Beneficiaries' View of Actor Networks: *Service Resonance for Pluralistic Actor Networks*

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In design for service, understanding the social fabric of the service system demands special focus, because the networks of actors that collaboratively create value strongly affect the multitude of service values for the beneficiaries of the system. This article explores mental models of actor networks from the phenomenological perspective of the beneficiaries, who ultimately determine the value of the service. The authors argue for a visual phenomenology and leverage the resourcefulness of individual network actors through a qualitative interpretive study that relies on in-depth interviews supported by generative card activities. By asking service beneficiaries (in this case, the elderly) to map their care-based network contexts, this method encourages human-centered, participatory approaches that reveal service systems from beneficiaries' perspectives. With an analysis of constructed visual artefacts and data-rich narratives that uncover the instrumentality of visualizations, the authors further identify different types of networks and the dominant values held by each network's focal actors. The authors hence suggest that not only should value creation as such be viewed as idiosyncratic, but so should the networks of actors that co-create value. Finally, the concept of *service resonance* is suggested to aid in accounting for the pluralistic perspectives of the network actors.

Keywords **–** Design for Service, Actor Network Mapping, Service Resonance, Network Topology, Dominant Values.

Relevance to Design Practice **–** In contemporary design practice actor networks are frequently mapped with various techniques. The proposed materially supported method to map networks opens up for a higher degree of participation in design practice. The conceptualization of service resonance as a strong concept, as an answer to the finding of the varying ways of expressing the actor networks and associated dominant values, is an aid in working with service development.

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Introduction

In new service development and service design, an increasingly common practice is to map networks of the actors engaged in value co-creation (e.g., Bitner, Ostrom, & Morgan, 2008; Diana, Pacenti, & Tassi, 2009; Segelström, 2013; Shostack, 1984). An underlying assumption is that these actor networks are not merely maps rather, as phenomenological artefacts, they can provide a clearer understanding of a service and its value co-creating processes.

Within service (dominant) logic, value, or improvements to well-being (Vargo, Maglio, & Akaka, 2008) are determined by service beneficiaries, who in turn are actors in networks (Grönroos, 1990; Vargo & Lusch, 2008). Networks are governed and influenced by institutional arrangements, which reflect the formal and informal ties built among actors (Akaka & Vargo, 2015; Edvardsson, Tronvoll, & Gruber, 2011). Finally, value is co-created among actors (Grönroos & Voima, 2013; Prahalad & Ramaswamy, 2004) and over time through acts of resource integration (Gummesson & Mele, 2010; Lusch & Vargo, 2006).In design, value is strongly linked to meaning and meaningfulness (Almquist & Lupton, 2010; Krippendorff, 1989; Ylirisku & Arvola, 2016), such that individual actors look for locally articulated values (Blomkvist, Åberg, & Holmlid, 2013). The focus is on human-centered co-creation of value (Sanders & Stappers, 2008), which stems from resourcefulness and participation (Holmlid, 2012). Furthermore, value is determined by the individual rather than the organization (Boztepe, 2007), such that value creation appears idiosyncratic (Wetter-Edman et al., 2014), and various beneficiaries form different understandings of value, through the value creation process (Arvola & Holmlid, 2016; Moeller Ciuchita, Mahr, Odekerken-Schröder, & Fassnacht, 2013).

This suggests that the network itself is as central to an understanding of service as are the networks of actors that collaborate to create value and they are, therefore, central to our understanding of design for service. Yet the practice of making

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maps of these actor networks remains underexplored—or at least less well documented. We explore the configuration of actor networks from the phenomenological perspective of the beneficiary, to determine:

- The ways in which actors in a service system (i.e., configuration of people, technologies, and institutions) describe the network, as a structure of actors and relationships;
- The types of visual artefacts they use to represent the network;
- The manner in which the visualizations expresses instrumental qualities; and
- The dominant values stemming from their narratives.

Through this we contribute new insights into modelling actor networks, as part of a human-centered design practice. Furthermore, we show how service beneficiaries' different mental models frame an understanding, and the expression in the maps, of service systems in which they actively co-create value, and how a service can resonate with a variety of mental models. These findings provide justification for the use of open and participatory mapping activities that do not impose strict formats, according to a predefined set of templates presuming the network structure, as an appropriate knowledge elicitation tool.

Background

Service design practice has prompted studies of different kinds of visualization (Diana et al., 2009) and their role in user research (Segelström, 2009) as well as their role in service prototyping (Blomkvist, 2016). The categorisation of visualization formats reflects various dimensions, such as time or abstraction. For example, Blomkvist and Segelström (2014) distinguish using visualizations to represent something *current* from using them to represent something in the *future*. In their framework, Diana et al. (2009) address whether development over time is part of the representation. If time is represented, the visualization is *diachron*, but otherwise, it is *synchron*. They also highlight that the means of representation may be *abstract* or *realistic*. Blomkvist and Segelström (2014) focus on the representation as such, distinguishing between *definite* representations, which are formats that do not change when someone *uses* them, and *on-going* representations, which emerge in the process of being represented.

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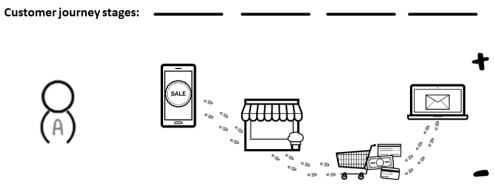
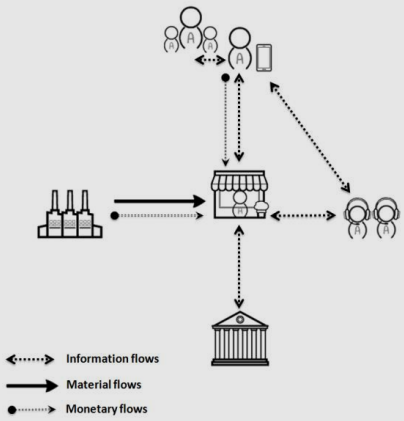
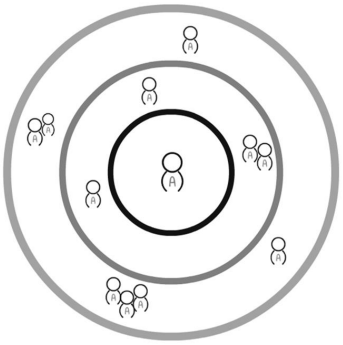
Actor Networks in Design

Table 1 summarizes a set of genre-typical visualizations that has emerged to represent a current service in service design practice. The first entry, a journey map type, is a diachron technique, and its visual appearance stresses how time develops and runs through the service, from a beneficiary's perspective. In many ways, it is similar to a blueprint (Shostack, 1984) except that, typically, less actors are represented directly in a blueprint. The second, the service system map type, tends to mix synchron and diachron techniques, with a visual appearance that stresses how technology and other resources relate to one another. This frequently abstract technique represents processes or system resources. The third, the ecology or network map type, is a synchron technique it is usually, but not necessarily, abstract and static. Specific phenomena are directly represented, but others can only be inferred, such as the actual organizational structure. This technique often results in visual artefacts, or is based on templates, that place the object of inquiry (typically, a focal actor or user) in the middle, with everything else ordered around this object.

A search in leading design journals for publications pertaining to maps of stakeholders, actor networks, or service ecologies yields very few hits. Across the top three journals (*Design Studies*, *Design Issues*, and *International Journal of Design*), only six articles were found, three of which relate to actor—network theory (Brodersen, Hansen, & Lindegaard, 2015; Petersen & Riisberg, 2016; Venturini, Ricci, Mauri, Kimbell, & Meunier, 2015). The other three do not describe how the networks were conceived, nor do they provide any visualizations (Ceschin & Gaziulusoy, 2016; Heylighen & Nijs, 2014; Stompff, Smulders, & Henze, 2016). One of the publications referring to actor-network theory (Venturini et al., 2015) offers an example of a complex actor network, in the form of a web of nodes and links. By widening our search for maps, we find a representation called *Actor Networks or Service Ecology Maps* (see Figure 1) in a service design textbook by Polaine, Løvlie, and Reason (2013). These authors suggest that the Actor Network map or Service Ecology emerged from desk research and interviews, and it depicts a system of actors and the relationships among them.

A number of other network visualization tools were identified, including the value network analysis (Allee, 2008), value framework (den Ouden, 2011), and value flow model (den Ouden & Valkenburg, 2011), which all rely on a researchers'

Table 1. Actor networks in design.

Genre/Tool	Who makes the map?	How are data collected?	Template provided?	Visualization Example
Journey map	Customer and/or service provider	Ethnographic studies including observations, in-depth interviews, and generative sessions	Yes	
Service system map	Service provider	Internal company information, interviews with various stakeholders, observations	No	
Ecology map or Network map	Service provider	Internal company information, interviews with various stakeholders, observations	Yes	

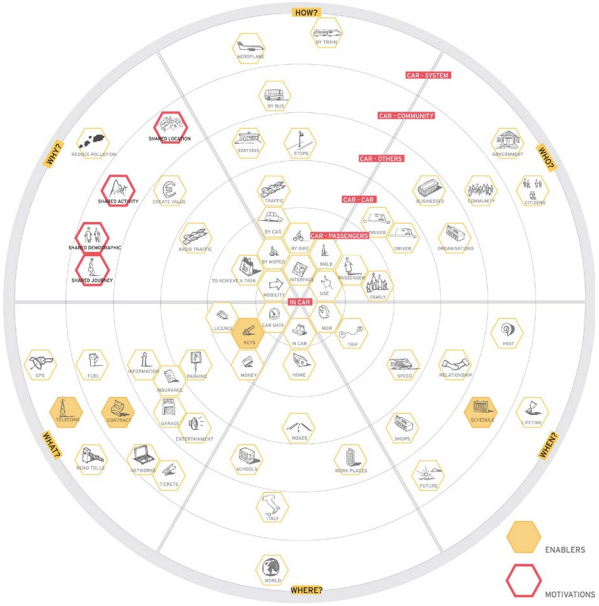


Figure 1. The actor network or service ecology map (Polaine et al., 2013).

representation of actor networks, usually spreading outwards with a focal actor set in the center of the visualization. Furthermore, a mapping concept, called Power Mapping or net-map (Schiffer & Hauck, 2010), was found that features maps built by the informants, individually or in groups with the intent to be shared with each other, without any pre-set template to follow, except the material used to do the mapping.

Actor Networks in Service

Moving to the domain of service marketing and management, the focus of many visualizations is on interactions, service processes, and operations (Patrício, Fisk, Falcao e Cunha, & Constantine, 2011; Sampson, 2012). They tend to rely heavily on the well-established service blueprint technique (Shostack, 1984), a diachron representation of service delivery. Different variations of service blueprinting emphasize a strong customer focus, such as by cross-referencing insights from multiple data sources, including observations, in-depth interviews, focus groups, and so forth (e.g., Patrício, Fisk, & Falcão e Cunha, 2008). Usually researchers, as members of multidisciplinary teams (e.g., marketing, operations, design, human—computer interaction experts), draw on the plethora of collected data and try to experience and map the service from customers' perspectives.

Similar to our search in leading design journals, we also conducted a search in the top service journals (*Journal of Service Research*, *Journal of Service Management*, and *Journal of Services Marketing*). There we identified only five papers that attempt to visualize actor networks or use other visualization techniques to analyze current service or actor networks (see Table 2). However, we also note an increasing interest within the service research community in understanding networks of actors that co-create value, especially through service interactions (e.g., Barile, Lusch, Reynoso, Saviano, & Spohrer, 2016; Fyrberg & Jüriado, 2009; Pinho, Beirao, Patrício, & Fisk, 2014). Various authors indicate the importance of zooming out from dyads to networks, however, few offer guidance for how to approach such complex network contexts. For example, in the *Journal of Service Research*, we find a variation of blueprinting, the *multilevel service design* framework (Patrício et al., 2011), that maps a service onto Edvardsson, Gustafsson, Sanden, and Johnson's (2000) three levels: service concept, service system, and service process. On the service concept level, the map reflects the customer value constellation of service offerings, a synchron representation such that actors can only be inferred from the representation. On the other two levels, diachron visualizations that represent processes and interactions are presented. The *process-chain network* (Sampson, 2012) instead outlines network actors and their interactions simultaneously. However, this visual technique uses a dyadic perspective, with one provider and one customer, and mainly represents their interactions. Finally, the *service delivery network* (Tax, McCutcheon, & Wilkinson, 2013) depicts actors and their interdependencies while describing their interactions in the explanation of the visualization. All three approaches are suitable for understanding and designing complex service systems, yet none of them involves network actors themselves in the mapping process.

Table 2. Actor networks in service.

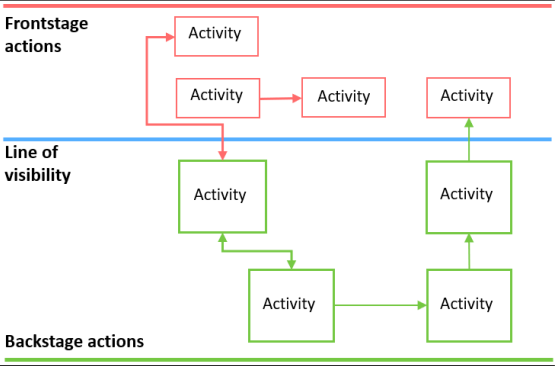
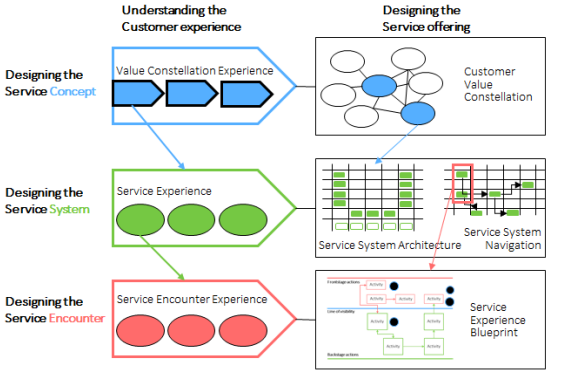
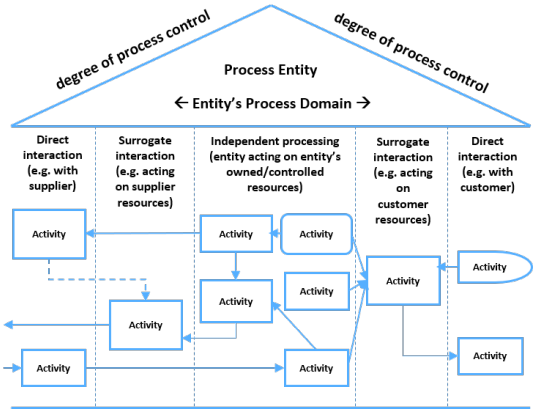
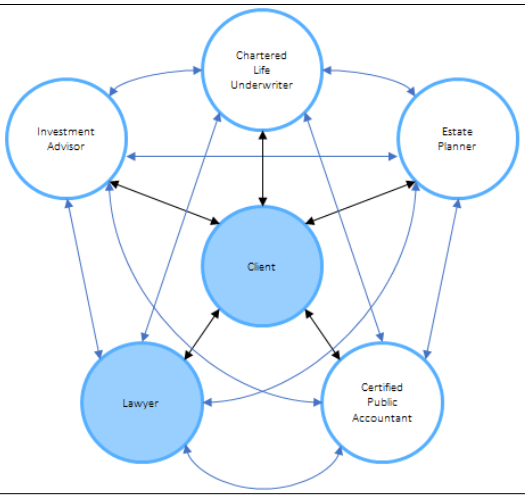
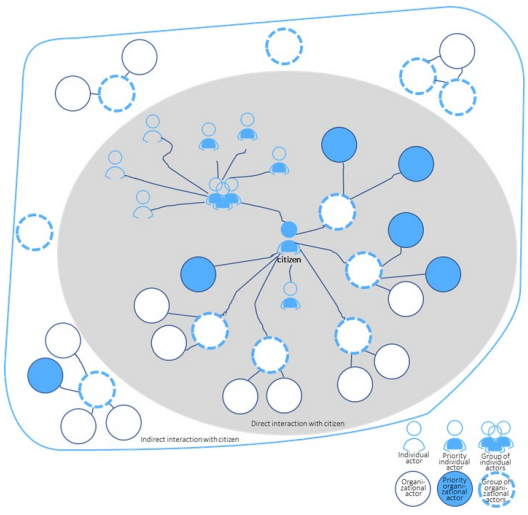
Genre/Tool	Who makes the map?	How are data collected?	Template provided?	Visualization Example
Blueprint map (e.g., Shostack, 1984; Patrício et al., 2008)	Service provider	Through observations, in-depth interviews, focus groups, service prototyping	Yes	
Multilevel map (e.g., Patrício et al., 2011)	Service provider, multidisciplinary team (manager of the business area and representatives from marketing, information systems, and operations)	Through observations, in-depth interviews, focus groups, usability testing, or walkthroughs	Yes	

Table 2. Actor networks in service (continued).

Genre/Tool	Who makes the map?	How are data collected?	Template provided?	Visualization Example
Process-chain network map (e.g., Sampson, 2012)	Service provider	Internal company information, interviews with various stakeholders, observations	Yes	
Delivery network map (e.g., Tax et al., 2013)	Service provider	Internal company information, interviews with various stakeholders, observations	No	
Network actor map (e.g., Pinho et al., 2013)	Different actors of the service system	Semi-structured interviews	Yes	

An exception is *value network actor map* (Pinho et al., 2014; Pinho, Patrício, & Fisk, 2013), which aims to provide an integrated view of the network relations among sets of actors. To create these visualizations, the researchers invited network actors to map how they envision value co-creation, though they include only five participants as representatives of four different network actors. The network map is structured into a single, integrated map, with categories based on a card-sorting task performed by the representatives. The main actor (in their study, the citizen) appears in the center of the visualization. The practice of finding consensus through card-sorting, and placing a main actor in the center, may be participatory, but gives little room for individual views to show through.

In the quest to understand how customers conceptualize and experience service, few visualization methods ask the involved actors to map how they perceive the interactions and how value is co-created among the actors who will be part of the actual service. While customer-centric, mapping approaches in Table 1 and 2 are not without shortcomings. The gap that frequently separates customers from service developers/designers makes it extremely difficult to adopt other viewpoints. Enabling and encouraging customers to sketch their own understanding of service actors, the networks in which they participate, and their value co-creation dynamics thus becomes important aspect for research.

The Limited Beneficiaries' Perspectives

As summarized above, for most mapping methods, the actors that are part of the network participate indirectly in the mapping of the networks as informants. If they participate directly, they often receive a mapping tool that directly prescribes formats in what ways they may structure the map, e.g., by positioning a predefined actor in the middle of the map. The former way of working restricts participation; the latter restricts the resourcefulness resulting from their participation. In both cases, the structure of the networks resulting from the mapping exercises is directed by someone other than the informant, so it does not represent the informant's own conception of the network.

We, therefore, seek to develop a conceptual understanding of how to map such networks in a way that is open to many beneficiaries' perspectives. We see the importance of leveraging the resourcefulness of the individual who performs the mapping. Actor networks are at the heart of value creation and, if value is idiosyncratic and determined by the beneficiary, mapping of these networks by many different beneficiaries could provide an idiosyncratic view of actor networks.

Actor Network Maps as Mental Models

Mental models make it possible to reason about how people understand phenomena in general and how their understanding shapes the way they engage with their surroundings (Norman, 1988). Along these lines, Norman's dilemma between mental and conceptual models in human-centered design may apply in the service domain. Norman describes the dilemma in that designers have their mental models that they use when designing a system, and the users have their own mental models when they use that system. The designers use their mental models and *translate* it into a system, also called a system image, which may or may not fit well with the user's model. The usage of the system, along with the experiential parts of the system image, are what the user combines with his or her own mental model, to achieve their goals. The differences between the user's model and the system image often create unnecessary friction. In human-centered design, the goal is to build systems based on the user's mental model, rather than the designer's.

Norman's ideas have gained traction in designing and using IT systems. Often the dynamic nature of the system image is restricted by laws of computation. However, within service systems, *users* are part of the system itself, as actors, so the complexity of how mental models interact and develop with the service system in action increases. In a service system, the actors also participate in resource integration (Gummesson & Mele, 2010), actively co-creating the prerequisites for the system, the system itself, and the value (Maglio, Vargo, Caswell, & Spohrer, 2009). That is, the actor's mental model of the service system functions actively to manipulate the structure and components of the service system, and thus the system image. In addition, the system is partly built around technology, which may be used collaboratively or through self-service options, and it is governed by institutional arrangements (Edvardsson, Kleinaltenkamp, Tronvoll, McHugh, & Windahl, 2014), which are assumed and ingrained through service cultures, genres, and routines.

One aspect of the system is the network of actors that build the social fabric of the service system, as well as the action possibilities of the system, because acts of resource integration are what drives any service system. Therefore, the mental models of the individual actors in that actor network constitute one key entry point to understand how individual actors in the service system view and understand the system and how it works, such that they might shed light on some of the norms and institutional arrangements.

Most of the actor network maps cited in the previous section either represent the mental models of service management researchers or else restrict representations of an actor's mental models to a predefined network structure template. Moreover, most of them work on an aggregate level, either by combining several maps into one, or combining several actors in making one map. For many other studies of networks, it is these aggregate networks that are in focus (Wasserman & Faust, 1994). In effect, there is little understanding of individual actors' mental models of service systems, and little research on what such mental models might be or look like. Allowing individual actors to do the mapping themselves therefore is critical, because "[w]hen someone externalizes a structure, they are communicating with themselves, as well as making it possible for others to share with them a common focus" (Kirsh, 2010, p. 444).

Actor Networks as Concept Mapping

In service design, mapping techniques help designers collect and summarize knowledge together with beneficiaries (Blomkvist & Segelström, 2014). Finding a way to allow actors to express their own mental models of the service system, building on a human-centered ideal, is preferable. In cases when informants use mapping as a straightforward knowledge elicitation tool, the maps represent so-called concept maps (Novak, 1991; Trowbridge & Wandersee, 1998). A concept map reflects one individual's conceptualization of the world or some phenomena within it. It offers a means to organize and explore a person's thinking about and understanding of related concepts, because a concept map visually represents concepts and their relationships. Their use in learning studies facilitates assessments of new learning strategies, the communication of complex knowledge, and support for decision-making and learning processes.

Many mapping techniques relate to concept maps as a genre of representation, distinct from the *maps* described in the model by Diana et al. (2009), which is a more generic genre for certain kinds of visualizations. Concept maps do not restrict how something is represented (abstract or concrete), nor what the links across the different nodes denote (synchron or diachron). Nevertheless, most

mapping techniques in design settings are specialized, with pre-defined or inherent rules about what may be represented (and not) and how. A system map and a customer journey map, thus, might be considered part of concept mapping, but they also are more specialized. These discussions motivate our interest in finding ways to involve beneficiaries more in drawing networks and freeing them to represent the network in ways that they find plausible.

Maps as Representations and Engagement

Visualizations of current services have several purposes, such as; for designers to develop insights or communicate insights to others, or for a design team to maintain empathy built previously in the process (Segelström, 2013). The network mapping techniques we have presented this far seem devoted to communicating with others or maintaining empathy. In some cases they function less as representations and more as tools or protocols to document research. That is, they are representations of actor networks and shorthand notes for a researcher; in both these cases, they are created by the designer and may follow a template.

For facilitation and mediation in design processes maps sometimes may be taken not only as models or representations of an actual network, but also *become* the networks themselves. Manipulating the map is understood as manipulating the network. Working with the representation, as such, would then be regarded as enough. Nonetheless, the manner in which these techniques impose restrictions on participation and resourcefulness suggest that understanding and using maps *as* networks constitutes a switch from representations of something real into a hyper-reality where reality is more or less obscured (Baudrillard, 1983). In some instances, it would be appropriate to say that the map is a simulacra, without representing anything real, although relying on claims that it does.

Malafouris (2013) argues that models that we use, especially those expressed in material form, do "not primarily embody a 'communicative' or representational logic but an enactive one" (p. 90) based on extended cognition concepts that replace the dichotomy between the brain and the world with an embodied, systemic view of cognition (Clark & Chalmers, 1998). There is a dynamic to the material engagement of our articulations (Malafouris, 2013). However, Malafouris does not suggest that the enactive logic applies to linguistic signs, whereas in extended cognition theories, a map would be perceived as a way of thinking (Kirsh, 2010). Madary (2016), developing a visual phenomenology argument, concurs that cognition can be performed with visual experiences. A consequence is that maps, thus, could constitute articulations with a certain dynamic for their material engagement which in turn is directed toward what the maps represent.

Research Methodology

Research Setting and Approach

The overall research objective in the research project was to acquire a better understanding of how elderly people conceptualize their care-based actor networks and value co-creation therein, before and after the introduction of a socially assistive robot to their assisted living contexts. We consider the insights of elderly people living in a nursing home or with relatives using a qualitative research method with an ethnographic approach (Segelström, 2013). We conducted in-depth phenomenographic interviews (Sandberg, 2000) in-situ; these semi-structured interviews sought to gain a deep understanding of people's conceptualizations and their sense making of their caring networks and surrounding context. We also wanted to elicit informants' needs and their affective reactions, in the form of data-rich stories.

A material facilitation tool, designed as a participatory and generative technique (Sanders, 2000; Stappers & Sanders, 2003), supported the in-situ interviews (Segelström & Holmlid, 2015). The tool enabled the articulation, in a visual/material form, of informants' models of the care-based actor network (Banks, 2001). The facilitation tool was a card activity (see Sutton, 2011) that sought to complement the explicit knowledge obtained from informants' verbal accounts, enhancing the possibilities to express and stimulate sharing of latent and tacit knowledge (Polanyi, 1967). The network actor cards also represent a response to Clatworthy's (2011) call for service design to make better use of tangible artefacts in the development and design of intangible service systems.

Informants

To ensure the validity of responses, we defined clear inclusion and exclusion criteria (Table 3). In total, 20 informants (10 women, 10 men) with minimal age-related health conditions participated in the study. The target population was elderly persons living alone at home (i.e., independent living), in a nursing home, or at home with assistance from formal or informal caregivers (assisted living at home). Table 4 presents details about the informants, using pseudonyms to protect their anonymity. The sample is diverse in gender, age, and living arrangements.

All interviews were conducted in person, in the informants' homes or nursing facilities where they resided and lasted 40–90 minutes with an average length of 70 minutes. We conducted four data collection waves over the course of 10 months until we reached theoretical saturation.

Table 3. Inclusion and exclusion criteria for prospective informants.

Inclusion criteria	Exclusion criteria
Elderly at the age of 60+ with no or only light (age-related) physical or mental health problems at the time of the study	Elderly with severe physical or mental health problems (e.g., dementia)
Living arrangements: independent, nursing home, or with caregivers	Elderly with no autonomy in their daily activities
Both genders, variety of daily habits, capabilities, preferences, technological skills, social status, etc.	Elderly not competent to give their consent

Research Protocol

After the initial recruitment, the informants who agreed to participate were first informed of the objectives of the study and received an informed consent form. Those who consented to participate answered demographic questions related to their age, gender, living arrangements, and number of family members. After collecting this general background information, a four-step generative *context disruption* interview (Čaić, Odekerken-Schröder & Mahr, 2018) was conducted (see Table 5).

Table 4. Informants.

#	Pseudonym	Age	Living Arrangements
1	Ms. Gray	72	Assisted living at home
2	Ms. Ellis	86	
3	Mr. Richards	90	
4	Mrs. Cross	61	Independent living
5	Mr. Cox	62	
6	Mrs. Bell	70	
7	Mrs. Newman	73	
8	Mr. Jackson	76	
9	Mr. Evans	78	
10	Mr. Butler	81	
11	Mrs. Moore	82	
12	Mr. Pearson	91	
13	Mrs. Sanders	78	Nursing home
14	Mrs. Smart	81	
15	Ms. Penny	82	
16	Mr. Cooper	83	
17	Mrs. Summers	83	
18	Mr. Davis	86	
19	Mr. King	90	
20	Mr. Wheeler	94	

In the first step, informants shared their everyday life experiences and the different people who currently take part in what we called their care-based actor network (i.e., informal and formal connections who are more or less actively involved in taking care of them, helping them with groceries, medicine intake, finances, moral support, and so on). In doing so they completed the *contextual value network mapping activity* using a set of specifically designed actor cards (Figure 2), a blank canvas, and color markers. It consisted of three steps: i) select appropriate network actors from a deck of network actor cards, ii) freely rearrange the selected cards into a conceptualized network configuration, and iii) add relations (i.e., pathways of value co-creation) among different actors.

In addition to asking about frequency of contact and general relationship dynamics, after the network mapping activity, the interviewer used the following probing questions to understand the role of each of the identified care-providing actors:

- Why is this actor important to you?
- What does s/he do for you?
- What does s/he mean for you?
- Do you feel like you are burdening this person?
- How would you be affected if this actor were no longer part of your care network?

The objective of this step was to get an understanding of how the elderly make sense of their caring networks and network relationship dynamics. Cards and mapping technique were deemed an appropriate method because of their ability to spark discussions with elderly respondents and their tangibility (Brandt, 2006; Clatworthy, 2011). The completed cards featured both images and text to ensure unambiguous understanding of their content. Thus, this activity collected both what the informants said (i.e., narratives built around the visualizations) and what they made (i.e., care-based actor network visualizations). The result was a comprehensive, holistic view of the actors in their networks. We did not presume to understand these informants' experiences and evaluations but rather encouraged them to express them, using *what* and *how* questions (e.g., What does s/he do for you? How would you be affected…?).

The collected insights from the contextual network mapping illustrate informants' existing care-based actor networks, before the network relations and structures become disrupted by the robotic technology.

Table 5. Context disruption interview protocol.

Step	Name	Description	Aim	Timing (approx.)
1.	Contextual value network mapping: *Current service*	Map the care-based actor network before the introduction of the socially assistive robot	Collect both what they say and what they make to get a holistic understanding of key network actors, their importance for the elderly's well-being, their value co-creating practices, and roles.	30 minutes
2.	Active immersion	Sensitizing to new technology usage	Make informants sensitive to an area of experience (i.e., new technology) before introducing an unfamiliar technological impulse (i.e., socially assistive robots).	15 minutes
3.	Introducing disruption	Introduce, assess, and prioritize socially assistive robot functions	Get the informants acquainted with the socially assistive robot (e.g., look and feel, functionalities), collect their genuine care needs, and illuminate value priorities.	35 minutes
4.	Contextual network mapping: *New condition*	Map the care-based actor network after the introduction of the socially assistive robot	Determine whether and how the conceptualization and visualization of the care-based actor networks change with respect to that from the first step (i.e., before vs. after the introduction of the socially assistive robot).	15 minutes

Figure 2. Network actor cards.

Data Analysis

All interviews were digitally audio-recorded, and the visualizations created were photographed. Interviews were transcribed, translated, and reviewed, resulting in 326 single-spaced pages of text. In the analysis in this paper, we investigate the data from the first step, *the contextual network mapping of the current service*, and surrounding narratives to establish an initial understanding of how elderly people conceptualize these care networks. The unit of analysis was a particular actor network, 20 out of the 40, visualizations and their accompanying interview content.

Initially, three researchers read the transcripts individually and took notes on emerging themes. In parallel, each author analyzed the collected visualizations taking a visual perspective—focusing on emerging network structures. We opted for involving at least three researchers from the author team to minimize individual author's biases and to increase reliability of visual analysis and interview analysis (Sandelowski, 1993).

In the first joint session, the authors shared their understanding of the reoccurring network types, which resulted in a list of three distinct network configurations (i.e., network archetypes). In a subsequent series of group analysis sessions (see Figure 3), three authors first individually coded each of the 20 visualizations and then examined the agreement among them.

Figure 3. Data analysis session.

The collected narratives were coded in parallel with the analysis of accompanying visualizations. First, the lead author applied line-by-line coding (Charmaz, 2014) to later develop a more focused coding scheme. In another group analysis session, two other researchers from the author team coded the raw data based on the established coding scheme, which led to the emergence of three overarching themes of values. In total, 365 quotes with underlying values were extracted from 20 in-depth interviews. Primarily, the lead author coded all the quotes using various colors: red color to denote one of the value themes (i.e., emotional values), green color to denote second value theme (i.e., functional values), and blue color to denote third value theme (i.e., social values). Later, in the final group analysis session, the other two researchers used the same coding scheme to analyse the quotes.

Finally, a straightforward analysis of correlations between network types and value quotes was performed. For each network type a frequency analysis of emphasized values was made (the number of quotations and sources; Wünderlich, Wangenheim, and Bitner, 2013) and compared to the total number of quotations per a particular category (i.e., value type).

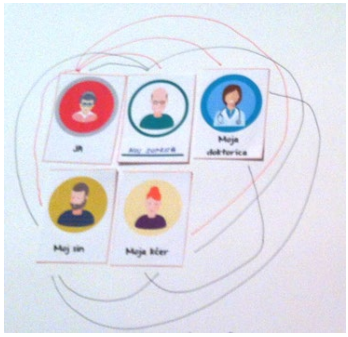
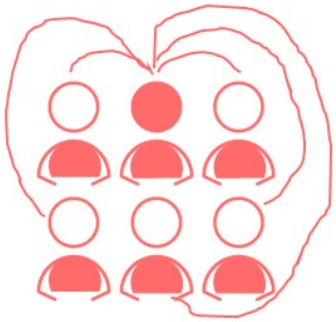
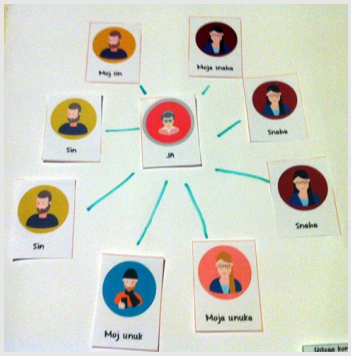
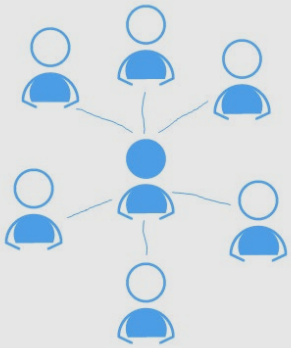
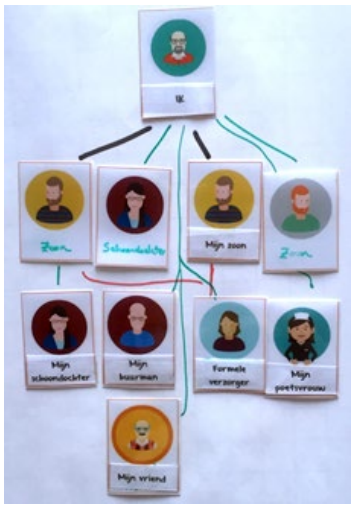
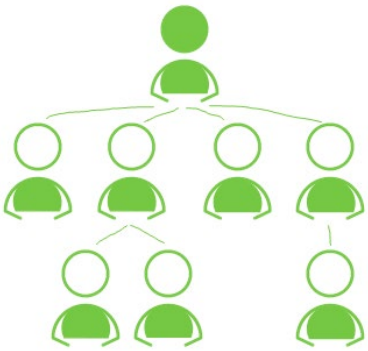
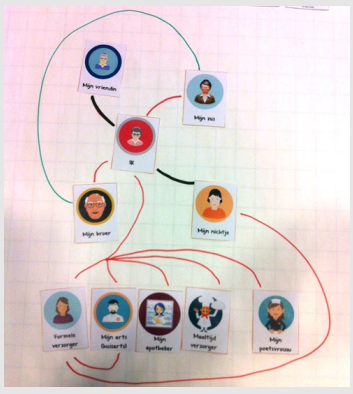
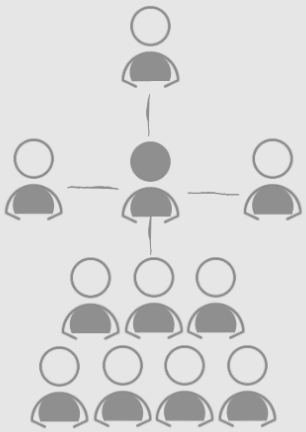
Results

In this section, we start by presenting how, by leveraging the employed participatory approach, we discovered different network types that emerged from the visualizations created by the users themselves. Next, we explain the different network configurations according to the expressed value priorities.

Finding Network Archetypes

In ensuring the active involvement of users in the fuzzy front end of design research, we acknowledge that value is phenomenological and experiential in nature. Leveraging this approach, we uncover layers of complexity through an emerging network topology. Table 6 outlines three network types: bundled, focalized, and hierarchical, as well as a hybrid network configuration.

Table 6. Network topology.

Network Type	Visualization	Archetype Diagram	Frequencies pure (hybrid)
Bundled network			2(6)
Focalized network			4(4)
Hierarchical network			5(8)
Hybrid network			9

Bundled Networks

A bundled network centers on the collective of actors in a network. Visually, it locates all the network actors in the middle and shows their connections, representing the different streams of value co-creation on the outside (see Figure 4). The elderly person, as a pivotal actor, is either placed first from the left or in the middle of the row. The bundled network type appeared two times in a pure form and six times as a hybrid within our sample.

Focalized Networks

In a focalized network the focal actor is placed in the very center connected through value streams with surrounding network members (see Figure 5). Connections (i.e., lines) differ in length, however, from the information solely gained from the visualizations it is difficult to make claims regarding the meaning of their length. Narratives offer more insights on this matter with the line length signalling one or more of the following: i) frequency of contact (e.g., shorter lines suggest more frequent contact, while longer lines less frequent contact); ii) physical proximity (e.g., shorter lines present geographically closer actors); and iii) emotional versus functional relevance (e.g., shorter lines connect the elderly person with their emotionally-relevant connections including close family members, while longer lines connect functionally-relevant support including formal caregivers). This focalized network type appeared four times in a pure form and four times as a hybrid version within our sample.

Hierarchical Networks

In hierarchical networks the focal actor is at the top. Participants put themselves at the top connected to other actors in a hierarchical order (see Figure 6). Again, inferences about connections can be made from the narratives: i) shorter lines (direct contact; frequent interactions; physical proximity; functional-dependability; emotional relevance; informal ties), and ii) longer lines and indirect lines (indirect contact; infrequent interactions; formal ties; support of less functional/social/emotional intensity). The hierarchical network type appeared five times in a pure format and eight times as a hybrid in our sample.

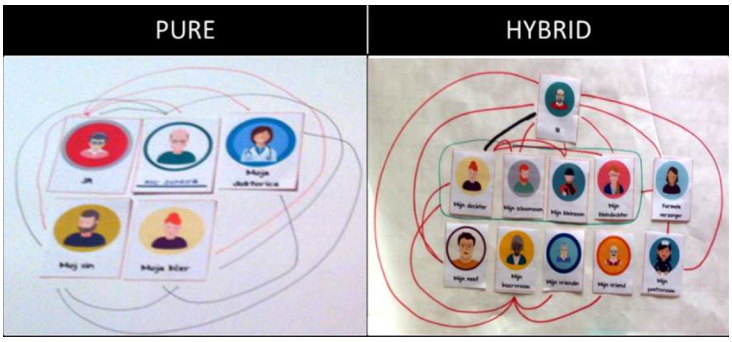


Figure 4. Bundled networks, pure and hybrid.

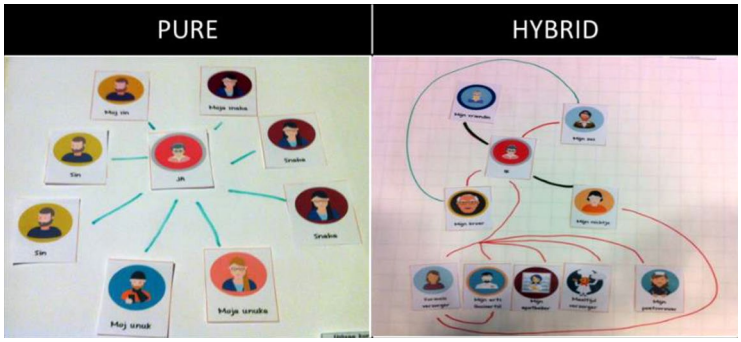


Figure 5. Focalized networks, pure and hybrid.

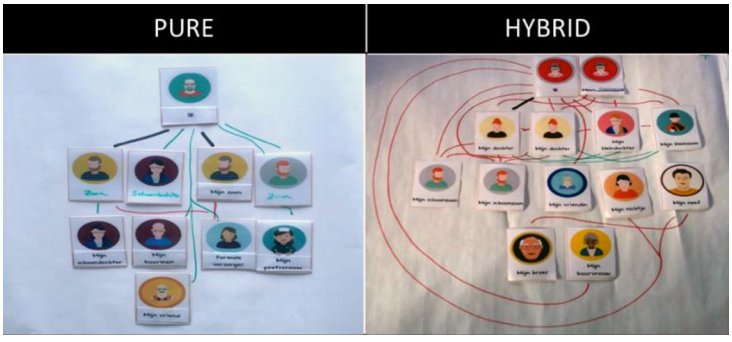


Figure 6. Hierarchical networks, pure and hybrid.

Hybrid Networks

Finally, hybrid network configurations can be described by at least two of the network archetypes. In total, we identified nine such occurrences: A focalized/hierarchical network occurs three times, bundled/hierarchical occurs five times, and bundled/focalized occurs once. The classification according to network archetype of the twenty networks analyzed is presented in Table 7. Figure 7 depicts the distribution of collected visualizations among the three network types.

Finding Dominant Values

We undertook further analysis to determine whether the different types of networks constitute just different ways of depicting the same thing, that there is an equal neutral actor network behind the visuals, or if more complexity might be hidden within and beyond these visualizations. To answer this question, we focused on the narratives shared by our informants. The specifics of these narratives transform the synchronic scenes into diachronic ones, by adding more layers of contextual understanding.

We started by analyzing the codified values that resulted from our group analysis sessions. We used the definition of value rooted in the service-dominant logic, which identifies an "improvement in systems well-being" (Vargo et al., 2008, p. 149). All units of meaning related to the improvement in elderly persons' well-being were codified and subsequently clustered. The identified values that elderly persons realize through their network membership ranged from emotional (e.g., love, sense of belonging) to social (e.g., entertainment; being connected) to functional (e.g., practical help, feeling of safety, sense of retained order). The resulting frequency for each analyzed interview is found in Table 8 and Table 9.

When analyzing the different value quotes all three clusters of values (i.e., emotional, social, and functional) were generally present in all collected narratives. However, when analyzing the frequency of different values per network archetype there was a dominant value (i.e., salient value) representative of each of the network archetypes (see Figure 8). The sample of pure network archetypes is small, which limits the possibilities of this study to go beyond correlations.

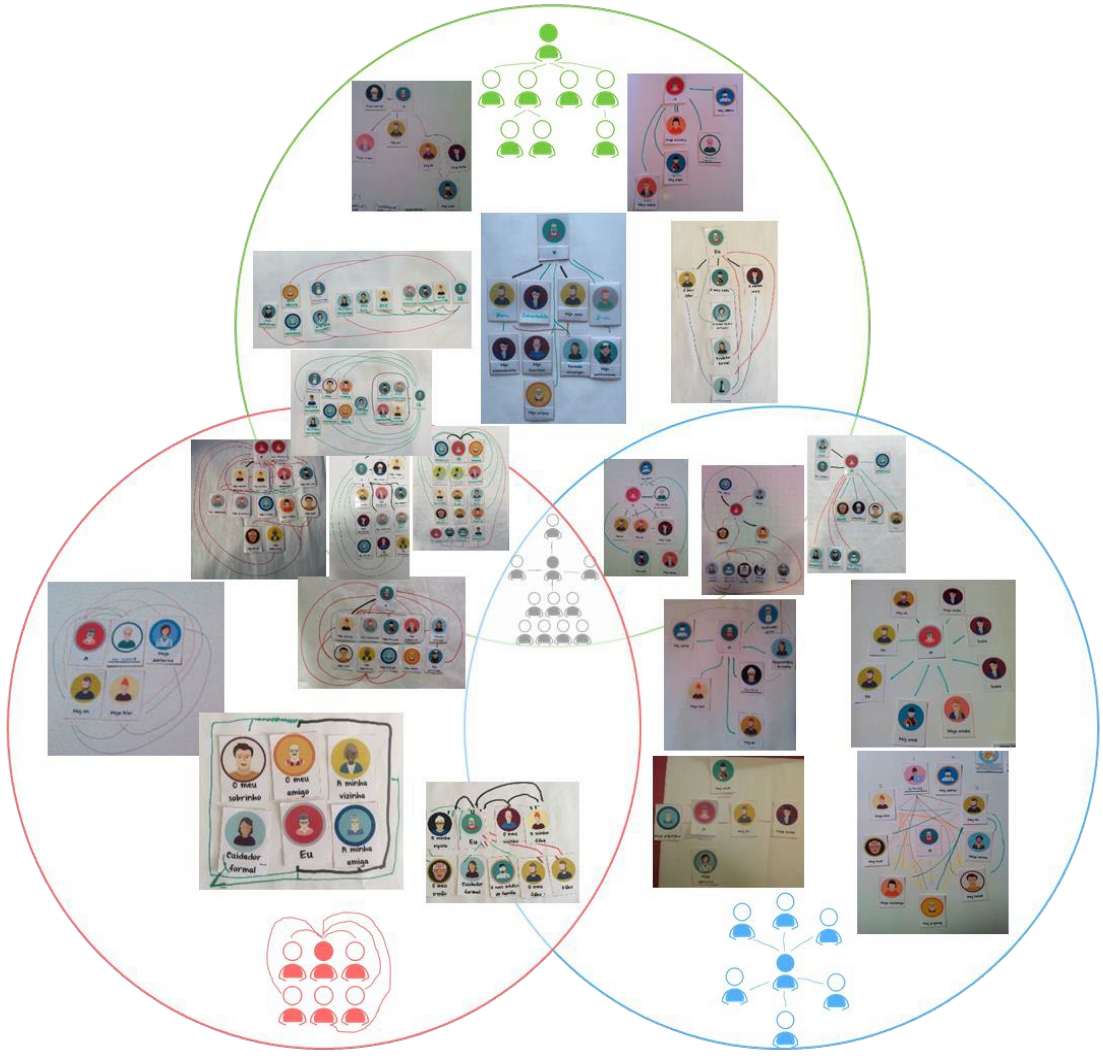


Figure 7. Network visualization clustering.

Table 7. Archetypes of networks (B = bundled, F = focalized, H = hierarchical).

Archetype/informant	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20
Bundled	**B**																			**B**
Focalized		**F**				**F**	**F**	**F**												
Hierarchical				**H**	**H**									**H**		**H**		**H**		
Hybrid			F/H						H/B	F/H	H/B	F/H	B /H		B/H		B/H		F/B	

Table 8. Frequency of value quotes (non-hybrid networks marked in bold, B=bundled, F=focalized, H=hierarchical).

Value/informant	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
Emotional	**11**	**2**	5	**3**	**2**	**3**	**3**	**4**	4	3
Social	**4**	**10**	4	**2**	**3**	**13**	**13**	**8**	6	6
Functional	**8**	**8**	14	**9**	**13**	**7**	**4**	**8**	7	12
Archetype	**B**	**F**		**H**	**H**	**F**	**F**	**F**		

Table 9. Frequency of value quotes (non-hybrid networks marked in bold, B = bundled, F = Focalized, H = hierarchical).

Value/informant	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20
Emotional	8	3	9	**5**	9	**1**	4	**5**	5	**7**
Social	3	5	4	**2**	3	**4**	5	**2**	4	**3**
Functional	5	9	10	**4**	6	**9**	8	**15**	6	**3**
Archetype				**H**		**H**		**H**		**B**

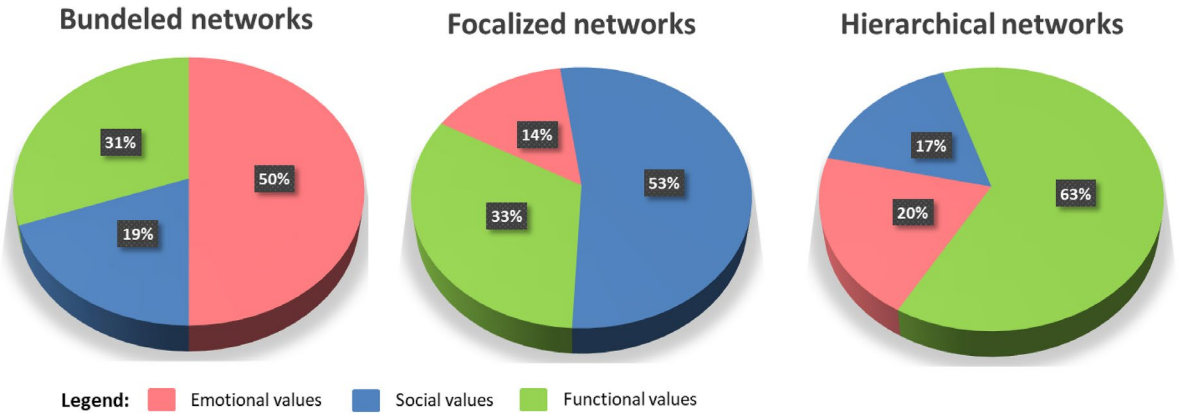


Figure 8. Total frequency of value type per pure network archetype.

Bundled Networks: Emotional Values

In the data, we find eight bundled actor networks, in which the informants placed all their actor cards in the middle, then drew connections to the outside. Emotional values represent a metacategory (96 quotations from 20 sources) of emotional needs including *love*, *attention*, *companionship*, *sense of belonging*, and *family*. The emphasis on emotional values was found in the eight bundled network narratives through 57 quotations representing 59 percent of the total emotional value metacategory. In analyzing what informants said while drawing these bundled network, we determined that they invariably emphasized the importance of their families and the need to treasure such relationships:

> My family is very important to me. I believe the family is a pillar, a backbone. Yes, one can have many friends, neighbors, relatives, but family is a constant, something that needs to be cherished; I have a family and I am happy to have it. I love my family. (Mrs. Cross)

By choosing to show their network as a bundled network, through their placement of the cards, these informants convey the importance of their family. Keeping family close together is one of their main goals, which intensifies their sense of belongingness:

> Our family is very close. We organize a family day each year. My mom is still alive, she's 95 years old. The children, grandchildren, and great-grandchildren come together at my mom's place each month. (Ms. Gray)

Other common values mentioned in relation to these networks included attention and company:

> They [family and friends] offer me attention and companion. They are not taking care of me … because I can still help myself. (Ms. Gray)

> [Because of the family], I am not alone! (Mrs. Cross)

A sense of belonging, attention, and companionship thus is expressed through these informants' depiction of the actor network.

Focalized Networks: Social Values

We detected eight visualizations in which informants put themselves in the middle, such that relationships with the other network members stem from their central position. Social values illustrated a metacategory (104 quotations from 20 sources) which subsumes social needs including *being connected*, *socialization*, *entertainment*, and *comfortable and exciting life*. The emphasis on social values was detected in 63 quotations from the eight focalized network sources, representing 61percent of the total social value metacategory. From the analysis of the narratives we identified that informants who drew such focalized networks accentuate the importance of social contact:

> … but know this; it's difficult to be alone. There is this saying "Not in the mountain, not at the sea, not in the church, it is never good to be alone." I wish I had someone to talk to at least. (Mr. Davis)

> Every day I go to the day care centre where other retired people go to. Some of them I know, others I don't. There we talk all morning, drink some coffee.... (Mr. Jackson)

Other common values that emerged included entertainment and a comfortable, stimulated life:

> [My friend] comes by every week to catch up and play a game of Rummikub with me. (Mrs. Sanders)

> I play games on my iPad.... I've got e-mail on my computer. I can send messages or forward messages.... I'm able to send an e-mail by using the computer or a text message by using my phone. (Ms. Penny)

> Maybe the greatest satisfaction comes from my computer and all the possibilities I'm using … from communicating with people, doing bank transactions, I can do many things with the computer not having to physically go somewhere. I can take care of everything from my home. (Mr. Cox)

These values were more strongly emphasized by informants who depicted the focalized network than the value priorities stressed by informants relying on bundled or hierarchical networks.

Hierarchical Networks: Functional Values

What we define as hierarchical networks appeared 13 times in the sample. Functional values gave rise to a metacategory (165 quotations from 20 sources) comprising functional needs such as *practical help*, *problem-solving*, *organization*, *power*, and *security/safety*. Functional values emerged as salient in narratives surrounding hierarchical networks through 121 quotations from 13 sources, representing 73 percent of the total functional value metacategory. When informants placed the *me* card on top, with other network actors in hierarchical order underneath them, they communicate a specific organization of activities within their care-based actor networks and *care* primarily captures practical help:

> Three of my sons take care of me. One takes care of my insurance and all the paperwork, one takes care of everything here in my room, and one takes care of the grocery shopping. (Mr. Wheeler)

> My daughter does everything for me. She takes care of me, does the groceries. I'm not running short on anything. (Mr. Richards)

Furthermore, they emphasize a feeling of safety/security obtained from others in their networks:

> When something happens, she [niece] is the one taking care. I know I can rely on her.… Yes, I feel safer because of her. (Ms. Ellis)

> They [formal caregivers] help me take a shower. Luckily I still can do a lot of things myself.… When I need help, I just have to call and they will respond immediately. (Mr. Cooper)

Along with safety though, these informants stress the importance of retaining a feeling of independence, order, and power over their own lives:

> … I want to be able to do by myself whatever I need to do for myself. It is important because I still feel strong, I mean ... how to say this ... that I have not yet stumbled. So this is important. Even if there is something that is difficult for me to do, I do it to prove myself that I still can. (Ms. Ellis)

> My daughter often offers me to drive me around in case I need to go somewhere, but I don't want that. I want to be independent as long as I'm able to be on my own. (Ms. Gray)

Figure 9 depicts how the different network archetypes relate to specifically highlighted values.

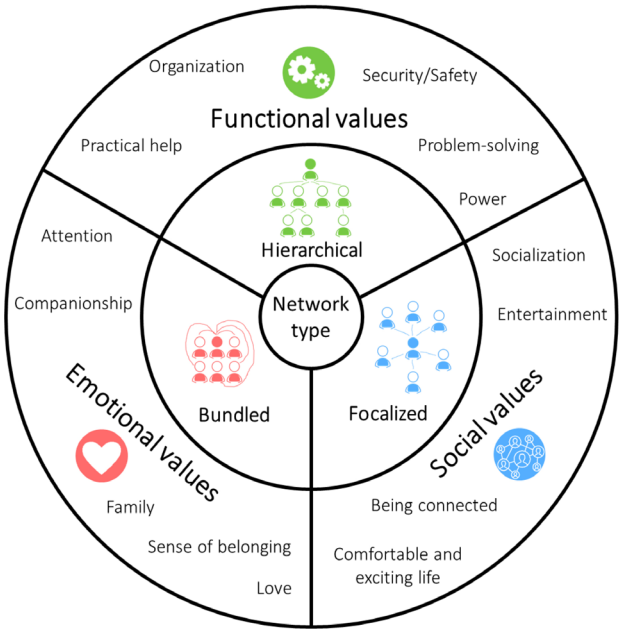


Figure 9. Value priorities according to the network archetype.

Discussion

This research demonstrates how, by empowering people to map their network context freely and express their models of service systems into visual artefacts, researchers can gather rich phenomenological conceptualizations of actor networks, as well as of value co-creation. Here we first discuss the mappings of actor networks, then the connection to dominant values, and drawing it together by introducing service resonance as a strong concept. After this we treat future research, implications and limitations.

Beneficiaries' Maps of Actor Networks

The participants in this study had the freedom to map their network contexts with the cards, without any predefined visual template or a structure to follow. They could have created highly similar visual networks but, instead, they chose to make maps in different ways and manifested in the visual renderings of these networks. The participants, however, were limited by the tool itself, the format of the cards and to drawing lines. The participants used these to project their conception of the networks, that exposed a variation of networks through and despite the limitations of the mapping tools. The network maps are not theoretical constructs of an ideal network, nor a construct based on a single predefined network topology, nor a construct of aggregated networks, but instead are practice-based conceptualizations of specific networks that describe how each individual view their network.

If we regard network maps as articulations of mental models, Norman's (1988) dilemma is clearly at play. Three distinctly different archetypes of actor networks arise, describing a particular standpoint of the beneficiary in the service system, in terms of how they structure and participate in resource integration (Gummesson & Mele, 2010), Each map is an expression of how the beneficiary acts (Malafouris, 2013; Kirsh, 2010) as a proactive agent with the other actors. Only the focalized archetype features visual similarities with how most techniques and methods suggest actor network maps should be created. That is, the recommended techniques in the literature review uncover or structure either the mental models of service designers/developers or else mental models that do not fully represent the phenomenological perspective of the beneficiaries (only four out of twenty networks were pure focalized). If a service is designed and operationalized according to those models, prescribed by the service developer's practice, the system image will not align, or resonate, with the different ways beneficiaries understand how the service system works.

Moreover, because the suggested models from the literature review focus on an ego-or concentric type of mapping, with similarities to the focalized archetype, they uncover a specific stance for human-centered design, namely, *putting the user in the center* as a leading statement. Yet in this study, when users had the opportunity to show how they view actor networks, they did not always put themselves in the center. We thus need a different stance, to be able to build on people's resourcefulness and structure a design process that makes the perspective of the focal actor manifest (Holmlid, 2009; Malmberg et al., 2019). That is, designers should not put the actor in the center but rather must let the actor decide how to position him- or herself.

Despite these differences in the visual appearance of the networks, we also note similarities, which suggests possibilities for aggregating network descriptions in new ways, according to their visual appearance, or their archetype. Instead of only aggregating on the basis of the content of all the networks, which eradicates some uniqueness of the different types, aggregation might instead reflect the use of archetypes.

Maps and Dominant Values

The interviews reveal that the different network types are associated with different dominant values. The current study supports that there is a correlation between network type and dominant values. Thus, the network types differ not only in how they look but also in what the person behind the network is saying. This supports a position that a thorough analysis of actor networks should be open to how beneficiaries view the network and enable those beneficiaries to articulate how the network works, beyond the visual map itself. Using the interview data, we can rely on visualizations that communicate these value relations, in accordance with one of the common roles of visualizations in design (Segelström, 2013). The variation between network archetypes may also have consequences for evaluating existing and new services (Foglieni & Holmlid, 2017), especially with respect to understanding how to cluster responses.

From a practical standpoint, value statements potentially could have been added to the network mapping, to establish value co-creation maps, by adding text to the links between actors. However, three factors limit this possibility. First, the simplicity of the mapping with the cards would be hampered if we were to add another task to the mapping exercise. Second, the requirement to add words or information to the arrows would direct the type of representation format, toward ones that separate the cards at some distance from one another. This push would make it almost impossible for an informant to choose to create a network expressing visually the bundled network. Third, the interviews produced more than just single value statements that characterized relations and clusters of relations. Either all of these clusters would need to be mapped onto the arrows, which would require large amounts of space, or some of the rich knowledge would be lost, because the interview would flow away from arrows that already had been labelled, even if this drift would be non-deliberate.

Introducing Service Resonance

Noting that there are different ways to understand the actor network, with their varying dominant values, service designers and developers must take pluralism into account. Several, non-exclusive approaches are possible and in common use today to handle such pluralism. One common strategy is individualization, where a core service offering is developed, and additional service offerings are added to cater to individual needs. Another common strategy is customization (Shostack, 1987), where a general service offering is developed and resources in the service system are developed to be customized. This could be a service where staff is adapting to differences in a service situation, to handle such customization. These approaches seek to minimize variation

through standardization. However, when ways of understanding the network, with their associated dominant values, differ radically, they uncover or expose variations in institutional norms and beliefs (Edvardsson et al., 2014), that goes beyond approaches focusing on the service offering.

In one sense, a service that 1) operates under differing dominant values and a variation of mental models, and 2) is well designed, one would expect to *resonate* with these different values and models. Hence, as a strong concept (Höök & Löwgren, 2012) to describe this characteristic of a service, we here suggest *service resonance*. Service resonance describes a characteristic of a service that is generative and evaluative, as compared to more descriptive concepts such as institutional norms and beliefs. Based on our study, we will focus our discussion around service resonance on pluralistic mental models, though we claim that the concept also is relevant with pluralistic dominant values and pluralistic institutional norms.

Service resonance refers to the relationship between the service and the different mental models (dominant values or institutional norms) for which it is intended. A service, in operation, can resonate well or poorly with any mental model for which it is intended. The strategies referred to above constitute approaches to handle resonance; some limit the offering to fewer mental models, while others put trust in staff to adapt to detectable differences in the mental models of the beneficiaries. In this study, we have highlighted differences based on elderly people's mental models, but for any service, there are many actors whose mental models are significant, such as the patient, the informal and formal care-givers, etc. As a consequence, the different mental models of any person involved in co-creating the service influence that service (Holmlid, 2012), as do all system images of artefacts or technology involved in it. Service resonance therefore entails relationships with all the mental models in play for a specific service.

Consider the limited example based on the networks of the elderly persons in the study. The service resonance of the formal caregiver's service, if being regarded as the same service across all of the elderly people, relies on whether that service resonates with the three network archetypes (bundled, focalized, hierarchical). That is, a service that resonates well, is a service that resonates with elderly people relying heavily on family relations as well as elderly people having a functional view of actors in the network as well as elderly people leading an active social life. However, it is not a necessary condition that a specific service have to resonate with all three, it may be a strategic decision to develop several different services with a smaller scope that resonates only with one of the models. As a consequence of this, when developing new services, or new resources that changes how a service operates, one need to understand the different models with which the service need to resonate. For example, a service relying on letters and paper as a means of communicating with patients in a health-care system, resonates well with several of the archetypes, while a service relying on electronic communication with requirements of secure personal identification, resonates less well with archetypes where family is an integrated part of informal care. That is, there is a design difference in allowing for family to open letters from a formal caregiver, and requiring an elderly person to share login and secure identity information with family.

Future Research

Our results suggest several possible questions and challenges for continued research. First, can similar results be found in other domains, and are there causal explanations to the connection between network types and dominant values? Second, do similar multiple perspectives appear in other synchron service representations? If so, how? And in what way may user involvement in making the representations uncover that? Third, is there a similar effect on diachron representations? Assuming that similar differences exist, are they central to how we need to understand diachron representations? Fourth, how can pertinent variations be manifested as a design concern? Fifth, would we gain an increased degree or quality of variation from involving more actors in the mapping? Sixth, how can the values uncovered in the study be related to other frameworks of value and quality of life, to support possible generalization of findings? Finally, if we assume that there are many different networks, how does adaptation to the situatedness of the different networks take place, and how does certain activities or actions work as means for coordination and calibration between networks?

Implications for Practice

Our finding that informants map different network types, with different dominant values, and that these differences do not seem superficial, suggests an important route for pursuing increased understanding of service and design for service. Tools used today to map networks, in service design, service management, and marketing, seem less well developed than the phenomena they try to capture. Several tools assume a single, best manner for mapping networks, with a template directing the mapping and the resulting map. We posit that there are two possible reasons for this gap. First, practitioners may believe that they are capturing the network with their restricted methods, such that they unintentionally ignore how these techniques limit the active participation of actors in describing the network. Second, practitioners know that understanding networks is a complicated task, beyond what a single mapping method can support, so they perceive no compelling need to develop such a method or technique, but rely on many different techniques. Design tools and methods that support many different ways to conceptualize networks thus might offer a promising way forward, to expand on both of these positions. With the assumption, as in the current study, that there are multiple ways to see networks in a service, new tools and methods likely are needed to clarify how different networks interact, how adaptation to the situatedness of the different networks takes place, and how certain actions work as bifurcation points, among other topics.

Limitations

While our study introduces interesting and novel insights into how service beneficiaries make sense of their care-based actor networks, through both visual and verbal conceptualizations, it is important to acknowledge the boundaries of our study. First, although we conducted a considerable number of in-depth phenomenographic interviews, it is difficult to make claims about generalizability of

our findings outside of the elderly care context. Future research should examine other service contexts—Edvardsson (2000) to explore how suitable the *context disruption* method is for understanding other types of actor and value networks. Second, while we acknowledge that including a quantitative validation for our dominant values claims is uncommon for qualitative research, we argue it substantiates our qualitative analysis, as well as the understanding about dominant values that the researcher who was embedded in the research context developed during the data collection. We do not claim a general or direct correlation between network types and the dominant values, even though future studies designed to clarify correlations, or even causation, may do so. We suggest that future research should search for ways to empirically validate and enhance our dominant value claims, either by studies designed to explore correlations or to find causation between network archetypes and dominant values.

Third, we acknowledge that our contextual netw*ork mapping activity* still has properties of a template—with cards representing network actors and lines representing their value co-creating relations. However, we provide evidence that it gives informants a higher degree of visual freedom in representing their network conceptions than other reviewed mapping techniques. In other words, we do not provide our informants with a predefined network structure—forcing their network visualizations into one of our detected network types. However, we do recognize that a different design of cards potentially could yield different network types. Fourth, our mapping tool and accompanying instructions did not explicitly ask informants to indicate distances, make connections between alternatives, or show if connections are uni- or bi-directional. As a result, we do not report established network analysis metrics (e.g., centrality, density, reciprocity). Finally, we emphasize that the collected data is cross-sectional and anticipative in nature, hence we open a promising area for other researchers to conduct longitudinal studies to examine how elderly persons' network conceptualizations change as they cohabit with socially assistive robots.

Conclusion

This paper contributes to service design and marketing in four main ways. First, it demonstrates that the networks maps are not only accidental visuals but are active manifestations of how a beneficiary is networking to co-create value. Second, it identifies a correlative nature between network archetypes and dominant values. Third, it illustrates that service designers and researchers should not prescribe mapping structures when studying actor networks, nor should they map the networks themselves. Finally, it introduces a strong concept of service resonance for pluralism of actor networks.

More specifically, we contribute to an expanded understanding of beneficiaries' perspective on how actor networks are configured, for the network to work as a co-creative base for the beneficiary. Our study shows that beneficiaries of a service have different models of the actor network that vary in their structure and dominant values. It is clearly wrong to assume that there is a single way of understanding and using a service network for any service. We detected three kinds of networks: hierarchical, focalized, and bundled, and three metacategories of dominant values: functional, social, and emotional respectively. While we do acknowledge that all types of values appear irrespective of the network type, we emphasize the dominance of one value for different types of networks. We corroborate our claims through both i) quotation frequencies and ii) the researcher's specific understanding of the research context. Furthermore, we argue that the insights regarding different dominant values affect designs of future robotic services and communications targeting the elderly care beneficiaries—which we capture in the service resonance concept.

We also show that by allowing informants to map their network conceptually in an interactive session, researchers and designers can access the different ways they view networks. Accordingly, using pre-structured mapping tools is likely to produce partially incorrect results. This caution is important for researchers trying to capture and structure a network on the basis of interview data. Researching service systems may require the participation of informants to conceptualize the system in the first place.

Moreover, we have described ways in which participants, or co-creators of value in a service, conceptualize the network of actors and resources that are necessary for their co-creation of value. We thereby highlight the importance of understanding service systems, actor networks, and so forth as social constructs, which may take many different forms, depending on the individual actor. A service that relies on an actor network for value co-creation features complexity far beyond the actual nodes and connections of the network, spreading into the very way that a network's meaning and relevance is described, as well as how the network gets put to work by the different participants, through the roles assigned or taken by specific actors and agents in the network.

Finally, we suggest the strong concept of service resonance, as a relationship between the service and the different mental models (or institutional norms) for which it is intended, and the degree to which the service works well under the varying models.

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