Design Ethnography and Service Design Thinking on Triadic Relationships in Product-Service Systems

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SUMMARY

This study has used design ethnography and service design thinking to understand triadic relationships in product-service systems. The data used in this research has been collected in an explorative user research phase of an overarching service design project at Scania CV. The service design project was of purpose to apply a user-centered design approach to investigate Scania Driver Services.

This study finds Design Ethnography and Service Design Thinking as fruitful in understanding triadic relationships in product-service systems, but also identify challenges that require further exploration in order to enable the best possible value-propositions.

The study contributes to understanding what kind of knowledge that applying design ethnography and a service design thinking approach to understand triadic relationships in product-service systems concern. A summary of knowledge identified is presented below.

Understanding and knowledge concern:

- Contradictions between the purchaser and end-user perception.
- Actor perception of another actor(s).
- Actor perceived evolution of another actor over time.
- Actor change of view due to its own evolution.
- Relationships of the service provider, purchaser and end user.
- Misconceptions between actors.
- Variation in communication between actors.
- What the communication between actors is perceived to concern.
- Additional actors than initially considered that are crucial for understanding the triadic relationship.
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1. INTRODUCTION

Scania is a global truck and bus manufacturer with over 45,000 employees owned by Volkswagen AG. Scania, as we know it, was founded in 1911 when Scania in Malmö and Vabis in Södertälje were merged. As of today, Scania has transformed from being a product company to a product and service solution provider which has offered new challenges and opportunities.

Traditionally in manufacturing businesses the competencies required within design has been product designers. Whereas businesses expand their views and transform to product-service systems (a business model where a combination of both products and services are offered (Goedkoop, Van Halen, Te Riele, & Rommens, 1999; Kanda & Nakagami, 2006)) the requirements for other competence arise (Holmlid, 2010). The transition from a product focus to services is referred to as servitization (Goedkoop et al., 1999; Lightfoot, Baines, & Smart, 2013; Vandermerwe & Rada, 1988).

Today, Scania offer a variety of services to its customers, ranging from physical trucks and buses to financial services and driver performance measurements. Scania could be considered in servitization process and a transition from a product focused company as a truck manufacturer to a service focused transport solution provider. The service design approach with user-centered methodology and value as a keyword is therefore suitable to examine, explore and unfold propositions for future service development. In this thesis, on the behalf of Scania in Södertälje, Scania Driver Services has been tackled with a service design approach. This approach intended to generate valuable insight into the use of services provided by Scania by its customer – the transport company and their truck drivers.

This thesis investigates the relationship between the service provider and its customer, where a dyadic relationship of seller-buyer is not enough to describe the complexity of the service. Instead transitive and intransitive triadic relationships, as described by Kowalkowski et al. (2016) (see 3.3), are assumed and explored using design ethnography and service design thinking. The actors within the triadic relationship of this study is the service provider, the purchaser and the end-user.

1.1. PURPOSE

The purpose of this study is to use design ethnography and service design thinking to frame and understand triadic relationships within product-service systems. Also, the purpose of the overarching service design project is to attempt to gain knowledge of how understanding triadic relationships can support development of current and future driver services at Scania.

1.2. RESEARCH QUESTION

The research question that this thesis intends to answer is:
What understandings can design ethnography and service design thinking provide regarding relationships in triadic relations in product-service systems?

1.3. DELIMITATIONS

This thesis has been a part of a service design project. Service design strive to create value for all actors within a service. The service design project has been carried out within the context of the Swedish transport industry and had a primary focus on investigating the transport
company point of view. Deliberately, a greater focus has been on value in the eyes of the transport company as one of the actors in a triadic relationship.

This study investigates relationships in a commercial context and does not attempt to generalize relationships at large.

The actors in the triadic relationship are the service provider, the purchaser of the service provider’s value-proposition and the end-user of the service offer. The design team has been considered as the service provider during the work of the service design project.
2. BACKGROUND

At Scania Research and Development, services and methods dealing with data from more than 250,000 connected vehicles are developed. One area of interest is Driver Evaluation where tools and services aim to support drivers in improving their fuel efficiency.

This subject of this thesis has been part of a service design project with the intention to apply a service design approach to investigate driver services at Scania. Scania Driver Services and Scania Connected Services consists of tools and services with the goal of monitoring, evaluating and improving driver performance. The triadic relationship investigated concern Scania and its customer – the transport company – at where the user of Scania Driver Services are the employees – the truck drivers.

The service design project was performed similar to the well-renowned double diamond design process (Design Council, 2005) – hence, consisting of two repeated processes with convergent followed by divergent design work. Roughly described, the process applied covered domain research, collection of user data through interviews, observation and workshops, an ideation phase followed by development of a prototype to test the final concept.

The project in which this study has been performed primarily concern Scania services being Driver Training, Driver Coaching, Driver Evaluation, Scania Fleet Application, Fleet Management Portal and Driver Support – all of which are presented briefly below. Other services offered by Scania are Scania Smart Watch, and Vehicle Instruction Application, Ecolution, Tachograph Services and more.

- **Driver Training** educates drivers in advanced driving techniques to increase fuel efficiency and spare the environment.
- **Driver Coaching** is a coaching service that targets stress reduction and increase of comfort for healthy and pleasant driving.
- **Driver Evaluation** grades drivers on different parameters of driving compared to other Scania drivers driving in a similar context. From the driver aspect, this service is commonly referred to as the Fleet Management Portal. The Fleet Management Portal is a portal where the transport company can keep track of its fleet of Scania trucks. The Fleet Management Portal is used by truck drivers to access their driver evaluation.
- **Scania Fleet** is an application for iOS and Android devices where a driver can locate other vehicles in the transport company, send messages, turn on vehicle heater and more.
- **Driver Support** is a real-time feedback tool located in Scania’s vehicles. The tool provides feedback grades in different parameters based on recent driving.
- Scania Driver- and Connected Services can be purchased by transport companies in different packages with the possibility to provide different results. The purpose of the presented overview of services offered today and investigated in this study is to provide an understanding of the main cause of the services and the variety that exist.

The service design project has had the mission to apply a service design approach to investigate and map customer experience of Scania Driver Services. From insights generated during the work the overall goal is to propose improvements to Scania Driver Services to increase customer value and experience.
As this thesis has been part of a greater service design project, the data used for analysis come mainly from the user research parts of the greater project at hand. Therefore, the insights are derived from an explorative design process rather than a deterministic.
3. THEORY
In this chapter, theoretic framework for understanding the research performed in this thesis is presented.

3.1. DESIGN ETHNOGRAPHY
Ethnography has its origins in anthropology (Segelstrom, 2013) and is the study of how people live their lives (Anderson, 2009). Ethnography is considered a research method within social science (Genzuk, 2003) and in ethnography, field work is common means for performance (Emerson, Fretz, & Shaw, 2011). In 1922, Bronislaw Malinowski published a book on his extensive ethnographic field work conducted over a three-year span in the western pacific. In his work, Malinowski note three premises, or ideals, for conducting ethnography (Malinowski, 1922) roughly saying:

• Live with the ones you are studying for a longer period to enable studies of every aspect of their lives
• Learn and speak the local language
• Participation observation; do the same thing as those who you study as good as you can do it while you observe them

In research on ethnography in interface design, Segelström et al. (Segelström, Holmlid, & Alm, 2008) note that designers tend to use the term to refer vaguely to any kind of field work. By applying an ethnography closer to anthropology than what is common in design in practice, a proposition consisting of four principles that designers should consider to enable “full advantage of the potential in ethnographic approaches” has been presented (Segelström et al., 2008, p. 8). This ideal is presented below:

• **Be properly prepared:** Although the fieldworker spent several weeks learning the system, Week 1 of fieldwork did not yield many insights. Instead Week 1 should be seen as period during which rapport was built, that is as a way of letting informants prepare themselves to being studied. Rapport was built through formal introductions and also by showing that the fieldworker would not disturb the normal workflow. This first week also enabled the researcher to identify the focus points to guide the fieldwork. After selection of focus points and preparations for and of the field, there was a large increase in insights. These insights were in many cases vital for the fieldworker’s understanding of the field, for example, the identification of new user groups.

• **Analyze and start analyzing early:** The importance of simultaneously analyzing insights, as well as a continuous reflexive analysis, is underscored by the fact that the design rationale to a large part was constructed by these. A simultaneous analysis also provided a good way of structuring impressions for the fieldworker. Indeed, many insights were noted already during the preliminary analysis during the fieldwork. Moreover, the simultaneous analysis also provided a foundation for the reflexive analysis. Reflexive analysis may help the fieldworker identify issues not articulated or directly visible. When such issues are identified, the reflexive analysis raises new research questions. Nevertheless, it is also important to stress the need for a thorough analysis after the fieldwork is completed, as this is where the larger patterns commonly emerge.

• **Let the fieldwork take time:** Ethnographic style fieldwork for design often only lasts a few days, but as shown here, insights cannot be planned. A glance at the weekly
summary of insights gives the impression that the earlier quoted statement by Hughes et al [8] regarding the quick pay-offs for design when it comes to ethnographic research holds. However, a closer look at the mapping of insights per day makes it evident that this view needs to be nuanced. Not only in Week 1, when no substantial insights appeared, but also in following weeks, there were slow days. If the study had been aborted after Day 12, in which no new insights appeared, a third of the direct observations would not have been made. Focusing on the two different types of insights, it is also worth noting that the decline in the weekly findings is in the Analysis category. The point is that although one never knows when the next insight will appear, it is clear that they consistently appear over a longer period of time than a few days.

• Get first hand data: As the collected data needs to be analyzed continuously and, the importance for the designer to do the fieldwork him/herself has to be strongly stressed. Moreover, if the designer lets someone else do the fieldwork, he/she will often lack the empathy and contextual knowledge needed for the analyses. To the point, if the fieldworker and designer are different persons – many details may become lost in translation.

While the question of relevance between ethnography and design and whether actual ethnography or not is used not has gone unnoticed (Segelström, Raijmakers, & Holmlid, 2009), Jeanette Bloomberg note six reasons on the note of relevance (Schuler & Namioka, 1993, pp. 141-142). The six reasons, summarized by Mccartney & Seymour (2002), are as follows:

1. To gain insight on the user’s environment
   First, since designers often create artifacts for work settings they know little about, some understanding of those settings is needed so that the technologies suit the situations of their use.

2. To eliminate the designers’ worldview
   Second, because technologies help shape the work practices of their users, it is important that the designers’ worldview not be imposed inappropriately on users. If designers have little information regarding the situations in which technologies are used, the best they can do is rely on their own experiences and imagination thus running the risk of designing technologies better suited to their needs than those of the actual users.

3. To optimize technologies even when there is uncertainty regarding use
   Third, there are situations where designers create technologies whose possible uses are unknown. Such situations might be described as technology in search of an application. Some understanding of the work in which potential users are engaged can help identify possible uses and refine the original technology design.

4. To better understand the context of use
   Fourth, in understanding that the utilization of technology is inextricably linked to the conditions of the user’s environment, technology that is tested in a more traditional [human-machine dyad] may fail to capture important nuances.

5. To create (provide) a fuller (thorough; more comprehensive) picture (vision; visualization; representation) of the technology for the user
   Fifth, when designing radically new technologies, users often are unable to give meaningful responses to queries about how they might use such technologies. They
need to be provided with a way of envisioning and experiencing the technology in the context of their own work practices before they can contribute to such a discussion. To create the context for such a discussion and to be useful partners in the joint exploration of the relation between work and technology, designers must have some understanding of the user's work.

6. To shift design from single-task focus in order to account for a more holistic understanding of outside influences on the users

Finally, the single-task focus of some technology design efforts is ill-suited to the design of technologies that support task integration. Simply focusing on a single task or the tasks of the single user ignores how the work of one individual articulates with that of many others. For example, a print shop operator's work may rely on the work of document creators, word processing specialists, graphic artists, sales representatives and many others. Systems that support the print shop operator's work should be designed with some larger understanding of how the work of these others impinges upon the work of the print shop operator.

The ethnographic approach used in this study is one relating foremost to a more adapted to “designer way” of application. However, at the foundation of the ethnography research undoubtedly relies Malinowski’s principles for ethnography.

3.2. SERVICE DESIGN THINKING

Service Design is an interdisciplinary approach that as of today could be considered to lack a unified definition (Stickdorn & Schneider, 2011). The approach uses methods and tools from a variety of different disciplines such as anthropology, cognitive science and marketing. As service design practice is interdisciplinary, it cannot be considered a discipline by itself – it does however entail a certain way of thinking (2011), which is introduced in this section. The methods and tools used within Service Design differentiates from product design in focusing on processes and value-in-use rather than form and function (Holmlid, 2010). In their well renown book “This is Service Design Thinking” Stickdorn & Schneider (2011) present five principles of Service Design Thinking that supposedly cover much of the work of a Service Designer.

Service design is:

1. User-centered
   Services should be experienced through the customer’s eyes.

2. Co-creative
   All stakeholders should be included in the service design process.

3. Sequencing
   The service should be visualized as a sequence of interrelated actions.

4. Evidencing
   Intangible services should be visualized in terms of physical artefacts.

5. Holistic
   The entire environment of a service should be considered.

3.2.1. VALUE

Common as a keyword to what service design is intended to achieve is value. In service design literature and research - value, what value concern, and how to find propositions to produce value to the different actors within the service is discussed. A well renown proposition, known
as a service-dominant logic, was published and later revised by Vargo & Lusch (2004, 2008). Blomkvist (2014) describes a service-dominant logic as an alternative to goods-dominant where focus revolves around value creating activities rather than differences between products and services (regardless if products are involved or not). Service-dominant logic is a mindset and organizing framework rather than a theory (Kowalkowski, 2010), which could be considered to entail service design thinking.

Vargo & Lusch (2004) has initially suggested eight foundational premises for their service-dominant logic. Those were later revised, and another two have been added (Vargo & Lusch, 2008). The premises are presented below.

- FP1: Service is the fundamental basis of exchange
- FP2: Indirect exchange masks the fundamental basis of exchange
- FP3: Goods are a distribution mechanism for service provision
- FP4: Operant resources are the fundamental source of competitive advantage
- FP5: All economies are service economies
- FP6: The customer is always a co-creator of value
- FP7: The enterprise cannot deliver value, but only offer value propositions
- FP8: A service-centered view is inherently customer oriented and relational
- FP9: All social and economic actors are resource integrators
- FP10: Value is always uniquely and phenomenologically determined by the beneficiary

Whereas value is a rather subjective term, the service-dominant logic premises gives an idea of a way of thinking. In a service-dominant logic, customers and providers co-create value in the service actualization (Vargo & Lusch, 2008), this is referred to as value-in-use. Value is thus defined by the user and the offer from the service provider is considered a value proposition (Arvola & Holmlid, 2016). As noted by Arvola & Holmlid (2016, p. 531), “the service helps the customer to achieve some goal, and value can be assessed once that goal is reached.”. Further, Arvola & Holmlid (2016) present a translation of a typology from the user experience research field, discussing various aspects of value that a service design proposal can contribute to. The different kinds of values discussed are summarized in a table which is presented in Table 1 below.

<table>
<thead>
<tr>
<th>Kind of value:</th>
<th>In relation to:</th>
<th>Defined by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usefulness</td>
<td>Purpose</td>
<td>Beneficial to and serving the purpose of the activity or welfare in the life of someone</td>
</tr>
<tr>
<td>Instrumentality</td>
<td>Goal</td>
<td>Serving the goal well</td>
</tr>
<tr>
<td>Technical excellence</td>
<td>Requirements</td>
<td>Excelling in performance in relation to requirements or competition</td>
</tr>
<tr>
<td>Social significance</td>
<td>Symbols</td>
<td>Status and identification</td>
</tr>
<tr>
<td>Mutual advantage</td>
<td>Stakeholders</td>
<td>Beneficial for several stakeholders in cooperation</td>
</tr>
<tr>
<td>Collective welfare</td>
<td>Social unit</td>
<td>Welfare of an organisation or society</td>
</tr>
<tr>
<td>Aesthetic values</td>
<td>Individual</td>
<td>Pleasurable experience</td>
</tr>
<tr>
<td>Moral implications</td>
<td>Outcomes</td>
<td>Desirable and undesirable outcomes for the happiness and wellbeing of people and other living things</td>
</tr>
</tbody>
</table>
Arvola & Holmlid (2016) clearly state that the typology presented is neither comprehensive or final. The framework originates in the user experience research field and it does have an overweight toward experiential values (Arvola & Holmlid, 2016). However, the typology provides a good foundation for discussion.

3.2.2. INSIGHTS RESEARCH
As mentioned, service design combines methodology of human-centered design and social sciences to gather insights into experiences, desires, motivations and needs of consumers and distributors of services. As described by Polaine et al. (2013), in service design, research stretches across all actors involved in a service ranging from the managing director of a company to the end-user. Market research is focusing on quantitative measures yielding statistically proven truths whereas insights research focus on qualitative data from a smaller amount of people producing insights. Exemplified; instead of a 10:1 ratio in people producing a truth, a 1:10 ratio of people producing insights is applied. While not claiming statistically proven truths are not useful, insights from qualitative research closer explain the designers’ interests in human needs, behaviour and motivations (Polaine et al., 2013). Data collection in the overarching service design project have applied this philosophy.

3.2.3. ETHNOGRAPHY IN SERVICE DESIGN
As a main challenge in service design is to put the user under the spotlight, some of the methods used by designers are loosely referred to as ethnographic (Segelström et al., 2009). Whereas researchers investigate various ways to collect data and gain insight into the life and experiences of people (Arvola, Blomkvist, & Wahlman, 2017), traditional qualitative research methods as interviewing and observation are well established and have a key role in service design (Van Dijk, 2010). As described by Van Dijk (2010, p. 1);
“Design ethnographers are design thinkers. They firmly understand the design process. They know what is needed at every stage of the process, and how this can best be explored, discussed and shared. Some design ethnographers are initially trained as designers, and have later specialised themselves in doing design research based on ethnographic methodologies. Other design ethnographers may have been trained as anthropologists or social researchers, and specialised themselves in applying this for design processes.”

Thus, there is no reason to distinguish ethnography in service design from design ethnography (see 3.1), as they arguably can, and will in this study, be used synonymously.

3.2.4. VISUALIZATIONS
Representations of services are important due to the limitation in visual appearance and the heterogeneous group involved in the conception and construction that services possess (Diana, Pacenti, & Tassi, 2009). Services are more difficult to represent, in contrast to products, due to services consisting of chains of events and processes (Segelström, 2010). Representations of services are more commonly referred to as visualizations (Segelström, 2010) and are used in service design practice mainly to articulate and communicate insights as well as enable designers to maintain empathy to data (Segelström, 2009). Research studying the most common methods to visualize data by service designers in real business based projects has identified 17 types of visualizations, further divided into following categories: Blueprints, Customer Journeys, Desktop Walkthroughs, Personas, Storyboards and System Maps (Segelström & Holmlid, 2011). What kind of visualization service designers tend
to use is mainly influenced by two aspects; the characteristics of the data to be visualized and the cause of the visualization (Segelström, 2009).

3.2.5. CO-CREATION AND WORKSHOPS
As design have moved closer to the needs of users, the user has switched from a passive research subject to an active participant in the design process and the role of both the user, designer and researcher have changed (Kaasinen & Koskela-Huotari, 2013; Kronqvist, 2009; Sanders & Stappers, 2008). Looking back at the premises for service-dominant logic by Vargo & Lusch (2008), the customer is always considered a co-creator of value, which changes the nature and landscape of the design process from the view of the user as subject into being seen as a partner (Sanders & Stappers, 2008).

Co-creation is a broad term used within a variety of applications (Sanders & Stappers, 2008). Other terms not seldom occurring are co-design and co-produce. The similarity in the nature of the terms may cause some confusion. Co-design sometimes infer that customers and/or users together with design practitioners take part in the design process (Polaine et al., 2013; Sanders & Stappers, 2008), as opposed to the creativity of collaborating designers only (Sanders & Stappers, 2008). Co-creation and co-design are often treated synonymously and opinions whether they should or not varies (Sanders & Stappers, 2008). Co-production however describe the nature of services. Services can be considered as co-produced and are so when user action and service providers’ value proposition meet, becoming a user/service experience (Polaine et al., 2013).

In this study, co-creation is used as a metaphor to the description of activities performed in a collaboration between designers and actors in regard to the service. The purpose of co-creation is to collaboratively produce knowledge based on the ideas and beliefs of the actors involved. In this study, co-production is not considered.

A common way of co-creating in service design is through the setting of workshops. In turn, the use of the term workshop is in this study fairly synonymously with co-creation, but does however refer to the actual session where co-creation is performed.

3.3. VALUE PROPOSITIONS AND TRIADIC RELATIONSHIPS IN SERVICES
Common concepts of value propositions in service systems have usually involved two parties and a dyadic relationship. Those dyadic relationships usually consist of one buying part and one selling (Havila, Johanson, & Thilenius, 2004), corresponding well to the mind-set and framework of a goods-dominant logic (Vargo & Lusch, 2004). However, in international relationships exporting suppliers often are represented by and intermediary, suggesting those relationships actually are triadic (Havila et al., 2004). In marketing, research has been made on triadic relationships with intent to investigate if trust and commitment in business-relationship triads are different from dyads – which seemingly is the case (Havila et al., 2004).

Even though being common, dyadic relationships are not sufficient for value propositions in many service systems, where more than two actors are not a rare cause (Kowalkowski et al., 2016). Both previous research has been made on incorporating service-dominant logic and customer network actors in marketing (Cova & Salle, 2008) and more recently on how to create a triadic value proposition examining the triadic relationship of producer, salesperson and user before and after a service initiative is taken (Kowalkowski et al., 2016). The definition
of a triadic value proposition of Kowalkowski et al. (2016, p. 1) reads; “a reciprocal resourceintegration promise and value alignment mechanism, operating to and from three actors that seeks equitable exchanges”.

Kowalkowski, et al. (2016) speak of connections between actors (e.g. A, B, C) in triadic networks as \textit{intransitive} or \textit{transitive} (see Figure 2). In an intransitive triad, the actors are connected such as A-B-C. In a transitive triad, an additional connection between A and C exist, resulting in a connection between all of the actors. To achieve maximum potential of a triadic value proposition it is required of all actors to be involved in the process in order to contribute to the production of value (Kowalkowski et al., 2016).

In this study, design ethnography and service design thinking will be used to investigate how we can understand triadic relationships in a product-service system based on the idea of intransitive and transitive triadic networks. However, different from the research by Kowalkowski et al. (2016), this study concern the relationship of service provider, purchaser and end-user rather than producer, salesperson and user.

The findings from Kowalkowski et al. (2014), also speak of the dimensions of the relations between the actors in triadic relationships. In their research, three relationship dimensions between actors are presented; Structural/Technological, Economic and Social. The relationship dimensions are also noted as tied weak, medium or strong. Through implementation of a service initiative, all relations were strengthened and new relations rose.
4. METHOD
This chapter presents the methods used in this study. Methods that fall under Design Ethnography, as interviews, observation and workshop have been applied. These methods were originally chosen as suitable for the explorative phase of the overarching service design project. However, reason number six on the note of relevance of ethnography in design by Bloomberg (as summarized by Mcartney & Seymour (2002)), is motivation for also applying the methodology in this study;

“To shift design from single-task focus in order to account for a more holistic understanding of outside influences on the users”

4.1. DOMAIN RESEARCH
As a natural first step to be able to understand the needs, ideas, feelings and thoughts that the transport companies and truck drivers may have concerning Scania Driver Services, a thorough exploration of the services was conducted at Scania in Södertälje. Stakeholders including product owners, supervisors and other people with insights of Scania Driver Services were both formally and informally interviewed. To get an overview of the Scania view of their customer relationship, everything was presented, discussed, examined and explored.

The domain research has helped understanding one of the actors of the triadic relationship investigated, namely the service provider - Scania.

4.2. USER DATA
At Scania, a resource that is used is the transport laboratory. The transport laboratory is a transport company owned and used by Scania to transport goods between Scania in Södertälje, Sweden and Zwolle, The Netherlands. The truck drivers working at Scania Transport Laboratory use everything within Scania Driver Services and are used as a testing resource in development and testing.

Whereas the transport laboratory at Scania has good insight in the use of services and Scania has good insights in the work of the transport laboratory, the decision was made to collect user data at transport company actors outside Scania as extensive as possible. This decision was made as the transport laboratory is not representative for Scania customers, and also as an attempt to avoid biases.

To get in touch with transport companies, different salespersons at truck dealers were reached out to by e-mail and phone calls. The salespersons further provided contact information to their customers, the transport companies, who they believed could be interested in participating in interviews, observations and workshops. Hence, user data has been collected through interviews, observation and through workshopping.

The user data is collected to help understanding the other two actors in the triadic relationship investigated: the purchaser (the transport company) and the end-user (the truck driver).

4.2.1. USER INTERVIEWS
Two CEO’s of transport companies were interviewed at different occasions. The first transport company had about 10 vehicles and the second transport company about 65. The first CEO (C1) interviewed also worked as a truck driver for his company at times. Each of the two interviews lasted approximately between 4 and 5 hours. The interviews took place at the
office of respective transport company. An interview guide was produced prior to ensure coverage of the most important aspects of the transport company business and their thoughts and feelings concerning Scania Driver Services. During the interviews, notes were taken manually.

The user interviews were carried out with the focus of providing insights to the overarching service design project. Therefore, after the first two interviews, collected notes were transcribed digitally. Every note gathered were structured in plain notes and quotes. Insights were then graded arbitrary in a five-point scale to enable easy removal of insights with little or no relevance in regard to driver services. In this study, the ratings were of no relevance and have therefore been ignored in analysis. Data presented in results have been analysed based on the theoretic framework of triadic analysis and relevance in data has been considered likewise.

4.2.2. USER OBSERVATION
Two truck drivers were observed in their working context. The first driver (T1) was observed an afternoon for approximately four hours. The second driver (T2) was observed for a full work day, approximately eight hours. The setting of the observations was in a Scania truck with the driver performing his normal work duties.

In the first observation session, two observers rode along with the truck driver. In both of the observation sessions notes were taken manually meanwhile having informal discussions with the driver. An interview guide was brought along but not used other than as a reminder to topics of conversation. After the observation sessions, the design team derived insights from the notes along with information recalled by memory. The insights were grouped and clustered in various ways using post it-notes to identify themes and common denominators of a truck drivers’ day.

Observation and interview data were used to by the design team to produce a visualization of a transitive triadic relationship of the service provider, purchaser and end-user.

4.2.3. CO-CREATION WORKSHOP ON RELATIONSHIPS
A workshop was performed with the CEO of a transport company (C3) and one truck driver (T3). The truck was son of the CEO and had some insights in the business aspects of the transport company. The session lasted approximately for 4 hours.

In the workshop, focus revolved on exploring the relationship between different actors in the everyday life of a transport company and in relation to Scania Driver Services. During the workshop, the CEO of the transport company and the truck driver present took part in co-creating using Post it-notes to visualize and map their perception of various actors and their communication in relation themselves and their business.
Figure 2. Workshop investigating the relationship between actors in the service landscape.
5. RESULTS
This chapter presents outcome, results and material produced.

5.1. TRIADIC RELATIONSHIPS IN PRODUCT-SERVICE SYSTEMS
The data analysed come from material gathered in the explorative phase of the overarching service design project. Thus, data relevant for the purpose of this study has been extracted from a larger data set. This data set contain opinions and perceived experiences regarding Scania specific tools and services. Data of relevance for this study has arbitrarily been selected from the data set. Data of no apparent relevance for understanding triadic relationships in product-service systems has been left out.

The results are conclusions drawn by the author from interview and observation notes. The conclusions are presented with their corresponding notes that they are drawn upon. The notes are also presented with its source label. Data are from five different occasions and sources are labelled in future text as follows.

<table>
<thead>
<tr>
<th>Occasion</th>
<th>With</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview</td>
<td>CEO of a transport company</td>
<td>C1</td>
</tr>
<tr>
<td>Interview</td>
<td>CEO of a transport company</td>
<td>C2</td>
</tr>
<tr>
<td>Workshop</td>
<td>CEO</td>
<td>C3</td>
</tr>
<tr>
<td>Workshop</td>
<td>Truck Driver</td>
<td>T3</td>
</tr>
<tr>
<td>Observation</td>
<td>Truck Driver</td>
<td>T1</td>
</tr>
<tr>
<td>Observation</td>
<td>Truck Driver</td>
<td>T2</td>
</tr>
</tbody>
</table>

*Table 2. Data sources, descriptions and their corresponding labels.*

Note: No notes from the workshop reflect ideas that has contradictions between the participants expressed.

Transport companies have prejudices of factors that motivate truck drivers. The prejudices do not correspond to the perception of truck drivers.

• C1: You used to work for a company – now you work for yourself and money
• C3: Money is the only thing that motivates in this kind business
• T1: Daughter is a motivation to both think of the environment and to be safe while working

Transport companies see everything through a monetary filter. This is a possible explanation to their perception that money is all that matters for truck drivers.

• C1: Money is important
• C2: Wear is a great expense
• C3: Everything is money
• C3: Every day I can see truck drivers through my office window that let go of the gas too late and break instead and all I see is wasted money

It is not rare that truck drivers lack understanding of the transport company business. Arguably, understanding the business has an effect on the driver.

• C3, T3: Truck drivers lack understanding of the transport company expenses
Transport companies are often inherited and CEO’s of transport companies have often been a truck driver.

- C1: As CEO, you are proud to have been acquired by a venerable family company
- C1: Ownership still relies within the family
- C1: There is pride in the company background as a family business
- C2: Is as a CEO not supposed to drive that much but it happens from time to time

Dispatcher is a role that you usually obtain by performing a good job as a truck driver.

- C1: Dispatcher is a role you usually obtain through hard work

The CEO of a transport company does not necessarily fit in a leadership position.

- C1: You used to work for a company – now you work for yourself and money
- C1: Loyalty to your employer does not always exist
- C2: There are transport companies that are not good with truck drivers

Considering the CEO of a transport company previously being a truck driver and that truck drivers’ lack understanding of the transport company business. A shift of focus occurs somewhere along the way.

Misconception between actors in a triadic relationship concerning prejudices has been identified. In an intransitive triadic relationship, the service provider relies on the purchaser perception of the end-user. In the overarching service design project, a visualization of a transitive triadic relationship between the service provider, purchaser and end-user has been created as a proposition to how to explore and develop driver services.

The visualization does not intend to represent a service at large, but how requirements from the purchaser should guide the development of the solution proposed by the service provider (which is intended to be developed together with the end-user). Hence, the visualization is not immediately recognizable as one of the classic representations commonly used in service design. The aim of the visualization is however to make the idea of the proposition easily graspable. The visualization is synchronic, meaning it represents time-independent information rather than a journey or flow, i.e. diachronic (Diana et al., 2009).

The visualization produced represent a transitive relationship between service provider (Scania), purchaser (transport company) and end-user (truck driver). In the overarching service design project, the visualization is used to communicate an understanding of how relations should be considered between the service provider and its customer to develop valuable services and to emphasize the need to understand the end-user and not only the goals of the purchaser.

At the core of the triadic relationship there is a challenge perceived by the purchaser. Requirements (blue) from the purchaser actor represent the demands the purchaser has on
the solution. A realistic example of such a requirement could be that the solution cannot consume too much time.

- C1: Timekeeping is of the essence in transport business

The requirements are to be met by the solution co-created by service provider and end-user. The requirements (yellow) are output from the proposed service, and should correspond to what the purchaser requires as return from the proposed solution/value-proposition. As to the previous example, the output should be that the solution does not require a significant amount of time. The yellow and blue rectangles covering the service provider and end-user actors are considered the design space for a solution to the challenge.

![Figure 3. Visualization of a triadic relationship with the actors; Service provider (Scania), Purchaser (Transport company) and End-user (Driver).](image)

As the visualization only consider relationships through the requirements stated by the purchaser, it is bound to the context setting of the overarching service design project. The visualization does not thoroughly represent triadic relationships.

Further, the transport company speak of the historic evolution of the end-user. Historically, truck drivers have possessed what is referred to as “common-sense” to a greater extent.

- C1: Drivers today don’t possess common-sense as they used to
- C3: The work description assumes common-sense

Transport education fail to deliver truck drivers that understand the required work effort.

- C1: You want to see truck drivers’ that are interested in their work which is not always the case
- C1: The school system does not always manage to deliver adults and people who understand the work required
There is a belief of more junior truck drivers that you just drive, which is not the case.

- C1: “Senior drives”, jobs with less physical work and more driving is something you earn over time
- C2: As long-term planning doesn’t exist in our business we have high knowledge requirements in problem solving

This is discussed as a probable effect of a development on a societal level where Sweden and agriculture looks different today than in the past. It is unclear how the relationships in a triad should be considered when there are variations of single actors over time.

In an intransitive triadic relationship, dyadic relationships within the triad are stained by prejudices that are incorrect. Assuming a transitive triadic relationship, insights of where these shortcomings affect the triadic relationship arise. Understanding the challenges of the purchaser in the intransitive triadic relationship, the value-proposition can meet his perceived needs. If the perceived needs contradict the perception of the end-user, mutual value is unlikely to be achieved.

The workshop focused on further exploring purchaser and end-user understanding of the relationships that exist in the transport company business. The workshop has revealed a more complex network of actors than initially assumed. Other actors than the three assumed in a triadic relationship of service provider, purchaser and end user occurred. Those actors were:

- C3, T3: Salesperson
- C3, T3: The customer of the transport company
- C3, T3: Mechanics at the service workshops

The salesperson, as being one of the actors in the previous research example by Kowalkowski et al. (2016), has from the domain research not been considered as part of the service provider. The same applies for the service workshop.

Assuming this view suggest that the service provider consist of a network of actors. As interviews with CEO’s of transport companies revealed that the quality of service workshops can affect whether an investment in a specific truck brand or not will be made, there is motive not to overlook the identified additional actors.

- C1: There is a great focus on uptime of the vehicles
- C2: If the service workshop is not working you may invest in another brand
- C2: It’s important to keep vehicles running

The understanding from the domain research together with the understanding from the workshop raise the question of how to delimit the service provider. The design team represent the service provider and the purchaser perceived actor “service provider” does not correspond to their understanding. The domain research revealed that the salesperson is not directly connected to the business setting of the service provider. In this case, the salesperson is not directly employed by the service provider. The business of the salesperson does however rely on the service provider and vice versa.
Also concerning delimitation of the service provider, the perception of the end-user is that his relationship to the service provider is through workshop mechanics. The business of the mechanics is once again not directly connected to the business setting of the service provider.

- C3, T3: The drivers’ connection to the service provider is some contact with workshop mechanics

The value-proposition from the service provider to the purchaser requires different means of communication to the end-user. The end-user, commonly lacking business experience as mentioned, require another type of trust and transparency of the service than the purchaser.

- C3, T3: You can ignore using Driver Support because you don’t have incentives to, you don’t believe that it makes a difference

Not understanding the value and incentives for using what is proposed by the service provider, the weight of the service provider understanding the end-user is clearly exemplified through the following note.

- C2: Sometimes you remove system messages because they are perceived as more stressful than helpful

While the truck driver perceives his communication with the service provider being through an actor not previously recognized. Assuming an intransitive triad, the transport company relies upon his own ability to communicate the value-proposition from the service provider to the end-user. As mentioned, a CEO of a transport company does not necessarily possess leadership competencies. However, a willingness to provide positive feedback to drivers does exist in some cases:

- C2: We try to provide positive feedback to our drivers but it is common that it does not reach them

The characteristics of the relationship between actors in a triadic network, transitive or intransitive, varies. In this case, the relationship between the purchaser and the service provider concern is perceived to be mainly through the salesperson, concerning money and investment. The relationship between the end-user and the service provider is through workshop mechanics and concern use and functionality.

Summarized, the knowledge that has been identified related to understanding triadic relationships in product-service systems concern:

- Contradictions between the purchaser and end-user perception.
- Actor perception of another actor(s).
- Actor perceived evolution of another actor over time.
- Actor change of view due to its own evolution.
- Relationships of the service provider, purchaser and end user.
- Misconceptions between actors.
- Variation in communication between actors.
- What the communication between actors is perceived to concern.
- Additional actors than initially considered that are crucial for understanding the triadic relationship.
6. DISCUSSION
This chapter contain discussion of the results of how applying design ethnography and service design thinking have helped in understanding the relationships in relation to the idea of both intransitive and transitive triads in product-service systems. Further, the benefits and constraints of the methodology applied is discussed.

6.1. RESULTS
The results will be discussed using the visualization, results and summary presented in section 5.1 (see 5.1) and theoretic framework (see chapter 3).

6.1.1. VISUALIZING TRANSITIVE TRIADIC RELATIONSHIPS
The visualization produced contributes to communicating and emphasizing insights gathered, as proposed by Segelström (2010). The visualization relates to the overarching service design project to an extent that could be considered too great to be of particular use for this study. The visualization by itself does not contribute to answering the research question. However, design ethnography and service design thinking has enabled the production of the visualization and thus, visualizing knowledge of the actors in a transitive triadic relationship. Considering the fact that all information visualized is gathered in the explorative service design project using design ethnography, there is support for the approach being viable for producing relevant understanding. The visualization could be elaborated with a greater level of detail to support communication and emphasizing triadic relationships.

6.1.2. RELATIONSHIP DIMENSIONS
The dimensions of relationships by Kowalkowski et al. (2014), being Structural/Technological, Economic and Social are all aspects that have been recognized while applying a design ethnographic and service design thinking approach in the setting of this study. However, relating the dimensions from previous research will be done with care due to the fact that the actors within the triadic relationship in this study are different. Also, it should be noted that Kowalkowski et al. (2014) intended to investigate these dimensions throughout implementation of a service initiative. In this study, the dimensions can be identified but not expressed in regard to change.

In relation to the relationship dimensions of Kowalkowski et al. (2014), a concrete example of where design ethnography has helped in understanding triadic relationships in product-service systems is where the end-user has trouble seeing incentives for using a tool delivered by the service provider. This is noted in the workshop with C3 and T3, stating that Driver Support can be ignored by a driver because of lack of incentives to use it. The purchaser has somewhere along the line found motivation for investment. It is clear that the end-user does not understand this motivation when choosing not to use the tool at hand. Thus, the economic tie between purchaser and end-user could, in reference to Kowalkowski et al. (2014), be considered as weak. The service provider has however not understood the structural/technological aspects of the end-user in his work when stress is another factor for not using the tool, as C2 have noted in his business. On the note of social aspects, these are recognized in the interview with C2 where notes reveal an attempt to have positive feedback reach the truck drivers'.
Also, as discussed in 6.1.5 (see 6.1.5), data concerning both misconceptions between actors and contradictions in their perceptions concerning social aspects and could be related the strength of a social dimension in the relationship of actors in a triadic network.

As the results of the study can be compared to the dimensions of relationships, this provide another aspect of what kind of understanding design ethnography and service design thinking have produced in regard to triadic relationships in product-service systems.

6.1.3. EQUITABLE EXCHANGE

As mentioned, Kowalkowski et al. (2016) speak of triadic value propositions as “a reciprocal resource-integration promise and value alignment mechanism, operating to and from three actors that seeks equitable exchanges”. It is questionable whether equitable exchange can be considered as value in the setting of service provider, purchaser and end-user. Whereas the end-user lack understanding of the purchaser’s business setting, it is noted that it could be profitable for both actors if the end-user possessed some understanding. However, it has not been further examined what possible negative effects understanding the business setting may entail.

It has neither been explored what equitable exchange is considered which can be an effect of the overarching service design project having a greater focus on value in the view of the transport company, i.e. the purchaser. As the transport company perceive everything through a monetary filter, it is plausible, however not certain, that the end-user perceives equitable as competitive market wages. Whereas the methodology applied has revealed that money is not the only thing that motivate truck drivers, in this case, the data at hand does not in its current state reveal anything about the relationships within the triad. Referring to user defined value, as proposed by Arvola & Holmlid (2016), there is reason to believe that value in the eyes of the end-user has another dimension in this triadic setting than equitable exchange.

6.1.4. SERVICE DESIGN THINKING

The effects of service design thinking to this study are a bit more implicit than design ethnography which is residing closer to actual methodology. All data collected is from an explorative phase of a service design project. The main cause for data collection has therefore not been to describe the research question of this study. Whereas understanding of triadic relationships in product-service systems has been generated, it is fair to say that there is support for service design thinking being useful.

Concerning methods applied, what could be considered closer to service design thinking than design ethnography is the co-creation workshop. As the user has evolved from a passive research subject to an active participant, the information gathered in co-creating has turned out fruitful for understanding triadic relationships in product-service systems. This, by revealing common understanding, contradictions and new information of the perceived relationships of the actors involved.

By relating the co-creating in this study to theory of visualizing insights in service design as found by Segelström (2010), visualizing also help generating new understanding. As previous, main causes of visualizing insights are to articulate insights, communicate them and to maintain empathy. Visualizing the different actors and their relations by using post it-notes
also has generated new insights, namely; the purchaser and end-user perceived understanding of actors and relationships concerning the service provider.

It should be noted that both of the participants in the co-creation workshop in this study had experience of the transport company business and therefore the results are not fully representative for discussion between purchaser and end-user.

To further elaborate, the co-creating revealed actors that are part of the product-service system that has not been considered in advance. This understanding, whether considering a transitive or intransitive triadic relationship, has the potential to reframe the whole understanding of the service setting. As the actors in previous research by Kowalkowski et al. (2014) are not the same as in the context of this study the question arises of where to make delimitations of the service provider actor. The co-creation workshop revealed that both the purchaser and end-user consider the salesperson and workshop mechanic as part of the service provider actor. This is overlooked in the domain research and the understanding from the service provider point of view differs (as the design team has been considered service provider representatives).

6.1.5. PRODUCED KNOWLEDGE THEMES
The knowledge that has been identified related to understanding triadic relationships in product-service systems concern is presented once again below.

- Contradictions between the purchaser and end-user perception.
- Actor perception of another actor(s).
- Actor perceived evolution of another actor over time.
- Actor change of view due to its own evolution.
- Relationships of the service provider, purchaser and end user.
- Misconceptions between actors.
- Variation in communication between actors.
- What the communication between actors is perceived to concern.
- Additional actors than initially considered are crucial for understanding the triadic relationship.

The themes are clustered and discussed in regard to understanding that was revealed in the study.

**Contradictions between the purchaser and end-user perception,**

**Actor perception of another actor(s).**
Contradictions between purchaser and end-user is identified in conflicting comments from C3 and T1. C3 believes that money is the only motivational factor whereas T1 has other examples. Value-propositions in product-service systems will suffer from contradictions as value is subjectively perceived accordingly with foundational premise 10 (FP10) of the proposed service-dominant logic by Vargo & Lusch (2008), namely *Value is always uniquely and phenomenologically determined by the beneficiary.* If the perceived value from purchaser does not correspond to perceived value at the end-user, there will not be equitable exchange for actors involved. The motivational factors, attitudes and beliefs that are revealed by applying design ethnography does not provide an understanding of how a value-proposition that entail *equitable* exchange should be framed.
Actor perceived evolution of another actor over time,
Actor change of view due to its own evolution.
End-users that are new to the transport industry vary in competencies from historically. There is a perceived lack of common-sense from previously by the purchaser, which is also noted by C3. However, arguably everyone changes over time and the purchaser in this context is also common to previously have been the end-user. In an interview with C2 it is mentioned that you are not supposed to drive that much but as a CEO it happens from time to time.

The fact that the purchaser perceives end-users to have changed over time provide an understanding of the triadic relationship by identifying where the service provider possibly could find new business opportunities. It is important to note that “end-user” and “end-user” does not necessarily have the same challenges in his every day work. The same of course applies for other actors. Not only do the end-user change over time historically. As mentioned by C1, dispatcher is a role usually obtained by hard work, which suggest that you also change over the course of your own career.

Also, it is not rare that the purchaser has evolved from being an end-user. This is a bit contradictory as it should be clear for the purchaser that a change of view has occurred.

Relationships of the service provider, purchaser and end user.
With the design team representing the service provider participating together with the purchaser and end-user in a co-creation workshop – fruitful insights for the understanding of the triadic relationship were revealed. The knowledge mainly concerns the fact that the service provider is perceived differently from the design team. As the workshop with C3 and T3 revealed, new actors as salesperson, mechanic and the purchaser’s customer are revealed. While both C3 and T3 suggest that their interaction to the service provide is through salesperson and mechanic, these are actors not considered as part of the service provider by the design team. As the design team represented the service provider, it is questionable whether the characteristics of insights would differ having had an explicit service provider actor taking part in the workshop. Who would be suitable to represent this actor remain unexplored.

Misconceptions between actors,
Variation in communication between actors,
What the communication between actors is perceived to concern.
Misconceptions between actors are identified in the workshop with C3 and T3. It is noted that you can ignore the use of Driver Support because as a driver you lack incentives to. This could also be an effect of the end-user not understanding the business of the purchaser, which also is noted as common in the workshop with C3 and T3. It is notable that T2 suggest that his driving has become different after getting insight and experience of the business of the purchaser.

From a service provider point of view, it is important to understand for whom you are to deliver a value-proposition. Communication varies between the actors in a triadic relationship and depending on to which actor a point is to be made, the communication may need to be framed differently.
Additional actors than initially considered that are crucial for understanding the triadic relationship.

The workshop with C3 and T3 revealed factors crucial to the understanding of the service provider. Once again, this refer to the identified actors not previously considered. The question arises concerning where the delimitations of what and who should be considered the service provider. There are actors that by the design team are considered external but are perceived as the service provider by the purchaser and the end-user. According with Vargo & Lusch’s (2004, 2008) fundamental premise FP2, indirect exchange masks the fundamental basis of exchange. Whether considered as indirect exchange or not, this new understanding of actors in the system could possess great implication of how a triadic relationship could be perceived.

The question of whether a triadic relationship is enough is a target for future research. If the service provider is actually a network of actors by itself, it is fair to assume that the understanding of this network is crucial for the further understanding of the service provider as an actor in a triad with purchaser and end-user.

6.1.6. DYADIC RELATIONSHIPS AS ELEMENTS IN A TRIAD

The common view of dyadic relationships that correspond to a goods-dominant logic (Vargo & Lusch, 2004, 2008) where the relationship seller-buyer exist is in this study elaborated to a triadic relationship consisting of service provider, purchaser and end-user.

Whereas dyadic relationships exist in the triad – when assuming a triadic relationship, the dyads could be overlooked. It is of importance for understanding the triadic relationship that this does not become the case. It has become clear that the relationships between actors in a transitive triad is affected by the actors’ perception of the dyads within. Design ethnography and service design thinking have helped understanding the triadic relationship through understanding the dyadic relationships.

6.2. METHOD

As being part of an overarching service design project, the methodology applied has been explorative, as opposed to deterministic. This arguably strengthens the whole idea of applying design ethnography and service design thinking to understand triadic relationships in product-service systems, as the goal of data collection has explicitly focused on pursuing a design process of different focus.

The methodology applied to the analysed data should be considered valid as design ethnography rather than a more common deterministic qualitative research methodology. This, due to the underlying cause of the ethnographic work has been to move a design process forward and not explicitly and systematically explore and understand the nature of the people studied. Whereas the methodology applied relies within the field of qualitative research, it is unclear whether the results would have been any different if explicitly applied to explicitly deterministically investigate the target of this study. It is however fair to believe that the outcome would be similar, due to the nature of qualitative research and what we refer to as design ethnography.
6.2.1. INSIGHTS AND HANDWRITTEN NOTES
The raw data used in this study are handwritten notes from interviewing and observing. There are flaws in having this kind of data for analysis. The applied approach has been focusing on insights research. As of this, and that the design process rapidly has moved forward and validating the insights at hand thoroughly have not been the case. The conclusions drawn from the data collected as notes could have been validated by cross-checking the interpretations with the source of the information. The conclusions drawn therefore rely heavily on the memory of the researcher taking notes as the level of detail of the notes vary. Also, when using notes as data, there is no chance of being near as objective as by transcribing actual comments and citing those. However, as the researcher, having five years of studies in cognitive science heavily focusing on ethnography and subjective experiences this hopefully have influenced the notes taken advantageously.

Other methods that could have been applied during the research to easier validate the conclusions drawn could have been to either record audio and transcribe the interview sessions or to record and analyse video material. Neither have been done in this case.

6.2.2. SERVICE PROVIDER AS FACILITATOR OF USER DATA COLLECTION
The user data collection has been facilitated by the service provider. As being part of the overarching service design project, the domain research of the service provider should have provided a reasonably fair understanding of the service provider. However, during the proceeding design process, the design team, as considered part of the service provider actor identified new information about purchaser and end-user perception of the service provider. The workshop with C3 and T3 revealed that they consider both a salesperson and mechanic as their communication with the service provider. The design team have been presenting themselves as representatives of the service provider and have explicitly lived under its reputation while collecting data.

By applying this methodology, one matter that is target for future research is how the fact that the reputation of the service provider may have affected the outcome of interviews, observation and co-creation workshop with external users and thus the understanding of the relationships in the triad.

6.2.3. METHODOLOGY CONTRIBUTION
The understanding that the design team have had of the service provider turned out to differ from the ones of the purchaser and end-user. Having a representative with even greater knowledge of the business of the service provider present, this may have turned out differently. This is also reason to believe that the domain research possibly has not been extensive enough. Delimitation of the actors within the triadic relationship is a target for discussion.

Another premise with unknown effects of the outcome is the fact that the design team has represented the service provider when collecting user data. Even with the sought actors’ present, the results show that, once again, the understanding of delimitations of the actors in the product-service system may be perceived differently among the actors involved.

The combination of design ethnography and service design thinking did however successfully achieve results in understanding relationships between actors in a triadic network. Had “only”
design ethnography been applied, the same question as previously noted arise; whether a deterministic qualitative research approach would have been viable to provide the same understanding.

6.3. KNOWLEDGE APPLICABILITY
The knowledge of triadic relationships in product-service systems that has been produced in this study should not be generalized and taken for granted in product-service system settings that does not contextually conform actors being the service provider, purchaser and end-user. Even with corresponding actors in the triad, there is no guarantee that the findings of this study are applicable.

However, applying design ethnography and a service design thinking approach have the ability of producing knowledge of each actor within the triad and thus the relationships between them. This knowledge has been further used in the overarching service design project to propose suggestions future development of Scania Driver Services.
7. CONCLUSION
This chapter contains concluding words of the thesis results, research contribution and ideas for future research.

7.1. DESIGN ETHNOGRAPHY AND SERVICE DESIGN THINKING
Design ethnography and service design thinking have been applied in an explorative phase of a service design project. The applied methodology support understanding of triadic relationships in product-service systems. A summary of what produced knowledge concern is presented in bullets below.

• Contradictions between the purchaser and end-user perception.
• Actor perception of another actor(s).
• Actor perceived evolution of another actor over time.
• Actor change of view due to its own evolution.
• Relationships of the service provider, purchaser and end user.
• Misconceptions between actors.
• Variation in communication between actors.
• What the communication between actors is perceived to concern.
• Additional actors than initially considered that are crucial for understanding the triadic relationship.

7.1.1. IMPLICATIONS FOR UNDERSTANDING TRIADIC RELATIONSHIPS IN PRODUCT-SERVICE SYSTEMS
The results indicate that each actor within triadic relationships may have to be elaborated further to thoroughly describe the relationships in the setting of service provider, purchaser and end-user. It has become clear that delimitation of the service provider is not perceived by the purchaser and end-user at is has been by the design team representing the service provider. A thorough understanding of each actors’ beliefs and perception should provide a better understanding of the relationships between them.

7.2. FUTURE RESEARCH
Questions have arisen during the application of design ethnography and service design thinking on triadic relationships in product-service systems. The knowledge produced in this study concern what service design thinking and design ethnography can provide in terms of understanding triadic relationships in product-service systems. The suggestions for future research are to validate the knowledge produced, and also to support better application of the methodologies used.

Proposed subjects for future research are:

• Can application of design ethnography and service design thinking in a deterministic manner to the research question at hand rather than being part of an explorative overarching project further validate the approach as beneficial for describing triadic relationships in product-service systems?
• What are the effects of representatives of a service provider as opposed to external resources performing design ethnography?
• How do you delimitate service provider in triadic relationships where the actors are service provider, purchaser and user?
• How do you define equitable exchange in a triadic relationship where the actors are service provider, purchaser and user?
• Are triadic relationships enough to describe the complexity of product-service systems or should a network of dyadic relations be considered?
REFERENCES


Stickdorn, M., & Schneider, J. (2011). This is service design thinking. basics, tools, cases.


