Multi-Touchpoint Design of Services for Troubleshooting and Repairing Trucks and Buses

Abstract
For professional transport companies, the time that a vehicle is not used for work – the downtime of a vehicle – is costly. In this paper, we introduce a research project that aims to speed up troubleshooting for trucks and buses through a combination of process improvements and development of software support. The result is a service that consists of multi-touchpoint encounters. During the project, we want to investigate how multi-touchpoint encounters can be represented, introduce the concept of implementation during the design of multi-touchpoint services and explore the consequences of the presence of multiple (non-)human actors that follow from multi-touchpoint encounters. We discuss preliminary results regarding these aspects. Thereby, we contribute with knowledge about how multi-touchpoint service encounters can be explored and how their implementation can be discussed as part of the process of designing them.

Author Keywords
Multi-touchpoint design; service design; service implementation; Service Logic
Introduction
Transportation companies want to limit the time that their vehicles are standing still to a minimum. Standing still might lead to missing delivery deadlines and when a truck or bus stands still, it cannot be used to earn money. Therefore, it is important for transporters to have reliable vehicles that – in case of an unplanned stop – are quickly available for work again. Manufacturers of trucks and buses work to meet this need by constantly improving both the performance of their vehicles and by speeding up the process of troubleshooting and repair.

Many different actors are involved in this process of troubleshooting and repairing trucks and buses, either directly or indirectly: driver, owner, workshop receptionist, mechanic, etc. As a consequence, the process involves a variety of touchpoints between different service systems. Technological support that is part of the process adds to this complexity.

Guided remote and workshop diagnostics
We are part of an ongoing research project with a truck and bus manufacturer, that aims to speed up the process of troubleshooting and repairing their vehicles. These improvements include adding new steps in the existing processes and development of advanced software technology as support for those trying to solve the problem. The software allows to remotely perform tests on the vehicle, to collect information and ideally identify the cause of the problem earlier in the process. The software provides step-by-step guidance for troubleshooting based on the information collected from the vehicle.

The general scenario starts when a Driver identifies a problem. He or she then informs the Owner of the vehicle (in the case where the Driver is not self-employed) about the problem. They decide to contact a call centre – that we will refer to as Helpdesk in this paper – where an operator will use the software under development in this research project to remotely perform an initial troubleshooting. This includes downloading fault codes and running tests on the vehicle. Based on the fault codes, the software support can suggest which test(s) to run to collect information that is most helpful in finding the cause of the problem. As part of such a test, the Driver might need to perform actions (e.g. press the brake pedal) to help collect information. The generated data is stored in the software support system and can be used to demarcate – and ideally pinpoint – the cause of the problem. After the initial troubleshooting, Helpdesk contacts a workshop and discusses with the Receptionist of the workshop whether that workshop can take the case. The information stored in the software system is available for this Receptionist, for planning the work. If the workshop takes the case, the truck is brought in to the workshop or a Mechanic drives to the truck. Using the information collected by the Helpdesk, the Mechanic determines what parts and tools might be needed for the repair and prepares these, either for repair at the workshop or for a roadside repair. The Mechanic receives suggestions from the software regarding the best next action(s) to perform, based on information about the problem that has been fed into the software.

The service thus exists of distinct service moments. In the background of most of these moments, the software support is an extra layer that results in additional touchpoints for information throughput or
support. Especially the encounters that involve troubleshooting on the truck are multi-touchpoint encounters: Drivers might receive instructions from the system, while also on the phone with the Helpdesk, the Mechanic may require the Driver to do additional tests (other than those done by Helpdesk), and might do additional troubleshooting on site, for parts that could not be completed remotely.

The process improvements and software development aim to improve the service experience for actors involved in the process in the following ways:

- Customers know earlier what the (extent of the) problem is so they can make better decisions and plan their operations accordingly.
- Workshop receptionists experience less difficulties in planning the work and predicting time, parts and skills required for the work.
- Mechanics feel more confident when approaching the problem because they can use the information that is collected to better prepare before they start working and they have the software to support them.

**Research themes**
We want to use this research project to study the following themes regarding successful realisation of multi-touchpoint service experiences:

- Representations of multi-touchpoint services
- Implementation during service design
- Switches between actors with complementing resources

**Representations of multi-touchpoint services**
Service representations are central in service design tools and methods (e.g. [1]) and are used by service designers for different purposes [2].

We want to look at how current techniques to represent services in a definite and ongoing way [3] can be used to represent multi-touchpoint encounters and what role such representations can play in discussions about realisation of multi-touchpoint designs. We want to learn about ways to depict how several touchpoints are related and built up to become multi-touchpoint encounters. For instance, when Drivers are on the phone with the Helpdesk, they might simultaneously receive instructions to perform tests on the dashboard of their vehicle. How can you explore these situations and aspects such as order of importance of the touchpoints?

**Implementation during service design**
Services often involve a complex combination of resources (e.g. skills, information, technology). As a result, service implementation is a challenging endeavour, but has received little attention so far [4]. We argue that the concept of implementation should be introduced during the design process of a service to increase the odds of a smooth implementation and want to investigate how this could work. More specifically, we want to look at how a holistic, designerly way of working [5] can contribute to knowledge and discussions about successful realisation of future value co-creation during design processes.

Besides this, we want to investigate how the Service Logic framework presented by [6] can be useful to go from a provider-oriented view on implementation, that
is common in discussions about service implementation [7], to a more holistic, view that includes, for instance, what changes and developments are required from customers for successful service implementation.

On the overall level of the project, we want to learn more about how you can structure a dialogue about implementation during design processes and how to structure the process moving from a service idea to an implemented service in sequences.

Switches between actors with complementing resources
In the service described above, actors from different service systems are involved to varying extents at different points in the process. The Owner, Driver and Vehicle form one service system, who decide to interact with the service system of the manufacturer, consisting of the Helpdesk, the workshop network, Mechanics, etc. The resources and information are obviously not equal for all actors: The driver might be the only access point to certain information about the problem (information that cannot be reproduced or collected through tests afterwards, only retold). Only the Owner might have the authority to take decisions about what tests and repairs may be performed.

Furthermore, there is not one actor that is part of all the encounters. Instead, the service involves switches between the different actors. The Driver does not talk directly to the Mechanic until the vehicle is at the workshop or the Mechanic has arrived at the vehicle, but then the mechanic already has a mental image of the problem through the Receptionist, who draws on the software and information from the Helpdesk. The Owner of the vehicle is involved in decisions but is otherwise not part of nor at the locus of the repair; he or she is dependent on information updates from other actors, such as the Driver. The Owner is sometimes the only one communicating with the customer of the transport company (about e.g. delays in delivery).

Given these dyadic relationships during the process, where few actors are constant over time, transparency and providing all actors with the same information is important, to prevent a whisper-game scenario.

Method
We want to research these topics and questions through a combination of co-design workshops, interviews, collaborative data-analysis sessions, field visits as well as the development and discussion of representations of the service process.

Preliminary results
Workshops sessions as well as interviews at garages and transportation companies have provided the following preliminary results:

Channel-smoothening occurs, for instance as a result of trust and habit. Similar to how a river smoothens a riverbed by constantly flowing through it, some service channels are used more intensively, creating paths of least resistance. When new channels or touchpoints are introduced, they contain more friction relative to existing ones. Therefore, service journeys are more likely to follow the desire paths that have already been formed instead: Driver or Owner might call their home workshop rather than Helpdesk because they know and trust the people at their home workshop more than the Helpdesk.
An actor’s service willingness influences the quality and effectiveness of value co-creation: Drivers may have different levels of interest for participating in the (remote) tests or might be stressed, for instance if their truck stalled on an inconvenient location.

Service resources, new roles and positions that actors mention as required for the future service process are expressed in the terms (resources, roles and positions) of the existing service, rather than being separate from it. For instance, an interviewee mentioned that the workshop would need “a second workshop manager” to deal with the calls from the Helpdesk.

In this service, there are several guided touchpoints: the driver receives guidance from the Helpdesk operator in performing tests, the Helpdesk operator and the mechanic receive guidance from the software in their touchpoints with the driver, customer and vehicle.

Conclusions
Development and implementation of technology as a part of service processes can add another layer of touchpoints to the service journey, leading to multi-touchpoint encounters.

In this paper we have presented a research project that involves a multi-touchpoint service for troubleshooting and repairing trucks and buses. In this project we want to look at representations for multi-touchpoint encounters, the introduction of the concept of implementation during the service design process and the dynamics resulting from different actors being involved in different encounters of the same service journey. We want to develop knowledge that can help to improve the design and successful implementation of multi-touchpoint service journeys.

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References