to explore their applications in industry-based projects, which have longer timespans and real-life constraints. Future research could incorporate a particular methodological lens to analyze the use of the cards in designers’ creative processes such as theories of social practices. This will not only help better grounding our work in the designers’ processes at their place of work, but also may offer the deeper insights of the design space in the context of sharing economy.

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