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CUSTOMER JOURNEY MAPPING IN DOCUMENTING GRAPHICS PLAYOUT WORKFLOW: A CASE STUDY

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ABSTRACT

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The goal of this thesis was to map out the high-level customer journey of graphics playout, to identify possible challenges faced during the journey and suggest recommendations to address the identified challenges and pain points. It also aimed to evaluate the effectiveness of customer journey mapping in capturing and documenting the graphics playout workflow and the related experiences of technical specialists.

A mixed-methods approach was utilized to address the research questions. After desk research, three co-design workshops with three technical specialists responsible for graphics playout were held to map the customer journey. After the workshops, an in-depth interview was conducted to identify challenges and potential improvements.

The customer journey map of graphics's playout with relevant steps, work roles and stakeholders was successfully documented in the co-design workshops. The study identified three primary challenges in the workflow: communication, resource constraints, and rapid technological development. Despite the challenges, technical specialists generally found the workflow to be efficient and working well. This case study indicates that customer journey mapping can effectively capture the graphics playout workflow and the experiences of technical specialists. The mixed-methods approach used in this case study, combining co-design workshops with interviews, proved to be effective in collecting and documenting data.

The case study provided a comprehensive understanding of the challenges and workflow dynamics in graphics playout. The created customer journey map makes it possible to clarify roles and responsibilities from the perspective of different users, to help evaluate new systems to be implemented, and to assess users' needs and requirements for them. The findings highlight the importance of effective communication, adequate resourcing, and strategic management of technological advancements in ensuring a smooth and efficient workflow. The insights gained from this study can serve as a basis for future research and practical applications aimed at optimizing customer journeys within similar contexts.

Keywords: Service design, Customer journey mapping, Graphics playout

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1. Introduction

1.1. Background and motivation

Graphics are an essential part of journalism and storytelling, both online and in broadcasting. This thesis focuses on a case study that is done in a media company. In the company there are several systems and integrations related to graphics production and playout, making the associated workflows lengthy and complex. Hundreds of people at the company work in various roles related to graphics workflows.

Graphics-related systems and roles can be broadly divided into graphics production and graphics playout. Graphics production refers to systems and tasks where a graphic designer creates visual or artistic content. Graphics playout systems on the other hand render and playout graphics for broadcast or pre-recorded productions. The company produces a wide range of diverse productions, with daily studio productions being produced differently from lightweight, short-term productions that may also be produced outside the organization. Consequently, the needs for systems, services, and their development vary greatly depending on the production.

Technological advancements in the media industry are remarkable today. The development of Artificial Reality (AR) and Virtual Reality (VR) graphics, the evolution of Internet Protocol (IP) technologies alongside broadcast technology, and the pressure to rapidly produce content for the web create increasing demands for the development of graphics system environments. User needs evolve rapidly with technological advancements, and new development requirements constantly arise from users.

Service design (Stickdorn et al., 2018) is a powerful approach to designing services that align with user needs, and expectations. It acknowledges that service experiences are shaped by the perceptions, emotions, and interactions of users at various touchpoints. It is a broad approach that considers all aspects of a service, including both user-facing components and behind-the-scenes processes. It aims to create better service experiences for users by improving the service delivery, quality, and efficiency. Service design takes into account the entire service journey, from the initial point of contact to

the final interaction, and it often involves multiple touchpoints and channels. By employing methods and techniques that actively involve users throughout the design process, valuable insights into user behaviors, pain points, and preferences can be gained.

To examine the future requirements of graphics playout systems and production environments, it is necessary to first describe the current state. As an essential part of describing the current services, it is important to systematically map users' service paths to better understand their needs and challenges. We need to understand what users are trying to accomplish within the workflow and what challenges they face at different points in the service.

1.2. Research objectives and questions

The primary objective of this case study is to map the high-level customer journey of graphics playout focusing on technical specialists and identifying possible challenges they face at various steps throughout the journey. By closely examining the steps in each stage of the workflow, the study aims to provide a comprehensive overview of the graphics playout workflow and possible challenges and areas of improvement related to it.

The research questions that will be addressed are as follows:

1. What is the high-level customer journey of graphics playout from the point of view of technical specialists?
2. Are there challenges faced during the journey?
3. What recommendations can be made to improve the customer journey and address the identified challenges and pain points?
4. How can customer journey mapping effectively capture and document the graphics playout workflow and related experiences of technical specialists? What are the potential benefits of utilizing customer journey mapping in documenting the graphics playout workflow?

A mixed-methods approach will be utilized to address the research questions. Existing workflow data will be examined, and co-creation workshops with technical specialists will be held to create a customer journey map. This will be followed by an in-depth interview with the specialists to identify challenges and potential improvements. The methodology and detailed case study design will be expanded upon in Chapter 4.

The thesis is divided into five main chapters. Chapter 2 discusses user-centered design, goal-directed design and service design. Chapter 3 discusses customer journey mapping, setting the theoretical framework for the case study. Chapter 4 presents the case study on mapping the graphics playout workflow, providing a practical application of the customer journey mapping using co-design and interviewing methods. Chapter 5 provides a discussion and analysis of the findings from the case study, with Chapter 6 drawing conclusions and implications for future research.

2. User-centered design

The concept of user-centered design dates back to the 1980s when it was discussed and introduced by Norman in "The Psychology of Everyday Things" (which was renamed "The Design of Everyday Things" in 2002) (Norman, 1988). The book introduces the principles of designing objects and systems that are intuitive, usable, and user-friendly. Norman (2013) argues that design should prioritize the needs and capabilities of users, taking into account the psychology of human cognition and behavior. It highlights the importance of understanding human behavior, cognitive processes, and the principles of good design in creating effective and satisfying interactions between users and technology.

Norman (2013) introduces seven fundamental principles of design derived from the insights of the seven stages of action. These principles are:

1. Discoverability: Users should be able to determine the available actions and the current state of the product or service.
2. Feedback: Continuous and comprehensive information should be provided about the results of actions and the current state of the system. The new state should be easily discernible after an action is executed.
3. Conceptual model: The design should present all the necessary information to create a good conceptual model of the system, facilitating understanding and a sense of control. The conceptual model enhances discoverability and evaluation of results.
4. Affordances: The product should offer appropriate affordances that enable desired actions.
5. Signifiers: Effective use of signifiers ensures discoverability and facilitates clear communication and understanding of feedback.
6. Mappings: The relationship between controls and their corresponding actions should follow principles of good mapping, leveraging spatial layout and temporal contiguity whenever possible.
7. Constraints: Physical, logical, semantic, and cultural constraints should be provided to guide actions and simplify interpretation.

Overall, the emphasis should be on design to align with human needs and expectations, providing the necessary information and support to facilitate smooth and effective interactions between users and products (Norman, 2013, p.73).

Norman's principles of user-centered design laid a foundational framework in understanding the interaction between users and products. Since it was developed, design thinking has evolved to encompass more than just usability. When the focus is shifted from interactions between users and interfaces, design can also be a strategic tool for achieving specific user goals. Goal-directed design is a methodology that extends beyond the surface-level interactions by focusing into the motivations and objectives that drive user behavior.

2.1. Goal-directed design

While user-centered design focuses on user needs and tasks, goal-directed design is about understanding user goals and designing for them. User goals are often different from what we assume them to be, and they may not align with the goals of the organization. Personal goals, such as appearing competent, staying engaged, and achieving personal growth, are important to users regardless of their work tasks. Designing products that address both business goals and user's personal goals leads to more effective outcomes. Many software, websites, and digital products fail to meet user goals and business purposes and companies often prioritize implementation issues over user needs, leading to poor user experiences. Focusing solely on tasks rather than user goals can result in technologically sound but commercially unsuccessful software. (Cooper et al., 2014, pp. 13-14.)

Goals are distinct from tasks or activities. Goals represent the expectation of an end condition, while tasks and activities are steps towards reaching those expectations. Activity-centered design (ACD) (Norman, 2005, as cited in Cooper et al., 2014) emphasizes understanding activities and highlights the importance of considering how humans interact with tools. ACD is based on Activity Theory, which focuses on understanding human interaction with the world. While ACD is a step in the right direction, it doesn't go far enough, as it doesn't address the question of why users perform activities. Understanding user goals is essential for understanding user

expectations and aspirations, which helps designers decide which activities are relevant to their design. Goals are driven by human motivations and change slowly, while activities and tasks are more transient and influenced by technology. Designing solely based on activities or tasks may lead to designs that are limited by outdated technology or fail to meet user goals. Designing with a focus on goals allows leveraging technology to eliminate irrelevant tasks and streamline activities. (Cooper et al., 2014, pp. 14-15.)

Software should be adapted to match the users' way of thinking, not the other way around. Implementation models describe how a machine or application works and are represented by algorithms and code. Designing software solely based on its implementation model does not effectively support users in achieving their goals but can lead to user alienation and confusion. Mental models, on the other hand, are users' simplified explanations of how a complex mechanism works and they may differ from the implementation model. In the digital world, the differences between a user's mental model and the complex implementation model are pronounced. Software applications, in particular, present challenges in bridging the gap between the user's mental model and the complex implementation. This makes it difficult for users to perceive the connections between their actions and the application's responses. The represented model is how designers choose to represent an application's functioning to the user. Designers should aim to match the represented model with users' mental models to enhance usability and understanding. User interfaces based on mental models are superior to those that reflect the implementation model: designing goal-directed interactions that reflect user mental models leads to more successful digital products. The goal-directed design process helps determine users' goals and mental models, guiding the creation of intuitive and desirable products. (Cooper et al., 2014, pp. 16-20.)

Goal-directed design provides an important framework for understanding and meeting user needs at the level of individual interactions with a product. However, it does not take into account the broader environment in which these interactions occur. Service design takes the principles from goal-directed design and extends them to the entire service experience: it involves multiple different touchpoints or systems and various

stakeholders. The next section will discuss the approach of service design, which aims to create more seamless and user-centered service experiences.

2.2. Service design

There are a multitude of definitions and perspectives about what service design is and is not. It can be seen as many different things: a mindset, a process, a toolkit, a cross-disciplinary language, or a management approach (Stickdorn et al., 2018, pp. 20-21). Service design provides a practical perspective on enhancing or developing an organization's offerings. The approach is human-centric, collaborative, and iterative, utilizing research, prototyping, specific activities, and visualizations to create experiences tailored to the needs of users, businesses, and stakeholders. Six primary principles underlie service design (Stickdorn et al., 2018, pp. 18-26.):

1. Human-centered: The experiences of all individuals impacted by the service are paramount.
2. Collaborative: Stakeholders must actively participate in the service design process.
3. Iterative: Service design is a continually evolving and explorative method.
4. Sequential: Services should be conceptualized and coordinated as a series of interconnected actions.
5. Real: Needs and concepts ought to be researched and prototyped authentically, transforming intangible values into tangible or digital manifestations.
6. Holistic: Services should comprehensively address the requirements of all stakeholders throughout both the service journey and broader business operations.

Brown (2008) describes the design process as a "system of spaces rather than a predefined series of orderly steps". These spaces host various activities that shape the innovation process. The design project is typically depicted as consisting of three phases: inspiration, ideation, and implementation (Brown, 2008; Katzan, 2011). In addition to these, another separate phase can be identified, known as the research phase, where the goal is to understand users and their relationship to the service being developed (Stickdorn et al., 2018, p. 90). During the inspiration phase, designers and

stakeholders aim to discover new ways of thinking about the problem, focusing on the circumstances that catalyze the search for solutions (Brown, 2008; Katzan, 2011). The ideation phase involves generating, developing, and testing potential solutions, providing insights into the scope of the project. The implementation phase, on the other hand, focuses on developing the service in collaboration with customers through prototyping and testing. Given that service design is an iterative process, a new cycle of inspiration, ideation, and finally, implementation is often commenced after the initial round (Katzan, 2011). The number of phases can vary, but what is more important than strictly defining these phases is the emphasis on understanding customer needs, working iteratively, and alternating between divergent and convergent thinking and doing (Stickdorn et al., 2018, pp. 87).

Divergent thinking involves the search for a large number of ideas and possibilities. The ideas can be of various types and even far-fetched; the more important aspect is to generate as many as possible as it is believed that the outcome of divergent activity is a more creative result. Brainstorming can serve as an example of facilitating divergent thinking. Convergent thinking, on the other hand, is needed to clarify different ideas and concepts to achieve focus. It involves naming, arranging, and linking concepts and ideas and making decisions. Both types of thinking are required in the process, and they should iteratively alternate with each other. This type of design process is commonly referred to as the double diamond and it is depicted in Figure 1. (Stickdorn et al., 2018, pp. 84-89.)

The aim of this case study is to document the existing workflow process of graphics playout. The formation of a current process description can thus be seen as a part of the service design research phase, where the objective is to understand people, their motivations, and behaviors. It is important to examine the tools that facilitate this understanding. In the following section the research process and tools commonly employed in service design will be explored, shedding light on how they can be used to achieve the objectives set.

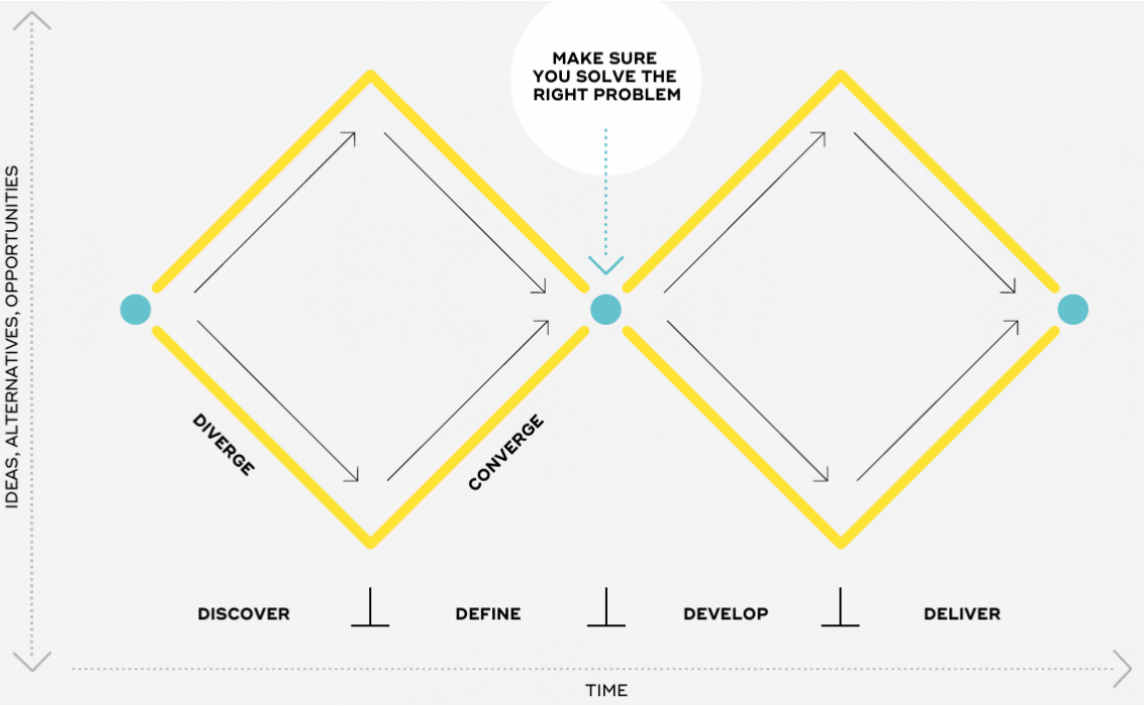

Figure 1: Convergent and divergent thinking, "the double diamond" (Stickdorn et al., 2018, p. 88.).

2.3. Service design research process and tools

The research phase is usually the first in the service design process, but it is also revisited later whenever the need arises. Research is used to understand both customer and employee experience, as well as to gain an understanding of the service ecosystem. Like other phases, research activities are iterative, incorporating both convergent and divergent thinking. The process often begins with a brief from the client, followed by preliminary research. After this, research questions are defined and the research plan is laid out. Following this initial "diamond," the scope and questions for the study have been determined and a research plan has been created. In the next phase of divergent action, data is collected in various forms. (Stickdorn et al., 2018, pp. 96-112.)

Stickdorn et al. (2018) define research data as one of the most important tools. Research data consists of facts in various forms, gathered through different research activities. Empirical data can be divided into so-called raw data and interpreted data. The difference between these is that raw data describes a situation without any

interpretation. Interpreted data, on the other hand, synthesizes the phenomena that emerge from the data. (Stickdorn et al., 2018, p.37.)

After collecting data, in a phase of convergent action the collected data is categorized and visualized. Data visualization helps teams get a better understanding of the volume of information. Visualizations make it possible to discern patterns and bring structure to complex data, and also help in identifying any gaps in information. (Stickdorn et al., 2018, pp. 96-112.) Visualization and mapping techniques are also good at clarifying the different elements within a service and how they contribute to the user experience (Følstad & Kvale, 2018). The data is visualized using different tools. The use of various visualization tools is characteristic for the service design process. The tools typically have a specific structure or are developed using templates. The selection of appropriate tools depends on the expected outcome. Most important examples of visualization tools used in the service design research phase include personas, system maps, journey maps, and service blueprints. (Stickdorn et al., 2018, p. 36.)

Persona is a profile that represents a certain group of people: an archetype based on research. It could be a group of customers, employees or stakeholders. Personas make the needs and motivations of users more understandable and can thus be used to share research findings to different stakeholders and collaborators. When creating personas, a portrait image and name are usually added as well as demographic information, a quote summarizing the personas attitude, mood images and description with details important in the context of the research question. (Stickdorn et al., 2018, pp. 40-41.)

Figure 2 depicts an example of a persona created of one common user type of an ecommerce site selling home appliances. The common user type is one that “engages in exhaustive comparison shopping and is especially interested in the overall reliability and warranties of appliance brands and models before buying.” Instead of representing this type of user as a nameless and faceless archetype, it is represented as a persona with a photo, name, a descriptive quote and biographical facts. Core needs and behaviors explaining her motivations are also included. **(**Laubheimer, 2022.)

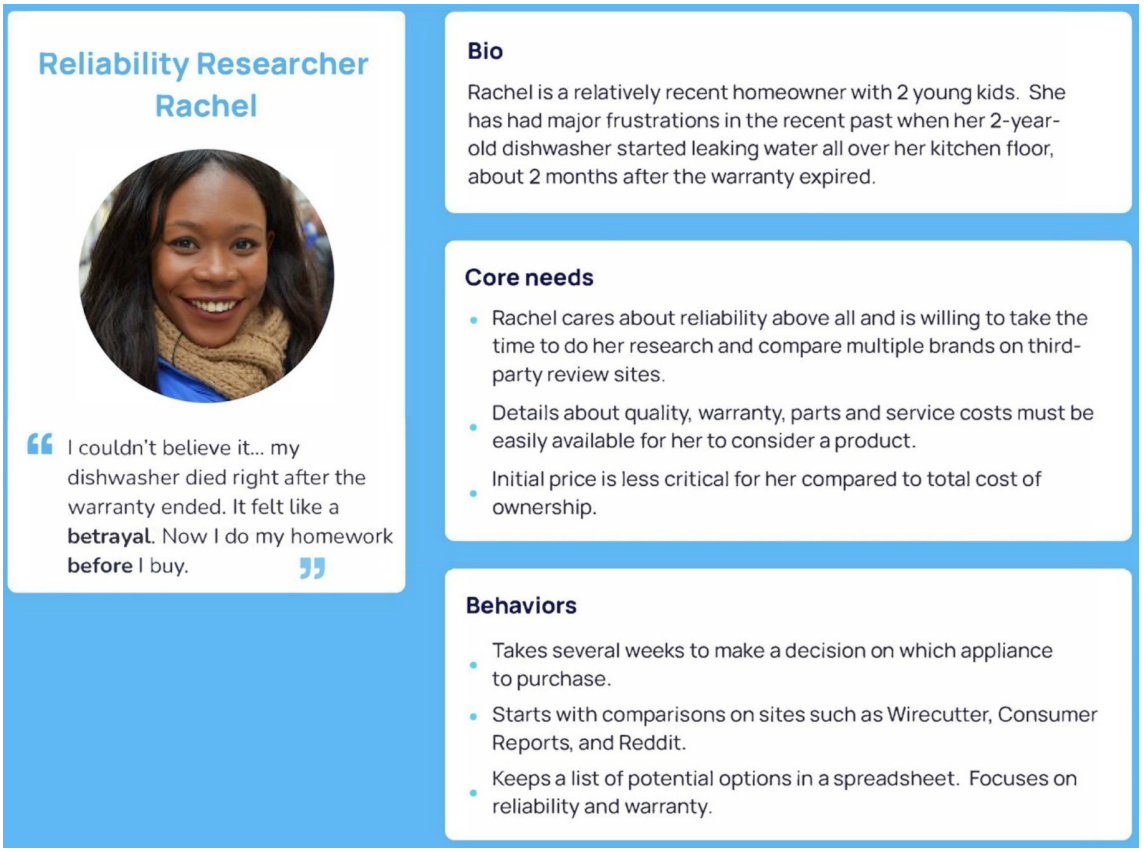

Figure 2. Example of persona, reliability researcher Rachel, with bio, core needs and behaviors **(**Laubheimer, 2022).

A system map is a visual representation of a system's structures, such as people, stakeholders, processes, services, and so on. Once the primary components of the system are depicted, it becomes possible to analyze and develop their relationships. Visualization also makes complex systems more understandable. Just like journey maps, system maps can be created for both the current state or future scenarios. Variations of system maps include stakeholder maps, value network maps, and ecosystem maps.

Figure 3 shows an example of an ecosystem map of the experience of buying a new home. The buyer is depicted in the center, being surrounded by different people, organizations and service providers who they interact with during the experience.
The map is made up of concentric circles that demonstrate the distance between the buyer and a person or service: the home buyer is in the center and people and services who have more influence and interaction with the buyer are closer to the buyer. People

and services that interact with the home buyer only indirectly or very briefly are depicted being further away from the home buyer. (Rosala, 2022.)

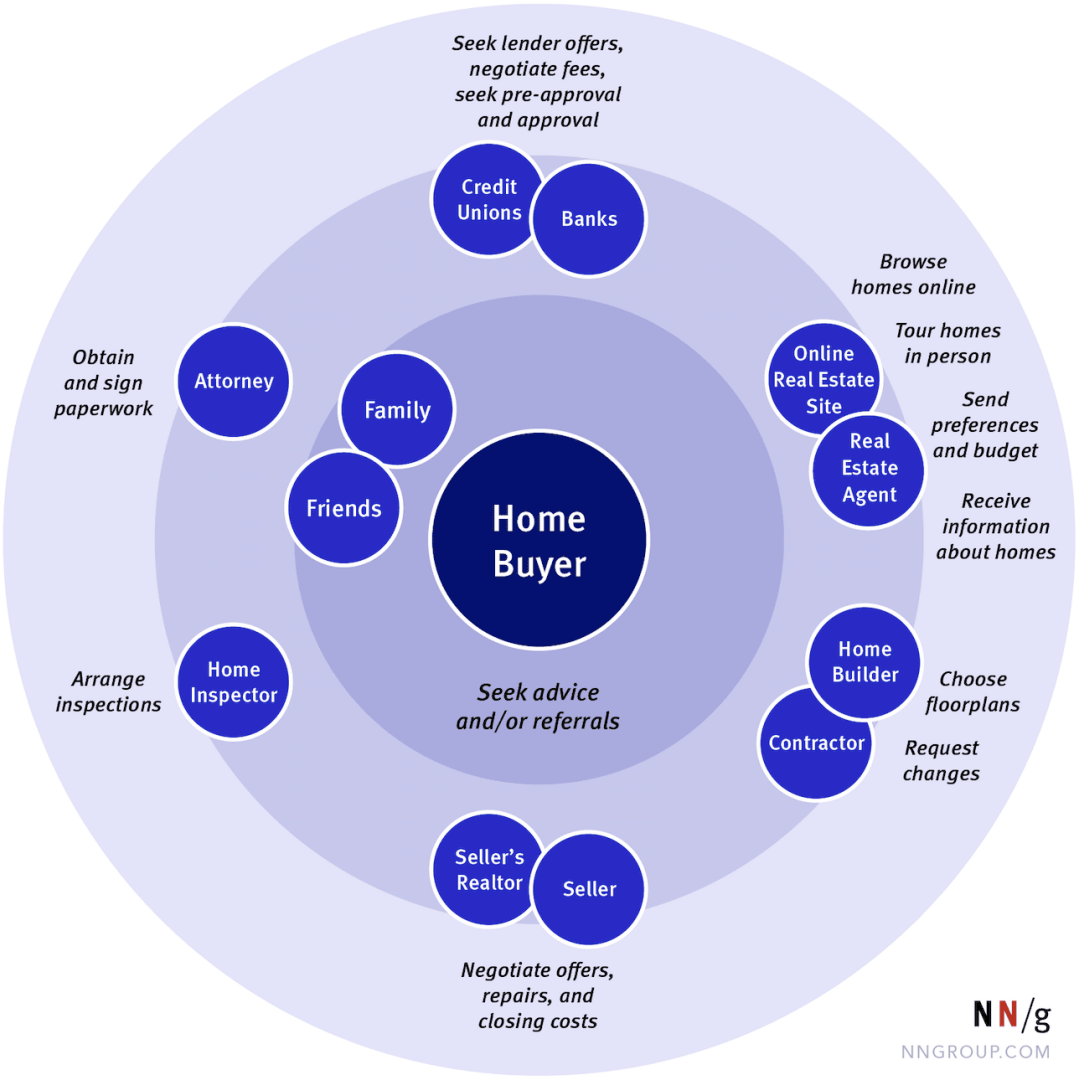

Figure 3. Example of an ecosystem map for buying a new home (Rosala, 2022).

The next chapter will focus on one tool that stands out for its ability to capture the complexities of user experience in a structured manner: customer journey map. This tool is a very central tool in service design and it also plays an important role in this case study. Customer journey map is a good tool to understand and visualize the entire customer experience, especially in identifying pain points and opportunities for

improvement. In the following chapter customer journey mapping and its applications will be looked into in more detail.

3. Customer journey mapping

Customer journey mapping involves examining and illustrating the current service process from the user's perspective. It looks at how services are currently delivered, often using qualitative and quantitative data gathered from both customers and internal stakeholders. The results are usually displayed visually to present the findings, and this method is commonly seen during the research stage of a design process. (Følstad & Kvale, 2018.) The primary objective of customer journey mapping is to identify pain points, moments of delight, and areas of improvement to enhance the overall customer experience (Verhoef et al., 2009).

Journey maps can be high-level or very detailed: often both are needed. A journey map usually focuses on one actor, that can be represented by a persona. The steps can be visualized by storyboards and emotional journeys pictured as graphs representing the actors' satisfaction at each step. (Stickdorn et al., 2018, pp. 43-46.) The visualizations of customer journeys can be very diverse, but some common features can be identified. They typically depict the journey as a process consisting of several steps, stages, touchpoints or activities. The additional information chosen for the visualization is based on needs and preferences instead of common conventions. (Følstad & Kvale, 2018.) Often the means of communication and involved stakeholders in each step are recognized as well as the possibilities for things to go wrong, the so-called "what-if" -lane (Stickdorn et al., 2018, pp. 43-46).

Within customer journey mapping, various types of touchpoints can be identified. At each stage of the customer journey, the customer interacts with different touchpoints that collectively shape the customer's experience, and it is essential to identify the critical touchpoints, often referred to as "moments of truth," as they have a significant influence on key customer outcomes. (Verhoef et al., 2009.) Touchpoints have also been defined to be an instance of communication between a customer and service provider, that must be visible to the customer, a discrete event appointed in time, and it must involve interaction between customer and service provider: they are service encounters or moments of contact between the customer and the organization (Halvorsrud et al., 2016). Designing customer journeys and their associated touchpoints brings added value

as it differs from traditional service blueprints or mappings by placing the customer at the center of service system design. The focus shifts from what an organization plans for the customer (cues and service encounters) to what actually happens from the customer's perspective (touchpoints and journeys). (Zomerdijk & Voss, 2010.)

Journey maps can visualize either the current or future experiences of a service. Either way, they should be research-based instead of based on assumptions. Current journey maps are good in finding opportunities of improvement. The point of view can be that of a customer, or employee, a company internal, for example. The points of view can be combined into one map, too. The journey maps' focus can be either product- or experience-centered: a product-centered map contains only the touchpoints (interaction steps), whereas the experience-focused maps reflect the context and show the relation of the touchpoints in the overall experience. (Stickdorn et al., 2018, pp. 49-52.)

Figure 4 depicts an example of a customer journey map. A is the main actor of the journey, represented here by persona "Tom". Lane B represents the main phases of Tom's experience, while steps are in lane C. In the example lane D is for storyboards that illustrate the experiences of the steps and are used to increase empathy and make navigation in the map faster. Emotional journeys in lane E represent Tom's level of satisfaction at each step. Lane F lists the channels of communication in the steps, and lane G lists the stakeholders. Lane H shows the dramatic arc, i.e. Tom's level of engagement at each step. Lane I shows the backstage processes connected to the steps and lane J is the "what if" -lane asking what could go wrong at each step. (Stickdorn et al., 2018, pp. 44-46.)

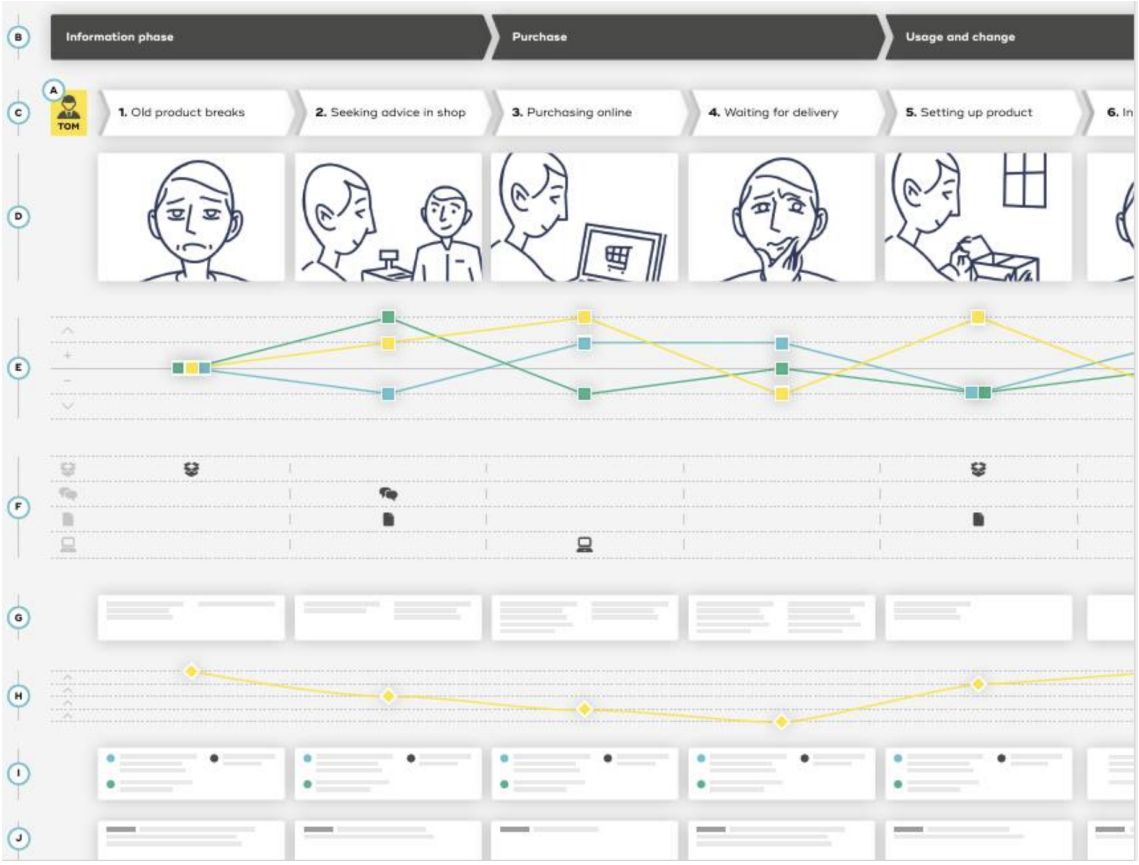

Figure 4. An example of a customer journey map (Stickdorn et al., 2018, p. 44).

Goal-oriented customer journey mapping refers to a customer journey mapping approach that focuses on understanding and analyzing the customer's journey towards achieving specific goals. It involves identifying the higher-order goals of the customers and mapping the various processes and touchpoints they engage with to accomplish those goals. There are three main levels of journeys, based on hierarchies of goals: consumer journey, customer journey, and touchpoints. The consumer journey represents the pursuit of higher-order goals and encompasses multiple customer journeys. The customer journey represents the pursuit of sub-goals and is nested within the consumer journey. Each customer journey, in turn, consists of several touchpoints that reflect goals at a more concrete level. Consumers set higher and lower goals at different levels of abstraction, compare their experiences to these goals, and work iteratively to change or maintain their perceived situation throughout the journey. Experiences thus serve as drivers for behavioral change towards goal achievement. (Becker et al., 2020.)

3.1. Service blueprint

Service blueprints can be seen as extended journey maps, the journey mapping being the first step in creating a more thorough service blueprint. It brings forth how internal processes and customer activities relate to one another. (Stickdorn et al., 2018, p. 56.) Service blueprinting is a collaborative process that brings together diverse teams, including service designers, managers, and frontline employees, to map out the customer's journey in the service. It begins by identifying the various stages and touchpoints that customers encounter, the “frontstage”. From there, the focus shifts to understanding the actions of contact employees, the supporting processes, and the physical evidence involved in delivering the service “backstage”. (Bitner et al., 2008.)

Whereas the customer journey map only focuses on the customer's point of view and visualizes only the “frontstage”, the service blueprint goes deeper showing the processes and people invisible to the user, the so-called “backstage” (Stickdorn et al., 2018, p. 56). In creating the service blueprint visual representations, such as diagrams or flowcharts, are used to visually depict the structure of the service system and illustrate the connectedness of its components. This approach allows for a comprehensive understanding of the service experience and facilitates effective communication and coordination among team members. (Bitner et al., 2008.)

Figure 5 depicts an example of a service blueprint. Line A shows the physical evidence that the customers come in contact with, while line B describes the actions the customer does in each step of the customer journey map. Line of interaction (C) shows a connection with a vertical arrow when the customer has an interaction with the frontstage employee. Lane D represents the actions of the frontstage employees that are visible to the customer. E is the line of visibility: it separates the frontstage and backstage actions of the frontstage employees. Lane F depicts the backstage actions of the employees that are not visible to the customer. G is the line of internal interactions, processes below the line are done by other departments or teams. Lane H is for depicting support processes. Additional lanes for custom perspectives can be added to visualize project-specific content. (Stickdorn et al., 2018 pp.53-55.)

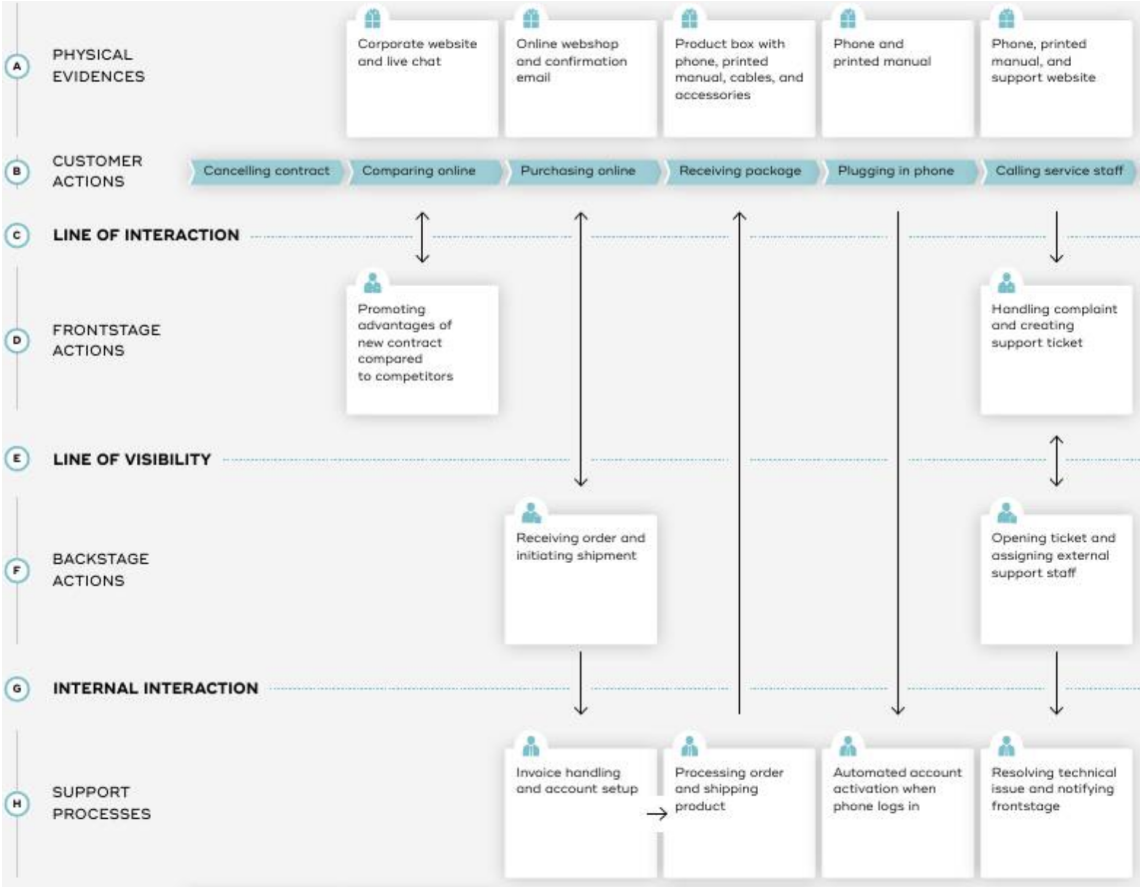

Figure 5. An example of a service blueprint (Stickdorn et al., 2018 p.54).

Service blueprinting has been recognized as a valuable method for mapping the various processes involved in a service, including the customer's journey. On the other hand, the customer journey approach focuses solely on the customer's experience of the service delivery process. These two approaches can be seen as complementary, with service blueprinting representing the organization's planned process and the customer journey representing the actual experience from the customer's viewpoint. (Halvorsrud et al., 2016.)

Følstad and others (2013) reviewed literature concerning customer journeys in order to get an overview how customer journeys are used for service management and design in different fields. They found that the customer journeys are used to support design in three ways: to structure user research at the beginning of the service design process, to support collaborative or co-design processes and to serve as visualizations of the output of service design projects.

3.2. Customer journey mapping methods

Stickdorn et al. (2018) categorize the service design data collection methods into five categories: desk research, self-ethnographic approaches, participant approaches, non-participant approaches and co-creative workshops. The categories are presented in Table 1. Desk research is about finding the right research questions to ask in the research: understanding the industry, organization and context better and finding out whether research about the topic already exists, either in internal or external sources. In self-ethnographic approaches the researchers immerse themselves in real situational contexts as customers or employees, or investigate interaction in online communities and self-document the experience. Participant approaches have to do with observing the participants, interviewing them in context or in-depth. In non-participant approaches the researcher doesn't interact with the participants during the data collection. These approaches include for example observing the participants' behavior in situations, participants self-documenting their experiences using their mobile phones and participants self-documenting experiences with field notes or photos or collecting artifacts. In co-creative data collection approaches the knowledge and experience of the participants is used to create for example personas, journey maps or system maps. (Stickdorn et al., 2018, pp-116-126.)

Desk research	**Self-ethnographic approaches**	**Participant approaches**	**Non-participant approaches**	**Co-creative workshops**
Preparatory research Secondary research	Auto-ethnography Online ethnography	Participant observation Contextual interviews In-depth interviews Focus groups	Non-participant observation Mobile ethnography Cultural probes	Co-creating personas Co-creating journey maps Co-creating system mapping

Table 1. Service design data collection methods categorized (Stickdorn et al., 2018, pp-116-126).

In a literary review by Følstad et al. (2013) concerning customer journeys the most frequently used method for data collection from customers was found to be interviews with customers, spanning from informal discussions to structured interviews, done retrospectively or during the journey. When observation was used, it was combined with interviews. The main method for involving internal customers was collaboration in the form of internal workshops, getting assistance from internals in gathering information and involving internals in service quality audits. When internal resources were used, it was mostly done by facilitating collaboration.

Crosier and Handford (2012) conducted a study using customer journey mapping to map the shopping experiences of blind and visually impaired individuals. Participants were asked to go through specific journeys, during which their experiences were recorded in both audio and written formats, supplemented by interviews conducted at different stages of the journey. This process resulted in a series of journey maps. Individual experiences were then synthesized into case studies, and participants reviewed them to ensure the accuracy of the journey. The individual respondents' journeys were combined to create a visual journey map that reflected the challenges faced by the participants. In addition to the traditional visual map, audio files were added to accommodate blind participants.

Trischler & Scott (2016) examined the use of three service design tools for developing public service system designs and understanding user experiences. They employed a combination of personas, collaborative mapping exercises, and observational techniques to delve into the user experiences within a service system. By developing personas based on in-depth interviews, the researchers aimed to explore specific behaviors and routines associated with the analyzed service. Collaborative workshops played an essential role in mapping the service system and identifying the touchpoints users encountered throughout their customer journey. The collaborative mapping exercises not only analyzed how the service system was facilitated by service providers but also shed light on how users experienced it. However, observational techniques fell short in explaining why certain touchpoints were perceived negatively or capturing the underlying factors influencing these perceptions. To address this limitation, the study

suggested the inclusion of in-depth interviews as a complementary approach to further analyze touchpoints and gain deeper insights into users' perspectives.

Han et al. (2018) employed a comprehensive 4D framework for team care service model development for resolving drug related problems. The framework included four phases: discover, define, design, and develop. The first phase called discover phase consisted of three steps aimed at identifying the diverse needs and expectations of stakeholders. Methods such as service safaris and user shadowing were used to understand how different users interact with the service. Emotional responses were recorded and visualized using a 1 to 5 interval scale. Customer journey maps were then used to identify pain points and opportunity points in the service. In the define phase the findings from the discover phase were translated to generate a collaborative service concept. Creative solutions for pain and opportunity points were explored through group discussions and brainstorming. In the design phase prototypes were designed and validated. New services were designed to manage the unmet stakeholder needs, and the prototype was presented as a story or a series of short stories.

In the context of Stickdorn et al.'s (2018) framework for categorizing service design data collection methods, the studies by Crosier & Handford (2012), Trischler & Scott (2016), and Han et al. (2018) each employ a mix of methods tailored to their specific research objectives. In the context of Stickdorn et al.'s (2018) framework, each study employed a mix of methods. Crosier & Handford primarily used non-participant approaches and interviews. Trischler & Scott combined participant approaches with co-creative workshops, using in-depth interviews and collaborative mapping exercises. Han et al. also used a mix of participant approaches and co-creative workshops within their 4D framework.

Co-design was used in the studies previously discussed and as Følstad et al. (2013) noted, it is the main method for involving internal customers. Co-design involves the active participation of both service providers and users in the design process, with the goal of creating more user-centered solutions. This collaborative method is a powerful

tool for identifying touchpoints, pain points, and opportunities in the customer journey, as Trischler & Scott (2016) discussed.

Steen et al. (2011) define the term co-design as creative cooperation during design processes, where "diverse experts come together, such as researchers, designers or developers, and (potential) customers and users to cooperate creatively." Based on reviewing existing literature and three case studies, they identified co-design benefits in service design projects that can be arranged in different categories: benefits for the service design project, benefits for the service's users and benefits for the organization. The benefits of co-design to the service users comes through improving the service: the service quality is higher and more differentiated, there is a better fit between the service and users needs and thus the service experience is better. This can be seen in improved longer-term effects as higher satisfaction and loyalty and more educated users. The project in itself benefits from the improvement of idea generation with better knowledge on customers, more successful innovations and improving project management. (Steen et al., 2011.)

In the context of customer journey mapping, there are several ways and methods to involve customers and internal resources in the process, referred to as involvement practices. Følstad et al. (2014) propose a framework for these involvement practices. They can be categorized into three dimensions: purpose, implementation (participant and methods), and output. Purpose refers to the goal of the involvement practice, while implementation refers to the practical arrangements, particularly concerning participants and methods. Output describes the result achieved through the practice. The goals of involvement practices can vary, such as analysis or design. The implementation can involve customers, company internals, or both. The methods of involvement can be qualitative, such as mapping or co-design, or quantitative, such as measurement methods. Qualitative methods can focus on individuals through interviews or observations, or they can be collective, such as mapping workshops or co-design sessions. The choice of involvement methods depends on their purpose and implementation. It is crucial to select the appropriate method based on the desired output or result. (Følstad et al., 2014)

4. Case study: mapping graphics playout workflow using customer journey mapping

4.1. Overview of the case study

The goal of this case study is to identify and visually map the workflow of graphics playout from the point of view of the technical specialists responsible for playout using customer journey mapping. In addition to creating the high-level process documentation, the aim is to recognize possible challenges faced during the journey. The graphics playout workflow is a process that involves many different phases and employees from different departments in the company. Since the aim is to depict the process from an employee's perspective and identify areas where challenges arise, customer journey mapping can be considered a fitting tool for the task.

In the context of broadcast production, graphics playout refers to the process of displaying or playing back graphic content during live broadcasts or pre-recorded productions. This could include elements like lower thirds, tickers, full screen graphics, transitions, or other visual elements. These graphics are often controlled and managed through a graphics playout system or software, which allows the production team to queue, manipulate, and play these graphics in real-time during a broadcast.

Figure 6. The graphics playout high-level workflow.

In the organization, graphics playout workflows have been described both at the level of individual systems and in a very broad sense, outlining the stages involved in the process. The stages of the process that have been identified in previous workflow depictions are depicted in Figure 6. They are brief, content creation, preparation for playout, playout. In the brief stage, an understanding of the project goal and scope is formed, including resourcing and timetable. During content creation stage, the visual design for the production is designed and created, the playout system chosen and the

graphics and templates built in the system and tested. Preparation for playout entails building the workflows and populating and editing the graphic content in the playlists. Playout stage entails the actual playout of graphics either in live production or loading the graphics into content in edit in a pre-recorded production.

There is some variation in the workflows depending on the production, but the stages remain the same. Identifying the stages is a good starting point, but there is a need for more detailed, yet still high-level workflow description documenting not only the steps during each stage in the workflow, but also the most important work roles during the workflow. After a high-level workflow depiction the workflows and needs can be described in more detail based on different production types or systems, for example. This study aims to map the high-level workflow of graphics playout within one unit in the company, from the perspective of the technical specialists. They were identified as the primary people of interest due to their central role in the workflow, their technical expertise and understanding of the production needs. Within the workflow, the technical specialists work as technical experts in the production, facilitating efficient and user-friendly graphics playout in production. They build the playout workflows and ensure the graphics playout production environment works, which is why their role in the workflow is crucial. In addition to the technical specialists, designers and production coordinators were identified as other important work roles in graphics playout workflow. The designer is responsible for designing the visual look of the production and creating the graphics. The production coordinators ensure that all necessary graphic elements are created, delivered, and incorporated correctly within the production timeline.

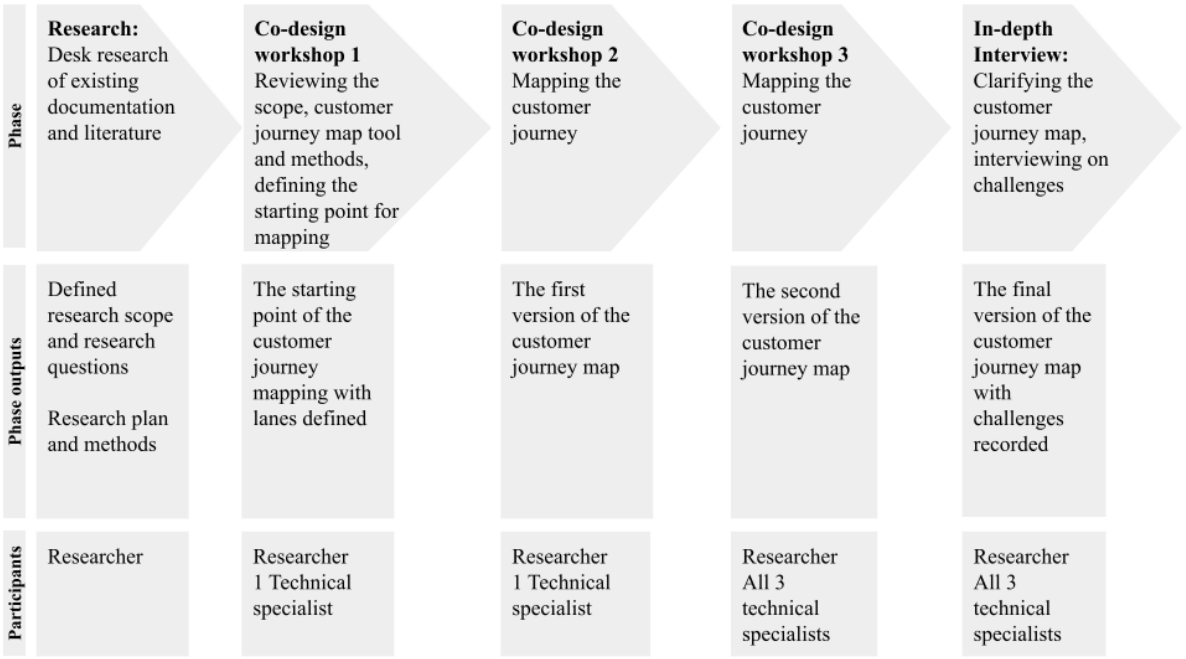

Figure 7. The process model on the case study research design.

To address the research questions, a mixed-methods approach was employed. The process of the case study is depicted in Figure 7. In the first step, the existing workflow documentation and existing literature were researched to define research scope and questions and form a research plan. After this the first co-design workshop was held with one technical specialist, where the customer journey map tool was introduced and validated and the starting point for the mapping was created. Two co-design workshops followed, where a customer journey map was created. In total three technical specialists, responsible for graphics playout, participated in the workshops. After the workshops, they were interviewed in depth to identify challenges and possible improvements during the journey and the map was then supplemented with this data. The methodology will be elaborated upon in the subsequent sections, providing a more comprehensive understanding of the case study research design.

4.2. Mapping the customer journey in co-design workshops

Documentation on various graphics playout systems and workflows from different units was reviewed. Data was collected from technical specialists, media technology department documentation, and the intranet, among other sources. Based on this data, the stages of the map and some journey steps were identified. The most important roles that act during the journey, in addition to technical specialists, were recognized to be designers and production coordinators.

The choice of using co-design workshops for customer journey mapping was influenced by the collaborative and participatory nature of co-design. Stickdorn et al. (2018) recommend co-design as a good method to create a journey map in collaboration with stakeholders: it is a method to bring their know-how to the center. Co-design workshops also allow for real-time feedback and iterative design, which is important for capturing the complexities of the workflow. Co-design workshops provide a good platform for stakeholders to voice their experiences and challenges and they can potentially lead to more innovative solutions, as it leverages the collective creativity of the participants (Steen et al., 2011).

Customer journey mapping was conducted in co-design workshops with technical specialists. There were three workshops in total. Due to scheduling challenges, the first two workshops were conducted with just one technical specialist. In the first workshop, the purpose of the study and the tool of customer journey mapping were discussed with the specialist. The first workshop began with recognizing the stages of the workflow. They could be identified right in the beginning of the working based on previous workflow process descriptions: the stages brief, content creation, preparation for playout and playout describe the rough or extremely high-level process of graphics playout. It was decided that the steps to be described could be divided under these processes. After identifying the stages, the most important lanes for the map were identified through interviewing and discussions and the starting point for the customer journey mapping was thus achieved after the first workshop session.

	Brief stage		**Content creation stage**				**Preparation for playout stage**		**Play-out stage**
Journey step									
Main actor									
Touchpoint									
Stakeholders									
Challenges									

Table 2. Customer journey map that was created in the first workshop, with the most important lanes in first columns and stages in first row.

The starting point for the customer journey mapping can be seen in Table 2. From the perspective of describing the workflow, the most important elements, or lanes, identified were journey stages, the main actor in each step, journey steps, touchpoints, stakeholders, and challenges encountered. The journey stages are depicted in the first row of Table 2, while the first column describes the lanes. When the map is created in the workshops, the assumption is that several different steps will be added under each of the stages.

Actor refers to the role that is responsible for said step. The journey step was defined as being the task that the actor is trying to complete to accomplish a goal. For example *testing the graphics templates in the production environment to make sure they are working as intended.* The terms touchpoints and journey steps are sometimes used interchangeably. Halvorsrud et al. (2016) defined touchpoints as instances of communication between a customer and service provider. Mirroring this approach in this case study the term was defined as being the point of contact where and how information is shared: a document, a meeting, or a system where resources are booked or graphics playout done for example. Stakeholders refers to all of the people in a production that are a part of each step: some steps might be done in collaboration with them, they need to be informed, give input to said step etc. Challenges lane was where the encountered challenges were gathered.

The first workshop sparked discussion on the point of view of the journey map: the workflow is so broad that three different job roles can be identified as actors along the way. From the perspective of this work, the most important role was identified as technical specialists, but from the point of view of the workflow other key actors in the process are designers and production coordinators. The map was decided to be created by combining the steps of different actors, as the primary goal was to describe the high-level process as a whole. The description of challenges focused specifically on the perspective of the technical specialists, as they have been identified as the most important technical partners in the development of the system environment.

A digital collaboration platform Miro (2023) was used for data collection and presentation. It was clear from the beginning that the work would be done digitally, as not everyone had the opportunity to be physically present.

Between the first and second workshop, the technical specialist attending had already outlined the key steps of the journey based on their knowledge on the workflow. In the second workshop, the touchpoints and stakeholders for each step were supplemented and the steps were clarified by discussing the goals in each step. Preliminary thoughts on the challenges associated with each step were also recorded. After going through the map with one specialist in these two workshops, the next workshop was scheduled, which included all three technical specialists.

At the beginning of this third workshop with everyone, the objective and purpose of the work were again reviewed, and the method was discussed with all the participants. The technical specialists are very familiar with each other and work closely together, so the atmosphere was relaxed and good from the start. During the workshop, the map was filled in step by step by interviewing and facilitating conversation. In this workshop journey steps were further clarified and discussed, and observations on challenges were recorded. After the workshops, a customer journey map on the graphics playout had been created. The actual map created in Miro will not be presented in this report, but the most important aspects of the map regarding the study are presented in Tables 3 - 7 that will be presented later in Subsections 4.4.2.-4.4.4.

4.3. In-depth interviews on challenges faced during the journey

After the workshops, technical specialists were interviewed in depth. In the interview challenges and possible improvements to each of the journey steps were looked into in more detail. The focus was on understanding the faced challenges better and trying to find out solutions to these problems. The interview was done by Google Meet and it lasted for 1,5 hours. All three specialists were interviewed at the same time to maintain a conversational atmosphere during the interview.

Cooper et al. (2014) define basic methods for ethnographic interviewing:

- Interview where the interaction happens
- Avoid fixed set of questions
- Assume the role of an apprentice
- Use open-ended questions to direct the discussion
- Focus on goals first and tasks second
- Avoid making the user a designer
- Avoid discussing technology
- Encourage storytelling
- Avoid leading questions

Ethnographic interviewing typically takes place in the environment where the product or service is used, allowing the interviewer to gain insights into user needs and goals (Cooper et al., 2014, p. 51). For this case study, conducting interviews in the user's environment is not an appropriate approach, as the customer journey is described at a high level and is a longer-term process. However, other methods of ethnographic interviewing are well-suited for this case study.

The interview was conducted in a semi-structured manner, using open-ended questions. Open-ended questions allow for more detailed answers or descriptions of the situations being investigated. These questions usually start with words like "why," "how," and "what" (Cooper et al., 2014, p. 53). Although a fixed list of questions should be avoided in open ethnographic interviews, it is good to have topics or different types of questions in mind that should be covered. This ensures that the most important aspects are

discussed and taken into account. Different types of questions can include goal-oriented, system-oriented, workflow-oriented, and attitude-oriented questions (Cooper et al., 2014, pp. 52-53). For this study, system-oriented and workflow-oriented questions are particularly relevant, as they provide concrete insights into challenges in the workflow, how they are resolved, what works, and what doesn't.

The interview began with general, personal questions to map out the interviewees' job descriptions. The questions that were asked are listed below:

- Describe the purpose of your job
- Describe your typical day at work
- What motivates you in your work?

After the general questions, the interview shifted to discussing challenges encountered in the journey steps. The jointly created journey map was thus reviewed in a more in-depth interview to ensure the accuracy of observations and to make changes as needed. Before the interview, the following questions were listed to support the interview and stimulate discussion as needed.

System-oriented questions:

- The frequency and importance of the task / problem? Does this happen often?
- How do you work around problems?
- What shortcuts do you employ?

Workflow-oriented questions:

- Dependencies—what must be in place to perform the task, as well as what is dependent on the completion of the task

Goal-oriented questions:

- What activities currently waste your time?
- What is most important for you?
- What helps you make decisions?

Attitude-oriented questions:

- What do you enjoy most about the workflow? What do you always tackle first?
- What would you prefer not to do? What do you procrastinate on?
- Problems and frustrations with current workflow

In the interview situation, notes were taken and the customer journey map was further supplemented, particularly in relation to the challenges encountered.

4.4. Customer journey map of graphics playout

Through workshops and interviews, a customer journey map was created as intended. The stages of the journey were identified at an early stage: these are brief, content creation, preparation for playout, and playout. A total of 24 steps were identified under the different stages. The stages vary greatly in length: there are 2 steps in the brief stage, 15 steps in the content creation stage, preparation for playout consists of three steps, and the playout itself consists of one. Content creation is the stage during which most of the work and planning takes place, which is why it involves the most work steps. The stages and the associated steps will be discussed in more detail in the following subsections.

The customer journey map as a template is linear, and it assumes that the workflow steps occur in a certain order. However, in the graphics playout workflow some steps are partially overlapping and some require the previous steps to be completed to be implemented. In the workshops, it was also identified that some steps marked as independent are actually their own subprocesses, which progress in parallel throughout a certain stage, rather than occurring at some specific point in the workflow. An example of this is the step planning- and work meetings that take place during the content creation stage: participation in the meetings continues throughout the entire content creation stage as it is in these meetings where the production is being worked on. At the same stage, the selection of playout tools is also defined as its own step, but in reality it is a subprocess of mapping of the needs and limitations of graphics playout, and it takes place in the aforementioned work meetings. During the workshops, a decision was made to place these two subprocess-like steps in the map among other, more linearly progressing steps.

In this case study, the goal was to document the workflow in a high level describing the work stages that repeat in the same way regardless of the productions. During the workshops, it became evident that, for example, the size or method of production affects

the journey somewhat: the actor and stakeholders might differ, and there might be little variations on the steps, as well. In large productions, a very large number of people may be associated with the steps, while in smaller productions the same person can act in several roles and not as many people are needed in different roles. The actor may also vary slightly according to the productions. On the other hand, it may also be that it is not possible to define a single actor, but a certain step is done in collaboration with different roles. When the actor varies or a step is done in collaboration, several responsible roles acting in a step were marked in that step. All in all, the stages and steps are quite similar regardless of the productions, with one exception. Depending on whether the production is broadcast live or is pre-recorded, the playout happens differently. To illustrate this, parallel steps in the playout stage were created.

This case study focuses specifically on the perspective of the technical specialist. The next subsection describes their job description and motivations in more detail, after which the created customer journey map is described.

4.4.1. Technical specialists' role in the journey

At the beginning of the workshops three actors in different job roles were identified: technical specialists, designers, and production coordinators. Since the aim was to form one, unified high-level description of the entire workflow, the steps of different actors were combined in one customer journey map. As described previously, it was recognized that depending on the production, the main actor of the same step can vary: it can be either a technical specialist, designer, or production coordinator. The main interest in this case study is the perspective of the technical specialist.

Within the workflow, the technical specialists work as technical experts, facilitating efficient and user-friendly graphics playout in production. Their professional aim is to ensure that workflows are as streamlined as possible and support user operations so that graphics playout is as seamless and operational as possible for the production team. At their work the specialists are motivated by learning new technologies, finding solutions to technical challenges and alleviating potential constraints, and ensuring the smooth functioning of graphics in production. Factors identified by the specialists that diminish

their motivation include unsatisfactory solutions for users, time pressure, extended schedules, and unpredicted, sudden urgent matters.

Technical specialists' role as active actors varies at different stages of the customer journey. For them, the most crucial stage in the workflow is the content creation stage, as this is when the production graphics and their playout are planned and the technical production environment for the playout is prepared. During the preparation for playout and playout stages, the role of technical specialists is more of supporting production coordinators and designers: in the interview, the experts described their role at this stage of the workflow as "cheering on the users, assuring them that everything will go well".

The following subsections go through the journey map in more detail from the perspective of technical specialists, focusing especially on the steps where they are the actors. The challenges that they experienced are highlighted.

4.4.2. Brief stage

During the brief stage, there are two steps involving the receiving brief about what the client aims to achieve, as well as the information on who will be engaged in the project and the amount of their work time that will be utilized. The brief is typically a meeting in which technical specialists are invited, alongside others involved in the production. The challenge during this process stage is that technical specialists might not be included in the brief. If the brief is missed, decisions about the playout tools might be made prior to the specialists' involvement. This results in a more reactive role later in the workflow for the technical specialists, as they might have to negotiate or make compromises regarding technical solutions. Additionally, in situations where decisions about playout tools are made very early on, before the involvement of specialists, not all required technical aspects might be considered. This could potentially lead to redundant work.

In workshops and interviews the technical specialists highlighted the importance of active discussion in the brief stage. This could take the form of a counter-brief for

example, so that the entire group working in the production would be more aware of the decisions and the factors influencing them.

There is one step falling between the brief and content creation stages, which involves receiving the project schedule. From this step, it was noted that schedule information might reach the technical specialists late or it might be incomplete. There are cases where it does not reach the technical specialists at all.

4.4.3. Content creation stage

The content creation stage is the most time-consuming and extensive stage of the workflow, as it is the stage where graphics are designed and made visually appealing and technically functional. In this stage, the technical specialists are responsible for ensuring the technical functionality of the graphics and graphics playout production environment by building efficient workflows, configuring the chosen playout system and resolving encountered challenges. From their perspective, this stage is the most crucial in the workflow.

In the content creation stage, 15 steps were identified, which are listed in Tables 3, 4, and 5. The table rows describe the step, main actor(/s) (ie. work role responsible of the step) in the step and challenges faced by technical specialists. The rows for stakeholders and touchpoints have been omitted from the journey map presented here, as they are not central to the research questions being examined.

The steps were generally clearly assignable to a certain point in the journey, but two steps stand out: participation in work and monitoring meetings (step 1), and the selection of playout tools (step 5) (Table 3). These steps are clearly their own iterative processes within the content creation stage: participation in them continues throughout the stage, as they are meetings where the production of graphics and the planning of the playout from a production perspective are advanced. These were described as separate steps in the journey map to make the possible challenges faced in the steps visible. Participation in project meetings was placed at the beginning of the content creation stage, as this stage can be seen to begin when planning and work meetings start. Instead

of placing participation in project meetings as its own separate step, it could be seen as describing the whole content creation stage: content creation actually has to do with creating content and a functional production environment by planning and working in close cooperation with those working in production in the workshops.

Journey step	1. Continuing: Attending production planning- and work meetings	2. Design of the production visual identity	3. Creating guide of the production visual identity	4. Creating a list of the graphics' elements	5. Continuing: Choosing graphics playout tools
Main actor	Technical specialist, designer and production coordinator	Designer	Designer	Designer or production coordinator	Technical specialist, designer and production coordinator
Challenges faced by technical specialists	Flow of information from the meetings	Graphics' playout is not taken into account Design is not completed early enough	Service providers/ external partners aren't known yet in this step and the guide doesn't reach them later	The listing in insufficient causing the missing elements being created in playout (gotten better due to communica tion)	Wanting to use a tool/system not yet in use Wanting to use a system that takes up more resources than actually needed

Table 3. Steps 1-5 of the content creation stage.

The selection of playout tools, on the other hand, takes place during the work meetings (step 1) and is an iterative sub-process in itself, but in the journey map it was placed in the content creation stage at a point where the playout tools must be chosen for the implementation of later steps.

If the brief was missed by the technical specialists in the previous stage, they join the production work meetings (step 1) at the beginning of the content creation stage. In workshops, specialists stated that depending on the production, this may sometimes be a sufficient and good point to join. The challenges seen in work meetings were related to communication: essential decisions or other important matters are sometimes not communicated out of the meetings, or essential people are missing from the meetings, which prevents matters from being advanced on schedule.

The next three steps, design of the production visual identity, creating the guide of the visual identity, and creating a list of all the needed graphics' elements, are steps where the main actor is designer. From the perspective of the technical specialists' work, the challenges that occur in these steps complicate their work in later steps of the workflow. For example, it might be that the graphics playout is not considered in the design of the visual identity, the design drags on for too long, or the guide of the visual identity does not reach service partners who join the production later, or the listing of graphics elements is missing some elements. If the design of the visual identity drags on for too long, schedule pressure accumulates towards the end of production. On the other hand, if the service partner is not informed about the overall visuality and appearance or the listing of graphics elements is incomplete, elements have to be created and possibly missing resources have to be patched up at the playout stage, which produces uncertainty for the playout. On the positive side, it was noted that playout is now better taken into account when designing the visual identity than before due to improved communication.

As stated earlier, the next step, the selection of graphics playout tools/systems, is a process that takes place in work meetings. The main challenge that technical specialists face in this step is that the production wants to use a tool that is not yet in use in the company. In this case, the playout workflows are missing and have to be built from scratch. In addition, a new system may require, for example, new operating system versions, machines, graphics cards etc. Technical specialists describe that this kind of situation may arise especially in new large event productions. Another, though not very common, challenge seen in the selection process is the desire in the production to use a

playout system that consumes unnecessarily many resources compared to the actual need: there is a desire to keep the "doors open" for various implementation possibilities in the production design. This, in turn, reduces the possibilities for other productions to use resources.

Journey step	6. Design of playout workflow	7. Booking technical resources	8. Creating the project in chosen playout system	9. Creating graphics in the playout system	10. Creating graphics templa-tes in the playout system	11. Approval of templates from the production
Main actor	Technical specialist	Technical specialist or production coordinator	Technical specialist	Designer	Designer or technical specialist	Technical specialist and designer
Chal-lenges faced by technical specialists	Planning workflow for a device that is not yet available → delays in equip-ment delivery & network changes	Same resources needed in over-lapping produc-tions Too tight schedule of purchasing: equipment not delivered in time Un-expected needs (e.g. cables)	Creating a project that isn't logically structured Chosen system lacks material-/ project manage-ment Work-flows are still in develop-ment			Changes are still wanted after this step or new needs arise

Table 4. Steps 6-11 of the content creation stage.

In the design of the playout workflow, the technical resources and work stages required by the chosen tool are identified. If a new tool has been chosen earlier, it may be

reflected in this stage as possible delays in equipment deliveries and the network changes required by the tool, which might delay the overall schedule. After the design of the workflow, the technical specialist identifies the technical resources required by the chosen tool and reserves them. The challenges related to this are overlapping productions that use the same resources, which means that the devices cannot be made available for production early enough, or they have to be procured on a too tight schedule. All needs are also impossible to identify at this stage: later it may be noticed, for example, that there is a lack of a certain kind of cabling or it is of the wrong type.

Journey step	12. Creating template and graphics guide	13. Testing graphics in production environment	14. Testing graphics templates in production environment	15. Delivering the ready graphics and templates to production
Main actor	Technical specialist and designer	Technical specialist and designer	Technical specialist, designer and production coordinator	Designer
Challenges faced by technical specialists	Because of a tight schedule is not done	Issues that call for big changes might come up (e.g. changing the playout system) Technical resources needed for production are not available when testing, and real production environment has to be emulated	Issues that call for big changes might come up (e.g. changing the playout system) Technical resources needed for production are not available when testing, and real production environment has to be emulated	After this step, no changes should be made. If changes are done, it might cause problems in playout as it can not be done as planned

Table 5. Steps 12-15 of the content creation stage.

In the next step, a project is set up in the chosen playout system so that the designer can create the graphics there and the production coordinator can create playlists. In some of the newer systems, there is no material or project management in the system and workflows for them are in continuous development. After the technical specialist has created the project base in the playout system, in the following steps, the designer can create the graphics and templates in the system and modify them according to feedback. After content creation and editing, the production approves the templates and graphics.

Once the graphics and graphic templates are ready, a guide is created for the graphics operators and others working with graphics. It is done either in the form of training or documentation, sometimes both. Due to scheduling, this step may sometimes be skipped. This is followed by testing the functionality of the graphics and graphic templates in the production environment, during which the necessary changes are also made. During testing, major changes may have to be made if the production environment is not operational. An example of a major change is changing the playout system at this stage or leaving some elements out. A challenge in testing may also be the lack of technical resources: the resources actually used in production are not available at the time of testing, so the production environment has to be emulated, and thus it does not give a realistic picture of the operation of the actual production environment. After testing, the finished graphics and graphics templates are handed over to production. After this step, there should not be any major changes to them, as their functionality has already been tested. Sometimes, however, changes are still wanted, which may cause the playout not to be able to be done as planned. It may thus be that the desired change can no longer be implemented in this late a step. The handover of graphics and graphic templates to production is the last step in the content creation stage, and after that, the preparation for playout stage begins.

4.4.4. Preparation for playout and playout stages

In the preparation for playout stage, there are three steps, which are described in Table 6. From the perspective of the technical specialists, the first of these is a step for active working. In this step, the previously planned playout workflow is built into the system, i.e., the playout system is made operational. Challenges may arise in this step, for

example, in the form of equipment breakdowns or updates, especially if a backup plan has not been designed in advance. An example could be the breakdown of a computer or video output board, which would need to be replaced. At this point, challenges may also arise if technical resources have been overused when selecting the graphics playout tools: there are no longer spare devices available.

Journey step	1. The playout system is configured: the planned workflow is built into the system	2. Populating the playlist with graphics	3. Editing the graphics contents of the templates
Main actor	Technical specialist	Production coordinator	Production coordinator
Challenges faced by technical specialists	Because of a tight schedule is not done	In live productions there will be changes in the playlist that require editing of graphics	The chosen playout system does not support quick or automated changes

Table 6. Steps in the preparation for playout stage.

Moving forward in the journey, the role of the technical specialist is more to support and assist the production coordinator and/or designer as needed. Once the playout system is operational, the production coordinator brings the content to the graphics and the graphic templates to the playlist. In live broadcasts, changes are made to the playlists, which means that the playlists and graphics still need to be edited, for which support may be needed. It may also be that the chosen playout system does not support quick or automated changes.

In the playout stage, there are only two steps, and these are alternatives (Table 7): in live production, the last step of the journey is the playout of graphics, while in a pre-recorded production, graphics are instead loaded into video content in edit.

Journey step	1. Live production: Playout of graphics	1. Pre-recorded production: Load graphics into content
Main actor	Production coordinator	Production coordinator / designer
Challenges faced by technical specialists	Force majeure -situations: a device might break and cause moving to a backup system Diagnostics on the problems is difficult and changes require specialized expertise on the environment, for example fast switching changes bypassing studio automation	The project in the playout system is created using wrong templates, which might cause the render engine to overload and slow down rendering

Table 7. Steps in the playout stage.

In live production, serious challenges might happen with the playout of graphics: the device may break down, requiring a switch to a backup device, for example. The production environment is complex, which poses challenges in diagnosing problems. Both in diagnosing problems and in the solutions they require, very specialized expertise on the production environment may be needed, for example, fast switching changes bypassing studio automation.

In non-live production, the graphics are edited into the video content before it is published. The challenges that might arise here is that the project in the playout system is created using wrong templates, which might cause the render engine to overload and slow down the rendering of graphics.

5. Results of the case study

In this case study, the goal was to map out the high-level customer journey of graphics playout from the point of view of technical specialists, to identify possible challenges faced during the journey and suggest recommendations to address the identified challenges and pain points. The aim was also to investigate whether customer journey mapping can effectively capture and document the graphics playout workflow and related experiences of technical specialists.

The goal was to map out the workflow of graphics playout, and this was successfully achieved, as described in Section 4.4. The high-level description of the workflow was missing in the organization, and now we managed to document the stages and steps of the workflow and identify responsible roles and stakeholders. In addition to identifying pain points and areas of improvement, the work makes it possible to clarify roles and responsibilities from the perspective of different users, to evaluate new systems to be implemented, and to assess users' needs and requirements for them.

5.1. Challenges faced during the technical specialists customer journey and recommendations on improvement

Although challenges were identified during the process and a lot of discussion was focused on them, in the end of the interview all of the technical specialists voiced out that all in all, they find the workflow to be efficient and working quite well. More attention could have been paid in identifying the positives of the customer journey, too: what works well and why? The focus in experiences being on pain points and areas of improvement might have led to the journey seeming more challenged than it in actuality is.

That being said, there were obstacles and challenges faced during the journey. Most of the challenges can be divided in three different categories: communication, tight resources and rapid technological development. Communication here has to do with communicating decisions, schedules, involving the right people and so on. This was a challenge that seemed to happen along the workflow in different ways. The specialists described how they might not be invited into meetings, have all the information they

needed to do their work, or the information doesn't reach all the relevant parties. Not being included in decision making makes the work role more reactive than active, causes surprises and double work or extra work and causes pressure at a later stage of the production, closer to the playout. A good finding was that the technical specialists perceive that the communication has greatly improved over the years: "This has been far worse before, nowadays these kinds of communication issues don't really happen that often". One suggestion for improvement in communication in the briefing stage was the idea of a counter-brief, where the needs and ideas could be clarified and the possible restrictions concerning playout communicated. This would also enhance the experience of the technical specialists perceiving their role as active subject matter experts. Another observation was to agree and clarify the rules of documentation: important decisions should be documented, the documentation should be accessed by everyone involved and be up-to-date, to name a few things.

Another category of challenges is resources. In this case resources refers to technical resources, but the human resourcing is quite thin, too. The growing hurry in technical specialists' work seems to be in part caused by the scarcity of people working in that role. One technical specialist described it this way: "Often the instruction in case of technical problems is not 'call the technical specialist', but 'call Juha', as I am often the only one to help in our unit. What happens when I am not there to help?" In addition to the scarcity of people working in technical specialist role with several productions at the same time, the same technical resources are often used in overlapping productions, or too many resources are used in a production, which in turn causes lack of needed resources elsewhere. Not having enough resources to test the production environment, for example, can be seen as a risk to production reliability. One possible source of problems with the resources is that technology can break at any time. This is an issue that cannot be fully solved with any amount of planning or testing: there will always be devices breaking at inconvenient moments. Good back-up -planning can of course reduce the risk of these to production.

One important category of challenges is the rapidly changing technical environment. The technical specialists described the situation in the interview: "Before it was a lot

easier to operate, since there was only one graphics playout system. Nowadays there is increasing pressure to test and try out new systems". More and more there is the will in production to test and use different systems and technologies, whereas five or ten years ago the options were much more limited: technical specialists described that before there was only one system, and operating methods and processes were clear. However, the situation has changed so that new versions and tools are wanted in a very fast cycle, which causes more pressure on the work of technical experts: their expertise is important in order to know how to take into account all the required issues from the point of view of technical resources and processes.

All of the challenges faced cause changes to the overall schedule, which results in pressure in a later stage of the production: the schedule of the production being aired can not be changed even though some aspects in the production design and implementation are delayed. Because of this the closer to the playout some changes happen, the more unstable the environment will become and the production reliability suffers. As it is the focus of the technical specialists' work to ensure a working production environment for graphics playout, a lot of the pressure falls on them. The technical specialists identified as motivation diminishing factors unsatisfactory solutions for users, time pressure, extended schedules, and unpredicted, sudden urgent matters. Delays in schedule can thus be seen as a major factor resulting in dissatisfaction at work for the technical specialists. Although the technical specialists described being motivated by learning new things and getting things to work as intended, the challenges caused by the demands on rapid technological development combined with other pressures on schedule can lead to the work feeling chaotic and stressful.

Recommendations on the improvement of tight resourcing and pressures caused by the rapid technological development were not addressed in this case study, as quick fixes or recommendations on how to solve these issues were not identified. Relating to the resourcing there are always the possibilities of increasing the amount of people and equipment or enhancing the ways of working. However, the problems caused by the resourcing and rapid technological development are issues that should be looked into in

more detail. A natural next step would be to delve deeper in these issues by looking at the journey map from the perspective of the issues they cause and trying to find solutions by for example co-creative ideation and other service design methods.

It is worth repeating that all in all the technical specialists experienced the workflow as working quite well. They described this saying: “We’ve been talking about problems quite a lot, but all in all the workflow works quite well and most of the issues are minor ones”. The communication challenges were felt to have improved and the playout to be taken into account in other steps better than before.

5.2. Customer journey map as a tool documenting the graphics playout workflow

A customer journey map is usually a linear path composed of successive steps. However, in the process of graphics playout, we identified not only steps that occur at one point in time and follow each other, but also parallel work steps and iterative work processes. The work processes were decided to be depicted as their own steps and placed in certain parts of the workflow, but this may not best illustrate the nature of these subprocesses. These were highlighted as individual steps in this project with the aim to clearly illustrate the types of challenges associated with these processes.

If the variation in the nature of the steps described above is disregarded, the customer journey mapping tool was a natural choice for describing this type of workflow. The tool was introduced to one of the technical specialists before starting the workshops and the decision to test the tool in documenting the workflow was made together. Although not all steps in the mapped workflow were sequential, the tool still reinforced the notion that it's an effective way to describe the workflow and the roles and responsibilities involved. During the workshops the technical specialists described the tool being “a good tool for describing complex workflows because it allows a clear depiction of different work stages, as well as the stakeholders and most important roles involved.”

Using customer journey mapping is beneficial because it helps in identifying all the touchpoints between the customer and the company (Lemon & Verhoef, 2016) and also allows the organizations to understand the customer's point of view, including their

needs, motivations, and pain points (Følstad & Kvale, 2018). This case study aligns with these findings: using the customer journey mapping method in identifying the steps during the journey enabled a deeper understanding of the technical specialists' work, and their needs and pain points associated with the work steps.

The benefits of using a customer journey map include its ability to document and categorize a large amount of information in one document, simplifying the presentation of complex and multi-faceted data, as the technical specialists described. In collaborative working, the customer journey map framework also aids in narrowing the scope of focus. This is particularly helpful when dealing with complex processes that involve multiple perspectives, as it keeps the focus on specific aspects. The technical specialists recognized keeping the scope narrow enough a challenge in the past when attempting to describe similar processes within the organization: “often the workflow depictions become too expansive, as we attempt to cover too many perspectives and in the end we can’t see the forest from the trees. Customer journey mapping helped a lot in keeping the focus on what is actually important and narrowing the scope when working”.

Customer journey mapping is often referred to as a tool for both data collection and visualization. In this project, the customer journey map was used specifically as a tool for collecting and documenting data. Customer journey map is typically created in workshops by collecting data from participants through interviews or co-design workshops (Følstad et al. (2013). This data is then used to create a visual, refined customer journey map in the next stage. In this project, we used a digital collaboration platform with a premade customer journey map base where input from participants were recorded. The next step would be to involve a designer in the project and use visual design tools to create a visual customer journey map that is easy and quick to comprehend. It would also be easier to visually illustrate parallel steps and work processes in a visually appealing, designer-drawn journey map.

This case study study indicates that customer journey mapping can effectively capture the graphics playout workflow and the experiences of technical specialists by

documenting complex processes and responsibilities. Despite some challenges in representing the true nature of iterative and parallel work steps, the tool's flexibility allows for iterative refinement and adjustment. The potential benefits of using customer journey mapping in documenting the graphics playout workflow include its ability to manage and categorize extensive data into a single, focused document. This aids in simplifying complex data presentation and maintaining clear focus during collaborative work.

5.3. Mixed-methods approach applied in the case study

The methods chosen for the journey mapping were mostly appropriate to address the research questions. One of the main data collection methods for involving internal customers in creating customer journeys is facilitating collaboration in internal workshops (Følstad et al., 2013) and creating the map collaboratively in co-design workshops by discussing, listening, and interviewing was a very effective working method it this case study, as well. It involved the technical specialists and ensured that they had a voice and their ideas and feedback came into focus. These findings are consistent with previous studies using co-design workshops and interviews that show that collaborative working is essential in mapping a service system and identifying all the touchpoints (Trischler & Scott, 2016, Han et al., 2018). Without the involvement of the technical specialists it would have been impossible to form a clear understanding of the graphics playout workflow.

Throughout the work, the map was iteratively refined and edited as needed. If the technical specialists had found it an ineffective way to document the workflow, it would have been easy to change direction during the work. Co-design workshops allowed the researcher to gain a deeper understanding of the users' work environment, needs and challenges. Combining the workshops with an interview made it possible to delve deeper into parts of the process and clarify possible misunderstandings.

The interview and workshops via Google Meet worked fairly well, although face-to-face workshopping using actual pen, paper and a research wall would perhaps have been a more activating way to work and have created a more innovative space. As

stated before, both the workshops and above all the interview did not delve as deeply into the recommendations for improvements as they did into other research questions, resulting in a problem-focused outcome. A logical next step would be to shift the focus towards solution-oriented strategies, exploring potential improvements and recommendations in more depth. This would provide a more balanced view and improvement insights for the future.

This methodology used in this case study could be adopted for similar case studies. The co-design workshops, which allow for collaborative mapping and in-depth understanding of the users by interviewing, could be an effective approach in a variety of contexts. The process is very flexible, as it has capacity for refinement and direction change, which is why it is adaptable to different workflows and working environments. This approach could thus be beneficial in other scenarios where a thorough understanding of a complex process and the roles of the individuals involved is necessary.

6. Conclusion

This case study has successfully documented the graphics' playout workflow using customer journey mapping tool. It has provided a comprehensive understanding of the unique challenges and workflow dynamics within this context. Although these findings may not apply universally, they offer valuable insights for organizations aiming to optimize customer journeys in similar environments.

The study identified three primary challenges: communication, resource constraints, and rapid technological development. Despite these, technical specialists generally found the workflow to be efficient and working well. The study suggests a need for future focus not just on pain points but also on what works well in the workflow. Future research should also delve deeper into recommendations for improvements regarding the perceived challenges, possibly through co-creative ideation and other service design methods. This approach could help generate solution-oriented strategies and provide a more balanced perspective.

The study demonstrated the effectiveness of customer journey mapping in documenting complex workflows. To increase its usefulness, future steps should involve refining the map into a more visually engaging format. Furthermore, examining the map from the perspective of different key roles, such as designers and production coordinators, could offer additional insights. The organization would also benefit from service blueprinting, of which the created map could serve as a starting point for, with potential benefits in improving the service if extended to all components, both backstage and front stage. After a high-level workflow depiction the workflows and needs can also be described in more detail based on different production types or systems, for example.

The mixed-methods approach used in this case study, combining co-design workshops with interviews, proved to be effective in collecting and documenting data. However, the focus was more on identifying problems than suggesting improvements, leading to a problem-focused outcome. A logical next step would be to shift the focus towards solution-oriented strategies.

In summary, this case study contributes valuable insights into the customer journey of graphics playout. The findings highlight the importance of effective communication, adequate resourcing, and strategic management of technological advancements in ensuring a smooth and efficient workflow. The insights gained from this study can serve as a basis for future research and practical applications aimed at optimizing customer journeys within similar contexts.

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