Design Thinking -

Understanding usefulness from tech company employees

Bachelor Thesis

By: Stefania Bondarciuc, 2261146
Supervisor: Dr. Joyce Karreman

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Abstract

Background
Though big tech companies sell a large number of software products to various customers, there is little knowledge on what techniques are useful in the selling process. Companies take different approaches when interacting with their customers, from initial client meetings to annual strategy sessions. Hence, there are multiple ways to engage with a customer, one of which being design thinking. Design thinking represents an iterative methodology that aims to improve a product by generating a creative mindset for the people involved in this process. An example of this methodology is a design thinking workshop that includes various exercises and templates. These materials help to understand the established problem better and analyse the end-user in depth. Overall, the aim of such a workshop is to define a viable and well compiled solution to the established problem of the product, while generating different ideas.

Objectives
The objective of this paper was to understand how useful is a design thinking workshop for employees in big tech companies. As this workshop might be a possible technique useful in the selling process of software products, it was vital to understand the employees' thoughts on actually using such a workshop with their customers.

Method
A usability test for a design thinking workshop was conducted, where 10 participants interacted with the workshop and expressed their opinions on its usefulness. A coding scheme was used to analyse the transcripts of the usability tests, through the process of open coding.

Results
The findings empirically confirmed that employees do see an added value of using a design thinking workshop, still holding some concerns on various details implied in the workshop materials. Participants thought that such a workshop can result in better engagement with their customers, but without a proper training prior to holding the workshop, they can encounter difficulties in performing.

Conclusion
It was further concluded that the design thinking methodology requires an adequate level of eduction on the topic, as well as enough practice to make employees in big tech companies feel confident in their overall performance. With that being said, a design thinking workshop can hold viable benefits to be considered by big tech companies willing to approach a new engaging way of selling software to customers.

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1. Introduction

Given the constant changes that the business world is facing, the subject concerning design thinking is becoming essential in establishing an innovative organisation. Design thinking represents an iterative methodology that aims to improve a product by generating a creative mindset for the people involved in this process. A design thinking process implies the integration of various innovative exercises, workshops and creative sessions (Wolniak, 2017). These materials help to understand the established problem and analyse the end-user in depth. The ultimate goal here is to define a viable and well compiled solution to the established problem of the product, fulfilling the user's needs. Generally, a design thinking process includes more people from different backgrounds collaborating together to come up with an initial version of the product (Micheli, Wilner, Bhatti, Mura, & Beverland, 2019). Bringing all these diverse ideas together can spark new solutions to the defined problem and therefore, the participants analyse more points of view to select the best fitted one. Besides the improvement of a product that design thinking allows for, Razzouk & Shute (2012) agree that the whole concept of design thinking is genuinely relevant in today's highly technological and globally competitive society, as it develops as well a set of important soft skills for the people participating in design thinking sessions. Critical thinking, teamwork, communication, problem solving, and brainstorming are just some examples of these soft skills that are brought up during a design thinking session.

With this being said, there is little doubt that an innovative and customer oriented company will receive a great amount of success between its competitors (Dunne, 2018). Therefore, design thinking methodologies are starting to gain more attention in various organisations. Criscuolo, Nicolaou, & Salter (2012) argue that while small businesses such as start-ups are known for keeping up with the latest trends, and constantly improving their business model, this can be rather hard to accomplish by big companies. In their case, the management department often struggles with changing the team dynamics, the daily work practices, and the overall functioning of the company (Freeman & Engel, 2007). Therefore, an innovative concept such as design thinking can often seem hard to implement in big companies, where employees already have a pattern of working practices, doubting implementation of new emerging trends in the business world, such as design thinking. Still, Cefis & Marsili (2006) found that in fact innovation can help big companies to stand out and survive in a competitive market. That is precisely why these organisations should aim to implement more innovative methodologies in the company's internal structure.

This study focuses particularly on big tech companies that sell software solutions to customers. Usually, in this case, the customer approaches the company with some requirements of the desired software and the employees work on building the product (Lacoste, 2018). The problem with this approach is that oftentimes, some important details are left out or overseen, resulting in an average product, which is not particularly innovative and fitted to the customer's core needs. Following this way of thought, Lack (2007) advocates the importance of a user-centred design. The author argues that a well shaped product should always solve the problems and requirements of the end-user, focusing on the little details that usually make the big difference between an average and upper-level product. Furthermore, if the employee has not collected enough materials or documentation from the customer side to build their software product, they repeat the initial meeting with the customer. Tyrväinen & Selin (2011) argue that this approach is often times seen as a traditional selling process of software products. This cycle can be seen as not effective and can as well be quite stressful for the customer. In this regard, Kwon, Choi, & Hwang (2021) reason that the design thinking methodology takes the shift

from the traditional selling process and brings the tech company employees and the respective customer together to create an integrated product that better fits the end-user.

However, as design thinking is not a mandatory methodology in big tech companies, the employees' position towards using it is still unclear. At this point in time, there is a debate going on about the usefulness, usability and added value of including a design thinking session into the product development process. Employees need to fully understand what is their benefit in approaching this methodology, before they commit to it. Therefore, this paper aims to answer the following research question: *"How useful are design thinking workshops for employees in big tech companies?"*. Firstly a theoretical framework is presented to explain in-depth the implications of design thinking. Secondly, a usability test for a design thinking workshop is conducted, where 10 participants give their opinions on the topic. Then, the final results of the study are presented in order to generate a line of reasoning for answering the research question. And lastly, conclusions on the overall subject are elaborated to narrow down the essential findings in the study.

2. Theoretical Framework

The aim of this theoretical framework is to explain the dimensions of design thinking, by connecting different points presented in the available literature. All this while keeping the following research question in mind: *"How useful are design thinking workshops for employees in big tech companies?".* Firstly, this theoretical framework focuses to analyse the concept of design thinking and its stages, comparing multiple definitions and ultimately giving a personal one that will be used in this study. Secondly, existing design-thinking tools are thoroughly examined and lastly, the relevance and effects of design thinking are described to have a complete understanding of the topic.

2.1 Definition

Design thinking is rather a new term in the business world that holds multiple implications. Still, it is important to have a clear picture about this concept in order to achieve the maximum results that it could deliver. Therefore to come up with a personal definition that will be used in this study, a common agreement on this conceptualisation has to be set.

Dorst (2011) states that design thinking can be described as an exciting, up-to-date methodology for dealing with problems within various fields of activity. This model revolves around the process of generating ideas through various exercises. Diverse, creative and sometimes even ideas that are not entirely well constructed. It is not about the quality of ideas, but rather the quantity. Jonson (2005) sustains this way of thought by arguing that design thinking encourages diversity in terms of ideation, pledging that a good solution can be formed out of elements of the most incompatible ideas. By the same token, Dunne (2018) conceptualise design thinking as a way of developing creative services and products that meet hidden requirements, emphasising the application in the business and public sector. In other words, these two articles focus on the idea of solving mainstream, as well as more difficult problems through creative ideas. However, Chasanidou, Gasparini, & Lee (2015) see design thinking as a far more complex concept. The authors conceptualise design thinking as a system of three overlapping areas, where viability speaks about the business perspective, desirability stands for the consumer's perspective and nevertheless, feasibility reflects the updated technology perspective. Only when all three spaces are brought together and used to their full potential, the

design thinking methodology can have impressive results within a company (Chasanidou et al., 2015). Therefore, design thinking can successfully bring together the company and its customers by aligning both views to create from scratch or improve the ultimate desired product. Chen & Venkatesh (2013) claim that this can be possible as design itself represents the highest form of creative enterprise. The authors furthermore reason that if the company and its customers engage in an imaginative, as well as iterative state of mind characteristic to design thinking, then their problem solving abilities can reach new heights. This path ultimately results in customer value creation, meaning the product is developed not only from the production company's perspective, but also from the customer's perspective (Weller, 2019). It has meaningful value to the customer, complying better with the user's needs.

For this paper, the information gathered above can be analysed to ultimately interpret design thinking as an iterative methodology that aims to improve a product by generating a creative mindset for the people involved in this process. This methodology starts with establishing the problem and ultimately ends with creating the respective solution. Thus, the participants using a design thinking methodology navigate through different materials and exercises that help them reach the last step of creating a solution more easily. What comes as a defining feature in following the design thinking process, is that the whole structure is organised in specific stages rather than having a chaotic way of working. Hence, it is important to understand the main stages that form the design thinking process. Emphasising, defining, ideating, prototyping and testing represent these five stages (Chasanidou et al., 2015). Figure 1 illustrates these stages.

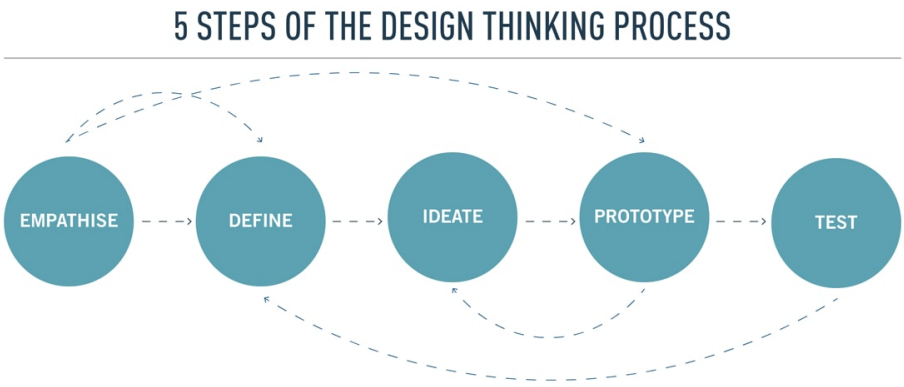

Figure 1. *5 steps of the design thinking process*

Emphasising relates to understanding the customer, asking for objectives and open questions. In this phase, there is plenty of discussions going on, that ultimately enable mutual understanding of the problem from all the parties involved (Luka, 2014). Possible questions such as "What is the current situation?", "Which needs are not being met?" and "What might the ideal experience of the future look like? are perfect examples of questions asked in this phase.

Furthermore, defining allows for immersing and choosing the right challenge. In this phase, the team should focus on the end-user and its needs (Wolniak, 2017). It is essential to frame a well-defined challenge and the following approach, as from this point onwards, the defined challenge will become the central focus of the entire session and the following three stages. In this case, possible examples of questions asked can be: "What makes the customer special?", "What does the customer need?" and "What are the dimensions of the problem we are trying to solve?".

Next, the ideation phase implies to envision the future, developing many possible ideas in a fairly small time window (Knight, Fitton, Phillips, & Price, 2019). At this stage, brainstorming exercises become the best ally, because they allow thinking outside the box, being creative when answering questions and nevertheless, promote quantity over quality. To get an interdisciplinary perspective and generate many different ideas, it is encouraged to actively involve as many people as possible. This allows for diversity and collaboration between team mates.

Subsequently, the next phase, prototyping, stands for building out a vision and a minimum viable product (MVP). Miettinen, Rontti, Kuure, & Lindström (2012) claim that prototyping is all about how the discovered solutions in the last phase might look like in reality. In other words, people start putting together a more concrete vision for the solution approach by means of visuals, archetypes, graphs, and diagrams. This helps to keep everyone on the same page and to communicate clearly.

Finally, the testing phase includes final implementation and sharing to the outside world. Complex challenges are all about experimenting and testing, thus learning from the results of the previous phases. Moreover, testing the prototype elaborated represents the best way to ensure that the solution was indeed build for the end user and not for the team developing it (Petersen & Hempler, 2017). Frequent testing and feedback sessions remain an integral part of design thinking to make sure that the solution fully addresses the customer's needs in the end.

2.2 Design Thinking Tools

Following the designated definition, it is vital to explore the usage of design thinking, shedding light on other popular stages and nevertheless, various tools used in all these phases. The available literature has shown a great deal of attention in the distribution and categorisation of design thinking stages. Whilst previously explaining the five stages of design thinking as presented by Chasanidou et al. (2015), other researchers have developed as well different points of view on design thinking stages. Liedtka (2014) lists other stages of design thinking: ethnography, visualisation, mapping and prototyping, which are all linked to a more managerial decision making. In addition to this, Alves & Jardim Nunes (2013) take another perspective on the stages of design thinking, arguing a four stage model: discover, reframe, envision and create. The discovery phase here is about understanding the current situation, reframe takes the situation as it is, in a clear way. Envision therefore, means exploring possible solutions and create stands for shaping the future. However, what all authors seem to highlight in this context is that design thinking is a process of creation. Through an iterative way, design thinkers aim to create new and fun solutions, rather than choose between already existing alternatives (Dunne, 2018).

All these stages not only vary in definition and terminology, but also in the specific tools used in every stage. Therefore, these tools have to be mentioned as well, as they represent the factual material used to achieve creative goals. For instance, a persona template helps defining the targeted user and identify their problems (Chasanidou et al., 2015). Personas are characters that are developed by both the customer and the organisation in the beginning part of the design thinking process, specifically the emphasising phase. They represent portraits of fictional yet realistic individuals which are commonly used as a reference point to reveal specific groups within the intended audience. They can provide a range of different perspectives, allowing the team to define and engage with the different interest groups that may exist within the target segment. Examples of segments to be filled within the persona template can be: "behaviour", "attitude", "pains and gains", "goals" and "quotes".

Apart from this, the service scenario map is a tool that better prepares for a storyline that can be shared with the created personas (Lee & AbuAli, 2011). It is a tool which helps in visualising the steps and actions which the person takes, when using the future service or product. In other words, it serves as a visualisation of the user experience, while using the service designed that was originally based on the ideas resulting from the ideation process.

Another frequently used tool is the stakeholder map, which is a charted representation of all the groups involved in a particular service that have an effect on the ultimate product (Giordano, Morelli, De Götzen, & Hunziker, 2018). When dealing with a challenge, many internal and external stakeholders have influence on the development and launching of a new service. Therefore, it is extremely helpful to use data to assess how the interests of those stakeholders should be addressed within the project.

And lastly, a customer journey map represents a series of touch points from the end user's perspective (Yoo & Pan, 2014). In the words, all means of interaction and communication between the service/product and the end user. Creating a customer journey map builds empathy by focusing on the present journey of the user. This is a continuous activity and it enables people to plot insights regarding the user's behaviour and how they experience interacting with organisations or services through these various touch points. By using this tool, people can identify opportunities in order to help users better attain their goals.

To sum up, these various tools can be either combined together, separately used or mixed with other forms of documentation and template assets (Akama, 2007). The authors also argue that as long as the tools help visualise and articulate a concept better, it is up to the design thinkers practitioners to choose how they tailor the materials to work best for their team.

2.3 Relevance and effects

Throughout the last years, the available literature has shed light on the relevance and effects of design thinking in the business world. Simons, Gupta, & Buchanan (2011) argue that design thinking encourages collaboration, creativity and innovation between the organisation and customers. With this concept in mind, let us dive deeper into how design thinking is relevant within these three dependant aspects.

First and foremost, the innovation concept implies a human-centred approach. At the root of every innovation stands the human necessities and wishes (Brenner, Uebernickel, & Abrell, 2016), which are fundamentally, the main particularities of the human-centred design. Not only does the end result need to be tailored to suit the necessities of the user, but also the whole experience of interacting with a product has to be easy and pleasant. If the customer needs fail to be met, then it can be concluded that the human-centred approach was not properly highlighted. Hence, it does not sustain an innovative base. In this regard, Baker & Moukhliss (2020) argue that a design thinking process involves by default focusing on the end user's needs, as the materials employed in a design thinking session are tailored to make the participants think of the established problem from the end-user's perspective. That is precisely why the subject of design thinking is considered relevant. Innovative teams appear to succeed at accomplishing their goals and reaching new heights (Taylor & Greve, 2006). Therefore, by taking the design thinking approach, people facilitate innovation, being more visual and prioritising the end-user.

Secondly, design thinking allows multiple parties, such as employees of tech companies and their customers to develop a mutual understanding and future solution to the defined problem due to its strong emphasis on team-based learning (Lindberg, Noweski, & Meinel, 2010). The process entitles a high degree of collaboration, where

there is no limit to admissible questions, interventions and solutions. Moreover, the parties involved are not exclusively from a design related background. Therefore, design thinking loosens the so called 'norm' where a particular field of activity doesn't cross its regular work activities. It rather encourages different professions, disciplines and job titles to take place in a co-creative setting, where design thinking tools are used (Wilson & Zamberlan, 2015). Still, there are currently no written rules that can make these different people work harmoniously in a design thinking session. Naturally, people are individualistic personalities and often times conflicts might arise when working together. Nevertheless, engaging in this collaborative approach of a design thinking session, people can take part in new conversations, create small communities and spark long-term working connections.

Last, but not least, design thinking practices are relevant as they prompt creative mindsets, an attribute that is positively seen in big tech companies. Rauth, Köppen, Jobst, & Meinel (2010) synthesise that the materials and exercises used in a design thinking session are shaped to be a source of inspiration for people. These assets are usually structured, dynamic in terms of content and focused on visuals. Thus, by using design thinking tools, people's way of thought is constantly challenged. This methodology encourages the discovery of unexpected ideas and new perspectives. Therefore, designers acknowledge that creativity will multiply only by getting out of the comfort zone, and taking a new approach on solving a basic problem (Simons et al., 2011). Design thinking aims to challenge the human mind by doing field research, targeting the end user, envisioning a future journey and actively ideating on various concepts and visions. Nowadays, a lot of these aspects are overseen in big companies, and that is why design thinking is considered a new method of working.

2.4 Conclusion

All in all, design thinking represents a new relevant concept that could potentially increase innovation, collaboration and creativity in big tech companies. By putting together a tailored toolbox of design thinking exercises, such as a persona card, service scenario, stakeholder map and customer journey map, a company creates an integrated methodology that can be applied in various work scenarios with prospective customers. Hence, the company's employees and customers are brought together to collaborate in an effective way and encourage diversity and creativity in ideas. As the participants of a design thinking session are the ones that can spark these creative ideas, it is important to understand their perceptions on the topic, hence the research question implied in the beginning of this theoretical framework: *"How useful are design thinking workshops for employees in big tech companies?".* The next chapter will present the method used for this study to find insightful answers to the research question proposed. Furthermore, a presentation of the results and discussion will follow.

3. Method

3.1 Instrument

For this study, a qualitative research was performed. The purpose of qualitative research is to thoroughly examine and understand social phenomena, by how people convey meaning to it (Boeije, 2009). There are multiple methods that enable an extensive way of studying the research question. But perhaps, what is the most important aim in a successful qualitative study, is the the way researchers establish meaningful contact with

the participants. The data produced must be rich and descriptive, so it will lead to significant findings and valuable theoretical knowledge (Boeije, 2009).

Furthermore, to understand how useful are design thinking workshops for employees in big tech companies, a complete design thinking workshop was created. The workshop was formed out of different exercises that are done in 4 stages of design thinking: *emphasise, define, ideate and prototype.* The last stage of a design thinking process, *test,* was omitted for this research, due to time implications in the testing phase. A product testing usually takes a longer period of time, requiring other participants that would test the prototype created. Therefore, this phase was out of the scope of the research question. Subsequently, the aim of the workshop was to create a website prototype, which represents a common software product of tech companies. The workshop first presented a small introduction exercise, also known as an "ice breaker". Then, a persona card exercise followed. The aim for this exercise was to build a profile of a possible end-user for the website prototype. The next exercise was a problem statement card, where the end-user's problems had to be elaborated and structured in the designed template. Another exercise of the workshop was a customer journey map. This required to elaborate on the steps the end-user goes through when navigating on the website. Last but not least, the prototype exercise followed. The idea behind it was to create a web screen mockup by drag and dropping website components into the frame. A complete overview of the design thinking workshop materials can be found in the appendix A.

Following, the workshop was tested by means of a usability test to observe how the users interact with the workshop and what is their overall opinion on it. Norman & Panizzi (2006) define a usability test as a way "to discover major problems in the user interface that could result in human error, terminate the interaction, and lead to frustration on the part of the user" (p. 246). This method can help in understanding the weak points of the workshop, as well as the most useful features, therefore providing answers to the research question. Furthermore, a script is considered to be a useful way to achieve consistency in usability tests (Lowdermilk, 2013). Because the course of each session can sometimes drift from the desired standard flow, a script increases the chance of delivering the test exactly the same way to all subjects included (Lowdermilk, 2013). It was important though, to make it feel natural, without overly sticking to every word in the script. Rather, it should serve as a helpful guideline for the entire session. The complete overview of the used script in this research can be found in the appendix B.

3.2 Target Group

For this study, 10 people participated in the usability test. They were selected based on the principals of a non-probability sample, specifically a purposive sampling method. This sample type involves non-random selection based on convenience, ease-of-use, or other criteria, allowing to easily collect data (McCombes, 2022). The purpose of following a qualitative study is not about doing inference on the entire population, but rather understand in-depth opinions of a shorter number of people selected on the specific theme studied. It's not about quantity, but quality. Hence, a purposive sampling method was chosen.

As this study focuses on how useful are design thinking workshops for employees in big tech companies, the 10 participants selected were employees of such a company, named Salesforce. These people were working directly with various customers, selling software products. All participants had experience in developing a website product, more specifically a e-commerce website. They held positions of either a Solution Engineer role or an Account Executive role. The difference between the Solution Engineer and Account Executive is that the former takes a more developing approach and the latter a more

executive approach. The participants held a position in the tech company ranging from 5 to 7 years. Due to the fact that they worked in a big tech company, the participants owned good technical skills. Some of them heard about design thinking in general, while others were not familiar with the concept. Additionally, they worked with either B2C or B2B companies, being part of various departments.

3.3 Procedure

It is important to point out the fact that generally, a design thinking methodology should involve people from different backgrounds or fields of activity. Moreover, these participants should collaborate with each other, working together to improve or come up with a better solution for the desired product. However, this study focuses particularly on how useful do employees in big tech companies see a design thinking workshop. Hence, only these employees participated in the usability test. As the participants didn't have any other prior experience with the workshop, their thoughts and opinions were considered candid. The usability test was held online and took around 30 min to complete. The main reason for the online environment was the accessibility for every participant that might be located in a remote place. Also, an online environment is often times familiar and feels quite relaxed to the participants, as they have their own privacy.

The usability test started by entering the online environment where the workshop was created - the Miro online whiteboard. Once the participant had entered the environment, a small introduction on the background of the study was presented, as well as the reasons for conducting a usability test in the first place. Once the scope for the session was established and the participants had no questions, they proceeded to walk through the content of the whole workshop, by skimming and scanning the exercises. The materials were meant to be filled-in superficially, as in a real design thinking session, more people are involved in coming up with ideas and getting to an agreement. The exercises were complex in terms of content, and they required collaboration with other peers in order to be successfully completed. Hence, the aim of the usability test in this case was rather to understand the main flow and aims of each exercise, and if a user could interact successfully with the interface of the workshop. By studying how the participants walked their way through the entire workshop, relevant technicalities and possible problems were revealed.

The first template that needed to be analysed was the *persona card*. Participants did not have a specific time frame to spend on each exercise, rather they were encouraged to take their time to fully understand what is presented to them and comment out loud their thoughts. When the researcher sensed they had nothing else to say on a particular exercise, they were instructed to move on to the next exercise. Following, the participants created a *problem statement* that served as the main challenge for the entire workshop. Subsequently, a *customer journey* card had to be filled-in by using post-its on the canvas. This activity was the most complex one, having multiple sub-sections to be analysed by the participants. Last but not least, the participants finished by creating one web screen prototype with the use of pre-made web components that they had to drag and drop on the screen mockup. During the whole study, the participants were encouraged to think aloud. This entitled participants to express out-loud their thoughts and reasoning for a particular action. By taking this approach, the researcher was provided with useful insights from the participants. In this sense, relevance was brought to previously unseen mistakes. In order to keep the whole session structured, the researcher outlined the specific goals of each task prior to completing it. Each task begun with the phrase "Begin task" and completed with the phrase "End task." Specific questions were not being answered during the tasks, to make sure not to lead a particular action and avoid any biases. However, some instructions were clarified if necessary.

Finally, one core aspect of the usability test that needs to be highlighted is that the participants themselves were not the ones being tested. Rather, the workshop's ability to help the participants solve a specific problem was being tested. Furthermore, all notes, documentation, and comments were completely anonymised. The usage of these materials remained unpublished externally. They were meant for academic research purposes only.

3.4 Data Analysis

After the usability tests were conducted, the gathered data was further analysed. This was done to have a thorough understanding of the existing content and discover meaningful insights for the chosen topic. To be precise, the goal of the qualitative data analysis was to unveil employees' opinions regarding the usefulness of a design thinking workshop. First and foremost, the usability test data was transcribed with the use of a software programme, thereby creating ten valid transcripts. The content was not altered or modified in any way to comply with the ethical transparency policies highly valued in qualitative research. Subsequently, these ten transcripts created the corpus. In qualitative research, a corpus can be further described as a collection of the participants' words, described ideas or phrases. The corpus was then imported into the software program ATLAS.ti, whose highly developed technology helped in analysing the data at a higher and more precise speed. The next step was analysing the corpus itself. By segmenting and reassembling parts of the corpus, the data was transfigured into findings (Boeije, 2009). This processes refer to a thorough examination of the text, categorising it by themes, purpose or other types of criteria. By taking this approach, the researcher created a better understanding of the raw data with a holistic view. Furthermore, the coding process started. More specifically, open coding, which can be defined as the process of distinguishing themes and categories within the data dividing it into fragments (Boeije, 2009). In the same book it is stated that these fragments are compared amongst each other, grouped and then attributed with a specific label that explains the meaning behind the text. Hence, the notion of a code. The author also argues that a code represents a particular label that depicts the core idea behind a phrase or a sentence. Furthermore, once relevant findings were shaped in the process of open coding, a codebook was created. It must be noted that a codebook consists of all established codes and possible sub-codes with the respective definitions. This served as a tool throughout the whole data analysis to build consistency and structure.

Furthermore, the codebook consisted of seven main codes, out of which 3 also included sub-codes. Two of the total codes were form codes (a quantitative type) and five were content codes (a qualitative type). Starting with the form codes, the following ones were created: *job title* and *years worked*. The other content codes were: *attitude*, *technical structure*, *job performance*, *creativity* and *innovation*. The complete overview of the used codebook in this research can be found in the appendix C. As the data analysis was done through the process of open coding, all the codes are created based on the corpus itself. When using the software program ATLAS.ti, these codes were attributed further on to the specific parts of the text. Every time a code was used, the software recorded this data, outputting statistical numbers of code usage to the corpus. In terms of efficiency, the use of the ATLAS.ti software, considerably improved the overview of the data.

All recorded codes in the codebook had the purpose of measuring different insights and characteristics expressed in the corpus. The codes explanation transpired as follows:

Job Title:
Stands for the current position of the employee. Description of the job title that the person entitles, either the solution engineer role (SE) or the account executive role (AE). This is an example of a form code that has the purpose to give a general understanding on the person's background.

Years Worked:
Stands for how many years did the employee work at the company. This is a form code that later on helps to have an overview on the statistical descriptives.

Technical Structure:
This code implied how did the participants interact with the interface of the digital workshop built on the whiteboard tool Miro. The participants expressed their opinions towards the technical structure of the workshop by communicating good, medium or bad features they encountered.

Attitude:
This code covers the general attitude towards using the design thinking workshop in current work practices. The participants had either expressed pros and cons of using the workshop or had a neutral opinion. The pros are conveyed through positive point of views, whilst the cons generate a rather negative approach to using the workshop. People with a neutral attitude held back from expressing a firm outlook on this topic.

Job Performance:
When people come across a new product, it is commonly known that they link it to their own benefits or disadvantages. With that being said, this code conceptualises how does the usage of the workshop affect the employee's job performance. The participants revealed their outlook on whether or not their performance at the workplace would be improved or decreased in the case of using the workshop.

Creativity:
The participants pointed out significant opinions on how the see the workshop being linked to creativity. As this theme can be interpreted quite different and broad, sub-codes were not created to avoid any limitations.

Innovation:
Participants expressed their thoughts on the innovation topic and how the workshop is linked to it. This code provides examples on why the participants see the workshop as an innovative tool in their daily work activities.

In order to continue coding all transcripts, a coder inter-liability test had to be performed. This test enables to understand if two researchers agree on the meaning behind the same code and if different parts of a transcript are coded the same way. This allows for a systematic approach to coding and defines a further valid analysis. Therefore, one transcript was coded by two different people, hence amounting to 10% of the corpus. The Cohen's Kappa represents a statistical number that measures this level of agreement between the two coders. One of the benefits of calculating this number is that it accounts not only for the percentage of agreement, but also for the fact that there might be a chance that some parts are coded the same purely by coincidence (Statology, 2021). The formula for Cohen's Kappa is the following: $k = (p_0 - p_e) / (1 - p_e)$, where p_0 is the relative observed agreement among coders and p_e is the hypothetical probability of

chance agreement. Thus, k = (0.7 - 0.1) / (1 - 0.1). The average Cohen's Kappa for this research was 0.66 which stands for a substantial agreement between the two coders. As the Cohen's Kappa number was not completely optimal, 1 being the number representing perfect agreement between the two coders, some adaptions in the coding list were made. As an example, the sub-code *neutral opinion* was added within the code *attitude*. Therefore, such adaptions allowed to continue coding all transcripts, as the codebook was considered reliable.

4. Results

The usability tests had the purpose of unveiling participants' thoughts on the usefulness of a design thinking workshop. During the session, they navigated through the workshop materials and presented their insights using think aloud protocol. Participants were introduced to the topic of the research in the beginning, as well as the explanation of the entire session's structure.

4.1 Technical Structure

In general, in terms of the *technical structure* of the workshop, the majority of participants had expressed a good evaluation. This can be deducted from the following statements: "I think looks very organised", "Nice that you have labeled the frames, so I know what I am looking at" and "I like the distribution between the quick example on the left and the four squares on the right for more ideas". Participant 3 also liked the usage of colour coding for different segments within one exercise: "I noticed that the journey steps above are colour coded, so that makes it way structured for me." There were also some opinions that raised technical unclarity when completing the exercises. For example, participant 5 mentioned "I see there are sticky notes, but how do I enter my text", while participant 7 struggled orientating through the materials "So, I'll just start from the left I guess, as there are no indication of a starting point". Also, participant 8 expressed some unclarity when using sticky notes, more specifically doubting the choice of having only one sticky note per question: "Should we stick with only one idea if there's one sticky note. Is this the reasoning? Cause if so, I definitely think there should be more sticky notes in the square". Fewer participants also held a neutral position regarding the technical structure of the workshop, this sub-code being the least used one out of all 3 sub-codes for the technical structure. The neutral opinion stands for an even-handed point of view, neither expressing a strong positive remark, nor a negative comment on the topic. Such an example is the following statement of participant 9: "The amount of exercises may be a little high for some accounts, but it depends on their goals and problems". By the same token, participant 8 emphasised a neutral position towards the structure of one exercise, particularly the prototyping one: "One thing about the prototyping pages. I'm not sure if they go all together, I mean the ones above or just the approach to it. But I guess it's neither a bad or good thing".

4.2 Attitude

Furthermore, another core aspect tackled in the usability tests was the *attitude* towards the usefulness of the workshop. The sub-code *pros of using the workshop* was used the most in this category, comparing it to the sub-codes *cons of using the workshop* and the *neutral opinion.* For example, participant 10 expressed his point of view mentioning that "I'm glad to see this part, because a lot of the times the customer asks me if he can already see a demo. And I don't always have something put together already. So, I think

this part can help a lot with visuals to show them". By the same token, participant 9 highlighted the fact that the workshop serves as a point of reference for understanding better the customers' requirements for the software product, hence finding it useful as well: "I think this can really help me in understanding some things that the customer for sure wants to see in their final web solution. It can save me a lot of time". Contrary to this, some participants indicated a few cons of using the workshop. In participant's 2 opinion, the last exercise of the workshop had some limitations: "I just wonder if this is not too complicated for people with zero digital skills, because we often work with customer service employees for example. They can have some trouble putting together such a prototype by themselves". Another con of the perceived usefulness was the workshop length aspect. Participant 10 mentioned that: "I think this is a detailed customer journey, maybe too long, which is not something people usually like". The neutral sub-code in this category was expressed by fewer participants. This tone can be deducted from statements such as "In general, I don't know how to actually put this to practise by myself. It's all quite new" and subsequently, "I think I'll invite here more people from the customer side so we have more ideas, but as well maybe someone for assistance or a prep session for us ahead of actually doing this".

4.3 Job Performance

The participants have also revealed interesting points regarding the use of the workshop linked to their *job performance*. This topic met multiple reactions, but much stronger points were highlighted for the sub-code increased job performance than the other sub-code decreased job performance. The former can be exemplified by the following statement of participant 4: "I'm always receiving better feedback for my work performance when I can show a possible screen or demo sooner in the process to a customer." By the same token, participant 2 highlighted the fact that the workshop serves as an accelerator for future conversations with the customer, thus increasing their job performance: "For me I also see the added value, because it will make the next discussions with them run more smoothly, as we already have an idea in mind about what kind of websites we want". In addition, participant 1 also stressed the fact that the job performance will benefit, as the workshop helps in focusing energy and time on website aspects that are indeed important to the customer: "It can help me a lot for already having a vision of what the customers would like for our demo. So, I don't spend all my time and energy on a possible web interface that the customer won't agree with in the end. Cool". Subsequently, the other sub-code *decreased job performance* is sustained by the statement of participant 7 for example "I think I would need some help myself here just brainstorming more, because doing it alone can be pretty difficult and the outcome not the best for the further performance evaluation". Likewise, participant 5 expressed a concern regarding possible confusions in the customer journey exercise, that inevitably can result in decreased job performance for the employees: "Interesting points, I think the actions part is self-explanatory, but I'm thinking that for the touchpoint part, the client will need a little help, cause you can't know all of that instantly. We could try to help of course coming up with some ideas, but if we have multiple clients this can be a bit overwhelming. We can end up getting confused in touch points and different customer details".

4.4 Creativity

The next theme that was outlined by the participants was *creativity*. This code did not have any sub-codes as the topic is quite broad, and can be interpreted by participants in different ways. To illustrate, participant 5 sums up his thoughts on one exercise in the workshop in the following statement: "So, I worked with some personas before, but it was

more like a Quip document, so it felt pretty boring and just a lot of unnecessary text. This one is way versatile and creative. I like the distribution between the quick example on the left and the four squares on the right for more ideas". The creativity aspect was also implied in an argument provided by participant 9, highlighting that "Yeah I see, could be that it's more structured like this. So sort of like a combined present and future customer journey. An integrated view. I think that really puts you in a creative mindset, focusing on the present but also on the future at the same time". In addition, participant 2 also emphasised the fact that more participants in the workshop can view the same exercise differently which results in a creative atmosphere "So like one person could view the journey in one way, but another slightly different. And by this I mean, you get pretty different and creative ideas brought to the table". In a similar way, participant 6 argued that the prototyping exercise allows for personalisation and creativity in terms of setting up an individualistic web screen that portrays a specific vision: "This part actually had my interest from the start. I really like the screen mockups on the right. I think for people who aren't that used to an online environment like this, having an example already made is nice. But also the components on the left could be useful for more specific ideas. If you're feeling creative you can take a shot doing your own screen, how you envision it".

4.5 Innovation

Finally, the last code *innovation* was not as highly outlined as the *attitude* code towards workshop usefulness, but still held interesting implications. The 6 statements that were coded here, mainly referred to the prototyping part of the workshop as being innovative. Participant 8 called attention to the up-to-date approach of the prototyping exercise: "Ok. Interesting, I like that there is some content already to work with if you're really stuck with your own design skills. But on the other hand, you also have these cool screen components that you can take from the left. I never did something like this with a customer. It's definitely a very up-to-date method aligned with current trends that I see happening". Likewise, participant 5 pointed out the innovative value of accessing the materials of such a workshop: "I never used such a collection of templates. Usually, takes me some time to find relevant material on Solution Central. But having them all in one place, like this whiteboard and especially ready to be used is really a step further". In addition, participant 10 revealed that exercises and materials as the ones presented in the design thinking workshop can be considered innovative, especially in big organisations: "Ok so the persona card. I can see myself really using this in the future. I saw some examples in the past and people seem to like doing these. I think it's also a nice way of storytelling you know, something that is quite new and innovative in big organisations like ours. Cause I didn't really hear colleagues doing this".

4.6 Conclusion

All in all, the insights provided by the participants covered the following themes: technical structure, attitude towards usefulness, job performance in regard to the usage of the workshop, the creativity aspect and the innovation aspect. Generally, the employees found the workshop as being well structured, with some concerns regarding more technical assistance required on request. The usefulness of the design thinking workshop was also well perceived, especially for creating a better relationship with the customer. What is more, a lot of the participants linked the workshop to an increased job performance, as the workshop helps in focusing energy and time on various website aspects that are indeed important to the customer. However, there were also implications about high amount of materials presented and long duration of the workshop. Still, participants appreciated the idea of working more closely with the customers on a

specific vision of the website product, thus depicting the creativity and innovative aspect of the workshop.

5. Discussion

5.1 Addressing the research question

The following discussion part of the presented results is structured according to the coding scheme elaborated in previous steps. The data collected in the usability tests indicated that the majority of the participants involved had positive opinions about the technical structure of the workshop. If people found all the necessary information in little time and immediately understood the task of one exercise, then their attitude towards the structure was good. On the other hand, if they did not understand where to start and how to proceed on doing a task, the technical structure was considered bad. This way of thought can be backed up by the cognitive overload theory. Fox, Park, & Lang (2007) argue that when a person is faced with a high amount of unstructured information, the individual is unable to process the information effectively. Thus, having no beneficial outcome of interacting with the specific information.

Furthermore, the data also indicated that the majority of the participants involved had positive opinions towards the use of a design thinking workshop. Some employees perceived the workshop as being useful due to its substantial focus on visuals. As mentioned in the results of data analysis, customers like to see a solution to their website inquires even in the early stages of working with employees outside their organisation. Therefore, employees of tech companies believe that a design thinking workshop that incorporates visuals in its exercises and materials can be qualified as useful. By having visuals included in an exercise, or another type of task, people can better envision an idea and make it more tangible due to their personal made associations imprinted in their memory (Beeland, 2002). To add, some participants in the study had raised concerns regarding the length of the workshop. It was brought up the fact that the workshop tested might take a longer period of time to complete than typical customer meetings, which can be deducted as a downside of the workshop. In other words, time is an important factor in this equation. If participants are not willing to sacrifice their time, a design-thinking workshop can be left unused. This reasoning can be explained by the high importance of attention spam. The average attention spam for adults is between 15 and 25 minutes (van den Boer & de Jong, 2018). The authors also claim that if people are faced with a long activity over the timeframe of 15 and 25 minutes, they easily disconnect. They require intrinsic motivation, as well as highly defined benefits to take their time in a long activity, such as the design thinking workshop. Furthermore, it was also found that without a proper training prior to the design thinking workshop itself, participants would be reluctant using the workshop. As the employees were not experts on design thinking, some considered fitted a proper design thinking training or preparation session before using such a workshop with a personal client. The available literature support this ideas by emphasising the importance of soft skills. Usually, a person feels confident not only when the theoretical material is well prepared, but also when there is confidence in soft skills. Dixon, Belnap, Albrecht, & Lee (2010) mention that the ability to communicate, solve problems, work with different people and coordinate ideas are essential for a successful work performance. All these being examples of soft skills. Hence, having a preparation session to perfect the knowledge on design thinking, as well as master soft skills represents an important topic highlighted by some participants in this study.

What is interesting, participants also expressed their perceived usefulness of design thinking workshops by linking the tested workshop to their job performance. Plenty of them indicated that a design thinking workshop as the one tested in the usability session can boost their engagement with a customer, ultimately resulting in bigger deals. This way of thought can be supported by the fact that customers are usually used to a traditional conference meeting where they talk about their business challenge and leave the rest of the work to the employees. They are not typically involved in the development process. Therefore, when faced with a new collaborative approach, the relationship between the two parties is strengthened. Moncrief & Marshall (2005) synthesised this way of thought by emphasising the traditional seven steps of selling, which is orientated towards the tech company part. The authors advocate for a more evolved selling process which focused on the customer, focusing on maintaining a meaningful relationship with prospective customers. On the other hand, some participants also mentioned that they could find themselves being stuck in brainstorming ideas in a design thinking workshop, which can lead to a bad job performance evaluations. In this regard, tech companies that want to use a design thinking workshop should have an open conversation with the employee about his strengths and weaknesses before employing them in such a workshop. Employees should always feel heard and valued in a company, being able to choose what feels more comfortable to them.

Following, some participants also brought attention to the creativity aspect in the design thinking workshop. From the results, it was deducted that because the workshop involves different people from various backgrounds ideating on a specific concept, a variety of creative ideas are pushed up. McCrimmon (1995) sustains this idea by arguing that teams that do not have specific roles are empowered for greater creativity. This is possible because people do not follow the path of only their work expertise, but allow themselves to think from a different role's perspective. A further aspect concluded from the study results is innovation. Some participants specifically linked the prototyping exercise of the workshop to innovation. Having an easy way to create a website mockup with customers was deducted as an innovative approach. Especially customers that do not have advanced technical skills benefit from taking part in this activity. To add, some participants perceived the workshop as innovative as all the materials were easy to access through a whiteboard format. In this regard, Scholtz, Mahmud, & Ramayah (2016) sustain that an innovative product that has a substantial degree of usability and accessibility, ultimately results in higher adoption rate.

5.2 Theoretical and practical implications

Based on the theoretical argumentation presented in the first part of this paper and the empirical results of the usability test, theoretical and practical implication of this study will be further highlighted in this section.

Firstly, this study supported other scholars' conceptualisation of design thinking by emphasising the ultimate aim of this methodology to improve a product. It was concluded that a design thinking session starts with establishing the problem and ends with creating a respective solution. Thus, the participants using a design thinking methodology navigate through different materials and exercises that help them reach the last step of creating a solution more easily. In this regard, Simons et al. (2011) argued that design thinking encourages collaboration, creativity and innovation between the organisation and customers. These attributes were considered positive outcomes of a design thinking session, thus portraying this methodology as being useful in a company. Therefore, to find out if employees of tech companies indeed consider a design thinking session useful, a digital workshop was created. The respective workshop included the design thinking steps as presented by Chasanidou et al. (2015), hence aligning this research study with

the scholars' view on design thinking stages. In addition, the study strengthened previous research as various design thinking tools and exercises as presented in the available literature were included in the workshop itself, and therefore tested in terms of usefulness. For instance, a persona card as described by Chasanidou et al. (2015) represented the first exercise in the workshop.

Secondly, the usability test also held some practical implications that need to be addressed. For instance, the participants interacted with the materials of the workshop individually. Generally, a design thinking workshop involves more people from different backgrounds working together in the session. Thus, because in this study participants worked alone, they did not get a chance to grasp the whole experience of a genuine design thinking session. Perhaps, this could have resulted in less ideas being brought up, limiting to understand participants' complete judgement on a particular exercise within the workshop. A recommendation for future research is to focus as well on the customer side of tech companies. This party also has to be analysed in order to come to a more solid understanding of the usefulness of design thinking workshops. By letting tech companies employees and respective customers work together in a design thinking session, a new research question can be studied from both the employees and the customers perspectives, leading to more accurate results. Furthermore, it was found that employees require additional design thinking knowledge and training prior to taking part in a design thinking workshop with a prospective customer. It could be that this specific finding might need further research in terms of specific materials and types of preparation needed. It could be likely that employees with a higher degree of design thinking knowledge perceive the workshop as more useful.

5.3 Addressing the research limitations

For this research, data was collected by means of a usability test. Ten participants tested a design thinking workshop, expressing its perceived usefulness. All participants were part of a tech company, selected through a purposive sampling method. Although considered a suitable method, the downfall is that not every subject has the chance to be included (McCombes, 2022). Therefore, there is a higher chance for sampling bias involved in this research, meaning some conclusions derived from this sample can be misleading and not correctly conveying the entire population.

Another point to be discussed is the benefits and limitations of the usability test. This method is considered suitable for this research as it allows to understand in depth how a person interacts with a product for the first time. Participants opinions on the design thinking workshop were unveiled and freedom of speech was encouraged by using think aloud protocol. However, there is a limitation of this method when only one researcher is present during the study. As the setting of the usability test was an online environment, it was quite difficult to grasp the genuine facial expressions and gestures of all participants. A delay in the network connection also imposted some difficulties in fully analysing the non-verbal body language. Therefore, if another researcher would have been present to assist the session, better shaped results could have been presented. A recommendation for future research in this case would be to choose a physical environment for conducting the study, allowing for an improved version of information exchange and communication skills.

6. Conclusion

To sum up, this study aimed to answer the following research question *“How useful are design thinking workshops for employees in big tech companies?”.* The usability test conducted enabled 10 employees of a tech company to interact with an already created design thinking workshop, while presenting their thoughts on its perceived usefulness. In general, participants believed that the workshop has potential to be used in further work practises. The structure of the workshop was well received by them, emphasising the importance of visuals. The study also demonstrated that a design thinking workshop can serve as an accelerator for an improved version of a software product, as the ultimate focus of the session is a user-centred approach to design. However, the majority of participants also emphasised that without a proper design thinking training prior to the workshop, participants were reluctant on their skills for successfully completing the session. In other words, it can be concluded that design thinking requires an adequate level of eduction on the topic, as well as enough practice to make tech companies employees feel confident in their overall performance. Still, it is important to point out that a design thinking workshop can hold viable benefits to be considered by big tech companies willing to approach a new engaging way of selling software to customers. Having these insights presented, the study can serve as a point of reference for future research on the topic of design thinking usefulness - a methodology that can be applied in big tech companies.

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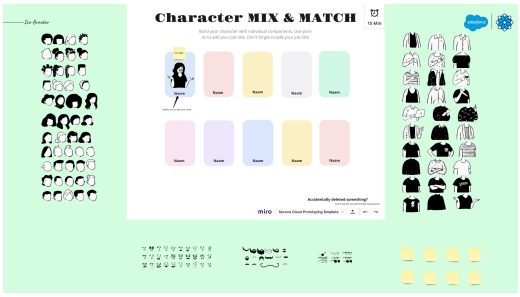
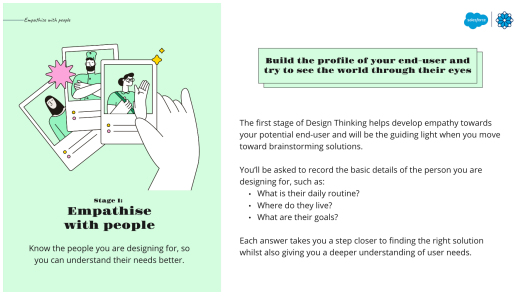
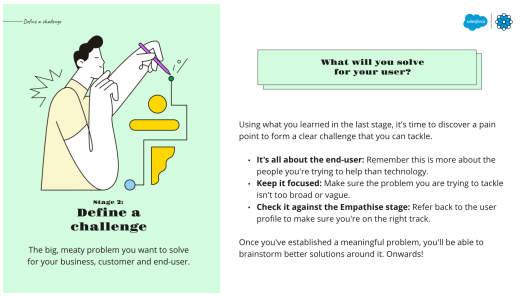
Appendices

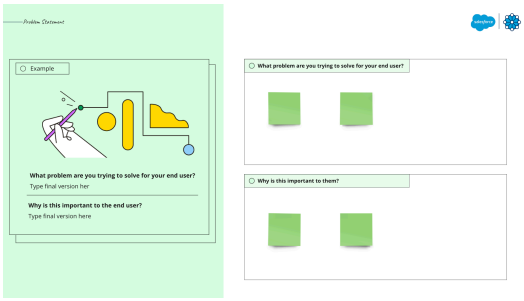
Appendix A

Design Thinking Workshop

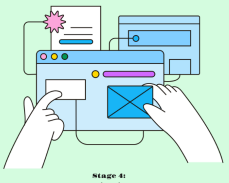








Prototype



Stage 4:

Prototype your design

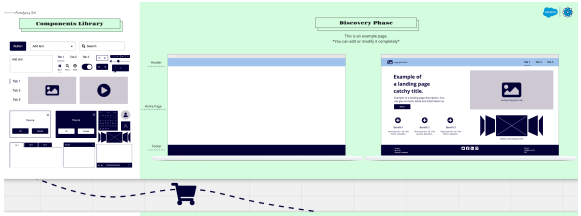
Turn ideas into visual mockups.

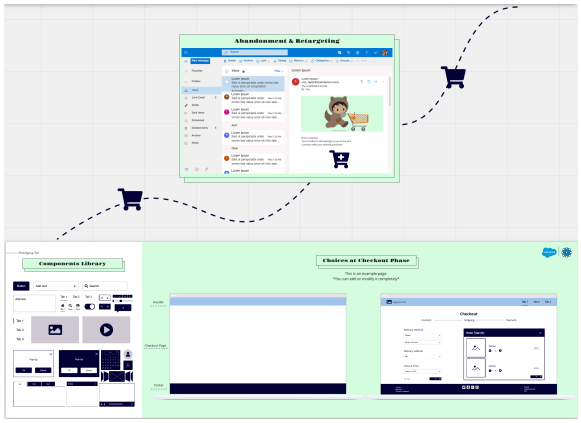
Bring your ideas to life and create basic commerce screens.

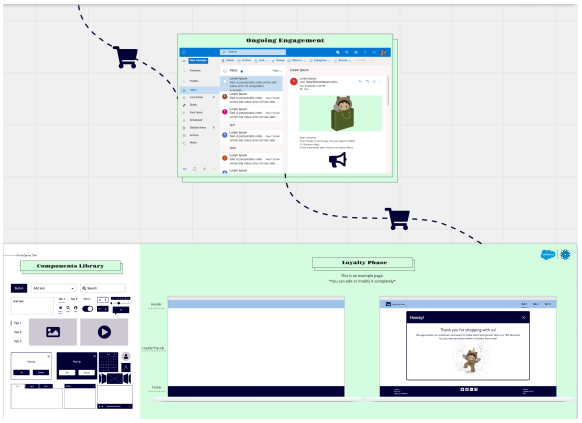
The best way to test ideas with users and start a conversation is to show them how the solution works. Prototyping is perfect for building your first product ideas at speed and making them tangible.

Design your ideas through drop-and-dropping the components provided next to the screen.

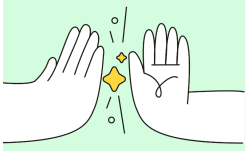
- Just start building, don't get hung up on visuals
- Don't spend too much time on one idea - move fast!
- Design only the screens that matter the most in your case







Feedback



Congratulations

You've completed your Commerce Cloud design-thinking workshop!

Your feedback is really important for the next steps in your journey

What I liked	What I didn't like

Appendix B

Sample Script

Introduction to Study

Thank you for agreeing to participate in the testing of *the design-thinking workshop*, an interactive session that allows you to solve a business challenge, by *co-creating commerce cloud web screens together with your customers.* For research purpose only, I will record this session and the data will be completely anonymised. Do you therefore give your consent?

Today, we're going to be testing four main features of the design-thinking workshop:

- *Create a persona card*
- *Create a problem statement card*
- *Create a customer journey card*
- *Create one web screen prototypes*

The study should take *30 min* to complete.

The first task will require you to *navigate from the start of the workshop until the last part of it*. Read the descriptions of each exercise carefully, then start by completing the persona card. Next, you will be asked to define a possible customer problem you are trying to solve. Furthermore, you continue by filling in a possible customer journey. Finally, I'll observe you drag-and-dropping web components on a screen mockup, thereby creating a customised prototype.

Prior to each task, I will outline the specific goals of the task to you. Each task will begin when I say, "Begin task" and complete when I say, "End task." I will not be able to answer specific questions during the task; however, I can clarify any instructions. Before we begin each task, I will ask you if you have any questions about the instructions. Remember that the final outcomes don't need to be perfect and completely filled in. Please narrate your thought process by thinking aloud. For instance, if you were going to *browse through the web components*, you would say out loud, "I'm going to *take a look at the left of the screen, where I see a bunch of web components to choose from*." This will help me understand what you're trying to do and improve the effectiveness of this study.

Please remember that I am not testing you in this study. I am only testing the workshop's ability to help you in completing your task. All notes, documentation, and comments will be completely anonymous.

Appendix C

Code Book

Code Number	Theme	Sub-theme	Definition
1	Job title	1.1 Solution Engineer (SE) 1.2 Account Executive (AE)	Description of the job title the person entitles.
2	Years worked	2 Years worked	How many years did the employee work in the company?
3	Technical structure	3.1 Good 3.2 Neutral 3.3 Bad	How does the technical structure of the workshop appear to be?
4	Attitude	4.1 Pros of using the workshop 4.2 Cons of using the workshop 4.3 Neutral opinion	Attitude towards the usefulness of the design thinking workshop.
5	Job performance	5.1 Improved job performance 5.2 Decreased job performance	How does the usage of the workshop affect job performance?
6	Creativity	6 Creativity	How is the workshop linked to creativity?
7	Innovation	7 Innovation	How is the workshop linked to innovation?

Appendix D

Study Log Book

Date	Database	Search terms	Search hits	Example of article chosen
20.03.2022	Google Scholar	Design thinking	4.810.000	Razzouk, R., & Shute, V. (2012). What is design thinking and why is it important?. *Review of Educational Research*, *82*(3), 330-348. https://doi.org/ 10.3102/0034654312457429
05.04.2022	Scopus	Innovation in organisations	2.190.000	Simons, T., Gupta, A., & Buchanan, M. (2011). Innovation in R&D: Using design thinking to develop new models of inventiveness, productivity and collaboration. Journal of Commercial Biotechnology, 17(4), 301-307. https://doi.org/10.1057/jcb.2011.25

Date	Database	Search terms	Search hits	Example of article chosen
10.04.2022	Google Scholar	Design thinking implementation	3.540.000	Lindberg, T., Noweski, C., & Meinel, C. (2010). Evolving discourses on design thinking: how design cognition inspires meta-disciplinary creative collaboration. *Technoetic Arts*, *8*(1), 31-37. https://doi.org/10.1386/tear.8.1.31/1
13.05.2022	Google Scholar	Software selling	1.080.000	Tyrväinen, P., & Selin, J. (2011). How to sell SaaS: a model for main factors of marketing and selling software-as-a-service. *Lecture Notes in Business Information Processing*, *80*, 2-16. https://doi.org/10.1007/978-3-642-21544-5_2