

Application of Value Proposition Design to a high-tech business market product

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DIVISION OF INNOVATION ENGINEERING | DEPARTMENT OF DESIGN SCIENCES
FACULTY OF ENGINEERING LTH | LUND UNIVERSITY
2021

MASTER THESIS



Application of Value Proposition Design to a high-tech business market product

A need assessment study of an
interactive software solution

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LUND
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P.O. Box 118, SE-221 00 Lund, Sweden

Subject: Innovation Engineering (INTM01), Product Development (MMKM05)

Division: Innovation Engineering

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Abstract

In early 2019, a system of sensors, projectors, and software was created for the purpose of improving the experience of entering Sony's offices in Lund, Sweden. The system attracted attention, both internally and externally, and grew organically in features and scope to meet the needs of its initial customers. Due to its modularity and wide applicability, it came to be known as the Interactive Content Solution (ICS).

At the start of this study, in mid-2020, the product faced a set of issues not unusual for complex technical solutions. Firstly, the solution had increased in both complexity and scope, making it increasingly difficult to communicate the essence of the solution and finding a common direction for future development. Secondly, in order to warrant continued development, the solution had to show potential to expand externally and as such, a target customer and market needed to be explored. This study aims to address these two issues by analysing and defining a chosen market segment, and by creating a value proposition for the ICS, using Value Proposition Design (VPD) methodology, qualitative interviews, and need assessment.

In addition to the above, the study also provides an element of method testing and method development by reflecting on the challenges of using VPD in a business-to-business setting for an existing high-tech solution. The authors' found the methodology's visual tools and presentation to be its core strength, while the at times poorly documented approach for business-to-business products its greatest weakness.

Ultimately, it is shown that for the ICS to satisfy its customers' needs, its value proposition should: impress, engage, grab attention, be easy to use, be easy to explain, and be reliable.

Keywords: Value Proposition Design, Customer needs assessment, Digital Signage, Interactive Digital Signage, Problem-solution fit

Sammanfattning

2019 skapades ett system bestående av en uppsättning sensorer, projektorer och programvara i syfte att förbättra entréupplevelsen i teknikbolaget Sonys kontor i Lund, Sverige. Systemet fick uppmärksamhet, internt såväl som externt, och utvecklades sedan organiskt som system för att svara på existerande kunders behov. I och med systemets breda användbarhet och koppling till interaktivitet blev produkten känd som Interactive Content Solution (ICS).

I början av denna studie, i mitten av 2020, stod produkten inför en rad frågor som inte är ovanliga för komplexa tekniska systemlösningar. För det första hade lösningen expanderat i både komplexitet och tillämpningsområden vilket gjorde det svårt för kunder att förstå sig på vad lösningen faktiskt erbjöd. För det andra behövde lösningen visa potential att expandera externt för att motivera fortsatt utveckling. Med andra ord behövde potentiella kunder och marknader undersökas. Denna studie syftar till att ta itu med dessa frågor genom att analysera och definiera en marknad samt genom att skapa en värdeproposition för ICS, med användning av VPD-metodik (Value Proposition Design), kvalitativa intervjuer och behovsanalys.

Studien bidrar med metodtestande och metodutvecklande information i formen av reflektioner kring utmaningarna med att implementera VPD för en högteknologisk produkt på en företagsmarknad. Författarna fann att metodens styrka låg i dess presentation och grafiska verktyg, samtidigt som dess största svaghet var den bristfälliga vägledning som erbjöds i relation till företagsmarknader.

Slutligen visar studien att ICS:s värdeproposition behöver tillgodose följande behov för att vara stark: imponera, engagera, fånga uppmärksamhet, vara lätt att använda, vara lätt att förklara och vara tillförlitlig.

Nyckelord: Value Proposition Design, Kundbehovsundersökning, Digital Signage, Interactive Digital Signage, Problem-solution fit

Acknowledgments

We would like to start out by thanking our supervisor Lars Bengtsson for his guidance, and examiner Jessica Wadin for her valuable feedback and patience. We would also like to thank the entire Technology Promotion department at Sony in Lund for giving us the opportunity to write about such an interesting subject.

To our wonderful interviewees who decided to participate despite not getting anything in return. We are forever grateful!

A special thanks to Fredrika Leyon Cervin, for everything!

Lund, May 2021

Claudio Gandra and Johan Hansson

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1 Introduction

1.1 Background

In 1992, Roy Rothwell acknowledged that “the rates of industrial technological change are high” and that not only technology itself is changing rapidly, but also the process by which technology is commercialised, i.e., the innovation process (1992). No doubt, this is still the case today, possibly to an even greater extent as globalisation and digitalisation drive competition and technological possibilities forward. This has led to a wealth of research on innovation process theory and made organisational innovative ability a critical factor for survival.

Since the 1950’s the way innovation is commercialised has evolved and changed significantly (Rothwell 1992). Initially, innovations were thought of as linear in the sense that they have a clear beginning and end, with an ordered sequence of activities in between. This view allowed for two opposing schools of thought, one arguing that technological and scientific shifts and advances *pushed* innovation, while the other thought the opposite, that it was the *pull* of market demand or need that fuelled innovation. Today, innovation processes are better understood as complex system-integrated network models, which are more efficient, faster and more flexible than their linear counterparts. However, despite their complexity, Benoît Godin argues that many modern holistic innovation models remain technology-push overall (2017, p.125-126).

In 2019, a team of developers at Sony’s office in Lund, Sweden, created a technical solution by combining existing hardware with custom-built software consisting of recycled modules from previous projects. It was conceived to fill a need from the facility team, who were looking to improve a grey and dull hallway near the office entrance using innovative technology. The software used had initially been developed for Sony’s R&D departments in a typical “push” fashion: created without any target customer or market in mind. Over the course of one and a half years, Sony’s Technology Promotion department in Lund kept evolving the solution in direct response to new needs from the slow but steady stream of customers (internal to Sony) who had seen or heard about the solution and requested installations.

In mid-2020, the solution faced two main problems: the solution’s lack of definition and the need for an external market. The solution had increased in both complexity and scope, making it increasingly difficult to communicate the essence of the solution and finding a common direction for future development. The need for a

better-defined product was justified even further after the development team had noticed that the unique features offered by the solution, considered to be its strengths, were seldom requested by the internal clients as they often did not possess the technical expertise to appreciate them. Furthermore, in order to warrant continued development, the solution had to show potential to expand externally and as such, a target customer and market needed to be explored.

In order to solve these two problems, this thesis covers the process of designing a value proposition for the product according to the methodology defined by Osterwalder, Pigneur, Bernarda and Smith (2014). By using this methodology, the authors were able to approach the two problems from a strict customer-needs perspective, gain valuable insights, and understand how to better define the solution to maximise its potential value for the customer.

1.2 Problem statement

In Lund, Sweden, Sony has developed tools and frameworks to ease the threshold of creating interactive content for large interactive displays, forming a solution called Interactive Content Solution (ICS). Due to the fact that the market for large-scale interactive solutions is still emerging and because of the innovative nature of the ICS, a better understanding of the market, the customers and the product itself are required to clarify the potential value of future investment opportunities.

1.3 Scope

1.3.1 Purpose

The purpose of this report is twofold:

- Firstly, the report aims to identify a problem-solution fit for the ICS by applying Value Proposition Design (VPD) and analysing actual customer needs. The obtained information will provide the relevant department at Sony with data to support future business decisions related to ICS and other projects of similar nature.
- Secondly, the report also aims to provide an element of method testing and method development by gathering first-hand insights on the use of VPD in a B2B environment and commenting on the perceived benefits as well as drawbacks and potential room for improvement.

1.3.2 Limitations

The study was conducted within a time frame of roughly five months, setting the bar for the entire scope of the project as all literature research, data gathering, and analysis had to fit within this time frame.

As further elaborated in chapter 2, the methodology offered by Osterwalder et al. (2014) features three different kinds of fits namely: problem-solution fit, product-market fit and business model fit. Due to the limited time frame and the state of the product at the time of writing, the authors of this thesis decided to exclude the latter two to focus on providing a solution for the firstly mentioned problem-solution fit instead.

The search for and selection of subjects to interview for the creation of customer profiles were intentionally limited to include members of two main segments: *Museums and cultural institutions* and *Office space providers*. These two segments were chosen based on previous customers found internally within Sony and the information gathered when exploring the market and potential competitors. Additional segments were also identified, as mentioned in chapter 5, but as the authors aimed for quality rather than quantity, these segments were excluded from the scope of this thesis.

Due to the COVID-19 pandemic, the research methods for the thesis were modified to fit restrictions and to comply with health and safety standards. As a result, interviews were conducted online using video conference software as opposed to (preferred) physical meetings, and the originally planned observational studies were deemed out of scope since the authors were unable to access the internal or external installations that were scheduled during the time of the study.

1.4 Objectivity notice

As one of the bases for judging the credibility of research includes objectivity, i.e. “the extent to which qualitative research can produce findings that are free from the influence of the researcher(s) who conducted the enquiry” (Denscombe 2010), the authors would like to note that:

- The authors of this thesis have been employed by Sony Group Corporation, commonly known as Sony, during the entirety of the project and the subject of the thesis and its direction have been made in agreement with the manager of their department at Sony and the supervisor from the Faculty of Engineering at Lund University. The fact that the study is not free from financial incentives increase the potential risk of creating conflicts of interest which could ultimately impact the objectivity of the study.

- As this thesis aims to explore the use of a software solution which has strictly been used internally, a majority of the selected interview subjects are currently employed by Sony and may have interests of their own which could impact the quality of the collected data.
- Furthermore, since the thesis is based on qualitative research, the authors individual identities, values and beliefs also have an impact on gathering and analysis of the data. (Denscombe 2010)

1.5 Research Questions

This thesis aims to answer the following two research questions exploring the previously defined problem statement.

1. How does the ICS satisfy the needs of its customers?
2. Who would benefit from using a solution like the ICS?

1.6 Report structure

This report is divided into seven distinct chapters covering a variety of topics. To aid navigating this document, each chapter, its title and a summary of its contents can be found below.

1.6.1 Chapter 2 – Theory

Gives a historical perspective to models of innovation focusing on the relationship between the theories of demand-pull and technology-push. The chapter further explores different methods and approaches to customer need assessment, modern hybrid innovation models and lastly, presents Value Proposition Design, the chosen method for this thesis.

1.6.2 Chapter 3 – Research method

Describes the methodology applied to answer the research questions of this thesis. The exploratory nature of this thesis prompted a flexible and abductive strategy that takes the practical form of a case study—consisting of a series of qualitative

interviews and the implementation of Value Proposition Design. Chapter 3 aims to justify the choices made and describes the steps taken during the course of the project.

1.6.3 Chapter 4 – Product and market settings

Defines Digital Signage and its subgroup Interactive Digital Signage as well as explores their applications, market, and trends after which the main topic of this thesis, Sony’s Interactive Content Solution (ICS), is introduced.

1.6.4 Chapter 5 – Analysis

Presents the findings and results from applying Value Proposition Design theory, mainly the four Value Proposition Canvases corresponding to four customer segments. Subsequently, a market and customer analysis are presented and finally, the value proposition for the ICS is defined.

1.6.5 Chapter 6 – Discussion

Discusses and reflects on the value proposition design methodology and process, with additional emphasis on B2B-aspects. The use of interviews as the main method for gathering data is discussed and the authors’ effect on the process are brought to light. Finally, the recommended next steps for Sony are presented.

1.6.6 Chapter 7 – Conclusion

Presents answers to the research questions of the thesis, provides a discussion on the thesis’ limitation and contribution to theory, and makes suggestions on future research.

1.7 Abbreviations

AI - Artificial Intelligence

BMC - Business Model Canvas

BSP - Business Segment Profile

CMS - Content Management System

DS - Digital Signage

DaaS - Digital Signage as a Service

ICS - Interactive Content Solution

Interactive DS - Interactive Digital Signage

IDS - Interactive Display Solutions

IR - Infrared

LIDAR - Light Detection and Ranging

NFC - Near-Field Communication

RGB - Red, green and blue

R&D - Research and Development

SDK - Software Development Kit

VPC - Value Proposition Canvas

VPD - Value Proposition Design

VR - Virtual Reality

VOC - Voice of Customer

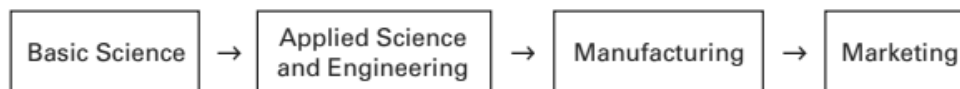
2 Theory

In this chapter, a historical perspective to models of innovation focusing on the relation between the theories of demand-pull and technology-push is presented. This is followed by an exploration of different methods and approaches to customer need assessment, modern hybrid innovation models and lastly, a presentation of Value Proposition Design, the chosen method for this thesis.

2.1 Models of innovation

The first and perhaps still most well-known model of innovation is the linear one. Since its inception in the 1950s, it has also been called the first theoretical framework in the study of innovation (Godin 2017). The model was commonly known as technology-push due to the idea that technological innovation began with research and development (R&D) or “science”, and that on the other end of a more or less linear process, the marketplace existed as a passive receptacle for the results (Rothwell 1992, p.221). Contrasting this theory was the demand-pull or need-pull model. Still using a linear sequence of activities, advocates of the demand-pull model proposed that rather than technology, users, markets, and applications are the key drivers of innovation (Chidamber & Kon 1993, p.1).

Technology-push model



Need-pull model



Figure 1: Illustration of Technology-push and Need-pull models (Rothwell & Zegveld 1985)

Setting schematic polarisation aside, Godin (2017, p.110) states that most researchers would agree that technological innovation results from a combination of both forces. This would indeed be true as all following generations of models of innovation, as defined by Rothwell, consider aspects of both theories (1992, p.236). There is a clear need for both theories, as an innovation originating in science and technology needs a market to be successfully commercialised, while innovations stemming from a pure demand-pull perspective still require technological competencies to be developed (Stefano, Gambardella & Verona 2012, p.1292). Yet, when holistic innovation models—which considers the need for both push and pull—are the norm, scholars rarely consider studying needs in a broad fashion (Godin 2017, p.125-126). Godin further claims that “[...] many holistic models remain technology-push overall and have not, despite the aims of their authors, abandoned the old assumptions” (Godin 2017, p.126). This statement is reinforced by Kärkkäinen and Elfvingren (2002, p.89) who goes on to discover that most of the companies studied were seeking more market-pull product development products at the time of the study.

It should be mentioned that this view of innovation processes—reducing them to two opposing theories—is very simplified. Modern innovation processes are much more complex and rarely, if ever, does a push or pull ideology individually define the whole system described by them. A modern process utilises extensive integration between multiple sources of innovation, while also appreciating knowledge, creativity, and learning as sources of innovation. It also makes better use of innovation strategies to identify, develop, and use resources and capabilities for the purpose of innovation (Dodgson, Gann & Salter 2005).

2.1.1 A need for assessment

It is difficult to assess and understand customer needs appropriately, particularly for companies acting in business-to-business (B2B) markets (Webster 1991; Kotler 1991, as cited by Kärkkäinen and Elfvingren 2002, p. 98). Kärkkäinen and Elfvingren’s case study shows that customer need assessment is a major development need in all companies studied, noting that many interviewees raised the issue of “unclear responsibilities of tasks related to the clarification and dissemination of need information”, and insufficient resources (Kärkkäinen and Elfvingren 2002, p. 99).

Unsurprisingly, this issue has seen many different proposed solutions, several of which are incorporated into modern innovation processes. One famous example of this is the stage-gate system introduced by Cooper (1990) who claims that the model provides stronger market orientation through market-related activities, like user needs and wants research and concept testing, to name a few. These activities are built into the different stages and each has set requirements needed to be fulfilled for the process to move forward. In recent years, the stage-gate model has also seen

development and evolution at the hands of both Cooper and other practitioners (Cooper 2008). These new versions have generally been created for the purpose of making the system less linear¹, more efficient, and more flexible. Many of what Cooper calls “smart companies” have done this through the integration of, and combination with, other methodologies and processes (2008, pp.223-232).

One such integration of note is the hybrid model of Agile and Stage-Gate, combining the set of methodologies known as Agile, originally created for software development in 2001, with the traditional stage-and-gate model (Cooper & Sommer 2016). This combination is, as Cooper and Sommer remark, not only applicable in the development of IT products, but also in a manufacturing environment. Among the reported benefits is the integration of voice of customer (VOC) in a “much more proactive and effective manner than traditional methods”, and a much higher level of responsiveness to changing customer needs. Furthermore, when they gathered data from firms that had implemented Agile-Stage-Gate, it was shown that the hybrid model improved customer focus in the innovation process from a XX degree to a medium-high degree.

2.1.2 Combined innovation models

Combining models, frameworks and tools can, as previously mentioned, have great positive effects on the innovation process of a company. Innovation process theory has gotten more and more complex as the models have grown in scope to capture every aspect of the system and respond to increasingly complex organisations (Rothwell 1992). Also, around the internalised processes are models addressing the many supporting or surrounding aspects of innovation. E.g. open innovation conceptualizes the idea that not all innovation comes from within the company and not necessarily even from other companies, but also from private individuals and stakeholders (Chesbrough 2006).

Realistically, companies need to work with different models at different stages of the process and in different parts of the organisation. Additionally, by shifting between technology and market development, companies create hybrid solutions which often overcome the need assessment issue, all while still using inherently technology-push models. Based on this hybridity, the subject of this thesis is a result of a technology-push methodology and a direct result of internal R&D activities. By using Value Proposition Design the authors aim to define and explore the product from a need-perspective, increasing understanding of who the customer is and creating alignment for continued innovation.

¹ The stage-gate has never been a truly linear process, against common belief (Cooper 2008, p.216)

2.2 Value Proposition Design

One of the most popular and widespread frameworks for creating business models is the Business Model Canvas (BMC) as defined by Osterwalder and Pigneur (2010) and illustrated in Figure 2. It offers an improved understanding of a company's value creation through a holistic perspective of the nine elements that together allow the company to create value. The concept of a *value proposition* is central to the model and is referred to as “The collection of products and services a business offers to meet the needs of its customers” (Fisher, Wisneski & Bakker 2020). In this thesis the presence of the BMC is only peripheral, instead, the focus is placed on the creation of a value proposition. However, the relationship between the Value Proposition Canvas (VPC) and the BMC is relevant in providing context using a framework that most business developers are familiar with and highlighting a natural path for continued development of a product with a defined VPC.

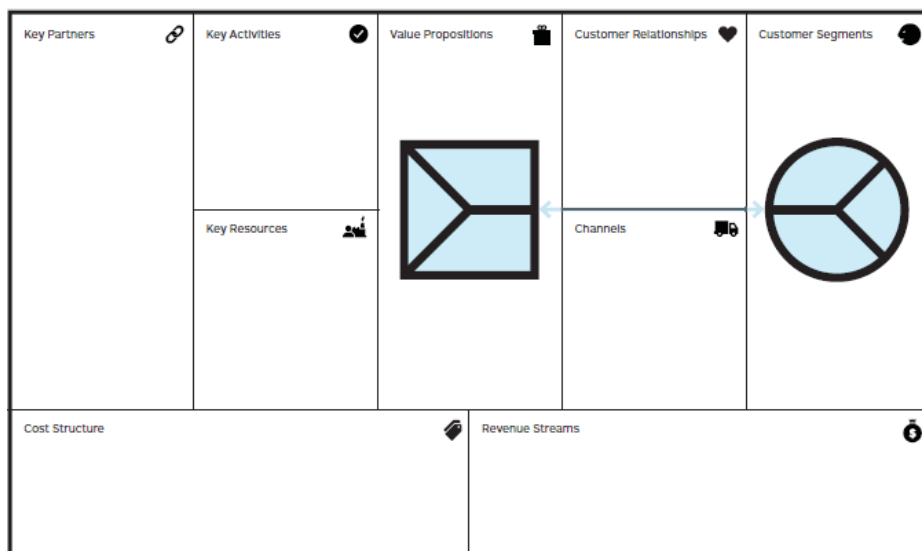


Figure 2: The Business Model Canvas (Strategyzer 2020)

Value Proposition Design is well described by the tagline of the book that introduced the methodology: How to Create Products and Services Customers want (Osterwalder et al. 2014). VPD is a customer-centred methodology based on the proposition that by properly understanding customer needs you can create products and services that are attractive to them—that gives the customer *value*. For this purpose, Osterwalder et al. introduce the VPC as seen in Figure 3. The canvas helps to structure and visually analyse a chosen customer segment, the product or service of interest and the dynamics of how this product or service creates value for the

customer segment (2014, pp.8-9). The left side of the canvas, the value map, represented the value proposition through its core aspects: products & services; pain relievers; and gain creators. Opposite the value map is the customer profile, representing the customer segment through its three characteristics: jobs; pains; and gains. The VPC is central for the methodology, with other activities serving as functions to populate, understand and use the canvas as well as for supporting the overall process.

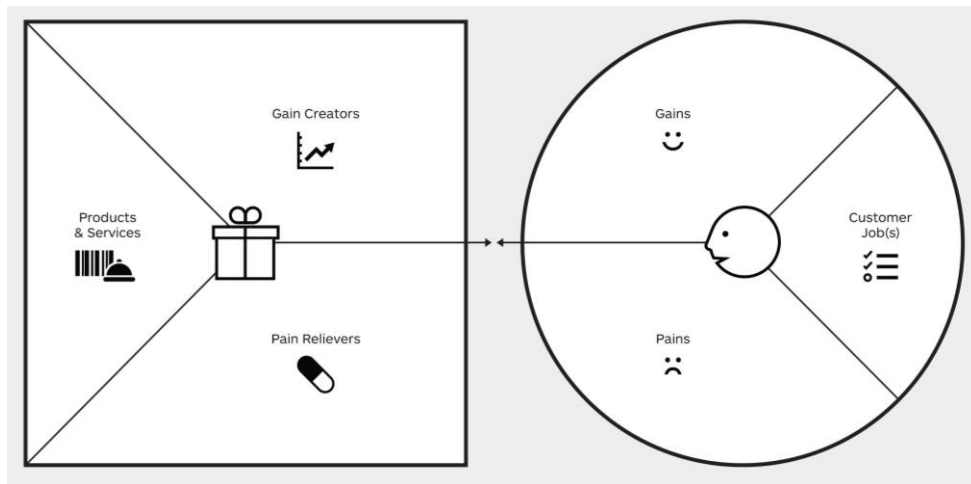


Figure 3: The Value Proposition Canvas (Strategyzer 2020)

2.2.1 The Value Proposition Canvas

This subchapter aims to familiarise the reader with the Value Proposition Canvas, its two parts, the customer profile and the value map, as well as their respective characteristics.

2.2.1.1 The Customer Profile

The process of creating value propositions using VPC is centred around the core concept of achieving *fit* between the customer profile and the value map. The customer profile consists of three types of characteristics, jobs, pains, and gains, all of which will be elaborated on below.

Jobs include tasks that customers are trying to get done, either professionally or personally and can be categorized into four different groups; functional; social; emotional; and supporting.

- *Functional* are the tasks they are trying to complete or the problems they are trying to solve (clean house, build house, etc.)

- *Social* describes how they want to be perceived by others (look good, appear professional, etc.)
- *Emotional* describes an emotional state they are seeking (piece of mind, feeling of safety, etc.)
- *Supporting* include supporting jobs in the context of purchasing or consuming value (comparing offers, disposing of a product, etc.)

A pain emerges when a customer is trying to get a job done but is hindered by something, either making the job more difficult to perform or preventing them from performing it. A pain also symbolises risk—potentially bad outcomes related to getting a job done badly or not at all. These pains are categorized into three groups:

- *Undesired outcomes, problems, and characteristics* affect the customer in many different ways. These can be functional (e.g., a solution doesn't work), social ("I look bad doing this"), emotional ("I feel bad doing this"), or ancillary ("Why do I have to go to the store for this?").
- *Obstacles* that prevent the customer from performing their jobs (e.g., lack of time, money, competence, etc.)
- *Risks* which might make a customer choose a different solution or avoid their job altogether (e.g., "I might lose credibility when using this solution")

Gains are the outcomes and benefits your customers want. These are categorised into four groups: required, expected, desired, and unexpected.

- *Required* includes gains without which a solution would not work (making a call on a phone, etc.)
- *Expected* consists of gains that are expected from a solution (well-designed sports car, etc.)
- *Desired* contains gains that go beyond what the customers expect but still desire (use one account for all devices, etc.)
- *Unexpected* are composed of gains that go beyond what the customers expect and desires (touch screens before smartphones, etc.) (Osterwalder et al. 2014)

Getting a sense of customer priorities and fully understanding what matters to the customer, including what does not, is essential when designing a successful value proposition (Osterwalder et al. 2014, p.20). Thus, each segment's jobs, pains, and gains are ranked according to their importance to the customer.

After considering the above, the process of achieving fit—analysing matches between the value proposition and the customer profile—is initiated.

2.2.1.2 The Value Map

The value map represents the company's way of creating value for the customer, as defined by the customer profile. Just like its sibling, the customer profile, the value

map is also divided into three categories: products and services; pain relievers; and gain creators. The first of which lists the actual offer the value proposition is built around, the second describes how the products and services create customer gains, and the last describes how the products and services alleviate customer pains.

Mirroring the process of creating customer profiles, each characteristic in the six fields is also ranked based on its relevance to the customer.

2.2.1.3 Achieving fit

The key to creating great value propositions is to find and assemble matching characteristics to achieve a strong fit. Fit is achieved by identifying and analysing customer jobs, pains, and gains, ranking them by relevance, and matching the latter two to the value proposition's pain relievers and gain creators. It is important to mention that not all pains need to or can be addressed by a pain reliever and similarly, not every gain by a gain creator. For this purpose, Osterwalder et al. suggest focusing on the ones that "matter the most" to the customer, and that are insufficiently addressed by existing solutions (2014, p.42).

Achieving fit is an iterative process that requires both sides of the canvas to be updated regularly as customers and markets change, including when further insight into customers reveal or change old assumptions. This implies that the process of designing value propositions and achieving fit is never-ending. It is therefore critical to review and revise each part of the VPC continuously to keep up to date on the latest changes and ensure that the value proposition still achieves its goal of creating value for its customers.

The process above describes the first of three kinds of fit between a company's offer and what their customers want, also known as Problem-Solution Fit. This occurs when relevant characteristics can be addressed with the company's value proposition. The second kind of fit, called Product-Market Fit, occurs when the company's value proposition has been proved in the market. The third and final fit, called Business Model Fit, takes place when a profitable and scalable business model surrounding the value proposition has been found and validated. For this thesis, the latter two steps will not be considered and instead, the authors will refer to Problem-Solution Fit as only Fit.

2.2.2 Understanding customer needs

Before beginning to identify customer needs, its essential to realise that customers themselves are not always able to recognize, nor describe, their own needs very well (Bayus 2008; Kärkkäinen et al. 2001). This is particularly common when addressing needs that are higher on the famous hierarchy of needs defined by Maslow's (1954), which unfortunately also makes them the most important ones to meet according to VPD (Bayus 2008; Osterwalder et al. 2014). Shillito (2001) goes on to state that there are at least three levels to a need, ranked by the abstractness of their scope.

From the concrete features that a product or service might offer, to consequences, which are often emotional in nature and are a result of the customer owning or using a product. To lastly, desired end-states which are the customer’s underlying purposes and goals. An example using the three levels on the customer needs for a digital camera can be found in Figure 4 below.

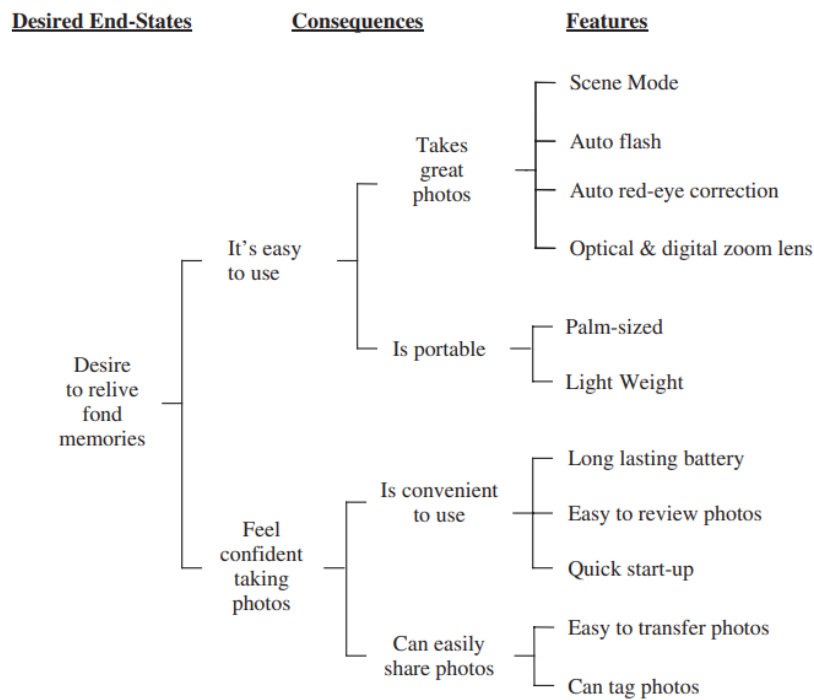


Figure 4: An example of customer needs for a digital camera (Bayus 2008, p. 120)

There are many ways to discover, understand and analyse customer needs, with Bayus (2008, p.123) presenting a number of sources on methods specifically for uncovering embedded customer needs. These include empathic design methods, user-centred design, and contextual inquiry as well as non-traditional market research approaches. When understanding customer needs through any method, the collected information – the voice of the customer – needs to be “translated” into a needs hierarchy (Bayus 2008). Figure 5 below visually depicts this, and highlights the fact that customers have both articulated and unarticulated needs.

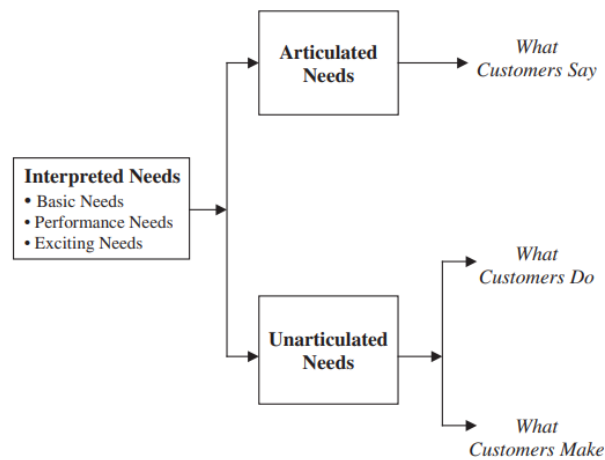


Figure 5: Translating customer needs (based on Bayus 2008, p. 126)

Articulated needs are those that the customer can easily verbalize and unarticulated those that they cannot. There can be many reasons why a customer chooses to say one thing, or to not say another, and it is therefore important to keep in mind that both exist and are of importance when understanding the full range of needs (Bayus 2008).

Naturally, different methods have different strengths when it comes to understanding the customer (what they say, do, and make). This thesis makes use of primarily traditional market research methods, such as personal interviews, when gathering information on the customers' behaviours and needs. These methods are a good fit for collecting data on articulated needs, however, they limit the researcher to reading "between the lines" and make inferences based on what the customer expresses in order to understand unarticulated needs (Bayus 2008). To better and more directly explore these needs, participant observation or contextual inquiry could be applied.

Finally, when defining a need Griffin (2013) states that there are four C's that one should follow:

- Customer words – is the need defined as the customer said it?
- Clear – is the need easily understandable by all and over time?
- Concise -is the wording concise?
- Contextually specific – does it contain all contextual references?

2.2.2.1 The business customer

Due to the complexity of a business-to-business purchase decision, it can be difficult to identify the needs of all the different actors related to the purchasing process of a B2B product (Kärkkäinen et al. 2001). Notably, those that perceive a need are not

necessarily the ones recognizing the opportunities that meet said needs. Furthermore, Almquist et al. (2018) suggests that the professional customer might have an even more complex set of needs as they take both personal and company factors into consideration when making a purchasing decision. To assist the practitioner when trying to understand B2B customers' needs, Almquist et al. (2018) presents a value pyramid for the B2B customer, similar to that of Maslow, which can be found in Figure 6.

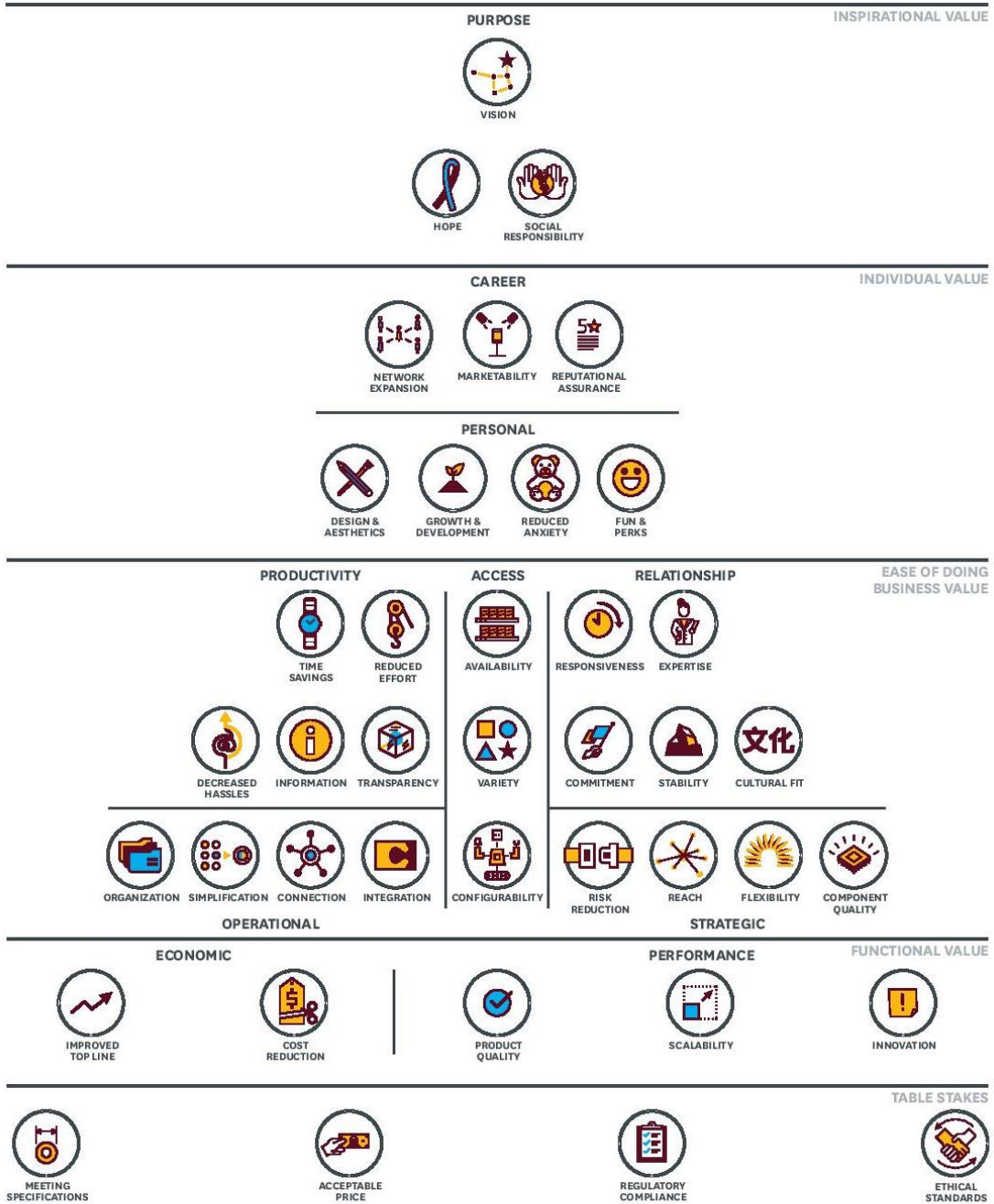


ILLUSTRATION BY NIK SCHULZ

Figure 6: The B2B elements of value (Almquist et al. 2018)

As B2B products and purchasing processes tend to involve several parties or stakeholders, Osterwalder et al. (2014) suggests creating a customer profile for each one of them in order to get a clear view of how each one's needs are met by the product. Each party is thus defined as a stakeholder, with their own jobs, pains and gains, and is mapped on the VPC.

The number and choice of stakeholders required differs depending on the size of the company and the industry in which they operate but as a starting point, Osterwalder et al. mentions six roles that are commonly found within an organisation. These include Influencers, Recommenders, Economic Buyers, Decision Makers, End Users and Saboteurs (2014, p.50-51).

- Influencers consists of individuals or groups whose opinions count in the eyes of the Decision Maker.
- Recommenders includes those responsible for making recommendations for or against different products or services by searching and evaluating options.
- Economic Buyers covers the person or group in charge of the budget and who is responsible for making the purchase.
- Decision Makers represent the individual or group who has the final say in a purchasing decision.
- End Users include those who benefit from using a product or service either within their own organisation or externally.
- Saboteurs is composed of those who can hinder the process of searching, evaluating, and purchasing products or services (Osterwalder et al. 2014:50-51).

After creating customer profiles and value maps for each of the most important stakeholders, the resulting characteristics can be aggregated into a single customer profile representing the business segment as a whole and similarly, the corresponding value maps can be aggregated to form a collated value map, also called the value proposition.

2.2.3 Designing value

A central part of VPD is iteration—repetition for the purpose of learning and improving. A practitioner can by themselves or in a group very quickly create customer profiles by identifying the jobs, pains and gains through assumptions and discussion (these do however need to be validated through experiments and data).

The method takes an iterative-learning approach, described in part by the summarization “design, test, repeat” (Brown 2008; Osterwalder et al. 2014, p.62). For example, Osterwalder et al. splits the first part of the design phase into three steps, interacting in a “fully iterative” process, i.e., when all steps can be followed by another and repeated without any set order an infinite number of times. These include “Ideas, Starting Points and Insights”, “Prototype Possibilities”, and “Understand Customers”. Together they help the practitioner gather valuable insights about the customer and the product and give validity to the value proposition by confirming assumptions and improving understanding. These three steps, or activities, can be performed using several different tools and techniques like interviews, observation, prototypes, etc. (Osterwalder et al. 2014, p.70)

When working with B2B products it is extra important to create several customer segments profiles in order to get the full picture of how the product gives value to different stakeholders. Osterwalder et al. also recommends creating many customer profiles when creating a value proposition for consumers, then generalising and merging them into one (2014, pp.50-51).

2.2.4 Summary

Regarding the previous discussion on technology push and pull, it is important to remember that approaching innovation from either direction does not make VPD more or less relevant as it merely changes the application and implementation of the methodology (Osterwalder et al. 2014, pp.94-97). From a push perspective, it fills an intuitive function as a method for finding the right customer segment for the product or service now available through science and R&D. In contrast, changes in user behaviour, market, or application can be understood on a *need* level more quickly through customer profiles. Likewise, new jobs, pains, and gains can quickly be assessed on relevance and importance—leading to informed decisions regarding an existing value proposition or the creation of a new one. This flexibility is highly attractive due to the ever-changing market many companies operate in today and, additionally, a core feature of the previously discussed Agile-Stage-Gate system.

Whether companies take a push or pull approach to technological innovation, implement a popular technology innovation model, or create a hybrid of several, they will need to consider their customers’ needs. In summary; ”Not all great value propositions need to start with the customer, however they all need to end with addressing jobs, pains and gains that customers care about” (Osterwalder et al. 2014, p.88).

3 Research method

This chapter describes the methodology applied to answer the research questions of this thesis. The exploratory nature of this thesis has prompted a flexible and abductive strategy that takes the practical form of a case study—consisting of a series of qualitative interviews and the implementation of Value Proposition Design.

3.1 Thesis process

The process of the thesis is elaborated on in four main phases: *project definition, choice of research method, data collection, and analysis and conclusion.*

1. The project definition phase covered the initial steps of the project and includes actions such as choosing the subject, defining the problem statement, purpose, and scope of the project as well as the construction of research questions and the creation of the project plan.
2. The second phase of the project, choice of research method, covered a thorough review of various models of innovation allowing the authors to familiarize themselves with the subject. The second phase also assisted by confirming the feasibility of using value proposition design to solve the challenge set out in the problem statement.
3. The data collection phase mainly consisted of finding suitable subjects to interview as well as reviewing literature and web resources to get a better understanding of similar products currently available on the market. In parallel to the data collection phase, the VPD process was initiated by creating preliminary customer profiles and value maps which would then be iterated again and again as information was gathered from interviews.
4. In the final phase of the project, analysis and conclusion, the data gathered during the project was compiled and analysed in relation to the research questions as well as the experience of applying VPD on the business-to-business use case was discussed.

All four phases of the thesis process are illustrated in Figure 7 together with highlighted parts of the VPD process. The main action points of each phase have been added to the illustration to more concretely emphasize the work that goes into them.

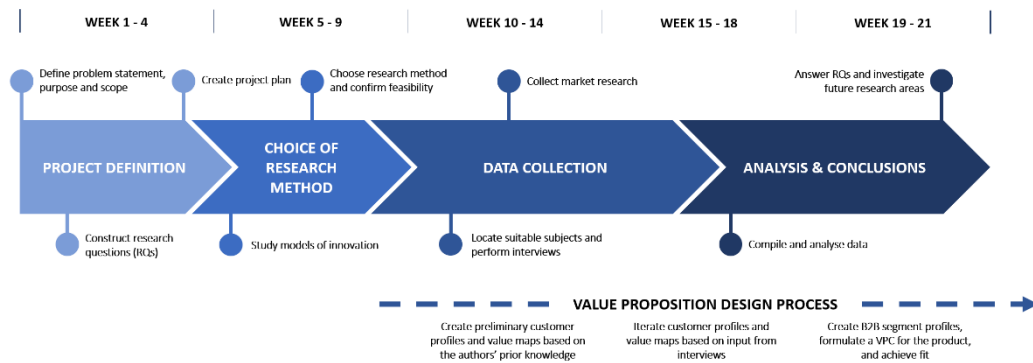


Figure 7: Illustration of the four main phases of the thesis process, each featuring a selection of action points, and the value proposition design process set on a joint timeline. (Own development)

3.2 Choice of research method

At the start of this thesis, the department at Sony highlighted two main issues which they wanted to address: the solution's lack of definition and the need for an external market.

With these two issues in mind, the authors of this thesis investigated how they could create a business case for the solution, thus mainly addressing the second issue: the need for an external market. However, applying a traditional business case approach quickly proved difficult as the product had yet to be properly defined. Furthermore, the solution underwent continuous change and any attempt at creating a business case would run the risk of the thesis findings becoming obsolete within a few weeks' time. As the authors wanted to provide Sony with a meaningful contribution, they sought to find a new approach to address the earlier mentioned issues while also providing the department at Sony with a foundation to build upon.

Considering the above, the authors decided on a case study design with the aim to identify a problem-solution fit for Sony's ICS by utilizing Value Proposition Design as the main research method. The reasoning behind choosing VPD was three-fold. Firstly, the authors had a genuine interest in the methodology having recently taken courses on the subject and were eager to test their newly acquired knowledge on a

real-world use case. Secondly, when searching for previous studies on how to apply VPD to business-to-business use cases the authors came up short and even though Osterwalder et. al claimed that the methodology could be used for such purpose, the steps required to do so were not immediately apparent. Applying VPD would therefore introduce a second aspect to the study in the form of testing out the feasibility of the method. Finally, the authors deemed that VPD was particularly suitable for the specific use case as one of the main benefits of the methodology is its ability to provide insights on patterns of value creation generated by a certain product. Furthermore, the authors also believed that methodology's ability to shift focus from the product towards creating value for the customer - by targeting the pains, gains, and jobs that they truly care about (Osterwalder et al. 2014) – would be of great value when defining the product and its potential market while also ensuring that any future resources spent developing the solution would go where they would benefit the most.

In addition to the three main reasons for choosing VPD, the solutions to the two issues (lack of product definition and need for an external market) also needed to be flexible due to the quickly changing nature of the product, and in this sense VPD was considered an effective tool. In their book, Osterwalder et al. emphasise that the value proposition of a product should be ever-evolving, continuously improved as the product and its customers change. This means that the iterative nature of the methodology would give the department a foundation to build upon, ensuring that the outcome of the thesis would still be of value in the future, despite the short timeframe. Additionally, the method is equally suitable for new ventures as well as established organisations which, in the context of helping a smaller department at a large established organization, seemed a perfect fit.

3.3 Data collection

3.3.1 Interviews

Interviews were chosen as the central method of gathering qualitative data from customers as they provide a natural way to understand a person and their opinions and because the authors were familiar with the method (DiCicco-Bloom & Crabtree 2006). Furthermore, interviews are suggested by Osterwalder et al. as a useful tool for understanding customers and gathering data for the creation of customer profiles (2014). To get more valuable insights for the creation of customer profiles, semi-structured interviews were chosen as they allow for better in-depth understanding of the interviewee, compared to e.g., focus groups.

A set of predetermined questions was organized to ensure that topics valuable for the study were discussed. These questions were prepared prior to each interview and

were specifically created for each individual, with the interviewee's unique knowledge and position in mind. Questions were grouped by topic and followed a natural progression from generic to more specific. Further questions were also presented during the interviews, generally when the authors wanted the interviewee to expand on or explain the reasoning behind a statement (DiCicco-Bloom & Crabtree 2006, p.315-316).

Both authors took part in the interviews with one leading the interview while the other focused on notetaking. Interviews were conducted online using video conference-software as some of the interviewees were located abroad and to avoid face-to-face meetings due to the ongoing COVID-19 pandemic. Each interview lasted between 30 and 60 minutes depending on the number of questions covered. No interviews needed to be cut short due to time-limits or other external factors.

3.3.1.1 Selection of participants

Participants were chosen purposefully by the authors to fulfil at least one of two criteria: (1) to provide information for the creation of customer profiles or (2) to gather market insights to better understand the competitive environment and the state of the market. To meet these requirements, a variety of stakeholders, such as potential buyers of the product, partners or competitors, and financial decision-makers were selected and examined on their fulfilment of the study's two criteria.

As suggested by Osterwalder et al. (2014), to fulfil the first requirement, the authors started out by developing customer profiles based solely on assumptions made by the authors. These helped the authors ideate jobs, pains, and gains and helped identifying potential participants, who largely or entirely matched the profiles. With regards to the second requirement, business professionals and insiders were chosen because of their perceived ability to provide qualitative market insights (Polkinghorne 2005). The better an interviewee fitted the requirement, the greater information power they held, thereby decreasing the number of interviews needed to get valuable insights (Malterud, Siersma & Guassora 2016).

To locate subjects with great information power, individuals with previous experience of the product or similar solutions were premiered, as well as employees with positions that would have had them interact with, create content for, or in other ways make use of the product. Decision-makers relevant to the process of choosing and purchasing products fulfilling the same needs as the subject of this thesis were also of interest. To fulfil the second requirement, industry professionals with extensive market experience and/or experience of similar products were also premiered.

After the first two participants were selected and interviewed, further participants were chosen based on information gained from the first two using a purpose-iterative approach, both due to its described effectiveness and because the methodology is in line with the iterative principles of VPD (Polkinghorne 2005). The collection of data through interviews was continued until information saturation

was reached, i.e., when sources to great extent repeated already known information (Glaser and Strauss 1967). A full list of participants can be found in Table 1 below.

Table 1: List of interview participants accompanied by company, role and purpose.

<i>Interview</i>	<i>Company</i>	<i>Role</i>	<i>Main purpose</i>
#1	Sony	Pre-sales Engineer	Market insights
#2	Ombori	Chief Experience Officer	Market insights
#3	Sony	Facility Manager	Customer profile
#4	Sony	Internal Communications Manager	Customer profile
#5	SMTM ²	Development Coordinator	Customer profile
#6	Sony	Senior Producer	Customer profile
#7	NMST ³	Project Manager, Exhibitions and Experiences	Customer profile

3.3.2 Identifying needs

In conversation with the participants, the authors applied the frameworks presented in chapter 2 to make the process of identifying needs easier, for example by enabling categorisation, and putting focus on the existence of both articulated and unarticulated needs. As suggested by Bayus (2008), the interviewees, or customers, generally had difficulties articulating needs, especially higher-level ones in the B2B needs-pyramid (see Figure 6). Also, direct inquiries regarding a subjects' needs were often met with some confusion which stemmed from the interviewee not understanding the purpose of the question, or how to answer it.

Naturally, all jobs, pains, and gains are related to the professional role or roles that the stakeholder represents. This created an extra layer of complexity for the authors as they had to translate and filter between personal needs of the individual in question, and their stakeholder role. Of course, this is by design and, as previously mentioned, some interviewees provided information for several stakeholder profiles. Still, in line with VPD theory, if a need was theorized by the authors based on information provided by the interviewee, it was written down so that it could be tested and confirmed, or denied, through future iterations or tests.

² Swedish National Maritime and Transport Museums

³ National Museum of Science and Technology

3.4 Value Proposition Canvas

The Value Proposition Canvas is the central framework of Value Proposition Design, as defined in chapter 2 of this thesis. Customer profiles and value maps were created digitally using a web-based tool provided by strategyzer.com, specifically designed for creating customer profiles for VPD and VPC. This web-based tool enabled the authors to work on the canvas remotely which greatly facilitated cooperation during restrictions related to the COVID-19 pandemic. The tool further enabled the authors to populate a digital representation of the customer profiles with virtual “sticky notes” and to simultaneously interact with the canvas, effectively serving the same purpose as its physical counterparts: a room, a whiteboard, sticky notes, and pens.

3.4.1 The Customer Profile

The authors arranged seven interviews in total, out of which five were purposefully orchestrated to collect data for customer profiles while the remaining two were intended for market insight. Prior to performing the interviews, the authors created one customer profile corresponding to each of the relevant subjects interviewed. These customer profiles were created to collate assumptions regarding the customer segments and to some extent establish a direction for the interviews. The profiles were thus initially only based on assumptions made by the authors, who have inherent market knowledge and experience from cases where the product in question had been implemented. As interviews were conducted the authors continually revised and improved these customer profiles by corroborating previously made assumptions with insights from the interviews.

In the VPD theory presented by Osterwalder et al. there is no such thing as too many characteristics on a customer profile and the practitioner is instead implored to “unearth as many jobs, pains, and gains as possible” (2014). Thus, the authors took care to gather a large number of characteristics for each profile.

Generally, the authors created jobs, pains, and gains independently, and then discussed, combined, and modified them. This enabled them to (to some extent) validate the interpretations of customer needs that had led to the resulting characteristic.

3.4.2 The Value Map

With the newly created roles in mind, a value proposition was created for each role, including products and services, pain relievers, and gain creators, by following a similar process as the one used for creating the customer profiles, i.e., ideating individually at first, then combining and evaluating. Since the value map is

specifically made to fit a role's customer profile, only the products and services that were of value to the specific role were included in its value proposition. Each of the remaining two characteristics were also mapped in a similar fashion. The authors identified and suggested items to put on the canvas, individually and then cooperatively, discussing and building on the already existing items. Common mistakes, such as mixing jobs and outcomes and mixing several customer roles into a single profile were taken into extra consideration during this process (Osterwalder et al. 2014, p.24). Once the authors were satisfied with the material, the characteristics in each value map were then ranked according to their importance.

3.4.3 Achieving fit

After completing the value maps for each role, the authors proceeded to analyse the fit by matching products and services with jobs, pain relievers with pains, and gain creators with gains. Each characteristic that was left without a match was coloured grey to indicate that it either was an unresolved problem or did not solve a specific problem.

When the authors were satisfied with the value proposition canvas of each role, the characteristics from all customer profiles were aggregated into one representing the business segment as a whole. Similarly, the characteristics from all value maps were aggregated to form a single matching value map. Prior to aggregating the characteristics, the authors made sure to sort out the previously greyed out characteristics from each map and profile and removed all duplicates.

3.5 Market research

For segmenting the ICS market, a multivariate segmentation was chosen. Combining behavioural segmentation—what *benefits* or *needs* do the customer want to fulfil—with business demographic segmentation on variables like industry, location, and relationship to new technological solutions. Behavioural variables, like the benefits sought by a customer from a product, are very useful as a starting point for building market segments (Kotler, Wong, Saunders, and Armstrong 2005). Also, the methodology was deemed a good fit for the qualitative nature of the thesis and need-assessing activities.

The main bulk of the market research was performed during the early stages of writing this thesis, in the autumn and early winter of 2020. Information was

collected through web searches, the LUBsearch library⁴, as well as through data provided by Sony. As the project progressed, valuable qualitative information was also collected through interviews with market actors.

3.5.1 Market Segmentation

To define a set amount of potential market segments for the ICS, the authors first gathered information to gain a deeper understanding of the existing Digital Signage (DS) market, explained in greater detail in chapter 4. DS solutions with interactive features were also analysed, giving insight into existing solutions and what needs they satisfied or what benefits they provided to the end-users, which were then further complemented by the insights gathered during the interviews.

Market segments were defined during the final phase of the thesis. The authors listed the needs and benefits they deemed relevant based on the products ability to meet the need and how well it did so. The resulting needs and benefits were then collated and aggregated to form five distinct segments.

Finally, the authors segmented the market on business-demographic variables, focusing on identifying industries of interest while also looking at geographical location and the importance of technology to their brand image.

3.5.2 Competition analysis

The authors gathered a list of companies that fulfilled the criteria of offering solutions perceived to address the same needs as the ICS. For this, actors on the digital signage market were premiered but other companies were also explored. In order to find these companies, a series of web searches were performed by searching for the phrases “digital signage”, “interactive digital signage”, “video wall”, “interactive display solution” using Google. The phrases were used by themselves and in combination. Search results were selected from the two first pages of each list of search results. Finally, some companies were added on request from Sony, and some were discovered through interviews and external tips during the writing process.

A total of 35 companies were analysed. Early on, the variance between the company’s offerings were fairly high, however after the first ten companies it drastically decreased, and the following companies offered almost exclusively the same type of interactive DS solutions. The number of companies gathered stems

⁴ Lund University’s search engine for academic journals and texts

from this lack of variance in later findings, prompting the end of the collection phase.

The companies were analysed based on the offerings and case studies they presented on their websites, and in rare cases, from information obtained through interviews or business articles. The following criteria were considered:

- Types of interactivity offered
- Level of complexity
- Target markets
- Business and/or customer focus

4 Product and market settings

In this chapter, Digital Signage and its subgroup Interactive Digital Signage will be defined, and their applications, market and trends will be discussed before finally exploring the main topic of this thesis, Sony's Interactive Content Solution.

4.1 Digital Signage and subgroups

When asked the question “what is Digital Signage?” it is easy to limit your imagination to the grand and well-known billboards in prime locations such as Time Square in New York City or Piccadilly Circus in London. While these examples are certainly eye-catching, the scope of digital signage is much broader than these monumental displays and many of its applications can even be considered commonplace today.

Digital Signage (DS) has evolved naturally as a “digital successor” to traditional signage, seeing rapid growth in recent years as technological advancements have made digital displays widely available and more accessible. This growth has prompted the development and definition of several sub-genres of DS – some of which will be discussed in greater detail below – effectively generalising the meaning of the term. Today, the term Digital Signage is commonly used to describe “[...] all types of technological solutions able to display digital content in practically any non-personal space such as offices, transportation and museums.” (Wired Store 2018). However, as a foundation for further discussion we will use a more specific definition of DS, as offered by Bauer, Dohmen and Strauss: “A networked system for displaying and controlling audio-visual content, either manually or programmatically, on decentralized digital displays, connected to a central management system which allows users to remote-control and schedule content as well as manage user rights.” (2011, p.138).

This definition narrows down the scope of DS by defining the fundamental elements on which the system relies, without limiting the fields and industries in which the technology can be utilized. Adopting a system-perspective of DS is essential to properly understand the market. This way focus is shifted away from displays and other hardware which only serve to display content and places it more aptly on the software capabilities of DS which connect the different components to form a complete system. This distinction also emphasizes a common misconception of the

DS market: that it is the hardware rather than the software that sets competing companies apart (Bauer, Dohmen and Strauss 2011, p.138). The truth is that for an actor on the DS market, software and integration capabilities, as well as competencies related to placement, marketing, analytics and realisation of an idea are of much greater importance than the specific hardware components it can offer (Interview #2).

To illustrate a few use cases of Digital Signage, the authors have included two images. Figure 8 is an image of Piccadilly Circus, a popular road junction in London's West End where one of the buildings is covered, top to bottom, in LED displays featuring advertisements. In Figure 9, the reader is presented with yet another conventional space for DS namely retail. The image features multiple displays using images and videos to advertise the brand and its products in the store.



Figure 8: Example of the large LED screens featuring Digital Signage at Piccadilly Circus in London, UK (Negative Space 2016).



Figure 9: Example of the Digital Signage used in a retail setting (Dise).

4.1.1 Interactive Digital Signage

You may have seen DS on your way to work, at the bus stop or at the reception desk during your last visit to the hospital or the mall. However, the digitalisation of signage has much more to offer than the images and videos typically populating these displays. An interactive subgroup of DS already exists and is aptly named Interactive Digital Signage (Interactive DS). This subgroup builds upon the foundation of DS by adding a variety of interactive elements such as detecting presence, identifying characteristics or tracking movements through the use of sensing technology (Bauer, Dohmen and Strauss 2011, p.138).

Just like its non-interactive parent, Interactive DS can be used to inform the public by displaying content featuring branding, advertising, internal communication and/or data visualisation to name a few. However, in contrast to its parent, Interactive DS allows the user to take control and explore the content in different ways. Users could for example browse through information to find the things that matter most to them or might even be presented with the most relevant information automatically based on characteristics such as age or perceived interests.

Apart from serving content, Interactive DS can also be used to create experiences with the purpose of engaging and entertaining users, the end goal of which is often to promote a brand, product or service. These experiences can include aspects of gamification to incentivise engagement such as sharing material on social medias or getting access to discounts on certain products, see Figure 10 for one such example.



Figure 10: Example of Interactive DS used to spread awareness by incentivising users to post information on social media. (Hansson 2019)

4.1.1.1 Availability of Interactive DS

In a 2018 survey carried out by Samsung at Integrated Systems Europe, the largest AV systems integration show in the world, when asked which signage technologies they are most excited about, signage professionals chose “Interactive Signage”, “LED” and “Bezel-less” as their top picks. In the same survey, when asked “Which display technologies most excite your customer’s?”, interactive and bezel-less displays were the most significant (Samsung 2018).

However, when browsing through the websites of various DS companies offering interactive solutions, the authors found that few seemed to do so wholeheartedly, and that the offers tended to only be available as a feature for customers who specifically request it. In other words, interactive solutions were not readily available for customers.

Furthermore, the vast majority of the companies that did offer interactive solutions mainly did so through the use of touchscreens with purpose-built software such as wayfinding. Because of this, despite its grand potential, Interactive DS has in common use become equivalent to touch-based kiosks for navigating in malls or browsing products in stores (Interview #2). More details regarding the availability of Interactive DS can be found in the competitor analysis featured in chapter 5.

4.2 DS trends and actors

4.2.1 Trends

To get a better understanding of the direction in which DS is currently evolving as well as its future applications, five trends have been presented below. These include Artificial Intelligence (AI) and analytics; interactivity beyond touch; cloud-based deployment; larger screen sizes; and DS as a service (DaaS).

AI and analytics

The use of AI and analytics is a growing trend in the DS market. Valuable insights for the retail industry are gathered through behavioural data, i.e., the number of customers looking at a certain display and what they purchase after being exposed to certain advertisements. By applying analytics to this data, digital signage solutions can make predictions on what content to show when, where and to whom (Sharp 2020). Furthermore, using AI together with DS does not just aid the advertiser, it also allows for a more tailored experience for the user (Sharp 2020). Predicting interests based on previous interactions or by age, gender and sex means that DS solutions can serve content that is meaningful to the customer to make the most out of each interaction.

Interactivity beyond touch

A visibly apparent trend within DS during the past few years has been the increased use of interactive touchscreens. Whether you are in the middle of a mall, at a hotel reception or an airport lounge you are likely to come across an interactive touchscreen kiosk. Despite having reached mainstream adoption in retail, the once attractive touch screen interactivity took a rough turn during the COVID-19 pandemic which limited the use of any and all physical interaction (Hastings 2020). However, the pandemic has also created the need and demand for new ways to interact and thereby accelerated the adoption of technologies enabling touchless interactivity which, thanks to their popularity during the pandemic, are expected to stay even as the circumstances eventually fade as society recovers. Even though many of these technologies were already available prior to the pandemic, the increased demand has made them more readily available with companies acting quickly to find safer alternatives for touchscreens. One such technology is proximity sensors which can be seen acting as a direct replacement for traditional pushbuttons, allowing for more advanced forms of interactivity than its predecessor, by not only detecting pushes but also detecting swiping motions similar to the ones found on smartphones (Hastings 2020).

Touchless

Furthermore, touchless interactivity such as voice interactivity is also increasing. Jeff Hastings, CEO of DS company BrightSign, predicts that voice interactivity will be one of the touchless options likely to catch on, given the acceptance of voice-controlled virtual assistants such as Siri and Alexa (Cooper 2020). Other noticeable mentions of touchless interactivity include facial recognition, near-field communications (NFC) and QR-codes, which provide completely different opportunities for customers to engage and interact with personalized content (Sharp 2020). Even if the direct demand for touchless interactivity created by the pandemic does not last, it will have effectively increased as well as changed the understanding among customers about the possibilities of Interactive DS (Interview #2).

Cloud-based deployment

The COVID-19 pandemic had a very direct impact on the DS market, affecting not only the way customers interacted with content but also the way content was deployed. The limited amount of access to physical locations increased the demand for content and customer management solutions giving users the ability to prepare and distribute content remotely (Interview #1; #2). Previous on-premises solutions relied on users preparing content on a local hard drive or USB drive and manually uploading it to each media player or to a central system. This has evolved with the use of cloud-based content management systems, which enables a business owner or content provider to update the content on all displays across their company from the comfort of their own home, thereby increasing scalability and providing greater flexibility (Munroe 2020).

Larger screen sizes

Large screen sizes have long been popular as they allow for greater impact, but a more recent trend has been the use of high-resolution displays in sizes of 84 inches and above. These screens often include the use of configurable video wall solutions which can be modified based on the available space (Munroe 2020; Sharp 2020).

Digital Signage as a Service

Another growing trend in the DS market is the option of offering digital signage as a service (DSaaS). This means that companies' offerings might not be limited to selling hardware, such as displays and players, but may also extend to content and the system delivering it, i.e., providing it as a service with a recurring fee rather than selling each component for a fixed price. Having the option of purchasing a complete service allows the customer to access hardware and software without any

additional expense of ownership. Additionally, since the customer no longer owns the hardware, they can easily scale their operation based on their needs allowing them to be more resourceful (Sharp 2020).

4.2.2 Actors

Bauer, Dohmen and Strauss suggest that the DS market consists of four major actors: *the advertiser*; *the consumer*; *the platform provider*; and *the space provider* (2011, p.139). The advertiser is the actor whose product or service is advertised by the solution, the consumer is the end-user interacting with the content or advertisement, the platform provider being the actor responsible for providing hardware and software infrastructure and lastly, the space provider is the actor providing the space where the solution is to be installed. For this thesis, the platform provider will be divided into two separate actors responsible for software and hardware aspects, respectively. With this distinction in mind, five market players will be considered for this thesis: *the advertiser*; *the consumer*; *the systems integrator*; *the software provider*; and *the space provider*. As the name suggests, the software provider will be responsible for the content itself as well as the software system providing it, e.g., content management and user right management, while the systems integrator handles the hardware infrastructure such as network equipment, monitors and cabling.

While it is true that these actors are typically present on the DS market, there are certainly exceptions to the rule. For example, some actors within the Interactive DS market prefer to take on the role as both software provider and systems integrator while others prefer to stick to their niche, delivering solely hardware or software solutions and instead partner up with other actors to provide a complete solution to their customers. The same goes for actors promoting their products within their own stores, thereby taking on the role of advertiser and space provider at the same time (Interview #2).

Since subgroups such as Interactive DS introduce a different set of requirements and competencies, due to the technical complexity of its content, traditional DS companies focusing on creating non-interactive content such as video and images often rely on third-party agencies to create interactive content, effectively introducing a sixth actor: the content provider. This distinction will however not be taken into account for this thesis and hence, actors providing content and software systems will be handled as one and then same.

4.3 Sony's Interactive Content Solution

Public display solutions, like the ones mentioned in the previous section, would not be able to fulfil their purpose without the ability to catch the eyes and ears of their intended recipients. However, creating high-quality content can be a challenging task and adding to that, the complexity that comes with making content interactive does not make things easier. However, there are software solutions available to make the experience of creating interactive content less strenuous, one of which is Sony's Interactive Content Solution (ICS).

To gain a comprehensive and structured introduction to ICS, this sub-chapter will focus on how ICS came to be, its main components as well as its intended use and user groups. In order to do so, one of the thesis' co-authors, Johan Hansson, has supplied the following information found in this chapter based on his experience working with the ICS at Sony in Lund over the past two years.

At its core, ICS is a software solution allowing users to create and manage interactive content for use on large-scale displays such as TVs, projectors and LED walls. The internal designers at Sony in Lund mentioned that designers often struggle to create interactive content as it typically requires experience and knowledge of programming, which many designers unfortunately do not have. Additionally, the same internal designers mentioned that the threshold for a designer to learn programming can be considered steep, especially if they lack previous technical expertise. In order to bridge this gap, Sony in Lund has developed modules, tools and frameworks purposefully designed to make interactive content creation easier to understand as well as more accessible. By streamlining the process of creating interactive content for large-scale displays using Software Development Kits (commonly referred to as SDKs) and a graphical editor, the ICS allows designers and other advanced creators to develop interactive content despite having little to no programming experience.

In itself, the ICS is a software solution connecting and utilizing a wide range of hardware to accomplish its goals. When combining the software with an additional hardware layer, the resulting solution shares many similarities with the previously mentioned Interactive DS. Both solutions consist of displays, sensors and computers which capture user data and render content based on the user's feedback. However, there are subtle differences between the two which will be further elaborated on in chapter 5. A few concept images of how ICS can be installed for various use cases are illustrated in Figure 11 below.



Figure 11: Concept images of installations aimed at different use cases featuring Sony's ICS. (Sony Professional, 2020)

4.3.1 A short history

In 2019, ICS was created as part of a workplace renewal initiative at Sony's office in Lund, Sweden where an internal team of developers installed an experimental setup in the office's main entrance. The setup featured four of Sony's UXGA ultra short throw projectors, three distance-measuring LIDAR sensors as well as a custom PC dedicated to calculating user interactivity and rendering the content in real-time. The cornerstone of the solution was a custom-built application based on a selection of software modules recycled from previous projects aimed at large-scale interactive experiences. The application included a text-based editor featuring a simple mark-up language that allowed designers to create interactive infotainment content by connecting assets, such as images and videos, to different interactive elements, e.g., buttons. The aforementioned software modules would then allow sensory input to trigger the interactive elements and in turn, alter the content in real-time. Figure 12 below shows an example of interactive touch content created using the text-based editor being displayed in one of Sony's existing installations.



Figure 12: Example of interactive infotainment content created using the text-based editor and displayed in one of Sony’s existing ICS installations. (Sony Europe B.V. 2019)

Since its inception, the previously mentioned text-based editor has evolved into a graphical editor featuring a user-friendly interface allowing content creators to create interactive content quickly by using premade templates, dragging and dropping assets, choosing interactive actions from menu lists etc. In short, the process of creating content using the graphical editor can be divided into three steps: assets sourcing and creation; importing assets; and adding interactivity. As the name suggests, the first step requires the designer to source or create assets—using their preferred application for creating graphics or video content. Once the designer is satisfied, they can then begin the second step by exporting their assets from their application of choice and importing them into the graphical editor by dragging and dropping them into the application’s window. When all assets are imported, the third and final step is to place the assets according to preference and assign interactive actions based on presets.

In addition to the graphical editor, the application has grown organically to suit the needs of the workplace and expanded its scope to cover a wider range of use cases, not typically associated with workplaces but rather Interactive DS. As of December 2020, the system and its modules have been used to create and display content promoting technologies and intellectual property at internal as well as external events within the commercial and B2B display industry. The addition of these new use cases also leads to the development of new methods of interaction which extends its scope even further into entertainment. Apart from the initial touch interactivity, the later solution could also detect motion, pointing, aiming and gestures. In order to realize these additional methods of interaction, the later solution made use of LIDAR sensors, RGB or IR cameras, depth cameras and VR controllers.

Another noteworthy development is the added support for large-scale displays. The content created through the ICS can be presented on any conventional display such as computer monitors, TVs, projectors, LED walls or even a combination of multiple displays. A common issue when displaying content using projectors in large areas is that in order for the projected image to stay true to its source, the surface it is projected on must be completely flat since irregularities would result in a distorted image. However, placing large white projection screens, as seen in most modern offices, throughout public areas is not a reasonable solution. Another way of solving this issue is to utilize the building's existing features, such as walls, floor and ceiling, and project on these instead, but in order to do so, one must be able to alter the projected image according to the irregularities of the surface to create an undistorted image. Software tools like this already exist but do not come cheap and are often part of a larger offer including pricey hardware. However, with the ICS these tools are—at the time of writing—already included as a built-in setting for each content created using the solution, thus bypassing the added issues with creating custom projection setups.

4.3.2 Main components of ICS today

Because of its origins as a workplace solution and in having borrowed its foundation from previous interactive large-scale experiences, the ICS consists of three main components: an infotainment application and editor; software modules for the game engine Unity; and a scheduling application. As of writing, the components are under continuous development to fulfil the different needs of internal clients as they emerge.

4.3.2.1 Component 1: Infotainment application and editor

The first component can be divided into two parts. Firstly, the infotainment application capable of displaying 2D assets such as videos, images and texts which users can interact with by moving their bodies, making gestures or touching the screen or wall. Secondly, the editor provides designers with the tools necessary to create interactive content without any previous programming experience. The editor features a graphical UI giving previous users of presentation programs like Microsoft PowerPoint a familiar environment to create their layouts and place their assets. User-friendly functionality such as dragging and dropping images and videos straight into the application window is supported and actions can be added to the assets by clicking on them and choosing according to the designer's preference. After the designer is satisfied with their creation the editor creates an executable file, the infotainment application, which can be run on compatible PCs.

4.3.2.2 Component 2: Software modules

The second component is a collection of modules created for the game engine Unity which gives advanced creators with novice programming experience the tools to

streamline the creation of interactive content. The component aims to lower the threshold for creating interactive content and supports 2D as well as advanced 3D geometry. Additionally, as the modules are created for a game engine, the complexity of the resulting content can go far beyond a typical infotainment application. The software modules range from templates for setting up custom projection or display solutions to accessing data from a wide range of sensors and implementations utilizing that data for different interaction methods.

4.3.2.3 Component 3: Local scheduler

The third and final component is a network-controlled scheduling application, often referred to as a Content Management System (CMS) and an Android companion app, through which users can schedule content for an on-premises solution. The application allows for custom playlists, giving the administrator the option of choosing when to display certain content according to a fixed list.

4.3.3 Prior user groups and focus

The three components that comprise the ICS have grown to suit the needs of different internal projects but as the solution evolves, other external user groups which could benefit from its features have been discussed. At the time of writing, these included designers without previous programming experience, advanced creators with some programming experience, and end customers—who manage and choose what interactive content should be displayed on the large-scale display. Prior to the start of this thesis, three unique offers were created for each of these groups. The three offers and their respective user group are briefly mentioned below.

Designers

By utilizing the ICS' graphical editor, internal and external designers could get the opportunity to create interactive content without previous programming experience. The designer could still use their usual workflow and programs for creating 2D assets and would create interactive content simply by importing and connecting them to interactive elements using the editor.

Advanced creators

By packaging the software modules into an SDK, internal and external advanced creators with novice programming experience could create advanced large-scale interactive experiences supporting a wide range of setups and interactive methods without having to develop the foundation from scratch.

End customers

By offering a Content Management System (CMS) with ICS as its foundation, the end customers could easily add new content and manage their existing content without directly interfering with the deployed system.

5 Analysis

This chapter presents the findings and results from applying Value Proposition Design theory, mainly the four Value Proposition Canvases corresponding to four customer segments. Subsequently, a market and customer analysis are presented and finally, the value proposition for the ICS is defined.

5.1 Value proposition design

Described in detail in chapter 3, the process of designing value propositions is non-linear, iterative, and in some ways, never-ending as markets, customers, and products keep changing. This is relevant for understanding how the time frame of this thesis affected the process, and especially its results. Presented below are the customer segment profiles and value maps on which the value proposition draft of the ICS has been based. The reader should be made aware that the following value propositions are not *final*. Rather, they are the results of an initial phase, representing essential knowledge needed for the next: performing tests and experiments (Osterwalder et al. 2014, p.70).

5.1.1 B2B stakeholders

After completing the interviews, the authors proceeded to examine the resulting customer profiles looking for similarities and differences in terms of jobs, pains, and gains. The authors then began assembling the customer profiles into the six generic B2B roles proposed by Osterwalder et al. (2014, p.50-51) while also taking into consideration the five market players of the DS market mentioned in chapter 4.

During the process, the authors found that the recommended roles either did not translate well from the customer profiles or did not properly reflect the real-world stakeholders observed by the authors. For instance, content-creators which fill an essential function for the ICS functionality, were not represented by any suggested role. As a result, the following modifications were made to the previously presented stakeholders:

- Decision Makers assimilated Economic Buyers, as the authors through the interviews found that both often were filled by the same physical person or company role.
- The authors also found that, due to the complexity and scale of such a purchase, companies tended to have employees with technical focus specifically for evaluating new technical products. Thus, the role of Technical Advocate was created, representing both Recommenders and Influencers.
- Due to the strong correlation between the stakeholder profile and the work title, End Users was renamed to Product Owner. The profile was also slightly adjusted to better fit a B2B-setting, reflected by the name change.
- The stakeholder Content Creators was introduced, as they play a great part, if not in the purchasing process, then in the usage and operation of the product.
- Saboteurs was removed due to its similarities with Technology Advocates, who critically examines the product and whose opinion affect the decision maker.

Notably, this excludes the “traditional” end-user: a customer, usually a private individual, that buys a product or service for private use. This is by choice, since although the needs or interests of—in this study’s case—visitors to museums and or offices are important for Sony’s customers to satisfy, studying them in order to understand the customers’ needs would be a much too large task for a thesis. Also, end-user needs unknown to the customers are not accidentally included in the value proposition.

The resulting set of roles is presented below in Table 2.

Table 2: List of business-to-business roles derived from Osterwalder et al. (2014, p.51-52) and altered based on interviews, accompanied by a description and examples of potential stakeholders.

<i>Customer segment</i>	<i>Profile description</i>	<i>Example of stakeholders</i>
Decision Makers	The individual or group responsible for the budget from which the cost of the investment will be taken, has the final say and can make the decision to move forward.	Development coordinators, site managers, and facility managers
Product Owners	An individual or group that owns and or benefits from using technical solutions.	Facility departments, IT departments, HR representatives, internal communication managers
Technology Advocates	An individual or group that searches for, compares, and evaluates options resulting in a recommendation for or against an investment. Has an interest in keeping the organisation technologically relevant.	Systems integrators, facility managers, and IT departments
Content Creators	An individual or group that creates 2D or 3D content for technical solutions.	Designers and developers

5.1.2 Stakeholder customer profiles

Four customer profiles were created, corresponding to the four previously described roles. These are presented in Appendix A, chapter 8.1.

The customer profiles in the images are illustrated as circles divided into one area for each type of characteristic, starting with jobs to the right, pains at the bottom, and gains to the left. The characteristics are represented by virtual “sticky notes” which include a brief description. Apart from placement, the notes also have different colours indicating its type with green representing *gains*, red *pains*, and yellow *jobs*.

Apart from customer profiles, each image also includes a ranking of all jobs, pains, and gains in the eyes of the specific stakeholder role. This is found in the square on the right-hand side of the image. The rank given to the characteristics of each customer profile is visualised by their placement on three separate lines with either a plus or minus symbol and a label at each end. The “plus”-side of the line represents high importance and/or relevance described by the accompanying label. The “minus”-side indicate low importance and/or relevance in the same fashion.

The placement of each note on the customer profile was made solely to indicate group-belonging. However, patterns do exist, often reflecting how the authors intuitively placed notes with similar content close to each other.

5.1.2.1 Reading the profiles

A few general jobs were identified among all participants. For example, they all communicated a will to perform well at work, and to be recognized for their achievements. Based on this and in conjunction with the B2B hierarchy of needs (Figure 6), the authors also inferred jobs along the lines of what their professional role's responsibilities were. Not unsurprisingly, the authors had difficulties establishing non-functional jobs (emotional, social, supporting) due to the professional context of the roles, and the interviewees' difficulties in answering queries intended to unearth these jobs.

Gains and pains also see a number of common needs among the profiles, like "Feel accomplished (at work)", "Deliver in time", and "Unengaging tasks". These appear on every role where they were deemed to be relevant based on the interviews. However, overall, these needs are more role-specific than the jobs. This might be an effect of the pains and gains being easier for the interviewees to communicate, but also of the authors' ability to better understand pains and gains related to a specific professional role in contrast to jobs—which easily becomes a list of the work tasks that are expected of the role.

A key takeaway from the customer profiles is the importance of good product support and ease-of-use. These needs are reflected as both pains and gains among all stakeholders. There was also a clear need among all stakeholders, except the content creators, that the product should be easy to explain and its features easily communicable.

5.1.3 Stakeholder value maps

In accordance with theory, a value proposition was made for each customer profile, so that four VPC's could be created and their respective *fit* explored. These can be found, coupled with the corresponding stakeholder's needs, in Appendix A, chapter 8.2.

As with the customer profiles, the placement of characteristics on the value map indicates type and so does the colour of each sticky note, with green representing *gain creators*, red *pain relievers*, and yellow *products & services*. Visualized on the square area left of the value map are the rankings of the value maps propositions in order of relevance and/or importance. They are ranked relative to each other, with placement close to the top indicating high importance (essential), and lower placement *lower* importance (nice to have).

Since value maps are based on an actual offer, in combination with the fact that it's made in relation to a customer profile, it is much easier to create as it matches features of a known solution to a finite list of characteristics from the customer profile. The creation of these maps was therefore much more straightforward than the creation of the customer segment profiles. Notably, the products and services (yellow) represented differ between customer segments. This is by design, as only the products and services relevant to the specific customer profile are to be included (Osterwalder et al. 2014, p.39).

5.1.4 The fit

Before presenting the *fits*, the authors want to make a comment on how to read them: because though it might be tempting, it is a mistake to count and compare the number of characteristics defined in a customer profile. Likewise, to count the characteristics that are part of a *fit*, comparing them to unmatched ones to extract a “fit ratio”. The results procured from any such method are meaningless, largely in part due to the theoretically endless pains, gains, and jobs one could ideate and assign a customer profile. Indeed, the choice of not only which but also the number of characteristics that are to be included on a customer profile can easily mislead and should be kept in mind when reading the results. There is no strict definition of what counts as “enough” jobs, pains or gains in a customer profile—because it is impossible to set one—and thus the ratio between matched and unmatched characteristics can be misleading. As previously mentioned, Osterwalder et al. recommends focusing on “[...]the jobs, pains and gains that *matter* to customers[...].” (italics are ours; 2014. p.34), effectively making quantities and ratios less relevant.

The four customer profiles and value maps constitute four distinct VPCs. These are presented in full in Appendix A chapter 8.3. Several notes have been greyed-out, representing the pains, gains and jobs *not* matched by pain relievers, gain creators or products and services of the relevant value map. Note that the customer profile has been replaced by a square containing the jobs, pains, and gains of the customer profile and have been ranked and placed in order of importance. By presenting the results in this fashion more information is provided, especially the crucial information of how *important* the needs addressed by the value proposition are for the customer.

5.1.4.1 Reading the results

Looking at the VPCs created and their respective *fit*, the authors have drawn the following conclusions:

Poor fit of jobs and pains

The current value proposition barely address the Technology Advocate's jobs or the Decision Maker's, and neither are the pains of any stakeholder except arguably the Content Creator. This may be in part due to the fact that many pains, gains and jobs collected during the interviews were directly linked to a specific type of product category that the subject worked with on a daily basis. Pains closely connected to organizational tools like project management, team collaboration, file sharing etc. were mentioned more frequently than creative tools for example, which is not surprising given that only one out of the four profiles are directly related to content creation.

No pain, lots of gain

Generally, the value proposition's gains are addressed to a far greater extent than pains, indicating that the proposition and, by extension, product & service is more of a "nice to have" than a "need to have" for the target segments. This indicates that the ICS is not a product that solves pressing needs but rather one that offers extra features beyond what other solutions—that fill the same functions—does.

Need for security and reliability

Many unaddressed jobs, pains, and gains are related to risk aversion and decision-making without underlying information or understanding. If the ICS' value proposition is further improved to address these characteristics, it will become much more attractive to the stakeholders.

Undervalued Technology Advocates

Out of the four roles, the *Technology Advocates* is the one that gains the least from the current value proposition as many of its highly valued jobs, pains and gains remain unaddressed. This stakeholder is responsible for finding, understanding, and procuring new technology for their organisation and therefore, improving this fit should be of importance for the success of the ICS' value proposition.

A well packaged product

Seeing how two out of the four roles, *Technology Advocates* and *Decision Makers*, highly value products and services that are easy to communicate and explain, putting added effort into creating documentation and video tutorials on how to use the product and its key selling points is likely a profitable investment.

5.2 Defining the market

In chapter 4, the thesis setting was established and, among other things, the market for Interactive DS. Over the course of this thesis, the authors gained a deeper understanding of this market, through which the potential market or markets for the ICS could be defined. An in-depth definition and analysis of this market are naturally of interest in the future development of the ICS. However, it is considered to be out of scope for this thesis. Instead, a top-level analysis and definition are presented, focusing on multiple market segments and competitors. On this note, the *potential* market of a product is defined as the “set of consumers who profess some level of interest in a particular product” (Kotler et al. 2005). Due to this market still being in its infancy, market development activities would need to be undertaken for it to grow beyond being an extension of the interactive DS market. No research on the size and shape of the *available* (interest, income, and access) market is presented here as it is considered out of scope. (Kotler et al. 2005)

Due to the ICS’ flexibility and modularity, resulting in broad potential applicability, it is difficult to describe and define a potential market for it narrowly. There is no doubt much overlap between it and the market for Interactive DS, with the former to a great extent acting on niche markets within the latter. However, while the market for Interactive DS serves well as a point of reference for market trends and developments it is not accurate—and detrimental to the development of the ICS—to accept it as its entire or only market. When analysing Interactive DS use cases, the authors rarely found the same high degree of interactivity and immersiveness that the ICS is capable of. It is therefore essential to distinguish the differences between the two. Thus, a separate theoretical market was created for the purpose of the discussion and defined as the market for Interactive Display Solutions (IDS).

5.2.1 Customer segments

Five benefits, or needs, of end-users were identified by the authors and deemed to be of particular interest. This judgement was made by considering the ICS’ strengths and weaknesses, functionality, empirical data of existing successes with similar solutions, and viability. There is also a direct connection to the purposes an Interactive DS solution might fill for an end-user. These include *Attention-grabbing*, *Engaging*, *Pedagogical*, *Experience-enhancing*, and *Brand-improving* each briefly mentioned below.

Attention-grabbing

This segment consists of companies that seek to grab their customers' attention, either through technological solutions or by other means.

Engaging

Companies in this segment work to get their customers *engaged* through different means, like gamification and competitions.

Pedagogical

These companies do business by helping their customers *learn*. This segment mainly includes cultural institutions like museums and schools.

Experience-enhancing

A company offering an experience of any sort will, at some point, be interested in enhancing that experience using new technologies, especially if they are trying to stay ahead in a highly competitive market.

Brand-improving

A niche, and at the same time very general, segment of companies that are looking to manage their brand.

Actors in the above segments are not exclusive from one another, and neither is one solution limited to only addressing one segment. By definition, companies that value the functions and strengths of the ICS should make up the target segments.

5.2.2 Business demographic segmentation

For the purpose of future market research, the authors have defined six potential market segments using knowledge of the existing DS and IDS markets gathered through literature and interviews. These segments are defined by their business demographic variables and should be combined with the previous behavioural segments to form a multivariate segmentation of the IDS' markets. They are as follows:

Museums and cultural institutions

These organizations have a general interest in using new technology to engage and grab the attention of visitors, enhance the existing experience and to teach, making them prime targets for the IDS (Interview #5). However, their unique qualities as cultural institutions (sometimes state-owned) need to be taken into consideration, especially if looking at a global market.

Office space providers

This segment makes use of the IDS' value as attention-grabbing and high-tech feel. One of few segments proven to be interested in the ICS specifically, based on insights from the installation in Lund.

Gyms and training facilities

Gyms and school gymnasiums can already be found as use cases for the IDS⁵, using them to enhance the exercise experience through gamification and overall enhancing effects.

Event industry

The ICS has already been implemented several times at major movie premieres, but practically all events—which by definition are short spectacles with ticket sales or sponsorships being major revenue sources—are interested in one thing: attracting visitors. By leveraging on this need, the IDS can surely find customers in this segment.

Amusement parks

Aiming to entertain, the IDS could enhance existing entertainments through digital effects, creating an AR or MR experience which could entice visitors. As amusement parks struggle to stay relevant, the increased use of these technologies is already a strong trend.⁶

⁵ 1. Fitness24seven gym in Lund Centrum. 2. Lü (<https://play-lu.com/>)

⁶ [US Patent 10685491](#) [US Patent 10809535](#)

Retail

Although dominated by existing Interactive DS solutions, this market still has niche actors that could be of interest to the IDS. A compelling value proposition can surely be made by leveraging the many benefit-providing aspects of IDS described above to large brand stores or high-fashion brands that want to provide their visitors with something extraordinary.

5.2.3 Further takeaways

Apart from industry, other analysed variables of business demography deemed of great importance to the segmentation of the IDS market are:

Geographical location

As interactivity by definition is a core part of any IDS solution, targeting companies that operate in areas where users are more likely to interact with the content is beneficial. The authors have found that geographical and cultural aspects—that naturally strongly correlate with each other—can affect users' willingness to interact with IDS, especially in public spaces (Interview #2).

Value of being considered “high-tech”

For some brands and companies, being seen as technologically advanced is a part of their image. For an emerging technology like IDS that can visually impress visitors easily, this is a big opportunity. (Interview #4)

5.2.4 Competitor analysis

As previously mentioned in this chapter, the DS market is deemed similar enough to the IDS market to effectively be used as a starting point for analysing actors etc. on the latter. While traditional DS companies still largely focus on non-interactive content, many do offer some form of interactive options to their customers. Competitor-status is defined by the companies' offerings and said offerings' ability to meet and fulfil the *needs and benefits previously* defined in 5.2.1 Customer segments. When reading the following results, one should keep in mind that data was gathered through publicly available offerings.

From the results of the competitive analysis, four main conclusions could be drawn:

1. A very limited number of companies offer solutions with advanced interactive solutions—interactivity beyond that of touch—as a part of their base offer.

2. By far, the most common application offered by Interactive DS companies was a monitor with touch-functionality, coupled with CMS-software providing content scheduling, simple content creation tools, and remote management of several units. These were usually targeted towards either large offices and business settings, public spaces and malls where they acted as maps and information centres, and kiosks for retail and restaurants.
3. Out of the nine companies offering advanced interactive solutions, three focused on artistic and explorative installations, taking the roles of creative studios rather than system providers. These mainly work with cultural institutions and events.
4. Overall, a very large majority of companies focused on traditional DS, with interactivity only being presented as an “upsell” or “extra” on the companies’ websites. This reflects the fact that the interactive market is still in its early stages, and that the functionality is still not commonly requested or understood by customers—a statement confirmed by interview #1.

Beyond the four conclusions mentioned above, three specific features of the ICS were found to be rare or even unique. Only two of the analysed companies offered one of these following functionalities and no individual company offered more than one.

Large-scale user-driven interactive content

This includes interactive content purposefully built for displays larger than a single TV such as those utilising projectors or LED displays.

Real-time rendered 3D graphics (excluding maps)

By rendering 3D graphics in real-time, content can change dynamically based on the user’s interaction instead of conforming to prerendered presets. For example, a pattern projected on a wall could mirror the silhouette of users walking past or change colour depending on the colour of the users’ clothes.

Methods of interaction beyond touch (such as gesture, eye-tracking or body/joint-tracking)

This includes any type of interaction method beyond conventional touchscreen displays such as body-tracking, eye-tracking, gesture detection etc.

6 Discussion

In this chapter, the value proposition design methodology and process are critically discussed and reflected on, with additional emphasis on B2B-aspects, after which the use of interviews as the main method for gathering data is discussed and the authors' effect on the process is brought to light. Finally, recommended next steps for Sony are presented.

6.1 The Value Proposition Design process

This subchapter aims to discuss the authors' experience of applying value proposition design on a real-world use case and more specifically, the perceived benefits and drawbacks of using the methodology for a business-to-business settings.

6.1.1 Application

The visual presentation offered by VPD was greatly appreciated by the authors and was one of its most treasured features as the graphical nature of the value map and customer profile made it easy to review results and find patterns. Seeing how jobs connected to pains and gains in the customer profile was intuitive and made ideating new characteristics less difficult. The process of ranking each characteristic and keeping the order in mind when creating the value map also profited from the ability to simply place the items on a line next to the map.

However, working with such visual processes also generated concerns by the authors since visual representations of information can be misleading. As mentioned in chapter 2, a high number of pains, gains, and jobs being addressed by a value proposition does not inherently make it great. Instead, the best value proposition is the one that address the customers' most important needs, the needs they care about. In using the VPD method of representing needs and propositions through coloured sticky notes, the authors felt that quantity is given an advantage over the ranking of importance—as this is not represented at all on a normal VPC. The authors suggest that this could be resolved by scaling the colour to illustrate each characteristic's relevance. Following this logic, a critical pain could be coloured in a vivid red while

the less significant pains would be coloured in more washed-out reds, based on their rank.⁷

In most cases, the visual feedback provided by the VPD was found enabling rather than hindering. However, the authors faced difficulties at times when the space within an area of the customer profile or value map did not fit the number of sticky notes created. Similarly, the size of the sticky notes limited the number of words one could fit inside each note, affecting the choice of words. While the latter is by design (the practitioner is specifically told to “grab a set of *small* sticky notes”) and limited by the fact that the practitioner needs to be able to fit text on it, how they should relate to the former is not properly addressed by the book. Due to this focus on using actual physical items for this process, these limits are self-imposed.

By using the web-based VPD tools instead of physical whiteboards and sticky notes the authors were able to apply the methodology—for all intents and purposes—as described while working remotely, which in this case was a necessity due to the ongoing COVID-19 pandemic. From the authors’ point of view, the virtual tools did a good job replicating the tools needed to carry out the chosen methodology.

The authors ran into one essential issue when ranking the characteristics of a customer profile by importance, a task central to addressing the right needs, and creating great value propositions. Despite this step being integral to the methodology, the book offered very little guidance beyond factually stating that it needed to be done, and that it was important. Additionally, the ranking was the most difficult aspect of the customer profile to extract from interviews, with interviewees often just mentioning one thing they thought of high importance—much less ranking several. This was a surprise as the in some ways simpler activity of ideating jobs, pains and gains were well-presented with examples and tips. Generally, the VPD book did not maintain the aura of importance that rankings were given early on throughout the book; a fact that is reflected in that they are not visually represented on any example value propositions.

The methodology of VPD builds heavily on iteration, relying on “relentless testing” among other principles to quickly test, ideate, test, start over, test, and so on. This concept was not unfamiliar to the authors, nor forgotten by them during the process as they went back to update and modify customer profiles and value maps. However, there are limits to what one can change, or “iterate on”, or test, in the span of a few months. A prototype did exist before the work with the thesis began but running experiments with users or changing parts of it was out of scope for this thesis. Thus,

⁷ Curiously, on page 37 of the VPD book, a different solution to this problem is hinted at. Shown graphically using drawn miniatures at the bottom of the page, the keen reader can notice that sticky notes are placed on the customer profile canvas in a column. Their order in this column, the authors assume, reflects their ranking. This is however never mentioned in text.

the product, in combination with the iterative approach, was not necessarily the best choice for a master's thesis project like this.

Throughout the bulk of the VPD process the authors followed the literature by Osterwalder et al. (2014), applying it step by step. This approach worked, to an extent. The book differs greatly from the text-heavy academic literature known to every business student. Instead, its design and layout promise light reading, applicable tools, and a general “how-to” approach. This promise was fulfilled, and the authors found themselves easily accepting the facts presented and using the first chapter of the book as a page-by-page guide to creating their first value propositions. However, this approach turned out to be a misunderstanding of the correct usage of the book in the authors’ opinion. Value Proposition Design is a collection of tools, a “cookbook”, for creating great value propositions. It is not a step-by-step guide for the researcher to follow, even though the first chapter could be read as such. Instead, the book should be read first to understand the overall process and then a second time to choose the tools and experiments that fit your VPD process. Of course, other methods for identifying needs, testing a hypothesis, or simply conducting market research could have been utilized as well.

6.1.2 The authors as practitioners

One appreciated part of the VPD book was the “assess your VPD skills”-spread covering pages XXII-XXIII. It presents five skills that it claims a practitioner should possess in order to systematically succeed when using VPD. It also recommends assessing these skills both before and after working through the book to measure the progress of your analysis. The authors see two purposes in this: the reader is made aware of their own direct effect on the success of the process and is reminded of the value, not only of the final results but also the *learning process*—the fact that no matter the outcome, your personal improvement means that the next time the outcome might be better. It should be mentioned that the authors might initially have overestimated their abilities in this case.

Apart from competence-related skills and knowledge that could help the authors in using the tools, there is also a need to discuss the effect the authors have on the need-identifying process. By interpreting inputs from the interviewees, the authors affect the result through their own backgrounds and biases. Perhaps most importantly, the two authors are fairly homogenous in background and character, which no doubt has limited, or skewed, the insights they have drawn from the data. Including people with varying backgrounds, sex, age, etc. in the VPD-process would improve the validity of the analysis.

6.1.3 Business-to-business markets and VPD

Applying VPD on a product intended for the business market proved more challenging than expected. When researching how VPD should be applied in B2B use cases, the authors found very limited information. Osterwalder et al. offer a generic approach using the concept of “unbundling” the value proposition—creating one for each stakeholder in the target business segment. Six typical stakeholder roles are presented as inspiration, which the authors also adapted to fit the ICS. They also indicate vaguely that the stakeholder roles should be aggregated into a single “business segment profile”, with a matching value proposition (2014, p.50). However, the authors have not been able to confirm or deny that this was indeed the approach intended by Osterwalder et al. and instead it is simply the authors’ interpretation of the material available in the book.

The authors, therefore, view the aggregated canvas chiefly as a result that is of value for presenting and explaining the *fit* between the ICS value proposition and the targeted business segment. This aggregated canvas should *not* be used for any type of analysis of said fit, or for deeper analysis of the value proposition. For these purposes, the four stakeholders should be analysed separately.

The following decisions were made by the authors in the process of creating the aggregated business profile:

1. Only keep characteristics that were matched by the value proposition
2. Remove or modify jobs, pains, and gains that were too specific, only relevant to that stakeholder
3. To not collate the rankings of jobs, pains, and gains

The first decision was prompted simply due to size restrictions, as all gains, pains and jobs from the four stakeholder profiles would be able to fit on just one. This did feel inconsistent with the principle that a value proposition should not address *every* job, pain, and gain. However, this canvas serves a specific purpose as previously mentioned and this was therefore deemed a non-issue. The second and third decisions were made in the same spirit. Too-specific stakeholder needs were not of relevance to the larger business perspective, and neither were the rankings. These are of course of great importance to the model, as often mentioned, but as the authors decided to keep this profile as an aggregated collection of stakeholder characteristics—rather than a new, modified profile created from a business-need perspective—remaking the rankings would not give any new information. Additionally, the actual rankings would be near impossible to determine and would therefore be akin to guesses.

Splitting a business customer profile into stakeholder roles offered a good approach but was regrettably not executed well by the authors, limiting subsequent stages as a result. The main issue encountered by the authors was that the subjects interviewed

contributed with experiences and insights from different business segments which made it challenging to find jobs, pain, and gains specific enough to bring value while remaining relevant for every vertical. However, this choice was largely made to meet the methodology's request of quality over quantity. Finding multiple subjects within the same segment rather than subjects with long experience within different industries and segments would have likely resulted in more valuable insights. To fix this issue, the business segment presented in the thesis would preferably be split into two, one for museums, and one for workplaces. Of course, to create two new value propositions for these respective segments, the existing material would have to be complemented with additional information and interviews.

6.1.4 Conclusion

The authors agree that the VPD methodology fits the purpose of the thesis well overall. However, the process described by Osterwalder et al. was at times difficult to grasp for the authors, who had limited experience using design thinking and working with new product development. Furthermore, the tools and skills needed—tangible and intangible—were not always accessible to the authors for reasons boiling down to lack of time, understanding, and/or experience. As a result and consequence of the aforementioned, the authors underestimated the amount of time needed in general. Naturally, this had a detrimental effect on the speed of development, and ultimately the results produced in the set amount of time.

6.2 Interviews; structure and choice of criteria

In the authors' experience, the digital format of the interviews did not hamper the flow of the conversation nor did it somehow decrease the quality of the gathered data. If anything, by conducting *all* interviews online, the risk of potential bias towards local interviewees—that otherwise could have been met in person—was removed.

Two criteria were used to select suitable subjects for the interviews: to form a basis for the creation of customer profiles, and to gather market insights to better understand the competitive environment and the state of the market. These complemented each other well and the authors never felt the need of extending the scope to include additional criteria. That said, after creating the customer profiles and value maps, the authors concluded that additional interviews would have been useful to further develop the existing value propositions', and to cover more segments of interest that were discovered during the course of the project. However, these were never realised due to time constraints.

The methodology used to limit the number of subjects required to satisfy both criteria, namely reaching information saturation, was considered very useful. However, the authors regretfully agree that it was not implemented properly and that more interviews would have been beneficial to the study. The main cause for this failure is poor planning from the authors' side. Interviews and other activities that led to new insights and better understanding also highlighted a lack of information not previously understood. However, this realisation came too close to the end of the process for new interviewees to be found and more interviews to be conducted.

It should also be noted that, while semi-structured interviews are an efficient and adaptable way of conducting studies, the interviews would have been complemented by an observational study, where interactions with a physical installation would have been monitored. The reasons for the observational study not being part of this thesis are threefold. Firstly, a temporary installation of that size, built solely for the purpose of the study, was deemed too costly. Secondly, the external installations that were scheduled within the time frame of this thesis (which would have offered opportunities for observational studies) were all put on hold indefinitely due to the COVID-19 pandemic. Finally, access to the already existing installation in the Lund office was limited due to the company's safety measures in light of the pandemic. Consequently, the lack of observational data is an inherent hindrance to this study and both research questions and methodology were adapted to be as independent of observational information as possible.

6.3 The market

6.3.1 Competition

Through the interviews, the authors found that not all companies promoted their advanced interactive offerings on their websites. Three companies that were shown to have made large interactive installations incorporating advanced technologies did not have any information of such solutions on their websites, and one did not clearly operate on the DS market. Thus, building on the competitor analysis in chapter 5, most notably the fact that companies selling IDS do not always choose to advertise this offering. This could be due to customers not understanding the possibilities of, or value in, IDS. That was in part confirmed by the subjects in interview #1 and #2, where the former said that interactive solutions often positively surprised the customers, as it was not initially what they had in mind when looking at their DS offerings. This lack of understanding of the capabilities and how to utilise them might be why the IDS market has had trouble breaking off from the DS market, instead being limited to cheap and easily understood touch-screen kiosks.

6.3.2 Segmentation

The market research performed during the process of this thesis filled several functions. Understanding the market through its actors and segments gave the authors valuable information on who to interview, and where to find them. In other words, who the customers are. Furthermore, VPD in B2B-settings should be applied to one customer segment at a time, making said segmentation a necessity. Finally, the information is of value for Sony and future development of the ICS.

6.4 Recommendation to Sony (What to do next)

As a result of this thesis project, seven noteworthy recommendations to Sony based on the findings and takeaways in chapter 5 have been summarised and presented below.

Confirm the value of unique features

The competitor analysis showed that at least three features are rare or unique with only two of the analysed companies including them in their offering. However, having unique features does not necessarily make a great value proposition—if the features are not valued by the intended customer. To move forward, Sony should confirm whether the three features are valued by their intended customers and if not, explore new customer segments that value them.

Review takeaways from analysis

Based on the analysis of four customer profiles, four main takeaways have been presented below. The four takeaways should be taken in consideration when continuing the development of the ICS if the solution is to improve its value creation to the chosen segment.

1. The current segment does not see the ICS as a product that solves pressing needs but rather one that offers extra features beyond what other solutions—that fill the same functions—does. This means that if the ICS has unique and valuable features for its stakeholders, they are likely not communicated well.
2. Putting effort into creating documentation and video tutorials on how to use the product and its key selling points will be highly appreciated by its stakeholders.
3. If the ICS' value proposition is further improved to address security and reliability, it will become much more attractive to the stakeholders in the chosen segment.
4. Improving the fit for the currently undervalued Technology Advocates is important for the success of the ICS' value proposition.

Validate results and observations

This thesis has put an emphasis on the design aspects of VPD. While this is certainly an important step, testing the findings and designs are just as important. In light of this, as restriction due to the COVID-19 pandemic cease, the authors highly recommend expanding upon the existing data gathered through interviews by performing observational studies using the existing and new installations.

Divide the B2B segment profile

As previously discussed in chapter 6.1, the business profile was deemed poorly defined by the authors as it combined stakeholders from two different business segments. Splitting the segments into two, namely *Museums and cultural institutions* and *Office space providers*, would likely result in more useful value propositions and by gather new data with these in mind, characteristics of even higher value to the customer and insights for further market development and segmentation could be found.

Explore and confirm remaining fits

Having created a problem-solution fit, as covered by this thesis, means that evidence have been gathered about jobs, pains and gains that customers care about and that a value proposition has been designed to address them. However, a problem-solution fit does not provide any evidence to prove that customers care about the created value proportion. To do so, a product-market fit would need to be explored by validating the value proposition's value creation with actual customers. Finding this fit can be achieved by performing proof of concepts or trail runs with actual customers, when circumstances allow. Once a product-market fit has been found, the third and final business model fit can be explored by providing evidence that a profitable and scalable business model can be created based on the value proposition.

Expand to additional B2B segments

The scope of this thesis has been intentionally limited to include two main segments: *Museums and cultural institutions* and *Office space providers*. However, as mentioned in chapter 5, three additional segments were found during the course of the project, including *Gyms and training facilities*, *Event industry* and *Amusement parks*. These three segments have potential and could be explored by creating new value propositions, customer profiles and business segment profiles for each.

Things to consider when selecting partners for proof of concepts

During the interviews, a few remarks were captured from the participants which could be useful to consider if companies for proof of concepts are selected or if a second round of data gathering is requested in the future. Out of these, two were deemed to be of the greatest importance: the value in being perceived as high-tech; and the role geographical location and culture play.

The first indicate that if Sony where to locate a customer for a proof of concept, they would likely gain from finding a company who values being associated as high-tech. The second indicate that cultural considerations can play a noteworthy part in the success of an interactive solution. Interview #2 mentioned that in their experience, the public's willingness to engage with interactive solutions varied greatly between countries and cultural settings. Since the value of interactive content is dependent on engagement, the public's willingness to partake in experiences has a big impact on the installation's success. This suggests that when choosing a company for a proof of concept, location as well as cultural aspects should be taken into careful consideration.

7 Conclusion

In this chapter, answers to the research questions are presented and the thesis' contribution to theory is discussed. Finally, limitations are discussed, and future research is suggested.

7.1 Answers to Research Questions

7.1.1 How does the ICS satisfy the needs of its customers?

By combining the value maps created for the four stakeholder customer profiles, the ICS value proposition is created. The value proposition canvas representing this fit can be viewed in high resolution in Appendix A chapter 8.4.

The value proposition for the ICS—consisting of products and services, pain relievers, and gain creators—clearly address and satisfy several important needs identified in the chosen customer segment.

The value proposition tells of a modular offer which through software and hardware relieves customer pains and creates gains. Also, its ability to impress and engage audiences, and its ease-of-use are of importance. Analysing the value map, one can also find pain relievers and gain creators responding to needs for high technological excellence and innovativeness, but also ease-of-use and ease-of-explanation. In the authors' experience, it is a challenge to offer both, as more advanced technology tends to be more difficult to explain and use. This might be a sign of a future challenge for the development of the ICS.

7.1.2 Who would benefit from using a solution like the ICS?

Through the VPD process, four customer profiles were created, reflecting the jobs, pains, and gains of four customer stakeholders. The ICS value proposition corresponds to these four stakeholders, meeting their needs.

The ICS value proposition thus benefit the following stakeholders:

- *Content Creators* who want to engage, inform and entertain, convey messages through media on a tight schedule by making it easier to review interactive content and allowing them to realise their creative ideas without technological limitations. Through the use of familiar editing tools, the ICS allows Content Creators to meet their client's, and their own, expectations resulting in a feeling of accomplishment.
- *Product Owners* who want to meet expectations from above, reach an audience and communicate through text and media to realise their vision by creating a fun and engaging environment for the end-user and generating a wow-feeling. The ICS allows Product Owners to manage content and make the most of it in modular setups in order to catch the attention of their audience.
- *Decision Makers* who want to grow their business and stay tech relevant by offering a unique solution that will inspire and entice customers with high wow-factor. Thanks to its modularity, the ICS is simple to maintain and is compatible with any large-scale display.
- *Technology Advocates* who want to explain technology to others by offering a solution with a high degree of modularity that exceeds expectations, the ICS delivers a solution that both meets strict requirements and operates reliably.

7.2 Contribution to theory

The authors hope that this paper will provide readers with valuable insights and inspire future research on the topics of product development and the application of VPD to a product acting on a business-to-business market.

There is a lack of academic papers discussing the implementation of VPD. The authors hope that this study can shed some light on the application of said methodology in a business-to-business market. Insights into relevant market segments for any IDS is presented, and a top-level analysis of the competition. Furthermore, insights into two engineering students' pains and gains of applying VPD in the specific context of the thesis is discussed in greater detail and could be applicable to similar cases.

7.3 Discussion of limitations and future research

This thesis is centred around the application of a methodology and framework to create a value proposition for a system-product conceived at Sony in Lund, Sweden. It is limited by this specificity in applicability, although it is possible that the insights surrounding the application of VPD to an existing early-stage product, could be applicable to other projects attempting the same. Similarly, the customer profiles should be applicable and usable by others interested in exploring value propositions targeting the same stakeholders.

For the consideration of anyone finding themselves in the place of picking up the development where the authors left off is the continued development of the value proposition for the ICS. The iterative nature of the methodology has already been established, and thus the first step should be to check any assumptions made by the authors through interviews, tests, and experiments. Furthermore, to counteract the homogeneity of the authors, practitioners with differing backgrounds and bias should partake in the process.

As discussed in chapter 6, the business profile was poorly defined, as it combines stakeholders from two different business segments. Rebuilding the business segments would be a step forward for the value proposition and would give insights for further market development and segmentation. The authors propose segmenting the businesses after the business segments defined in chapter 5.

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8 Appendix A

8.1 Stakeholder customer profiles

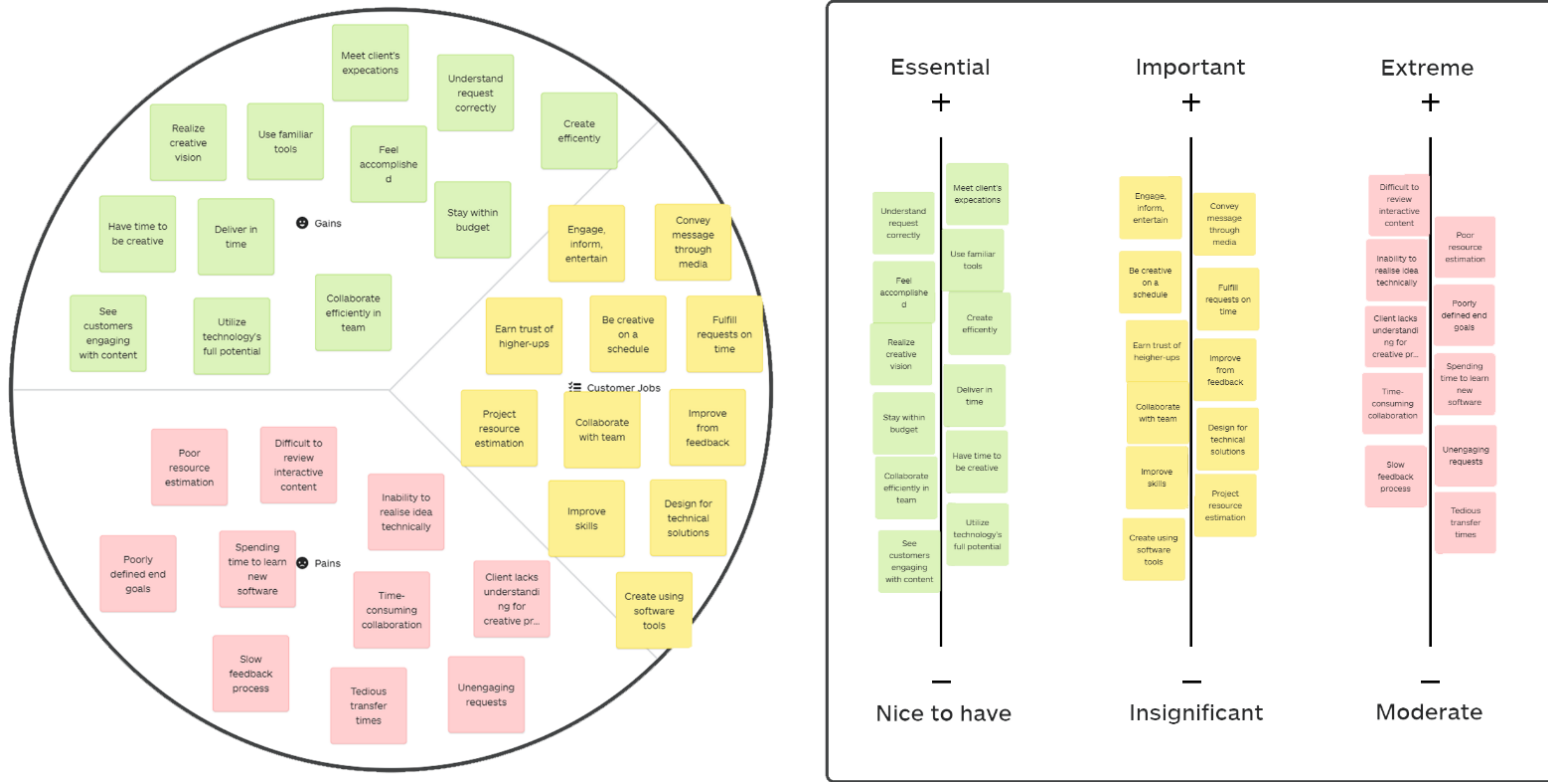


Figure 13: Content Creators - Customer Profile to the left, and ranking of jobs, pains, and gains inside the square to the right

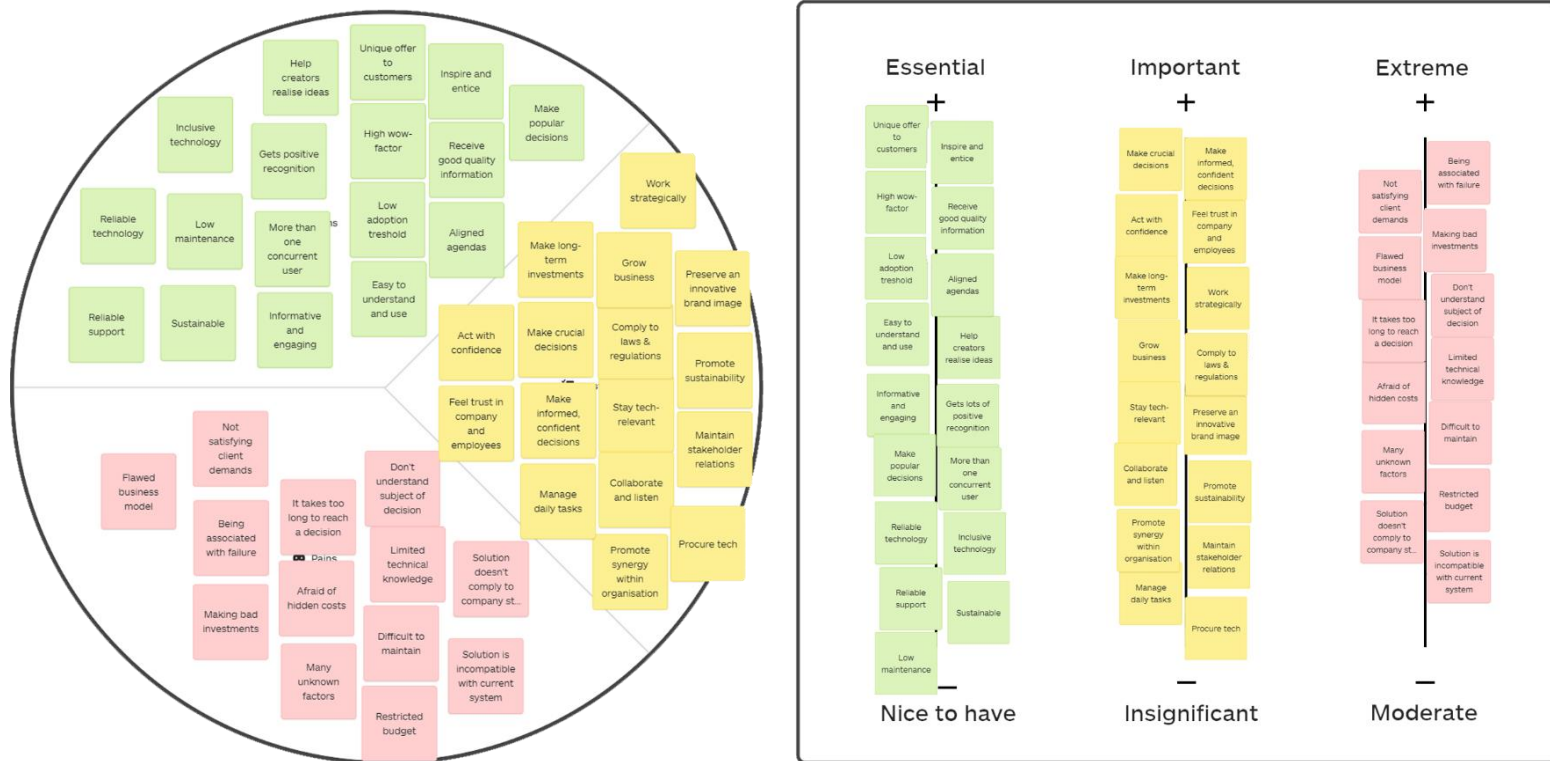


Figure 14: Decision Makers - Customer Profile to the left and ranking of jobs, pains, and gains inside the square to the right

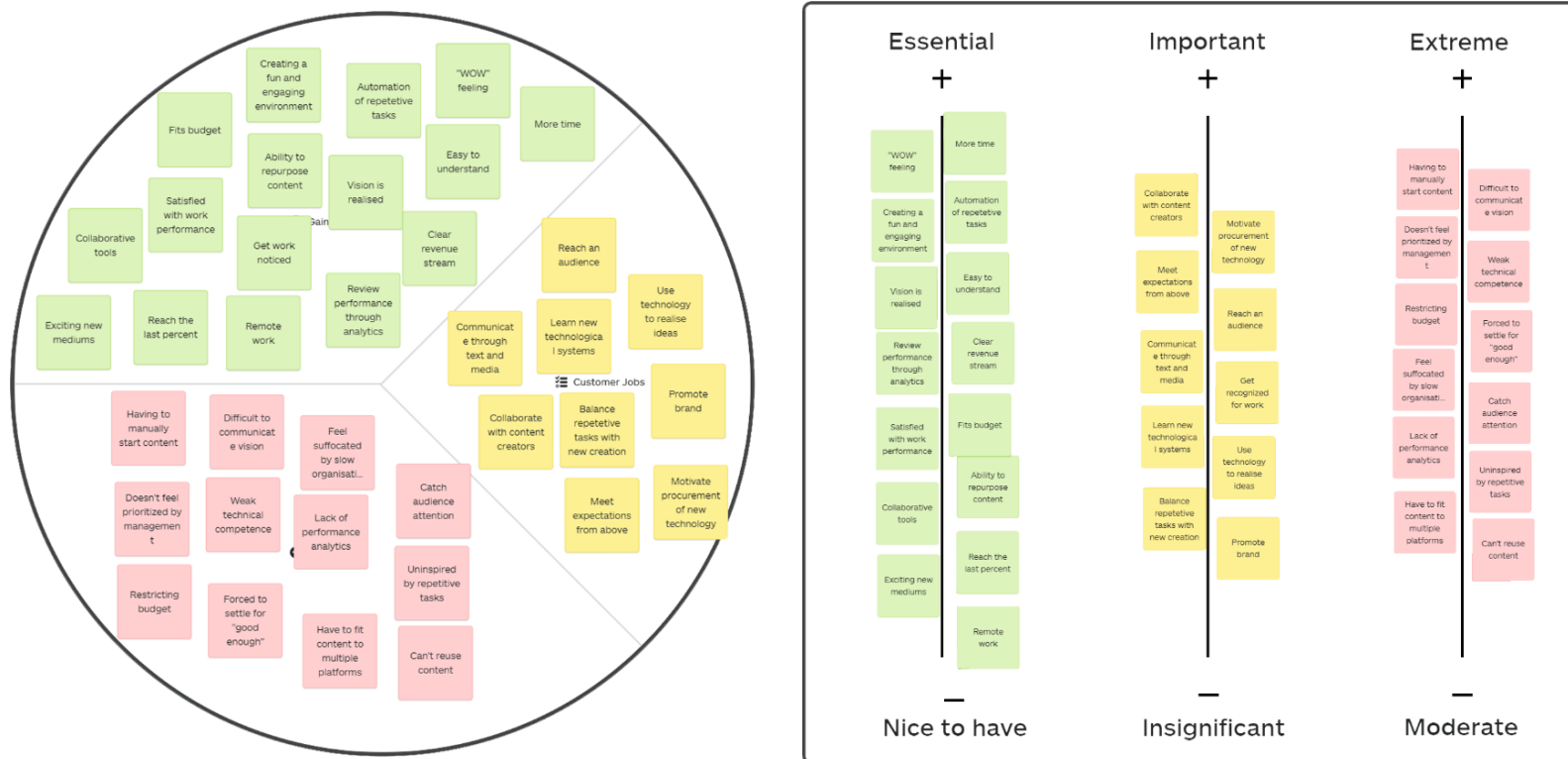


Figure 15: Product Owners - Customer Profile to the left and ranking of jobs, pains, and gains inside the square to the right



Figure 16: Technology Advocates - Customer Profile to the left and ranking of jobs, pains, and gains inside the square to the right

8.2 Stakeholder value maps

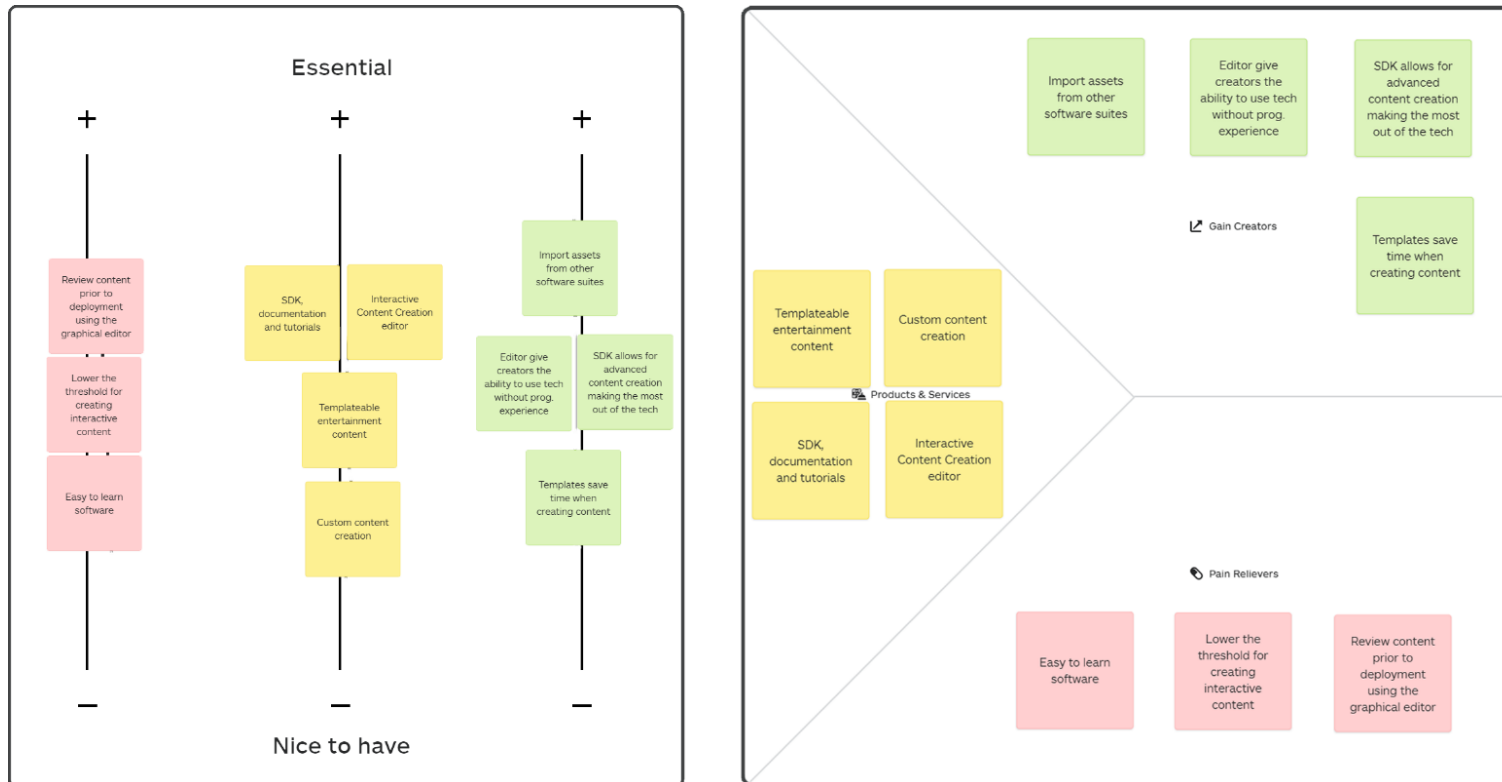


Figure 17: Content Creator - Value Map, with ranking of products & services, pain relievers and gain creators

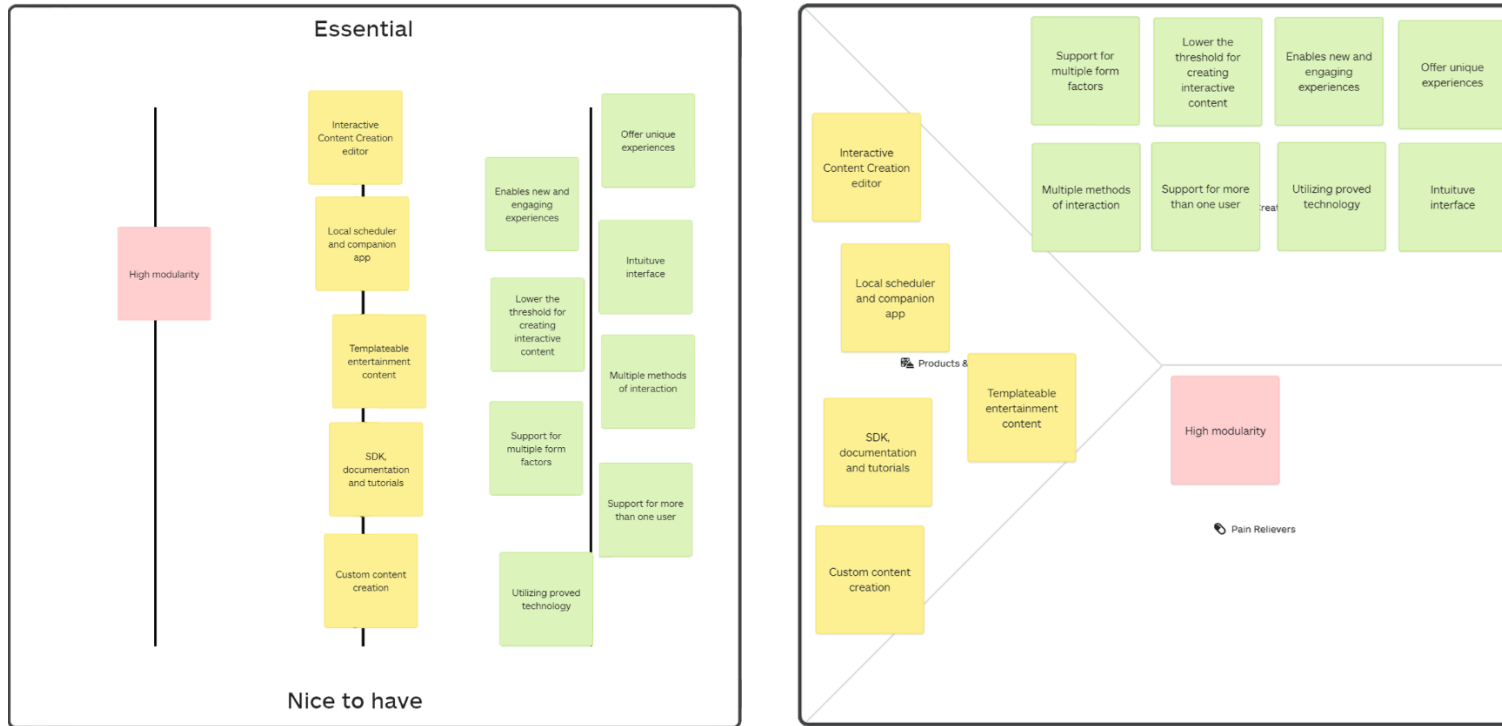


Figure 18: Decision Maker - Value Map, with ranking of products & services, pain relievers and gain creators

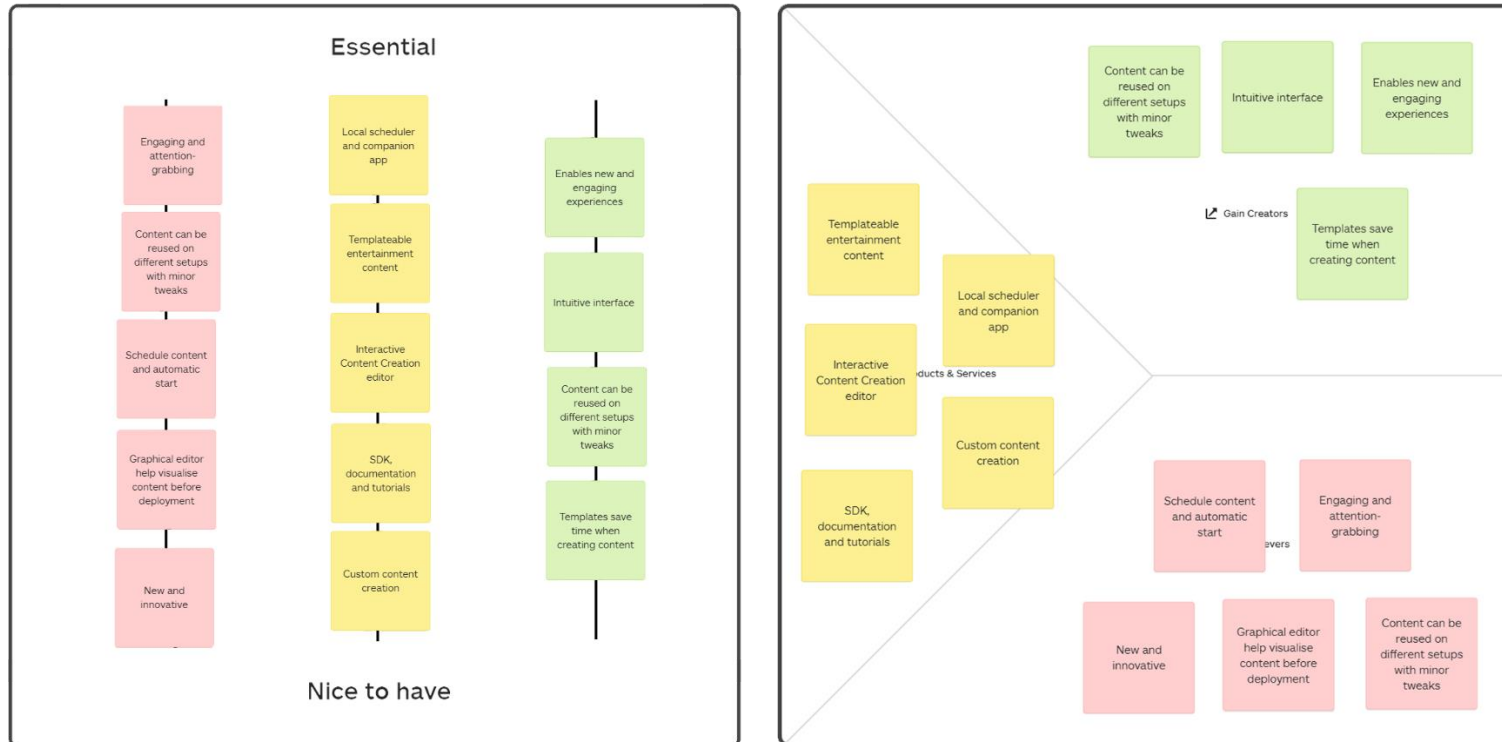


Figure 19: Product Owner - Value Map, with ranking of products & services, pain relievers and gain creators

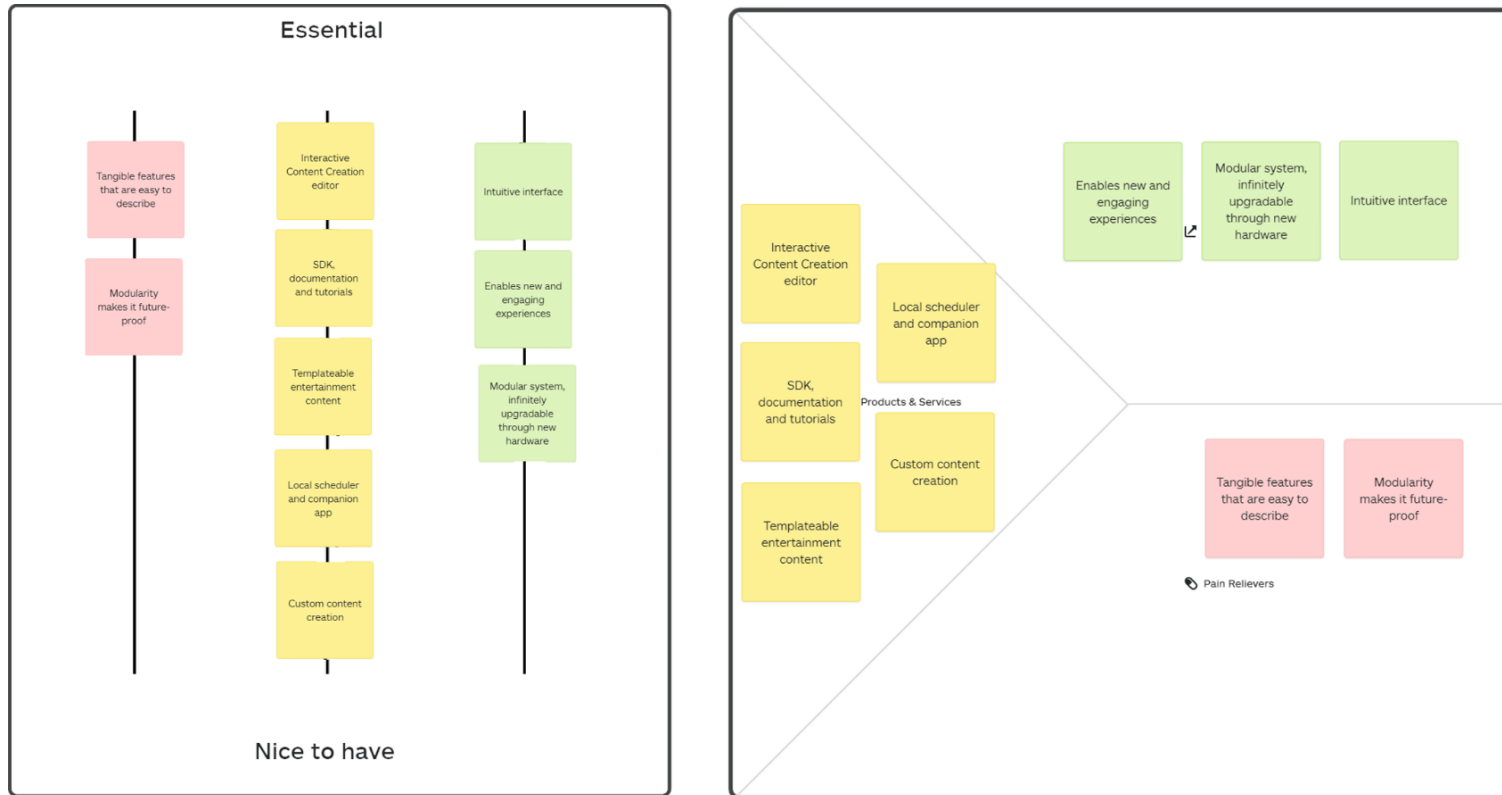


Figure 20: Technology Advocate - Value Map, with ranking of products & services, pain relievers and gain creators

8.3 Stakeholder value proposition canvases

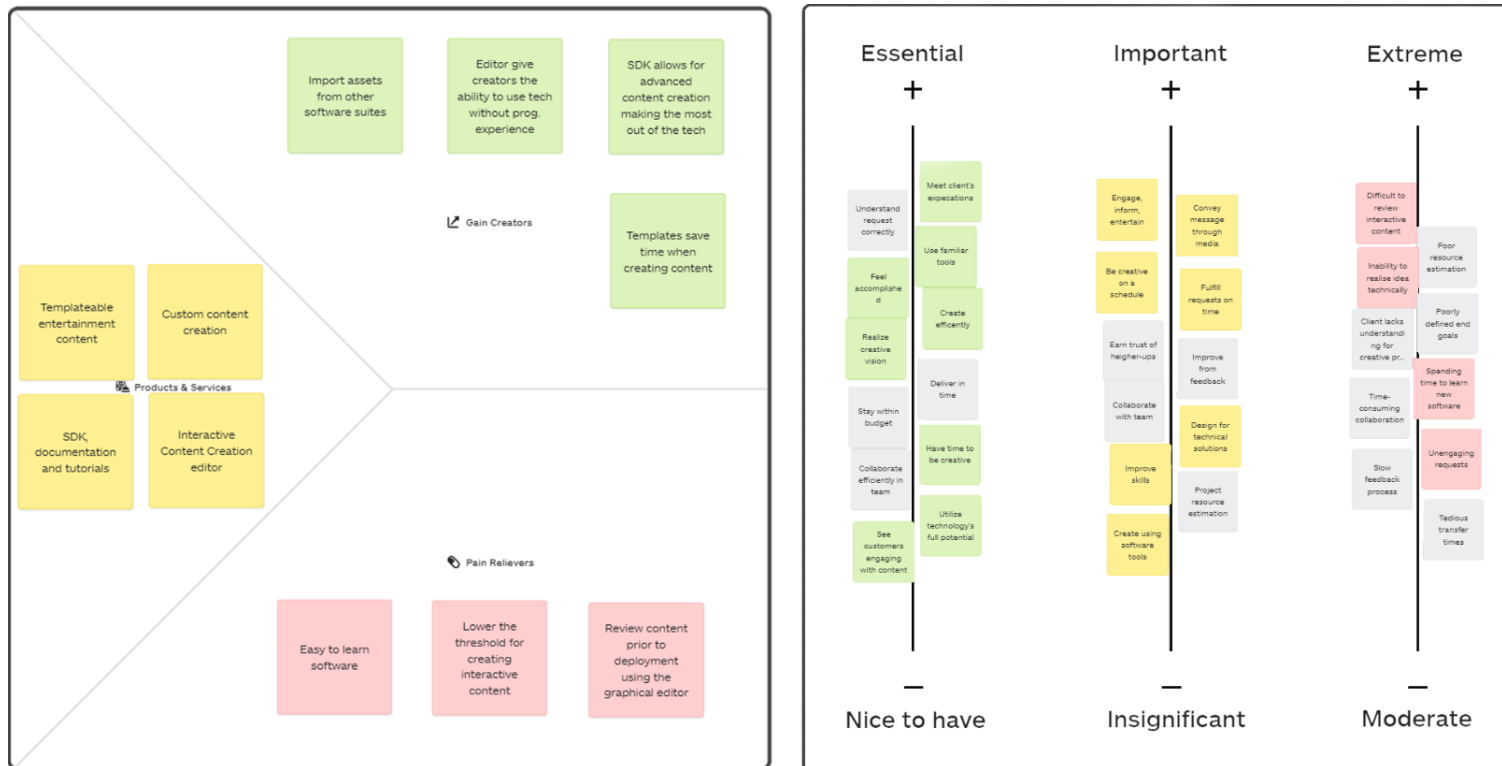


Figure 21: Content Creators - A complete Value Proposition Canvas with coloured notes representing “matches”



Figure 22: Decision Makers - A complete Value Proposition Canvas with coloured notes representing “matches”

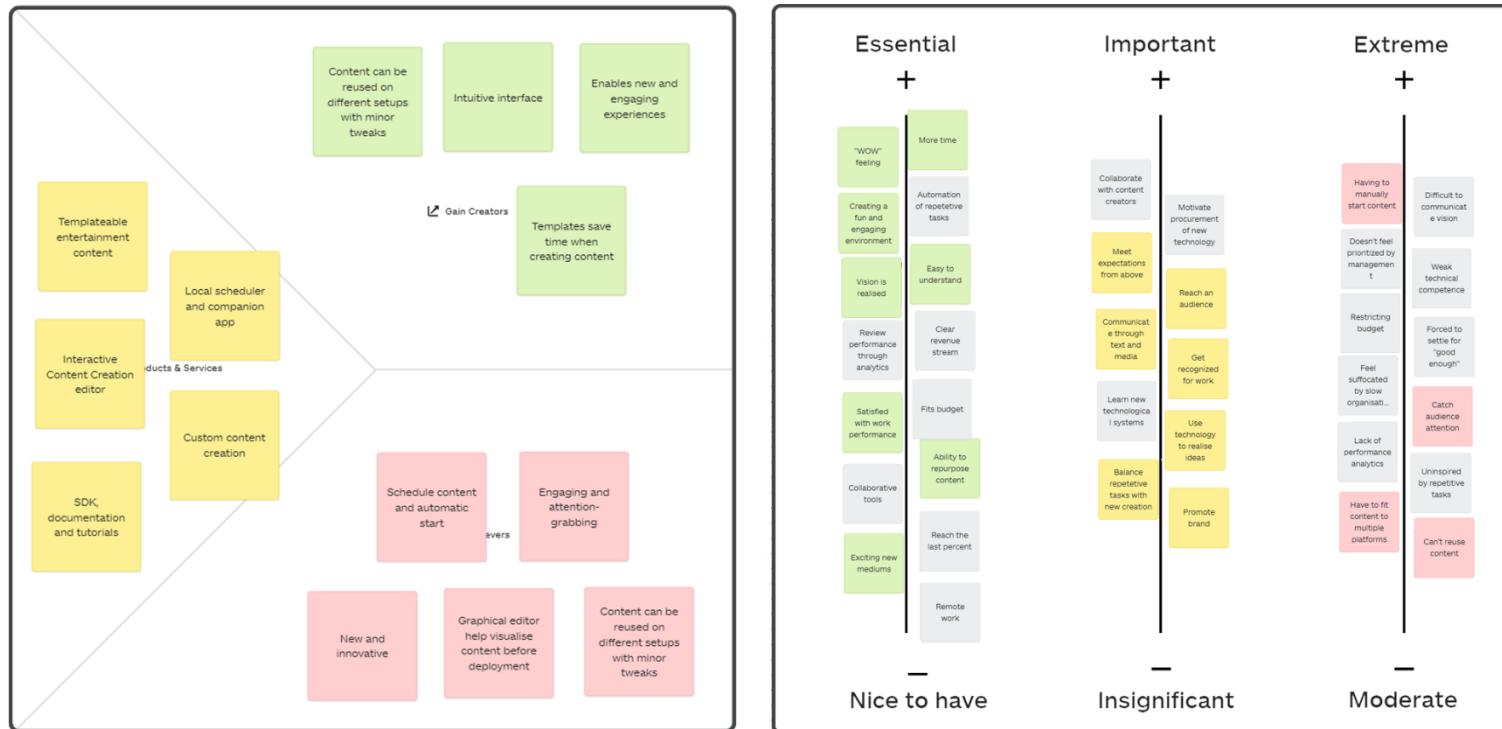


Figure 23: Product Owners - A complete Value Proposition Canvas with coloured notes representing "matches."

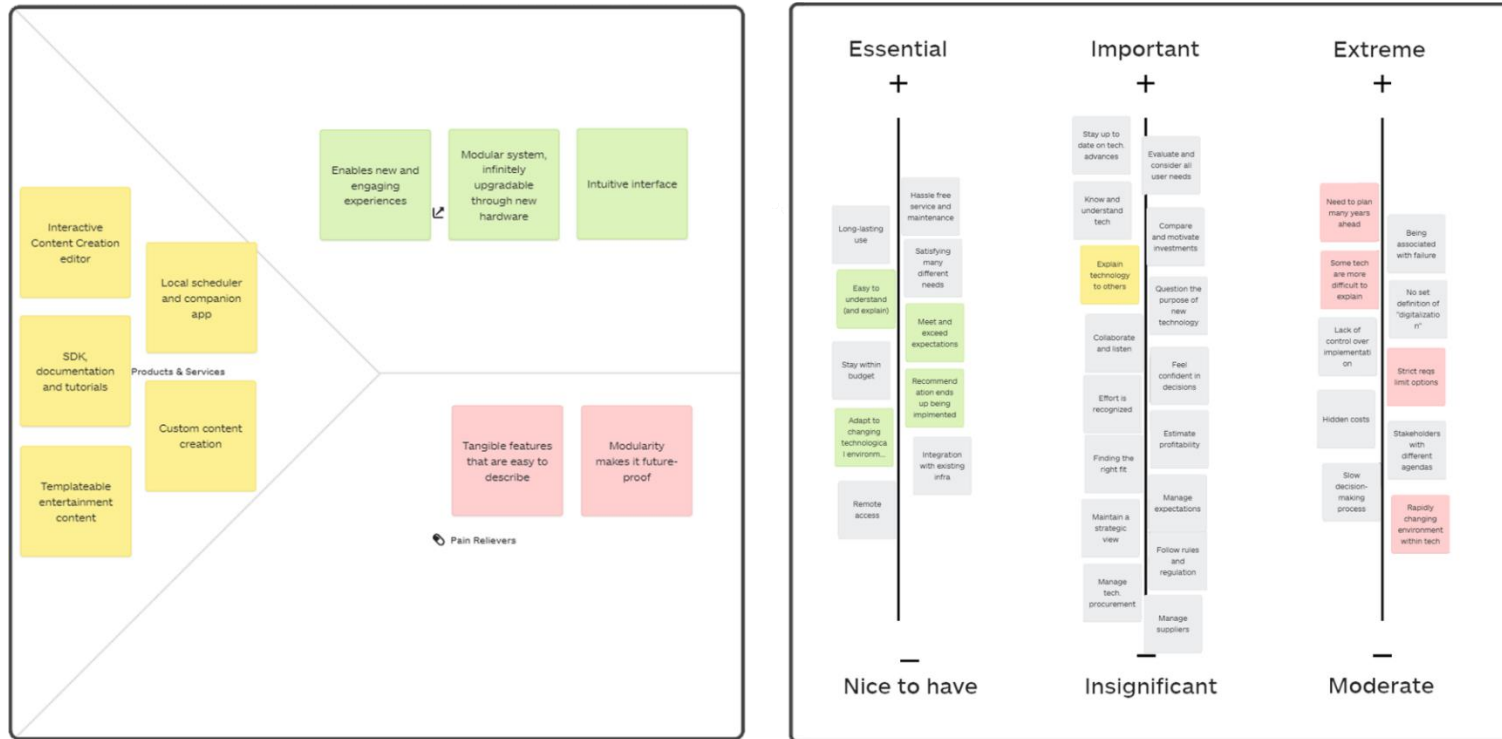


Figure 24: Technology Advocate - A complete Value Proposition Canvas with coloured notes representing “matches.”

8.4 The ICS value proposition

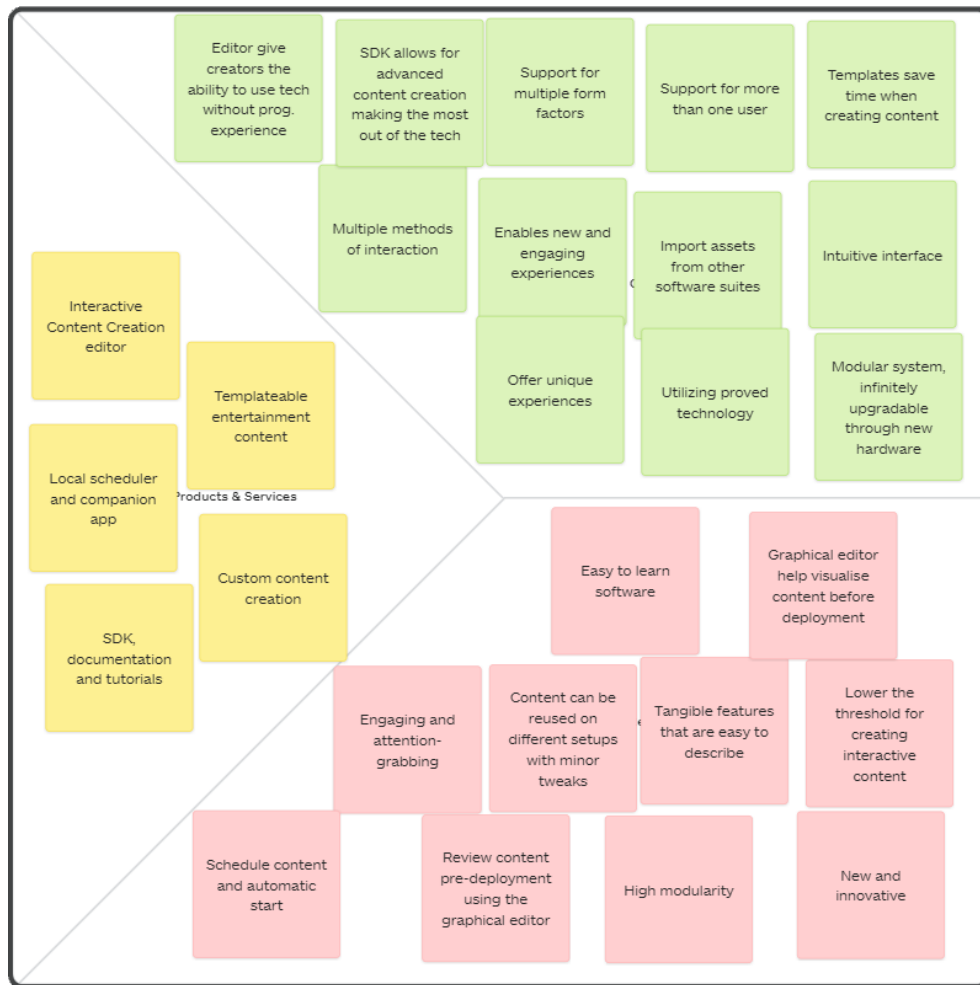


Figure 25: The ICS - Value Proposition Canvas