# Needs to consider when adapting IoMT value propositions for mixed home care

Sandra Lindgren & Ebba Örtenblad



MIOM05 Degree Project in Production Management
Division of Production Management
Faculty of Engineering LTH
Lund University
Supervisor: Göran Nilsson
Examiner: Ola Alexanderson

# Abstract

**Title**: Needs to consider when adapting IoMT value propositions for mixed home care

**Authors**: Sandra Lindgren and Ebba Örtenblad

**Supervisor**: Göran Nilsson, Division of Production Management, Faculty of Engineering, Lund University

**Background**: Healthcare systems across the globe face challenges with staffing shortages and unsustainable expenditure, intensified by an aging population requiring more long-term care. Mixed home care, combining formal and informal care at home, is a growing market, where Internet of Medical Things (IoMT) solutions offer opportunities for efficiency and personalized care.

**Purpose**: To identify, understand, and compare different needs to consider when adapting a value proposition for an IoMT solution for mixed home care.

**Method**: A qualitative analysis of customer needs is performed according to the value proposition canvas, using a case study of an IoMT solution being adapted to mixed home care. Secondary data and primary data from interviews with industry experts and stakeholders serve as the empirical foundation of the thesis.

**Conclusion**: Actors in mixed home care express many similar needs to actors in informal home care and formal nursing home care. However, four overarching needs to consider when adapting IoMT value propositions for mixed home care are identified. The identified needs include reassurance regarding patient well-being and quality of care, adherence to existing routines in mixed home care, facilitated documentation and communication processes, as well as a need for accessible knowledge and education.

**Keywords**: IoMT, Mixed home care, Informal caregivers, Home care services, Value proposition design, Value proposition Canvas, Urinary Incontinence

# Sammanfattning

**Titel**: Needs to consider when adapting IoMT value propositions for mixed home care

**Författare**: Sandra Lindgren och Ebba Örtenblad

**Handledare**: Göran Nilsson, Avdelningen för produktionsekonomi, Lunds Tekniska Högskola, Lunds universitet

**Bakgrund**: Sjukvårdssystem världen över utmanas av personalbrist och budgetbegränsningar, samtidigt som den åldrande befolkningen ökar behovet av långsiktig vård. Kombinerad hemvård, där formell och informell vård ges parallellt i hemmet, är en växande marknad där lösningar inom Internet of Medical Things (IoMT) ger möjligheter till effektivisering och personlig vård.

**Syfte**: Att identifiera, förstå och jämföra olika behov att ta hänsyn till i anpassningen av ett värdeerbjudande för en IoMT-lösning till kombinerad hemvård.

**Metod**: En kvalitativ studie av kundbehov genomförs utifrån value proposition canvas, inklusive en fallstudie av en IoMT-lösning som ska anpassas till kombinerad hemvård. Sekundärdata och primärdata från intervjuer med branschexperter och intressenter utgör den empiriska grunden för studien.

**Slutsats**: Aktörer inom kombinerad hemvård har många behov som liknar de inom informell hemvård och formell vård på äldreboende. Likväl kan studien identifiera fyra övergripande behov att ha i åtanke när IoMT-värdeerbjudanden anpassas för kombinerad hemvård: försäkran kring patientens välbefinnande och vårdens kvalitet, lyhördhet till befintliga rutiner, enkla dokumentations- och kommunikationsmöjligheter samt lättillgänglig kunskap och utbildning.

**Nyckelord**: IoMT, Kombinerad hemvård, Informella vårdgivare, Hemtjänst, Design av värdeerbjudande, Value proposition Canvas, Urininkontinens

# Preface

This master thesis was conducted by Ebba Örtenblad and Sandra Lindgren during the spring of 2024, as a final project in Industrial Engineering and Management at the Faculty of Engineering, Lund University. The project has deepened the authors' interest in digitalization and improvement of the healthcare sector, particularly LTC.

The authors would like to thank their supervisor, Göran Nilsson, for his encouraging and continuous support throughout the semester, and assistant supervisor, Ingela Elofsson, for her advice. Furthermore, a great thank you is directed to the case company for trusting the authors with an interesting case, particularly to the supervisors and company interviewees for their time and rewarding conversations.

An immense gratitude is expressed to all interviewed incontinence specialists, patients, informal caregivers, prescribing nurses, and care assistants for their participation. Their generosity, honesty, and differing perspectives are the foundation of this thesis, and their engagement has inspired the authors throughout the project.

Sincerely,
Sandra Lindgren & Ebba Örtenblad
May 2024

# Table of contents

# Glossary

English translations of Swedish healthcare terms:

| | |
|---|---|
| Home care services | Hemtjänst |
| Home healthcare | Hemsjukvård |
| Primary care center | Vårdcentral |
| Nursing home | Äldreboende |
| Municipality | Kommun |
| Region | Region |
| National Board of Health and Welfare | Socialstyrelsen |
| Swedish Medical Product Agency | Läkemedelsverket |
| Swedish eHealth Agency | eHälsomyndigheten |
| Swedish Association of Local Authorities and Regions (SALAR) | Sveriges Kommuner och Regioner |
| Swedish Healthcare Guide | 1177 Vårdguiden |
| Swedish Agency for Health and Care Service Analysis | Vårdanalys |
| Swedish Competition Agency | Konkurensverket |
| National Agency for Public Procurement | Upphandlingsmyndigheten |

Abbreviations:

| | |
|---|---|
| IoT | Internet of Things |
| IoMT | Internet of Medical Things |
| LTC | Long Term Care |
| UI | Urinary Incontinence |
| VPC | Value Proposition Canvas |

# Chapter 1 – Introduction

*This chapter provides background and context for the thesis by explaining underlying problems and drivers. Furthermore, the connected purpose, delimitations and aims are described, followed by an outline of the thesis structure.*

## 1.1 Background

Across the globe, healthcare systems are facing substantial challenges while simultaneously undergoing noteworthy advancements. Many systems suffer from high costs, low efficiency, and workforce shortages (Malani, 2023). Furthermore, the changing demographics and increasing prevalence of chronic diseases amplify and reshape the healthcare demand, thereby contributing to the numerous challenges faced by healthcare systems (Siegel, 2023).

Nevertheless, promising opportunities are presented from technological advancements. The integration of digital tools, artificial intelligence, and automation has potential to enhance efficiency, accessibility and decrease the workload for healthcare workers (Wicklund, 2023). The technologies are also supporting the increasing patient focus in the industry, putting individual patient needs at the forefront (Wicklund, 2023).

### 1.1.1 Increased demand for long-term care

Globally, a significant demographic shift is underway, marked by an increasingly aging population. According to the World Health Organization (WHO) (2022), this shift is evident in the growing number and proportion of older individuals across all countries. The WHO projections indicate that the global share of people aged over 60 is expected to increase from 12% in 2015 to 22% by 2050.

This aging population increases the demand for labor-intensive long-term care (LTC) due to the elderly's more complex conditions and large need for expert

care (OECD, 2023a). According to Lehnert, Günther, Hajek, Riedel-Heller and König (2018) this calls for significant economic and social adjustments, including changes in the funding and provision of LTC. The provision of LTC differs across countries, as explained by OECD (2023a), depending on healthcare systems and use of informal caregivers. OECD defines informal caregivers as "people providing any help to older family members, friends and people in their social network, living inside or outside their household, who require help with everyday tasks" (OECD, 2023a, p. 222) while formal care refers to care provided by professional caregivers. For instance, among 19 OECD member countries, approximately 60% of older individuals reported receiving exclusively care from informal caregivers. However, as the demand for LTC increases, OECD (2023a) explain that factors such as declining family sizes, increased geographical mobility, and greater female labor market participation are reducing the availability of informal caregivers.

Furthermore, research by Lehnert et al. (2018) shows that patients prefer to remain in their homes for as long as possible and receive home-based LTC when feasible. Due to the preference for home-based care and the high cost of facility-based care, nearly 70% of older individuals receiving professional LTC in OECD member countries are receiving it at home (OECD, 2023a). In addition, Rocard and Llena-Nozal (2022) explain that a vast majority are receiving informal care alongside professional LTC. Receiving care from both formal and informal caregivers can be referred to as mixed care (Renyi, Lindewedel-Reime, Blattert, Teuteberg & Kunze, 2020; Rodriguez, 2014; Broese van Groenou, Jacobs, Zwart-Olde & Deeg, 2016).

### 1.1.2 Workforce shortage and unsustainable expenditure

As the proportion of older individuals rises, the OECD (2023a) explains that there is a simultaneous reduction in the proportion of individuals within the workforce age bracket. They further argue that this dual demographic shift poses challenges as the demand for labor-intensive LTC increases while there is a

decrease in financial resources, informal caregivers, and healthcare professionals. According to WHO (n.d.a) estimates, the global shortage of healthcare professionals is anticipated to reach 10 million by the year 2030. Moreover, the OECD (2023b) anticipates a shortage of LTC providers, estimating that the LTC workforce needs to expand by 32% over the next decade. However, they argue that countries are struggling to recruit and retain LTC workers due to the poor working conditions and low wages.

Additionally, Sigel (2023) shows that the average cost of healthcare per citizen has risen since 2020, with the most recent WHO figures (2024) showing that the global health expenditure in 2021 reached 9.8 trillion USD, corresponding to 10.3% of the global GDP. This marks an increase of 1.3 trillion USD from 2011 (WHO, n.d.b), which in part can be attributed to the COVID-19 pandemic and its heightened strain on the healthcare system (World Economic Forum 2023). Furthermore, the World Economic Forum highlights that the increased healthcare expenditure is unsustainable as it exceeds the GDP growth.

### 1.1.3 Digital transformation

Another global trend implicating the healthcare system is the large technological development seen in the past decades. This has led to a paradigm shift often referred to as the fourth industrial revolution, or *industry 4.0*, which according to Koul (2022) is driven by the emergence of technologies such as the internet of things (IoT), artificial intelligence and big data. As industry 4.0 unfolds, Koul argues that a parallel evolution is taking place in the development of *healthcare 4.0*. In this new healthcare paradigm, telecommunication, artificial intelligence and IoT serve as fundamental building blocks for smart healthcare systems offering a higher degree of personalization, earlier diagnosis, and increased efficiency. Building on the same positive effects, the WHO (2021) has set a *Global strategy on digital health* for the years 2020 to 2025, recognizing digitalization as a significant step towards reaching the health-related Sustainable Development Goals.

Looking further into IoT, Cardona, Solanki, and Cena (2021) explain that IoT consists of a sensory object connected to the internet, through which it shares data in an automated process. It is commonly connected to a service that enables interaction with the IoT and relies on protective data security. Cardona et al. further detail that IoT in healthcare settings, which will be referred to as internet of medical things (IoMT), often consists of wearable sensors providing patients and/or healthcare professionals with real-time health data in digital platforms. The authors argue that these IoMT solutions support remote healthcare, thus shifting the focus towards home-centered medical appointments. They also enable automated data gathering which can provide healthcare professionals with alerts for faster response and data for earlier diagnosis.

The economic value of IoT is anticipated to grow over the upcoming years, reaching a total of 5,500-12,600 billion USD in 2030 according to Chui, Collins, and Patel (2021). They further anticipate the healthcare industry to be the second largest contributor to this development, representing between 10% and 14% of the total economic value. Furthermore, researchers expect that the number of IoT devices used in healthcare are increasing with 10% each year, reaching over 700 million devices in 2030 (MacGillivray & Reinsel, 2021, as cited by Chui et al., 2021).

### 1.1.4 From system to patient focus

A trend converging with both digitalization and the increased demand for LTC is the call for *people-centered care* and *integrated* care, according to the OECD (2023). In PPC, the people are put at the center of care, aiming to include patients and their families more in their care journeys (OECD, 2023c). This is for example done though increased information access facilitated by digital tools, and through participation in decision making regarding the healthcare journey. On a similar note, integrated care strives to share information between different

healthcare providers to increase collaboration and enable provision of cohesive and uninterrupted care throughout patients' lives (OECD, 2023c).

The WHO (2021) underscores the significance of digitalization in facilitating integrated care and PPC, and vice versa. On one hand, they state that digitalization is essential for fostering information exchange among care providers and patients, thereby establishing crucial foundations for integration and PPC. On the other hand, they highlight the importance of coordinated and well-integrated digitalization efforts to avoid ineffective stand-alone solutions that may contribute to a fragmented healthcare system.

### 1.1.5 From product- to service-based business models

Another development going hand in hand with digitalization is the shift towards intelligent service-based business models. The concept of *servitization*, first introduced by Vandermerwe and Rada (1988), suggests that companies in all industries are transitioning from predominantly offering traditional products in terms of goods, to putting services at the core of their value propositions. In their 2022 study, Mitnick et al. affirm the continued relevance of servitization. Over 80% of the companies researched in their study pointed to the transition from traditional products to services as the most impactful trend for their business at the time. The authors note that this development is closely intertwined with the ongoing digitalization, as the adoption of smart hardware and supporting software creates opportunities for new services. Furthermore, they underline that the shift is widespread in all industries, with the healthcare sector notably being one of the top recognizers of the trend.

## 1.2 Problem description

It is evident that healthcare systems across the globe are under pressure, with an increasing demand for LTC, workforce challenges and unsustainable expenditure. Simultaneously, an increasing number of patients prefer to receive care at home, commonly from both formal and informal caregivers.

Furthermore, the technological development, emerging people focus and transition towards service-based business models create new opportunities for companies to deliver value to the patients and caregivers, not least in a mixed home care context. However, seizing these opportunities requires companies to have a comprehensive grasp of the evolving markets and technological advancements.

## 1.3 Purpose

The purpose of this study is to identify, understand, and compare different needs to consider when adapting a value proposition for an IoMT solution for mixed home care.

## 1.4 Delimitations

Several delimitations define the scope of the study. The Swedish healthcare system serves as both a geographical and sectoral delimitation, enabling the incorporation of location-specific and contextual attributes.

Moreover, urinary incontinence (UI) is chosen as the focus healthcare domain for this study. Given its prevalence among the growing elderly population receiving formal and informal care, UI is identified as a suitable focus area for the thesis's purpose. Additionally, recent evident adoption of IoMT aids within the UI sector further justifies its suitability as a focus area. Within the UI healthcare domain, the thesis is delimited to studying medical aids, therefore excluding treatment methods.

To capture the challenges with an ageing population, the study is further limited to provision of UI care to elderly patients (aged 65 or above) as UI is more prevalent among elderly. For instance, the prevalence of UI in women aged 70 or above is estimated to be four times higher than among adult women, similarly the prevalence of UI in men increases with age according to Milsom and Gyhagen (2019). Furthermore, the study is limited to patients receiving informal

and/or formal care in ordinary homes or nursing homes, excluding patients not seeking professional healthcare for UI.

As stated in section 1.3, the thesis's purpose includes considerations for value proposition design. Adopting the value proposition design perspective of Osterwalder, Pigneur, Bernarda and Smith (2014), founders of the value proposition canvas, the study is delimited to exploring the needs of customers and users. Consequently, the study excludes other stakeholders such as legislators or interest organizations.

## 1.5 Thesis structure

The thesis comprises eight chapters, each serving a specific purpose. The first chapter provides background and context for the thesis by explaining underlying problems and drivers. Furthermore, it describes the connected purpose and delimitations. The second chapter outlines the research purpose and strategy employed and introduces the case study and the case solution. Following this, chapter three explores the theoretical framework that serves as the foundation for the subsequent chapters. Subsequently, empirical findings and analysis are presented in two phases. The first phase, comprising chapters four and five, examines the context, the case solution, and the involved stakeholders, while the second phase, comprising chapters six and seven, explores the needs of the relevant actors. Finally, chapter eight summarizes the thesis and discusses its limitations, contributions, and potential further research. Furthermore, appendixes A-D provide additional information on UI, detailed customer needs, interview guides, and lists of tables and images.

# Chapter 2 – Method

*This chapter outlines the research purpose and strategy employed in this thesis and presents a structured overview of the methodology and the design of each segment. Additionally, it introduces the case study and the case company.*

## 2.1 Research purpose

Before delving into research strategy and design, it is crucial to understand the research purpose. According to Saunders, Lewis, and Thornhill (2007), a research purpose serves as the guiding principle that directs the design and execution of a research study towards its ultimate objective. It outlines the specific aim of the research and provides a framework for selecting appropriate methodologies and techniques.

The purpose of this study is to identify, understand, and compare different needs to consider when adapting a value proposition for an IoMT solution for mixed home care. Breaking down the purpose, the first component is to identify different needs to consider in value proposition adaptation. Moreover, it aims to understand these needs, particularly what type of needs they are and how they relate to an IoMT solution. Finally, the aim includes comparing these needs, specifically contrasting the needs of mixed home care with those of the segments for which the IoMT value proposition is currently tailored, highlighting distinctions within the mixed home care sector. This is illustrated in figure 2.1, where the light blue box represents identification of needs, the left arrow represents comparison of needs, and the right arrow represents understanding of the needs in relation to the value proposition. As will be detailed in section 2.3, this thesis examines a specific IoMT solution being adapted for the mixed home care market. Currently, the solution targets informal home care (in ordinary homes) and formal nursing home care, which are used for the comparative analysis.

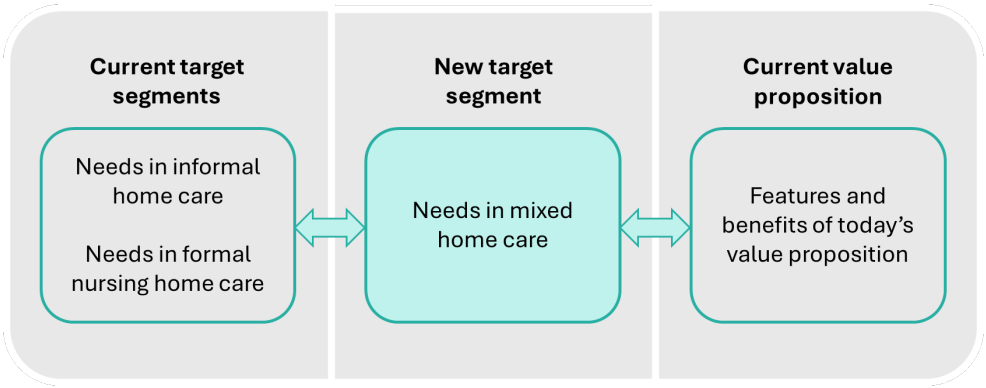


Figure 2.1: Illustration of necessary analysis derived from the thesis purpose.

To achieve this aim of identifying, understanding, and comparing needs, an exploratory approach is selected, allowing for a comprehensive investigation and comparison of unknown needs across various actors. Saunders et al. (2007) explain that an exploratory study is beneficial for gaining new insights or examining a phenomenon from a new perspective, aligning with the thesis's aim. The nature of an exploratory study is adaptable and flexible, as described by Saunders et al., which is suitable when examining unknown needs. Furthermore, as the study aims to suggest concrete needs to consider, it adopts a normative character. According to Castree, Kitchin and Rogers (2013) normative theory goes beyond assessing current conditions by critically evaluating existing practices and proposing specific improvements.

However, prior to identifying, understanding, and comparing different needs, it is essential to understand the care scenarios at the base of the comparison and determine whose needs are to be considered. The aim also necessitates an understanding of an IoMT value proposition and mixed home care. Consequently, it is necessary to describe the context, the value proposition, how care is provided, and which actors are involved. For this purpose, a descriptive study is utilized, which aims to provide accurate profiles of persons, events, or situations as explained by Saunders et al. (2007).

This results in a study with two phases. The study begins with a descriptive phase of current events, collecting and analyzing empirical data to create a fundamental understanding, describe how care is currently provided in the different scenarios in the comparative study, and identify the relevant actors whose needs are to be studied further. Building on these initial findings, the study progresses into an explorative phase, collecting empirical data on the needs of actors across care scenarios. The needs identified in the mixed home care scenario are compared to needs in the other scenarios and assessed with regards to their addressability by an IoMT solution, leading to conclusions addressing the thesis's purpose. Figure 2.2 shows the two phases, wherein the focus progresses between empirics, analysis, and conclusions. It also highlights how conclusions drawn from the initial analysis guide the empirical study of the subsequent phase. Thus, the method utilizes a descriptive study as foundation for subsequent exploratory research, which is recognized as a possible method by Saunders et al. (2007).

## 2.2 Research strategy

Building on the purposes and phases of the thesis, several strategic choices are made. This section explains and argues for the closely related abductive approach and flexible design chosen for the study.

### 2.2.1 Abductive approach

In the field of research methodology, Saunders et al. (2007) highlight the importance of defining the research approach, which outlines the overall strategy guiding the study. This approach is closely linked with the type of reasoning employed. The examination of needs to consider when adapting a value proposition for an IoMT solution for mixed home care requires an approach that resonates with real-world complexities. Following the insights of Robson and McCartan (2016), an abductive approach is suitable for this purpose.

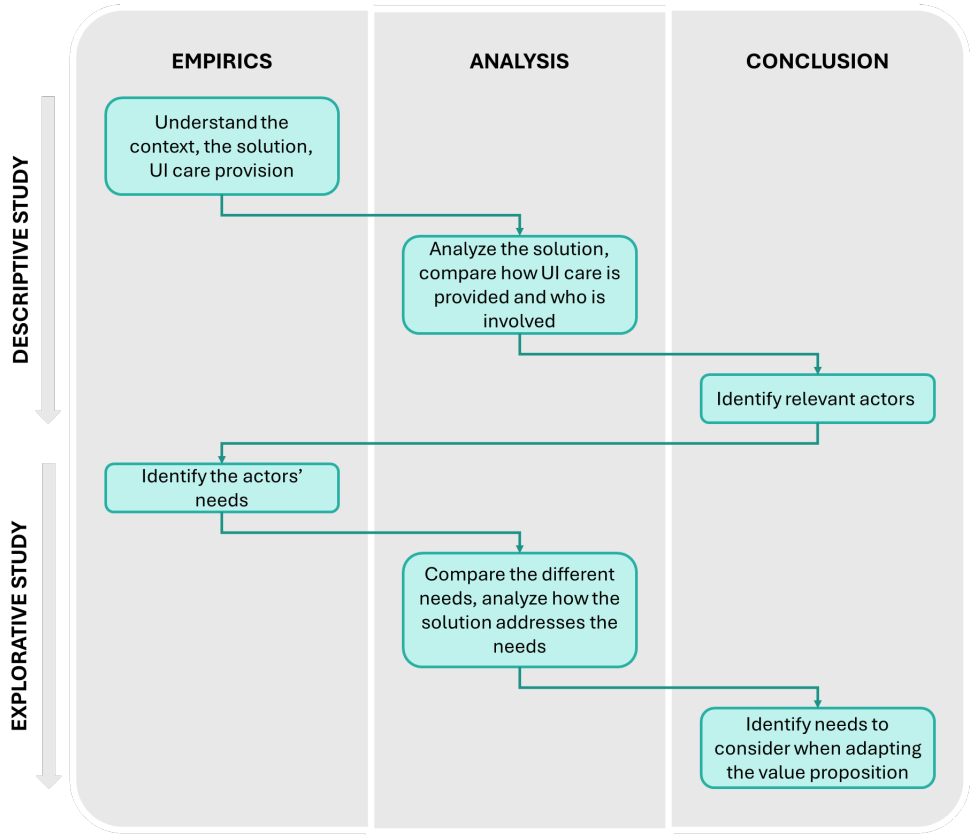


Figure 2.2: The two phases of the study.

Robson and McCartan (2016) explain that the abductive approach is a combination of deductive and inductive approaches. Unlike the deductive approach, which aims to confirm or refute a theory, or the inductive approach, which seeks to develop new theories, abductive reasoning strives to formulate the best possible explanation or hypothesis. It commonly starts with evidence or observations that may not fit existing theories and considers the available evidence and observations to draw conclusions. Furthermore, Robson and McCartan argue that an abductive approach is suitable for studying objects that are unpredictably affected by external factors. This study does not aim to confirm an existing theory or to develop a new theory. Instead, its goal is to formulate hypotheses regarding significant needs in mixed home care,

considering external factors and complexity. Therefore, the approach used in this study is considered abductive.

### 2.2.2 Flexible design

In addition to the abductive approach, a flexible design is chosen to align with the explorative purpose and fully capture complexity and unknown needs, as recommended by Robson and McCartan (2016). They explain that flexible designs are centered around iterative development during interaction with the studied object, intertwining data collection and analysis, aligning with the method described in section 2.1 and figure 2.2. Moreover, Robson and McCartan highlight that flexible design encourages problem-centric approaches, rigorous analysis, and nuanced writing reflecting real-life complexities. Chosen for its adaptability and nuanced understanding, a flexible design necessitates an open mindset, adaptable working methods, and interpretation rather than mere recording of information, requiring impartiality and openness to contradictory findings.

In line with Robson and McCartan's (2016) recommendation for a flexible design, this study opts not to categorize itself strictly as quantitative, qualitative, or mixed methods. However, it is worth noting that the study will primarily gather and utilize qualitative data to achieve its objectives. Qualitative data offers the benefit of delving deeply into participants' perspectives, experiences, and behaviors, providing rich insights that quantitative data may not capture.

## 2.3 Research Design

Given the research purpose and strategy, the design of the study can be selected. This section describes the chosen case study design, including the case selection, as well as data types and data collection methods utilized in the research.

### 2.3.1 Case study

This thesis seeks to create an in-depth understanding of value proposition design in a particular and rather complex setting, where results are likely to depend on the context and the specific IoMT solution. A case study is conducted to capture these unique factors.

A case study is described by Robson & McCartan (2016) as a method where the research object (e.g., an organization) is analyzed with its context, mainly using qualitative data. Moreover, Yin (2018, p.45) describes that a case study "investigates a contemporary phenomenon (the 'case') in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident". Yin's contextual emphasis aligns with the purpose of the thesis, allowing for in-depth exploration of needs to consider for a distinct IoMT solution. Yin further states that case studies commonly use existing theoretical frameworks to guide the data collection and analysis. Extensive research exists within the field of this thesis (e.g., regarding marketing, buying roles, and value proposition design), thus further advocating for the choice of a case study.

#### 2.3.1.1 Case selection

Having decided on a case study design, the next step involves selecting an appropriate IoMT solution to study. As described in section 1.4, delimitations are set to the Sweden and IoMT aids within the UI domain, which is chosen for its prevalence among the growing elderly population receiving formal and informal care. Additionally, considering the thesis's focus on adapting a value proposition to the mixed home care market, an IoMT solution that is utilized in other LTC markets but currently absent in mixed home care should be chosen.

A suitable case is identified in a solution developed by a company referred to as Company X. Company X is a global developer, manufacturer, and seller of UI products. Company X has a long history in developing and producing absorbent incontinence products, further referred to as pads, and is one of the largest actors

in the sector, with strong presence in the Swedish market. In recent years, Company X has acknowledged the potential for more people-centered, comfortable, efficient, cost effective, and environmentally friendly care through implementation of digital care solutions. Hence, Company X has developed an IoMT solution to support the entirety of UI care – including assessments, care plans, monitoring, and follow-ups. This solution will be referred to as Solution X and be further described in the empirical study in section 4.2.

As of today, Solution X is mainly being utilized by two target segments, both within LTC: informal caregivers and nursing homes. In rare cases, Solution X has been purchased by organizations within mixed home care, however, this is currently not a target segment and their needs have not been understood and considered when developing Solution X. Company X wants to explore the needs and preferences of this untapped customer segment, alongside a thorough comparison with the needs expressed by the current target segments. In its pursuit of integrated care solutions, Company X aims to grasp the diverse needs of caregivers engaged in UI LTC, thereby aiming towards a holistic approach to care provision. The aim of Company X to understand mixed care needs for adapting an IoMT value proposition aligns well with the purpose of this thesis, making Solution X suitable for the case study.

### 2.3.2 Data collection

As previously mentioned, Yin (2018) suggests that case studies can rely on previous research and frameworks in data collection. Previous research within marketing (e.g., value propositions, stakeholders, buying roles), healthcare processes (e.g., patient journey mapping), and value proposition design is explored through Lund University's catalogues LubCat and LubSearch, as seen in Chapter 3 of this thesis. The previous research yields a theoretical framework, guiding the collection of secondary and primary data to achieve the thesis's purpose.

#### 2.3.2.1 Secondary data

Secondary data, which refers to existing data sourced from external sources such as statistics or prior research (Lekvall & Wahlbin, 2001), is used throughout this thesis for two primary purposes. Firstly, publicly available data from authorities, Swedish regions, and healthcare organizations is utilized to describe and gain insights into the Swedish healthcare system, UI, LTC, and UI care provision. Secondly, previous research conducted by Company X is utilized to describe the needs of the current target segments, namely informal home care and nursing home care, allowing for a comparison with the mixed home care segment. The use of secondary data to comprehend the needs of the current target segments enables the utilization of existing in-depth customer knowledge and facilitates a deeper exploration of the needs of the new target segment within the thesis's defined scope and timeframe.

The secondary data includes referencing five studies conducted by Company X, identified as Internal reports A-D. The studies aim to understand the challenges of current target segments and based on focus interviews and surveys with more than 4,300 respondents, however, are not limited to studying the Swedish market. Interviews with market specialists at Company X and Swedish healthcare professionals are conducted to verify the reports' applicability to the Swedish market, as described in the next section.

#### 2.3.2.2 Primary data

The thesis uses interviews as its source of primary data. Two rounds of interviews are conducted, following the research strategy presented in section 2.2. Having gathered secondary data about the healthcare system, UI, etcetera, interviews in the first phase are used to fill in the necessary gaps. Interviews are held with employees at Company X to create an understanding of the healthcare system, UI, and Solution X. Furthermore, incontinence coordinators in three Swedish regions, an incontinence specialist nurse, and an assistant manager at a

regional center for assistive devices are interviewed to gain insights into LTC and UI care provision.

In the second phase of the study, interviews are held with relevant profiles to identify and understand their needs. These interviewees are mainly actors within mixed home care, but complementary interviews are also conducted with other LTC segments and Company X employees to gain increased understanding and verify data received from Company X. Mixed home care interviewees are asked about their needs' significance, resulting in a ranking on a scale of three. In cases where some interviewees find an attribute to be of higher importance than others, the higher importance is showcased in the study. In cases where large discrepancies in ranking occur, an average is showcased, including a denotation.

The interviews follow a semi-structured approach, which according to Saunders et al. (2007) is suitable for collecting qualitative data and allows for non-standardized interviews, flexible progression, and open discussions. Interview guides are carefully prepared and used for all interviews. In the first phase, the interview guides follow a similar pattern, although are adjusted depending on the interviewee and the remaining questions from the authors. As interviews in the first phase have a descriptive purpose, they combine open and closed questions, ensuring both discussion and precision. The second research phase has an explorative purpose, thus allowing for more open questions to let the interviewee discuss their thoughts and experiences freely. The open questions are followed by more specific probing questions, ensuring that the sought information is received and understood. A standard interview guide is prepared based on the chosen theoretical framework for the needs assessment, whereafter the guide is adapted to suit each interviewed profile.

The authors aim for geographically dispersed interviewees to make the study representative for the Swedish market. However, some roles and profiles have limited availability or publicly accessible contact details, thus reducing the

possibility for geographical spread. Contact details for all care and healthcare professionals are sources though the internet, and interviews are scheduled via phone calls or emails.

Moreover, each interview is conducted by one of the thesis authors, while the other takes detailed notes. The notes are subsequently reviewed by the authors together to ensure full coverage. All interviews are held anonymously to ensure comfort and encourage honesty, only including the role of the interviewee. The interviewees are informed of the confidentiality aspect and provided with an overview of both the interview's purpose and the thesis at the start of each session. Most interviews are conducted via video calls using Zoom Meetings, allowing for interviews across geographical distances. However, face-to-face interviews are arranged with patients due to technical constraints, and for three of the care assistants due to interviewee preferences.

In total, 24 interviews are conducted involving 27 interviewees. Table 2.1 provides a comprehensive list of participants, including their role and anonymous identifier, interview date, and interview format (video call/in person). Interview guides used in interviews with incontinence coordinators, patients, informal caregivers, care assistants, and prescribing nurses are found in Appendix C.

Table 2.1: List of interviewees.

| **Role/Anonymous identifier** | **Date** | **Format** |
|---|---|---|
| Employees at Company X | | |
| Innovation Manager | 14 March 2024 | Video call |
| Urotherapist | 23 February 2024 | Video call |
| Consumer Insight Manager A | 28 February 2024 | Video call |
| Consumer Insight Manager B | 28 February 2024 | Video call |
| Senior Marketing Manager | 15 April 2024 | Video call |
| Sales Manager | 12 April 2024 | Video call |

| | | |
|---|---|---|
| Incontinence specialists | | |
| Incontinence coordinator A | 29 February 2024 | Video call |
| Incontinence coordinator B | 4 March 2024 | Video call |
| Incontinence coordinator C | 5 March 2024 | Video call |
| Assistant Manager, Center for Assistive Devices | 4 March 2024 | Video call |
| Incontinence specialist nurse | 27 February 2024 | Video call |
| Patients | | |
| Patient A | 2 April 2024 | In person |
| Patient B | 2 April 2024 | In person |
| Informal caregivers | | |
| Informal caregiver A | 26 March 2024 | Video call |
| Informal caregiver B | 3 April 2024 | Video call |
| Care assistants | | |
| Care assistant A | 20 March 2024 | In person |
| Care assistant B | 20 March 2024 | In person |
| Care assistant C | 27 March 2024 | Video call |
| Care assistant D | 4 April 2024 | In person |
| Care assistant E | 16 April 2024 | Video call |
| Prescribing nurses | | |
| Prescribing nurse A (nursing home) | 27 March 2024 | Video call |
| Prescribing nurse B (nursing home) | 28 March 2024 | Video call |
| Prescribing nurse C (home healthcare) | 28 March 2024 | Video call |
| Prescribing nurse D (home healthcare) | 4 April 2024 | Video call |
| Prescribing nurse E (home healthcare) | 4 April 2024 | Video call |
| Prescribing nurse F (primary care center) | 25 April 2024 | Video call |
| Prescribing nurse G (primary care center) | 7 May 2024 | Video call |

## 2.4 Research credibility

Ensuring the reliability and validity of a study is crucial for its credibility. Reliability, as defined by Saunders et al. (2007), pertains to the consistency of findings across different occasions and observers. Conversely, validity concerns whether the findings accurately represent the intended phenomenon. Numerous threats to reliability are present in research. As noted by Saunders et al., errors and biases from participants or observers can compromise reliability, often

unintentionally. To mitigate these threats, Saunders et al. recommend ensuring participants anonymity during data collection to promote truthful responses, along with employing structured interview guides.

Several measures are taken to enhance the reliability of the study. In line with recommendations from Saunders et al. (2007), interviews are anonymized to promote participants' openness. Notably, interviews are not recorded to further encourage comfort and candid responses. In addition, as suggested by Saunders et al., the study uses semi-structured interview guides featuring open-ended questions to not guide the participants answers. However, when needed closed follow-up questions are used. To mitigate observer bias and error, one team member conducts the interviews while another takes detailed notes. Subsequently, the interviewer reviews and adjusts the notes as necessary, ensuring accuracy and reliability in data recording.

Another threat to reliability arises from utilizing insights directly from the case company regarding the benefits of Solution X and how it addresses customer needs. Although these insights are handled with care, it is important to note that Company X has conducted several clinically approved studies, showcasing different benefits of Solution X, and are therefore deemed to have significant insights into how Solution X creates value. Due to the limited scope and time frame of the thesis, no triangulation of Solution X's benefits is performed.

Additionally, Saunders et al. (2007) explain that there are several threats to the validity of a study, which can be categorized as threats to external and internal validity. The authors describe that internal validity concerns the extent to which the observed effects in a study can be attributed to the manipulation of the independent variable rather than to other factors. Moreover, external validity, also called generalizability, concerns whether the findings of a study can be equally applicable in other research contexts or to other populations.

Throughout the study, several measures are implemented to enhance the validity of the research findings. Both primary and secondary data are utilized to capture a comprehensive range of perspectives. Additionally, triangulation is employed, incorporating multiple data sources and methods. For example, in the first phase of the study, secondary data is combined with insights from experts in the field. Similarly, data collected in the second phase of the study is validated by experts from Company X, leveraging their expertise in the Swedish UI market.

To improve grammar and readability in the text, a large language AI model (ChatGPT 3.5 by OpenAI) is occasionally utilized. However, this is consistently done with caution, only controlling the language of already written paragraphs and never generating or modifying content, thus not affecting credibility.

## 2.5 Summary of method

In summary, the research purpose composes both descriptive and exploratory elements with an overarching normative character, resulting in two distinct research phases. To reach these objectives, abductive and flexible strategies, with mainly qualitative data, are chosen to allow for an iterative study that considers the real-world complexity. Moreover, a case study design is chosen to fully capture and consider connections with the context of the IoMT solution, as the solution exists in a particularly complex environment (i.e., the healthcare and LTC systems). Solution X, an IoMT solutions for assessments, real-time monitoring, and management within UI, is chosen, aligning with the set delimitations. The solution has been developed for nursing homes and informal caregivers, but the value proposition is yet to be adapted for the mixed home care segment.

Data is collected through secondary sources and interviews, of which the latter is the main source of primary data. The first round of interviews contributes to the descriptive part of the research, understanding the Swedish healthcare system, UI, LTC, Solution X, and UI care provision, whereafter the second round of

interviews contributes to the exploratory research of needs to consider in value proposition adaptation. Finally, measures for research credibility are taken through using anonymous interviews, semi-structured interview guides, and triangulation of data with numerous sources and interviewees.

# Chapter 3 – Theory

*This chapter explores theory relevant to understand and analyze the purpose of this thesis. First, an overview of the theoretical framework is given, whereafter the different identified theoretical models are described in more detail. Finally, the chapter ends with a summary of the identified and theoretical framework, building a foundation for the following empirics and analysis chapters.*

## 3.1 Introducing the theoretical framework

To fulfill the purpose of the thesis, a comprehensive exploration and application of theories in marketing and healthcare system analysis is conducted. A theoretical framework is established based on the thesis structure presented in section 2.1, boiling down the purpose of the thesis into the examination of *context*, *what*, *how*, *who*, and *value proposition design*. The following paragraphs provide an overview of the identified theoretical models for the different parts of the framework, whereafter the following sections describe the models in-depth.

Starting with *context*, Kotler, Wong, Saunders, and Armstrong (2005) emphasize the significance of exploring and comprehending the marketing environment of a company. In addition to the macro trends outlined in section 1.1, understanding the context involves an exploration of the Swedish healthcare system, the mixed home care setting, and the UI healthcare domain. Since this understanding can largely be generated from fundamental healthcare system information, the contextual level does not relate to specific theoretical models.

Moreover, the study includes questions of *what*, *how*, and *who*. First and foremost, the *what* refers to the offered value proposition, a focal point in the thesis purpose. Hence, defining what a value proposition is and identifying tools for describing it is fundamental. In this regard, the *three levels of a product* proposed by Kotler et al. (2005) is deemed a suitable framework, as it aims to dissect and describe value propositions. Secondly, the *how* refers to the delivery of UI home care. As the healthcare sector is known as remarkably complicated in

terms of processes and stakeholder involvement, theories for describing healthcare systems in particular are explored. *Patient journey mapping* is identified as an effective tool for describing different healthcare processes, where the map type *swimlane map* has additional emphasis on the involved actors. Thirdly, the *who* refers to the individuals involved in receiving and providing care. The business buyer profiles by Osterwalder et al. (2014) and stakeholder mapping is recognized as a valuable tool for categorizing and assessing the relative importance of different actors. Furthermore, research highlighting the role of *informal caregivers* is highlighted.

Finally, to identify and analyze needs and wants for a value proposition as per the thesis's purpose, relevant theory is identified in the *value proposition canvas*, building on Osterwalder and Pigneur's (2010) widely recognized *business model canvas*. The value proposition canvas examines the jobs, pains, and gains of different stakeholders or customers, and how these fit the value proposition.

## 3.2 What?

This section aims to introduce the concept of value proposition along with tools for describing it.

### 3.2.1 Definition of value proposition

The value proposition concept was first introduced in 1982 by Michael J. Lanning, a McKinsey & Company consultant and former brand manager at Procter & Gamble and has become a cornerstone in marketing and business strategy (Mahajan, 2019). In an interview with Mahajan (2019), Lanning explains that the value proposition term intended to shift the focus and purpose of businesses. He argued that business should be seen as value delivering systems providing and communicating value to its customers, rather than selling a product and beating competitors. Furthermore, Lanning states that "a value proposition is the most fundamental element of a customer-centric business strategy. A value proposition is a statement for guiding internal leadership and

management of a business strategy; it makes clear what the business intends to actually make happen for the target customers (who are identified in the value proposition)" (Mahajan, 2019). In the interview, he further remarks that the delivery of the value proposition should be included in the business strategy, not in the value proposition itself.

As the value proposition has been adapted by researchers and business professionals, a variety of definitions of the concept have evolved. Kotler et al. (2005, p. 9) define it as "a set of benefits promised to satisfy the customers' needs and it is fulfilled through a marketing offer that is a combination of products, services, information or experiences offered to a market to satisfy a need or want". Similarly, Osterwalder et al. (2014, p. 6) state that a value proposition "describes the benefits customers can expect from your products and services".

### 3.2.2 Definition of solutions and products

At the core of a value proposition is the *solution* offered. Vargo and Lusch (2004), renowned for their theories on service thinking and customer-centric perspectives, argue that solutions can include tangible products, intangible services, or a combination of both. However, Kotler et al. (2005, p. 539) instead use the term *product*, defining it as "anything that can be offered to a market for attention, acquisition, use or consumption that might satisfy a want or need". Similar to Vergo and Lusch's view of a solution, Kotler et al.'s view of a product includes both physical objects, services, persons, organizations, ideas and the mix of these entities. For this thesis, the term *solution* will be used to refer to the offering under consideration. Despite this, it is worth acknowledging that the comprehensive definition of a product, as outlined by Kotler et al. (2005), encompasses all dimensions of a solution, thus making their theories applicable for solutions as well.

### 3.2.3 Three levels of a product

To describe a product, or in this case a solution, Kotler et al. (2005) propose looking at the different product offerings on three different levels. The first level describes the core benefit of the product that the customer seeks – the primary problem that the product addresses. At the next level lies the actual product and its characteristics, delivering the core benefit. This encompasses the product's features, quality, brand, styling, and packaging. Finally, the value of the product is strengthened by the augmented product, which includes additional benefits and services. Figure 3.1 illustrates the model with examples of aspects for the three different levels.

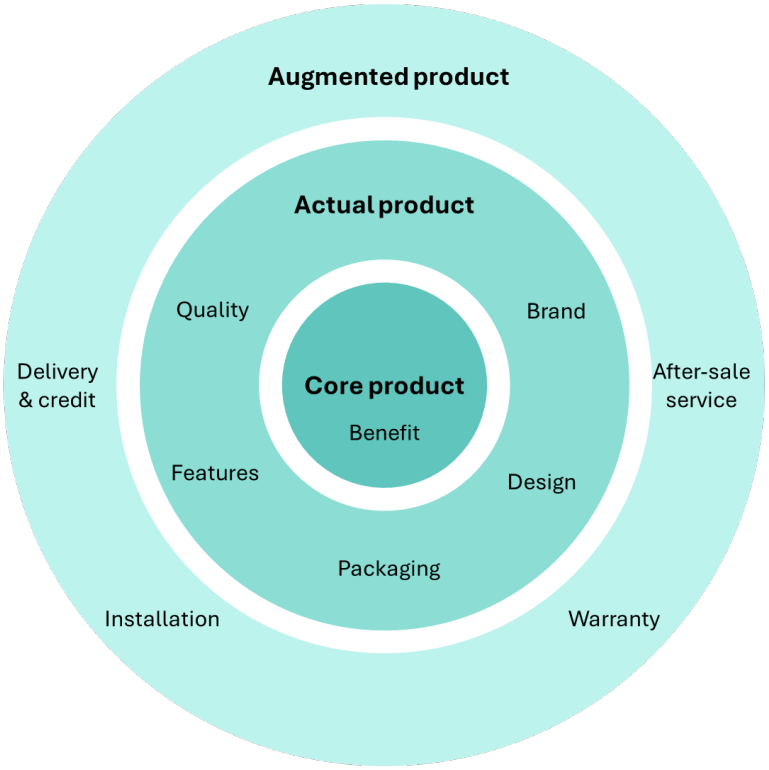


Figure 3.1: The three levels of a product, adapted from Kotler et al. (2005).

## 3.3 How?

This section aims to introduce theory for describing how a solution is utilized and delivered, specifically in a healthcare context.

### 3.3.1 Patient journey mapping

Several studies emphasize the need for a more people-centered perspective in the development of healthcare solutions, particularly digital ones. Wildevuur and Simonse (2015) highlight that advanced digital solutions often overlook the patient and service perspective, focusing excessively on technological and clinical possibilities while neglecting the patient impact. Consequently, these promising healthcare solutions tend to result in low patient satisfaction (Wildevuur & Simonse, 2015). As healthcare evolves to become more people-centered, researchers emphasize an increased need for healthcare solutions to consider the patient's perspective to enhance the acceptance of new medical and non-medical devices and systems (Borycki, 2010; Simonse, Albayrak & Starre, 2019; Gomes et al., 2022). One approach to achieving this, suggested by Simonse et al. (2019), is through the mapping of the patient journey.

A *patient journey*, as described by Barton, Freeman, Baum, Javanparast and Lawless (2019), is "a map of the steps a client takes as he or she progresses through different stages of a disease, often capturing diagnosis and management and interactions with health professionals". Various terms are used interchangeably to describe patient journeys, including *patient journey*, *patient pathway*, *referral pathway*, *client journey*, and *patient care pathway* (Davies et al., 2022; Gomes et al., 2022; Barton et al., 2019). This thesis will use the term *patient journey* to refer to this concept.

In addition to the diverse range of terminologies, various types of patient journey maps emerge, each tailored to specific areas of focus. Jun, Ward, Morris, and Clarkson (2009) describe eight various patient journey maps utilized within healthcare and highlight that the *swimlane map* is useful for understanding different stakeholders and their responsibilities, which aligns well with the thesis objectives. The swimlane map is explained by the authors as an extension of a flowchart, designed to show sequence of activities with a clear role definition by

arranging activities according to responsibilities. An example of a swimlane map with characteristic lanes for each stakeholder is shown in figure 3.2, where the different nodes symbolize different activities and decision points. The placement and linkage of the nodes illustrate the stakeholder involvement in each activity.

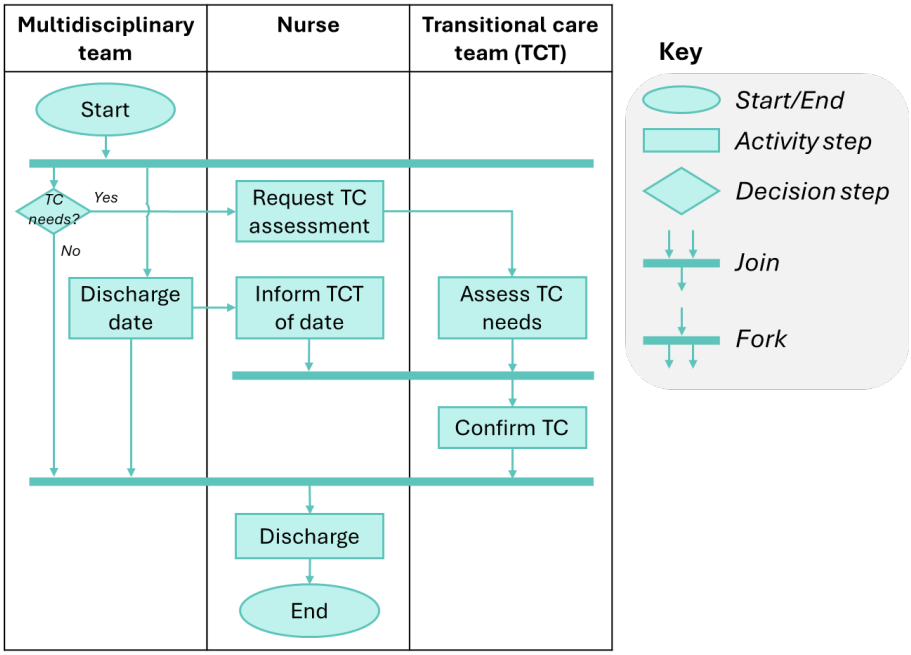


Figure 3.2: Example of a swimlane map, adapted and simplified from Jun et al. (2009).

While Simonse et al. (2019) highlights the advantages of patient journey mapping, Davies et al. (2022) critique the methodology for the lacking a standardized process. Additionally, Davies et al. found high variability in the quality of reporting and highlights issues with transparency and trustworthiness. Nevertheless, the researchers recognize several studies that highlight the value of patient journey mapping in improving quality of care, identifying gaps in services, and examining patient experiences. In response to the critique, Bulto, Davies, Kelly, and Hendriks (2024) propose a process for conducting patient journey mapping, which has been utilized to guide the process for this thesis. The process includes six steps from defining and designing the process mapping research, collecting, and analyzing data to reporting the findings.

## 3.4 Who?

This section aims to introduce theory related to categorizing and analyzing different stakeholders and buyers.

### 3.4.1 Definition of stakeholders

Prior to exploring the theoretical frameworks for categorizing and analyzing various stakeholders, it is essential to establish a clear definition of the term. *Stakeholders* are defined by Johnson, Whittington, Scholes, Angwin and Regner Scholes (2017, p. 134) as "those individuals or groups that depend on an organization to fulfil their own goals and on whom, in turn, the organization depends". There are several different groups of stakeholders who all have different demands, expectations and influence which depends on the situation. The external stakeholders are divided by Johnson et al. into five overarching groups including economic, social/political, technological and community stakeholders. Additionally, there are internal stakeholders. Johnson et al. highlight the importance of understanding who the stakeholders are, what they want, and which has the most influence upon the organization.

### 3.4.2 Buying roles

Customers are among the crucial stakeholders for any business. In business buying, multiple internal and external stakeholders play crucial roles in the customers' decision-making processes. Kotler et al. (2005) define distinct roles within the customer *buying center* to better understand customers' buying processes and dynamics. They argue that the buying center is commonly not a formal entity, that its composition varies between buying decisions, and that the roles can comprise several actors. Similarly, Osterwalder, the creator of the renowned business model canvas, and his co-authors suggest six distinct buying roles: *end users*, *influencers*, *economic buyers*, *saboteurs*, and *recommenders* (Osterwalder et al., 2014). Descriptions of the roles are given in table 3.1.

While Kotler et al. (2005) mainly discuss buying roles within the buying organization, Osterwalder et al. (2014) expand this view to include stakeholders outside of the buying organization. They argue that all buying roles, except for the decision maker role, could consist of actors outside of the buying organization. For example, an end user could be a customers' customer, and an economic buyer could be a supporting governmental organization.

Table 3.1: Description of business buying roles suggested by Osterwalder et al. (2014).

| Role | Description |
|---|---|
| End users | The actors who will ultimately be using the purchased solution, within or outside the buying organization. These can be either passive or active in the purchasing decision. |
| Influencers | Actors whose opinions decision makers listen to and take into account. |
| Decision makers | Actors within the buying organization who have the authority to select a solution and make purchase decision. They commonly have budget responsibility. |
| Economic buyers | The actors actually making the purchase. They commonly control the budget and can sometimes exist outside of the buying organization (e.g., governments purchasing supplies for nursing homes). |
| Saboteurs | Actors who can stand in the way of a purchase through disrupting the purchase itself or disrupt the searching and evaluation of solutions. |
| Recommenders | Actors performing the search and evaluation for solutions, commonly making recommendations regarding a purchase. |

### 3.4.3 Stakeholder mapping

In addition to the buying roles, stakeholders in general can be described based on their level of power and interest. This concept, first introduced by Mendelow in 1981, provides a framework for understanding stakeholder dynamics. Through the process of *stakeholder mapping*, the power and interest of actors are identified and organized into a matrix, as described by Johnson et al. (2017) and illustrated in figure 3.3. On the vertical axis lies the measure of power, defined as "the ability of individuals or groups to persuade, induce, or coerce others into following certain courses of action" (Johnson et al., 2017, p. 136). They further elaborate on various sources and indicators of power for both external and internal stakeholders, as summarized in table 3.2. Additionally, stakeholders are

positioned on the horizontal axis according to their level of interest, encompassing the degree of attention they direct toward the organization and the specific strategic decision at hand. According to Johnson et al., three key factors significantly influence the assessment of stakeholder attention: the criticality of the decision, the communication channels utilized, and the cognitive capacity to process the available information.

Based on the placement of stakeholders within the matrix, different actions and communication strategies are recommended by Johnson et al. (2017) as shown in figure 3.3. Stakeholders with low power and high interest should be kept informed, ensuring their concerns are addressed. On the other hand, stakeholders with high power but low interest should be kept satisfied to maintain their support. Those with both low power and low interest require minimal attention and effort. Lastly, key players, possessing both high power and high interest, require significant focus and engagement as they exert considerable influence on the strategic issue at hand. Johnson et al. highlight that this strategic approach ensures effective stakeholder engagement and management in decision-making processes.

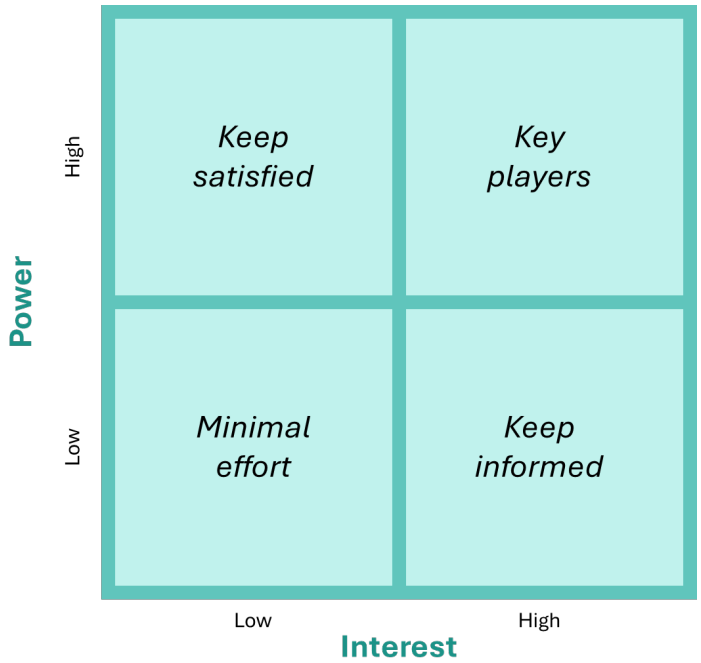


Figure 3.3: The power-interest matrix for stakeholder mapping, adapted from Johnson et al. (2017).

Table 3.2: Sources and indicators of stakeholder power, adapted from Johnson et al. (2017).

| **Sources of power** | |
|---|---|
| For external stakeholders | For internal stakeholder |
| Control of strategic resources<br>Involvement in strategy implementations<br>Possession of knowledge or skills<br>Through internal links e.g., informal influence | Hierarchy (formal influence)<br>Influence (informal power)<br>Control of strategic resources<br>Involvement in strategy implementation<br>Possession of knowledge and skills<br>Control of the human environment |
| **Indicators of power** | |
| For external stakeholders | For internal stakeholder |
| Status<br>Resource dependence<br>Negotiation arrangements<br>Symbols | Status<br>Claims on resources<br>Representation<br>Symbols |

### 3.4.4 Informal caregivers

Studying who is involved particularly in healthcare provision, mixed care evolves as a term capturing care provided by both formal and informal caregivers, as previously mentioned (Renyi et al., 2020; Rodriguez, 2014; Broese van Groenou et al., 2016). While the formal care system is well-recognized, informal caregivers are usually given less attention even though research indicates that they provide a significant share of care in Sweden. Previous survey studies show that between 15% and 52% of Swedish adults provide informal care (Ekman, McKee, Vicente, Magnusson & Hanson, 2021; Jegermalm & Joy Torgé 2021), at a yearly financial cost of around one third of Sweden's healthcare expenditure and 3% of its GDP (Ekman et al., 2021).

Jegermalm and Joy Torgé (2021) further research who the informal caregivers are, what form of care they provide, and whether they have co-carers, providing a framework for classifying informal caregivers into three caregiver profiles. The profiles are distinguished based on whether the caregiver cohabits with the cared-for and whether the cared-for has 'special care needs'. The latter refers to an individual who is elderly, sick, has a disability, or requires specific personal and physical care. The three informal caregiver types are detailed below and in table 3.3.

*The co-habitant family carers* are defined as "caregivers providing help for someone in the same household with special care needs" (Jegermalm & Joy Torgé, 2021), and most commonly care for a spouse or a child. According to survey responses, a majority of co-habitant family carers have no co-carers, and spend almost four times as much time on caregiving than the other two profiles.

*The care network* includes "caregivers providing help for someone not living in the same household but has special care needs" (Jegermalm & Joy Torgé, 2021), often referring to a family member such as a parent or grandparent. According to survey responses, almost nine in ten care network members have co-carers

(commonly formal caregivers such as home care services), thus being the caregiver type with the most assistance.

*The helpful fellowmen* are defined as "caregivers providing help and care for someone not living in the same household that has no special care needs" (Jegermalm & Joy Torgé, 2021). According to survey responses, this is the youngest caregiver type. Six in ten helpful fellowmen claimed to have co-carers, most commonly relatives to the caretaker.

Table 3.3: The three informal caregiver types identified by Jegermalm and Joy Torgé (2021).

| Caregiver type | Share of informal caregivers | Most common help provided | Share with co-carer(s) | Most common co-carer |
|---|---|---|---|---|
| **The co-habitant family carer** | 14% | Housework<br>Keeping company<br>Personal care | 43% | Relatives (26%)<br>Public services (16%)<br>Neighbor/friend (7%) |
| **The care network** | 28% | Keeping company<br>Housework<br>Taking care receiver out of the house | 88% | Public services (57%)<br>Relatives (48%)<br>Neighbor/friend (24%) |
| **The helpful fellowman** | 58% | Keeping company<br>Housework<br>Gardening, minor repairs etc. | 59% | Relatives (43%)<br>Neighbor/friend (20%)<br>Public services (5%) |

## 3.5 Value proposition design

This section aims to introduce theory on value proposition design, by exploring frameworks for business model and value proposition design.

### 3.5.1 Business model canvas

For any company with a value proposition, the surrounding *business model* is essential for realizing the value. According to Osterwalder and Pigneur (2010, p. 14), the purpose of the business model is to describe "the rationale of how an organization creates, delivers, and captures value". While the significance of a

well-defined business model is widely acknowledged, Osterwalder and Pigneur contend that achieving a universally accepted definition of a business model that effectively simplifies the concept without excessive oversimplification has been a challenge.

In response, they offer the *business model canvas* as "a shared language for describing, visualizing, addressing, and changing business models" (Osterwalder & Pigneur, 2010, p. 12), a concept initially created by Osterwalder in 2004. The business model canvas comprises nine elements that collectively build a company's intended business model: customer segments, value proposition, channels, customer relationships, revenue streams, key resources, key activities, key partnerships, and cost structure (Osterwalder & Pigneur 2010), see figure 3.4.


Figure 3.4: The business model canvas, adapted from Osterwalder & Pigneur (2010).

### 3.5.2 Value proposition canvas

Expanding on the business model canvas, Osterwalder et al. (2014) propose the *value proposition canvas* (VPC) as a tool for crafting new value propositions and

improving existing ones to cater to customer needs and wants. Accordingly, the VCP zooms in on two key elements of the business model canvas: customer segments and value propositions. This yields a two-sided model, as shown in figure 3.5. The authors' idea is that a good fit between customer segments and value propositions can be achieved through aligning the two sides of the model.

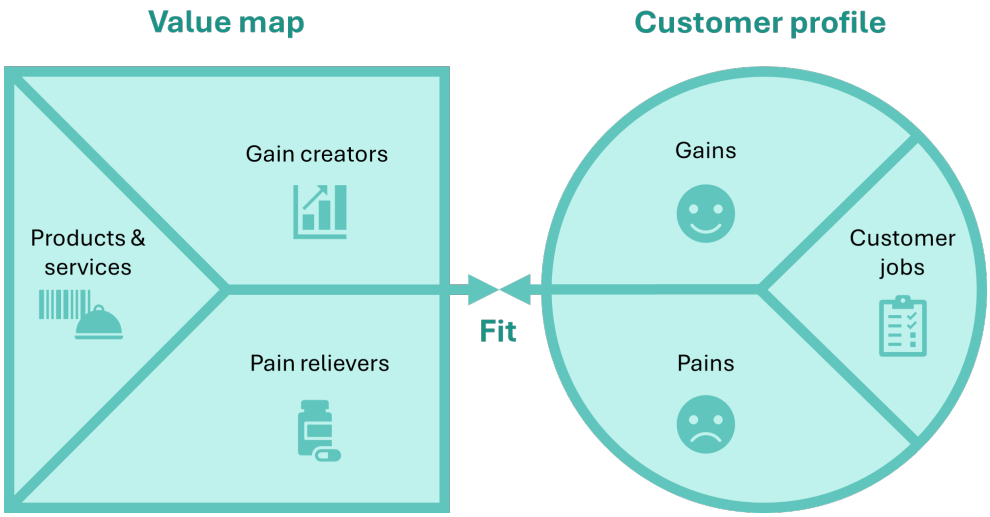


Figure 3.5: The value proposition canvas, adapted from Osterwalder et al. (2014).

#### 3.5.2.1 The customer profile

Adopting a customer-centric approach to innovation, Osterwalder et al. (2014) start by describing the customer segment component of the VPC, called the *customer profile*. The primary objective of the customer profile is to provide a structured approach to describing customer needs, completely separated from the value proposition. A customer profile is created for each customer segment of interest, providing a comprehensive description from three distinct perspectives.

Firstly, the *customer jobs* are described. Osterwalder et al. (2014, p. 12) explain that jobs typically encapsulate "the problems [customers] are trying to solve, or the needs they are trying to satisfy". This implicates taking a broader perspective beyond a specific product or solution, emphasizing an exploration of the root

cause behind the need. The authors further distinguish between four types of customer jobs: functional, social, personal/emotional, and supporting, as detailed in table 3.4. While a customer commonly has many jobs, Osterwalder et al. argue that not all hold equal importance. For instance, a job addressing a critical, recurring problem is deemed more significant than other jobs.

Table 3.4: The four different types of customer jobs (Osterwalder et al., 2014).

| **Customer job** | **Description** | **Example** |
|---|---|---|
| **Functional job** | Customer needs to solve a practical problem or perform a task | Mow the lawn |
| **Social job** | Customer needs to be perceived in a certain way | Look trendy |
| **Personal/emotional job** | Customer needs to feel a certain way | Seek peace of mind |
| **Supporting job** | Customer needs emerging in the purchasing and consuming process – depends on role | *For buyer:* compare offers, stand in checkout line<br>*For co-creator:* post product reviews, give feedback<br>*For transferrer:* cancel a subscription, dispose/resell a product |

Secondly, the customer profile describes the *customer pains*. Osterwalder et al. (2014, p. 14) define pains as "anything that annoys your customers before, during, and after trying to get a job done or simply prevents them from getting a job done" including risks associated with the job. The authors categorize pains into three categories. The first category includes feelings of dissatisfaction with a solution, e.g., that it does not work, makes the customer feel negative emotions, is annoying, or lacks aesthetic appeal. The second category covers obstacles to solving a job, e.g., that the customer lacks time or money for existing solutions. The third and final category includes risks, also referred to by the authors as

"undesired potential outcomes", e.g., potential loss of credibility associated with a certain solution. Similar to customer jobs, Osterwalder et al. mean that pains can vary in severity, ranging from "moderate" to "extreme".

Thirdly, the *customer gains* are described. Osterwalder et al. (2014, p. 16) explain gains as "the outcomes and benefits your customers want", such as functionality or cost savings. The authors divide the gains into four categories based on level of cruciality to the solution. Firstly, the *required gains* are the fundamental functions essential for the solution to operate. Secondly, *expected gains* consist of functions considered basic and, therefore, anticipated to be included in the solution but not crucial for its functionality. Thirdly, *desired gains* comprise functions that are not anticipated but add extra value to the customer. Lastly, *unexpected gains* involve unspoken needs or functions that customers may not identify on their own. This categorization highlights the varying degrees of importance assigned to different gains. Osterwalder et al. suggest placing gains on a scale ranging from "nice to have" to "essential".

After completing the customer profile, Osterwalder et al. (2014) highlight the importance of ranking different jobs, pains and gains according to the presented scales.

#### 3.5.2.2 The value map

Moving on to the value proposition part of the canvas, which Osterwalder et al. (2014) call the *value map*. Like the customer profile, the value map provides a structured approach to describing a certain value proposition based on three perspectives.

Firstly, the value map describes the products and services forming the foundation of the value proposition. Osterwalder et al. (2014) underscore that an array of products and services need to be considered, including tangible, intangible, digital, and financial products and services. Furthermore, products and services targeting supporting jobs (see table 3.3 above) can also be included.

Secondly, Osterwalder et al. (2014, p. 31) suggest identifying *pain relievers*, which according to the authors answer "how exactly your products and services alleviate specific customer pains". They note that the pain relievers should align with customer pains but emphasize that no value proposition can target every pain.

Thirdly, and lastly, *gain creators* are described. Like the relationship between customer pains and pain relievers, gain creators describe how the value proposition aims to create the earlier presented customer gains (Osterwalder et al., 2014). As it is impossible for a value proposition to respond to all articulated and unarticulated customer gains, the authors suggest focusing on a few gain creators.

Similar to the customer profile elements, Osterwalder et al. argue for the ranking of identified products and services, pain relievers, and gain creators to establish their relative importance (2014). The authors propose a ranking scale from "nice to have" to essential for all three elements of the value map.

#### 3.5.2.3 The fit

Once all six fields of the customer profile and the value map have been filled out, the fit between the customer profile and the value map can be analyzed. Osterwalder et al. (2014) outline this process, suggesting that each pain reliever and gain creator should be evaluated based on whether they target a certain customer pain/gain or not. This evaluation creates a comprehensive understanding of how well the value proposition resonates with the customer, highlighting potential areas for improvement.

Osterwalder et al. mention three distinct types of fit (2014). In the case of early-stage value propositions such as the one studied in this thesis, companies typically aspire to achieve a *problem-solution fit*. The authors explain that this is

done thorough careful analysis of customer profiles, using the insights to create a value proposition with attributes that address identified problems.

#### 3.5.2.4 Applying the framework

When applying the VPC for value proposition design, Osterwalder et al. (2014) propose two different starting points: *technology push* or *market pull*. In the push approach, a company formulates a value proposition based on its existing resources, such as technology or innovation. This means exploring the value map side of the VPC, designing a value proposition, and testing its compatibility with various customer profiles. The authors phrase this process as "a solution in search of a problem" (Osterwalder at al., 2014, p. 94). On the contrary, the market pull method initiates from the customer side of the VPC, generating a value proposition building on customer jobs, pains, and gains. Once these are thoroughly understood and ranked, a value proposition is designed, and resources are adjusted accordingly. Consequently, the pull method can be simplified as "a problem in search of a solution" (Osterwalder et al., 2014, p. 95).

Osterwalder et al. (2014) also discuss briefly how the VPC can be nuanced when applied in B2B contexts. They propose the creation of distinct customer profiles for various B2B buying roles, even within a single buying organization, thus capturing the different jobs, pains and gains that may arise from different stakeholders within or around the buying organization. The proposed customer profiles are end users, influencers, economic buyers, decision makers, saboteurs, and recommenders, which were described in section 3.4.2.

Sibalija, Barrett, Subasri, Bitacola, and Kim (2021) examine the application of Osterwalder et al.'s framework for value proposition design, analyzing its strengths and weaknesses. The researchers highlight the advantages of both the iterative and structured approaches in gathering insights about customer needs through interviews. However, Sibalija et al. note that Osterwalder et al. lack an external perspective on competitors. Additionally, the value proposition design process focuses on profit generation and is not tailored for non-profit

organizations like healthcare providers. Furthermore, while the researchers emphasize the benefit of a structured approach for data collection, they highlight a lack of formalized processes for analyzing the data.

### 3.5.3 Value proposition design for IoMT solutions in mixed home care

Limited research exists regarding designing IoMT value propositions for mixed home care as most research regards digital healthcare solutions with a technological emphasis. In a systematic review, Dantu, Dissanayake, and Nerur (2021) found a predominant focus on technology in IoT research within the healthcare domain, neglecting social and organizational challenges. In contrast, other researchers highlight organizational factors as significant barriers to implementing digital solutions within healthcare (Nilsen, Dugstad, Eide, Gullslett, and Eide, 2016; Gjestsen, Wiig, and Testad, 2017; Persson, Larsson, Erlingsdottir, and Rydenfält, 2023).

Furthermore, Nilsen et al. (2016) argue that understanding the barriers to implementation of new innovations is important when developing a solution. Moreover, the researchers found four main resistances to implementation of digital solutions within healthcare, organizational, cultural, technological, and ethical. Organizational resistance encompasses opposition to changing established routines, developing competencies and cross-group communication. Cultural resistance arises from language disparities and clashes of professional cultures. Nielsen et al. also highlight resistance stemming from reluctance to adopt new technology, IT infrastructure issues, and IT staff's resistance to innovation. Moreover, there are ethical concerns regarding patient safety, quality of care, privacy, dignity, and justice.

While the understanding of barriers to implementing digital solutions in healthcare is crucial, Shaw et al. (2018) emphasize the importance of focusing on the actual value created for end users, proposing VPC as a method for digital

healthcare innovation to achieve this goal. They argue that digital tools should not be viewed in isolation, as their effects on healthcare are closely linked to the professionals using them and the new routines they introduce or facilitate. Consequently, Shaw et al. advocate for evaluating digital innovations as service innovations, examining the associated "tool, team, and routines". Additionally, the study mentions procurement as a critical actor in the adaptation process.

Moreover, Frennert (2019) argues that healthcare technologies like IoMT should not be adopted merely for the sake of embracing technology but should provide tangible value to end users by addressing the specific needs of patients and care organizations. The research suggests a framework for developing healthcare technologies, which includes understanding and evaluating its purpose, implementation process, involved people, and the product itself. On a similar note, Persson et al. (2023), studying opportunities and challenges in home healthcare digitalization, argue that current routines as well as nurses' experiences and perceptions of digital aids should be considered in digitalization of home care. Furthermore, they show that nurses need easier information access and documentation opportunities on-the-go, better communication channels, and digital solutions that decrease workload rather than increase complexity.

## 3.6 Summary of theory

To identify and understand requirements to consider when designing a value proposition for an IoMT solution for the mixed home care market, a structure including the context, what, how, who, and value proposition design has been set. This approach is in line with the framework by Shaw et al. (2018), which advocates for using the VPC and examining the tool, the routines, and the team, corresponding to what, how, and who. The focus on carefully understanding the needs of patients and caregivers aligns with Frennert's (2019) general framework for developing healthcare technologies.

Building on this structure, suitable theoretical models have been gathered and described. Through combining the thesis structure with the theoretical models, a theoretical framework for the thesis is created and illustrated in figure 3.6. The framework provides a structured and comprehensive approach, guiding the empirical study and analysis to meet the research purpose.

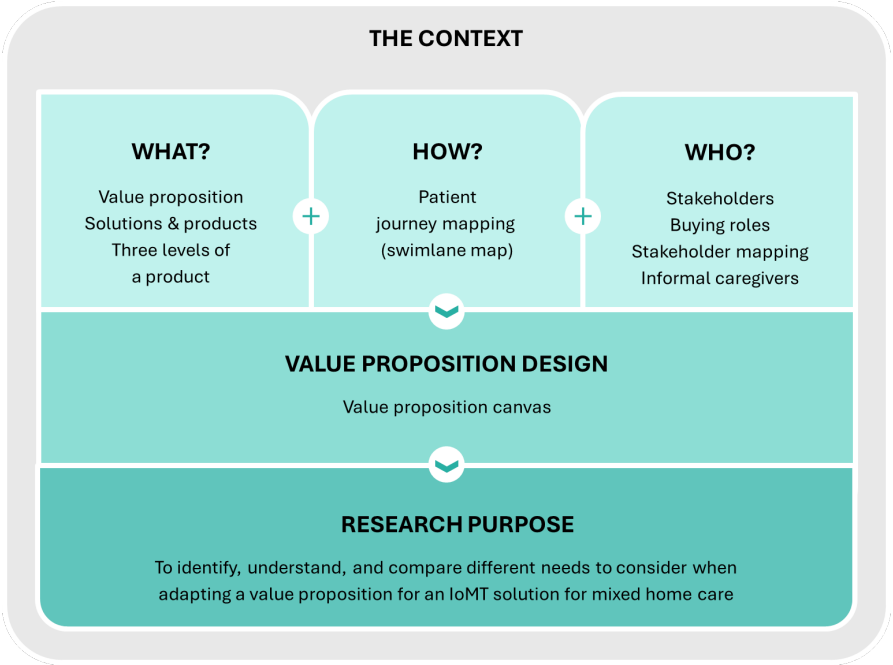


Figure 3.6: The theoretical framework for the thesis.

# Chapter 4 – Empirics on context, what, how, and who

*This chapter comprises the empirical findings for the first parts of the thesis framework. While not the primary focus of the thesis, this phase provides a necessary understanding for the subsequent chapters. It includes understanding the context, the solution, and UI care provision including how and by whom it is provided.*

## 4.1 The context

This section describes the context for the thesis case, including the basic mechanisms of the Swedish healthcare system, LTC caregivers, and the UI healthcare domain.

### 4.1.1 The Swedish healthcare system

The Swedish healthcare system involves various actors, collectively bearing the responsibility for healthcare provision. The Swedish Association of Local Authorities and Regions (SALAR) (2023) explains that there is a shared philosophy throughout the different levels of the healthcare system, aiming for equal and respectful treatment where priority is given to those in greatest need of care. The following sections describe the responsibilities allocated to the three levels of the healthcare system, the funding mechanisms, and the procurement processes.

#### 4.1.1.1 Responsibility on three levels

As outlined by SALAR (2023), the healthcare system spans national, regional, and local levels, which are detailed in figure 4.1. The national level, represented by the government and the Swedish Parliament (Riksdagen), establishes the legal framework, strategic direction, and allocates public funds through budget decisions. It is also responsible for legislation governing healthcare, including the Healthcare Act, the Patient Act, and the Patient Safety Act. Furthermore,

SALAR explains that national authorities contribute by providing knowledge support, gathering statistics, and evaluating healthcare. They are also responsible for health-economic assessments and decisions on what expenditures should be included in the state's coverage of individuals' healthcare costs.

The regional and municipal levels have more operational focus according to SALAR (2023). The 21 regions are responsible for most healthcare services, spanning health promotion, prevention, diagnosis, and treatment. This includes overseeing facilities such as hospitals and primary care centers as outlined in figure 4.1. In addition, the regions are responsible for allocating resources between healthcare providers.

The responsibilities of the 290 municipalities include providing LTC to elderly and people with disabilities in ordinary homes and special housing, as explained in the *Health System Review* done in collaboration between the Swedish Agency for Health and Care Services Analysis and the European Observatory on Health Systems and Policies (Janlöv et al., 2023). This responsibility extends to patients discharged from hospitals who still require ongoing care. Across all regions except Stockholm, management and execution of home healthcare has been contracted to the municipalities, according to SALAR (2023). Home healthcare offers similar services to primary care centers but provides care in the patient's home for those unable to visit the centers. However, SALAR remarks that municipalities are generally prohibited from offering medical services conducted by doctors.

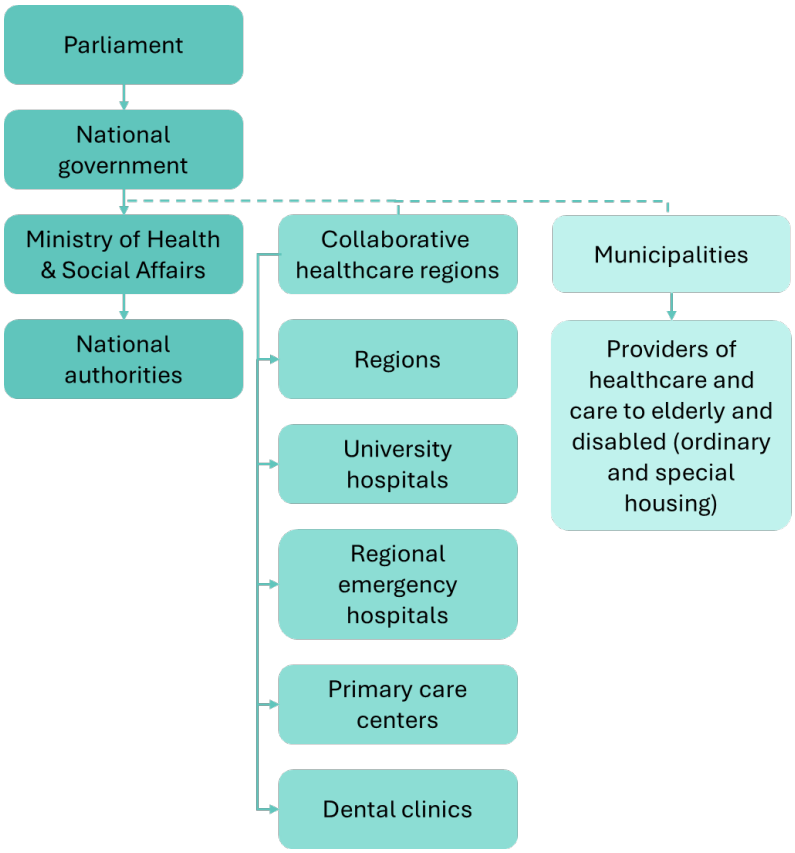


Figure 4.1: An overview of the three levels of the Swedish healthcare system (adapted from Janlöv et al., 2023).

The Swedish healthcare system allows private healthcare providers to operate alongside public services, according to Janlöv et al. (2023). Private providers must offer patient-centered care, ensuring patients can access information, influence their care, and meet regional requirements. As explained by the National Board of Health and Welfare (2019), private providers may have contracts with the national healthcare system or be independent, affecting patient costs and subsidizations. Additionally, patients in Sweden can freely choose their primary care provider, whether public or private, within their region (Janlöv et al., 2023).

#### 4.1.1.2 Healthcare financing

The Swedish healthcare system is mainly funded through local taxation, government grants, and out-of-pocket payments, including flat-rate fees for hospital visits, according to Janlöv et al. (2023). Looking at 2020 expenditures, around 51% was allocated to care facilities like hospitals and primary care centers, 26% to LTC for the elderly, and 12% to medical products.

The funding of healthcare benefits patients by supporting coverage for treatments and medications. All Swedish residents are entitled to healthcare coverage, and emergency care extends to residents of the European Union and other agreement countries (Janlöv et al., 2023). Rather than having a defined list of covered services, they further explain that healthcare providers are responsible for delivering care based on available funds, prioritizing those with the greatest needs. Generally, the most cost-effective treatments and medicines are offered, however local and individual variations exist.

Prescription drug coverage follows a progressive system. Once a patient's expenditure reaches 2,850 SEK within a year, prescription drugs become entirely free according to the Swedish eHealth Agency (2023). However, there is a lack of a similar system for technical devices and aids, resulting in regional differences in coverage, which is under government review (Janlöv et al., 2023).

#### 4.1.1.3 Procurement in the healthcare system

Procurement within the public sector in Sweden is regulated by the Public Procurement Act, which is based on directives from the EU, according to the Swedish Competition Authority (2022). This legislation applies across government, regional, and municipal levels to promote fair competition and efficient use of public funds. Under this act, public procurers must evaluate all suppliers impartially and select the best offering, without favoring national or previous suppliers (Swedish Competition Authority, n.d.a). According to the

Swedish Competition Authority (2022), tenders exceeding specified thresholds must be advertised in designated databases, allowing suppliers at national and European Union levels to submit bids.

Public procurement practices within the healthcare system vary. While individual municipalities or regions handle procurement independently, incontinence coordinator A[1] highlights that some regions establish collaborative alliances with shared procurement functions. They further explain that in many regions, private healthcare providers participate in purchasing contracts negotiated by these alliances, ensuring consistent suppliers and pricing. To advise procurement decisions, the interviewed incontinence coordinators[2] gather input from prescribing nurses through questionnaires. They also organize focus groups involving nurses, aid experts, and environmental specialists to evaluate alternatives and guide public procurement choices.

### 4.1.2 The LTC system

Sweden has a comprehensive LTC system. In 2020, the cost of LTC for elderly amounted to 2.7% of GDP, mainly covering assistance with daily activities in ordinary and nursing homes according to Janlöv et al. (2023). The elderly population, however, is diverse in terms of care needs. The Swedish Agency for Health and Care Service Analysis (2015) categorizes seniors into three groups based on their level of assistance required, ranging from none or mild to severe impairment. They argue that care needs typically depend on three factors: emotional needs such as worry or social isolation, cognitive impairment, and physical disabilities. Among elderly aged 78 and older, the agency estimates that 63% have no impairments, while 19% and 18% exhibit mild and severe impairments, respectively.

[1] Incontinence coordinator A, Interview via video call, 29 February 2024.

[2] Incontinence coordinators A-C, Interviews via video calls, 29 February 2024; 4 March 2024; 5 March 2024.

#### 4.1.2.1 The different forms of LTC

Meeting the diverse needs of the elderly requires various forms of LTC. In general, formal LTC can be categorized based on whether the elderly reside in ordinary housing or nursing homes. Nyholm and Björkman (2021) describe nursing homes are entities that provide accommodation for overnights stays along with support services in the form of care and assistance for elderly individuals. The services provided by nursing homes include round-the-clock supervision, assistance with activities of daily living such as bathing, dressing, medication management, meal preparation, recreational activities, and access to healthcare professionals such as nurses. For specialized care, individuals either visit hospitals or specialist clinics, or physicians come to the nursing home. Although most individuals in nursing homes stay for an extended period, Nyholm and Björkman explain that nursing homes also offer short-term placements for elderly following surgery or incidents that may temporarily reduce their ability to live independently.

While nursing homes function as integrated units, Seniorval (n.d.a) explains that the healthcare for individuals residing in ordinary housing is managed by various entities. General healthcare is typically provided through primary care centers. However, in cases where visiting primary care centers is not feasible, individuals may receive home healthcare. Additionally, specialized care is available at hospitals and specialist clinics as needed. Seniorval further explains that home care services offer additional assistance within the individual's own home, including tasks such as cleaning, cooking, dressing, bathing, medication management, and assistance with toileting. They moreover highlight that home healthcare workers may delegate certain healthcare tasks to care assistants in home care services.

#### 4.1.2.2 The extent of LTC

The Swedish Agency for Health and Care Service Analysis (2015) explains that as an individual's care needs grow, interventions become more extensive as

shown in figure 4.2. Individuals with severe impairments often receive more comprehensive assistance in nursing homes, whereas those with mild or no impairments typically receive less intensive support in ordinary housing, such as home care services. Additionally, some live in assisted living facilities which operate as ordinary housing, but cater specifically to the elderly, providing supplementary services within the premises. Janlöv et al. (2023) highlight that the high rate of home care services is in line with the national policies that promote care in ordinary housing over nursing homes for LTC recipients.

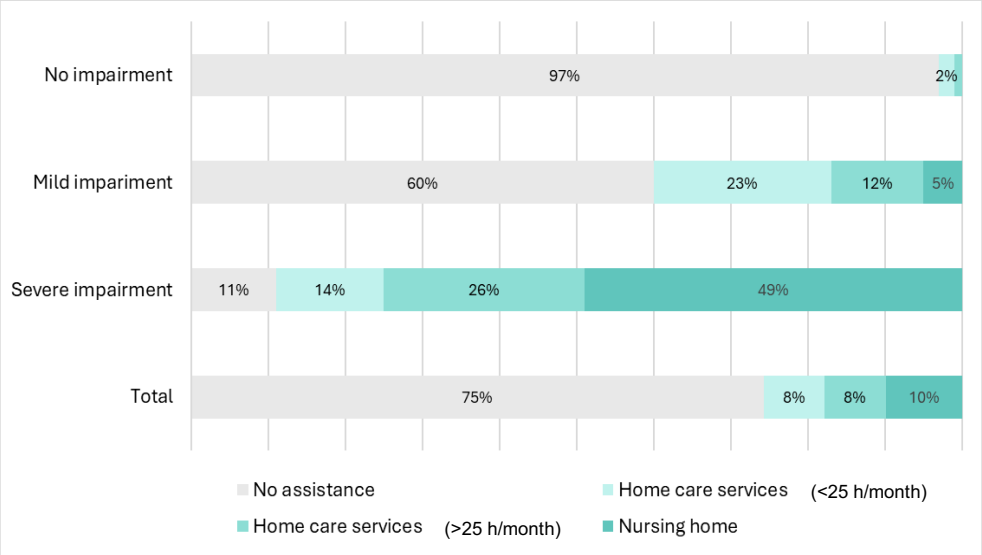


Figure 4.2: Type of LTC based on level of impairment, adapted from Swedish Agency for Health and Care Service Analysis (2015).

In addition to the type of care provided, the amount of care varies according to the Swedish Agency for Health and Care Service Analysis (2015). As illustrated in Figure 4.3, the quantity of formal and informal care received depends on the type of assistance and level of impairment. Notably, the level of informal care increases with the level of assistance and impairment until the patient transitions to a nursing home, where the involvement of informal caregivers drastically declines.

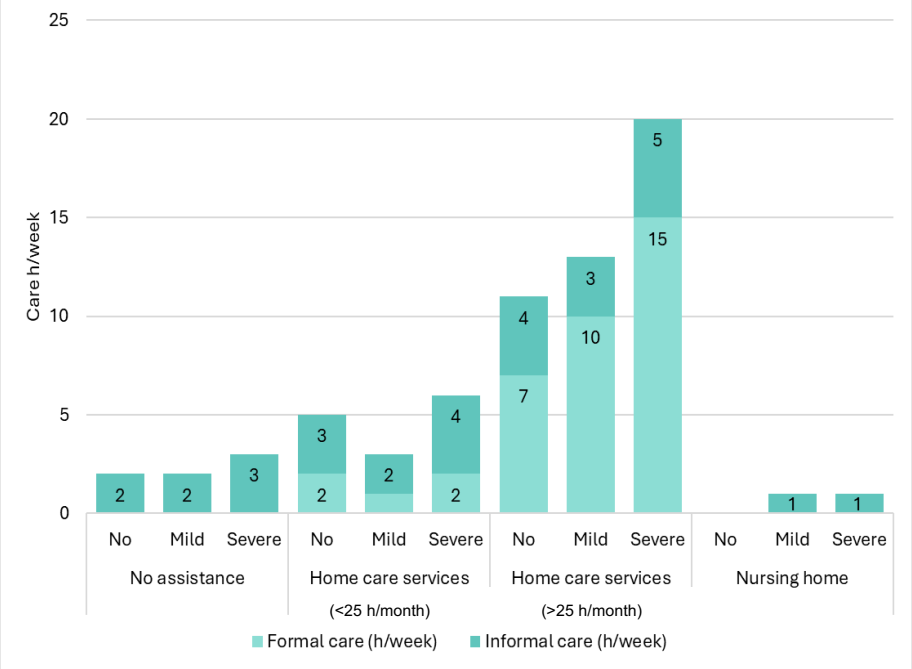


Figure 4.3: Extent of LTC based on level of impairment, adapted from Swedish Agency for Health and Care Service Analysis (2015).

Additionally, LTC, particularly for the elderly, is subject to significant variation over time. The variation in care need is evident in Hjalmarson's (2014) analysis of housing and condition of first-time applicants for LTC. Among the elderly individuals who applied for LTC for the first time, 70% sought home care services at their ordinary home, 7% sought home care services in assisted living facilities, and 22% applied for admission to nursing homes. However, Hjalmarson emphasizes that the duration of LTC is generally short, and care needs evolve over time. For instance, a majority of individuals who initially receive home care services transition to nursing homes within six years.

#### 4.1.2.3 Combining caregivers and healthcare providers

As discussed, multiple actors are involved in LTC, often in combination with each other (see e.g., Swedish Agency for Health and Care Service Analysis, 2015; Seniorval, n.d.b). Figure 4.4 shows how the different sets of caregivers are commonly involved in different care scenarios. As explained by the interviewed

incontinence specialist nurse[3], patients living in an ordinary home primarily receive healthcare in primary care centers. If they receive home healthcare instead due to their condition, incontinence specialist nurse[4] and prescribing nurses C[5], F[6] and G[7] explain that this is commonly combined with extensive home care services. For patients residing in nursing homes, both care services and healthcare are provided by the nursing home (Seniorval, n.d.a). As underscored in the previous section and shown in figure 4.2, informal care is commonly prevalent alongside formal care in all scenarios of LTC.

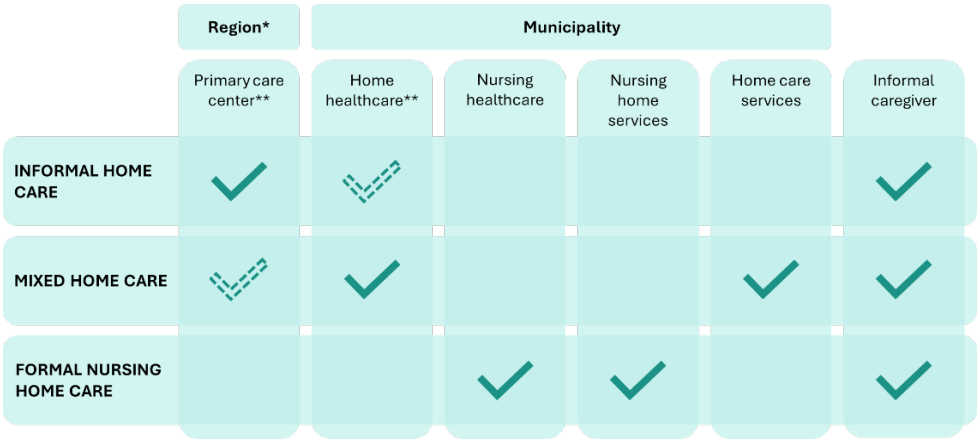


Figure 4.4: The main regional, municipal, and informal healthcare providers involved in different types of LTC, depending on patient needs.
*The region also operates home healthcare in Region Stockholm. **Healthcare is most often provided by the actor with the filled checkmark but can also be provided by the actor with the dotted checkmark.

#### 4.1.2.4 Assessment of LTC needs

The amount and type of formal care provided is based on the individual's needs, assessed by the municipality. While patients typically apply for formal care

[3] Incontinence specialist nurse, Interview via video call, 27 February 2024.
[4] Incontinence specialist nurse, Interview via video call, 27 February 2024.
[5] Prescribing nurse C, Home healthcare, Interview via video call, 28 March 2024.
[6] Prescribing nurse F, Primary care center, Interview via video call, 25 April 2024.
[7] Prescribing nurse G, Primary care center, Interview via video call, 7 May 2024.

themselves, the National Board of Health and Welfare (2016a) highlights that both informal and formal caregivers or healthcare providers can report a patient's need for care. However, it is noted that the patient has the final say in what care they receive.

Kunskapsguiden (n.d.) explains that patients applying for LTC meet with a social worker who assesses their needs, assists in the application process, and determines the level of assistance required. The evaluation includes the individual's health status, ability to perform daily routines, and personal preferences. Seniorval (n.d.b) explains that informal caregivers can participate in the needs assessment meeting together with the patient and social worker to support the patient. Healthcare professionals can also participate or give their opinions if needed, for example if the patient needs assistance following a hospital visit. Following the initial assessment, Kunskapsguiden (n.d.) underlines that the social worker conducts annual reassessments of assistance needs.

### 4.1.3 Urinary incontinence

This section describes UI, including its prevalence, treatments, and associated consequences. Understanding of the urinary system and different types of UI is detailed in Appendix A.

#### 4.1.3.1 Prevalence of urinary incontinence

UI is a common condition that significantly impacts the quality of life for many individuals. It is defined by the International Continence Society (n.d.) as "the complaint of any involuntary loss of urine". Stockholm Drug Committee's Expert group for urinary diseases highlights that due to variations in the definition, particularly the absence of specification regarding the frequency of leakage, estimations of UI prevalence vary (Janusinfo, 2023). In Sweden, the Expert group estimate that approximately half a million people experience UI, with leakage at least once a week, where women are three times more likely to be affected due to anatomical and hormonal differences. The Expert group notes that prevalence of UI in men is notably lower than in women up to the age of 75,

after which it rises to approximately the same level. Furthermore, the prevalence of UI increases with age both for women and men. For instance, the National Board of Health and Welfare (2016b) estimates that 30-40% of people aged 65+ have UI and 80% of elderly living in nursing homes. With the demographic shift underway, the prevalence of the condition is expected to rise.

#### 4.1.3.2 Treatments of urinary incontinence

There are various treatments for UI depending on the individual situation and type of UI. Stockholm Drug Committee's Expert group for urinary diseases (Janusinfo, 2023) outlines several common treatments, ranging from simple behavioral changes and specific exercises to pharmaceutical, neuromodulatory, and surgical treatments. The National Board of Health and Welfare (2016b) states that when treatments are not enough and leakage remains, there can be a need for UI pads. The pads are provided by the state for free according to the Swedish Healthcare Guide (2021), however some regions charge for the testing and prescription of aids. While various treatments are available, the Expert group (Janusinfo, 2023) estimates that only half of UI patients seek medical care, with even fewer undergoing assessment and treatment. One contributing factor to the low number of individuals seeking treatment could be the persistent taboo surrounding the topic, according to the Expert group.

#### 4.1.3.3 Consequences of urinary incontinence

UI can lead to significant physical and social limitations. In their 2020 study Pizzol et al. performed a systematic review of studies comparing quality of life between UI patients and people without UI, involving nearly 25,000 participants. Their findings confirm a strong link between UI and poor quality of life, highlighting the profound impact of UI on individuals' well-being. The authors further highlight that those affected often deny or hide their condition, due to societal perceptions and feelings of shame. The condition often results in reduced enjoyment of life and a loss of self-confidence, social isolation, anxiety, depression, and diminished sexual and physical activity. Moreover, UI imposes a considerable financial burden on society. The National Board of Health and

Welfare (2016b) estimates that the cost of UI aid varies between 7,000 to 11,000 SEK per patient annually, with half of the expenditure attributed to individuals over 80 years of age. As an example, Region Stockholm (2019) estimates that within the Stockholm region, home to a population of 2.4 million (Region Stockholm, 2023), the cost of UI care ranges from 500 million to 1 billion SEK, with around 250 million allocated for aids, primarily incontinence products.

### 4.1.4 Summary of context

In summary, the Swedish healthcare system is a complex system involving many different caregivers, including formal and informal, public and private, as well as regional and local actors. Responsibilities are divided between actors through legislations, aiming to provide full-coverage healthcare for all Swedish citizens throughout their lives. The healthcare system is mainly financed by income tax, which is then utilized to provide subsidized care to patients in need. Through laws on public procurement, public care providers systematically choose what healthcare should be offered to the people in terms of, for example, medicines and aids. Furthermore, it is common that different actors cooperate or share responsibility in the provision of care, not least in LTC of elderly. Finally, UI is described as particularly common among elderly and LTC patients. It poses a large issue both in terms of patients' perceived quality of life and financial costs for the healthcare system and is expected to increase in the near future.

## 4.2 The solution

Having established the essential context, focus can be directed towards Company X and the value proposition examined in this thesis. Company X aims to provide a comprehensive offering that caters to the many needs of UI patients and caregivers. They offer a wide array of UI pads and supporting products and services, such as products for skin health. The Innovation Manager at Company X[8] explains that at the core of the company's offer is the UI patient journey that

[8] Innovation Manager, Company X, Interview via video call, 14 March 2024.

encompasses assessment, development of a personalized care plan, execution, and evaluation of the care plan.

Taking a closer look at Solution X, it is a digital solution within the company's offering. It is built around a sensor that allows for two main tasks: assessment and real-time monitoring of UI. As described by the Innovation Manager at Company X[9], the wireless sensor is connected to a platform with interfaces for both computers and mobile devices. Using wetness detectors Solution X can monitor and report the moisture levels of pads. When combined with information about the absorption capacity of the specific pads, it can assist in mainly assessment and monitoring of UI.

When utilizing Solution X for assessment, the Innovation Manager at Company X[10] explains that the patient wears the sensor continuously for 72 hours to track leakage patterns. Specific pads with built-in wetness receptors are used. When changing pads, the sensor is detached, attached to the new pad, and the pad type is registered to the digital platform. Additionally, specific events such as toilet visits and pad leakages are manually logged into the platform. Following the 72-hour period, a report detailing the patient's leakage pattern is generated. This report is then analyzed by a trained nurse, who utilizes it to recommend optimal toileting schedules and appropriate pad selections. The Innovation Manager further highlights that Company X can assist in interpreting the charts.

The second main function of Solution X involves real-time monitoring of UI. According to the Innovation Manager at Company X[11], the sensor can be utilized either continuously or during specific time periods for this purpose. Like in the assessment process, the sensor is detached, affixed to a new pad, and the pad type is logged onto the platform with each pad change. The caregiver

[9] Innovation Manager, Company X, Interview via video call, 14 March 2024.
[10] Innovation Manager, Company X, Interview via video call, 14 March 2024.
[11] Innovation Manager, Company X, Interview via video call, 14 March 2024.

receives real-time updates on the pad's status, complete with notifications and recommendations for optimal pad changes. The Innovation Manager further highlights the versatility of the solution. For example, multiple caregivers can simultaneously access the system for one patient. Moreover, a single caregiver can oversee multiple patients. The data from the sensor can later be utilized during an evaluation of the patient's care plan, helping the prescribing nurse to determine whether adjustments are needed to the care plan or selection of pads.

To complete Solution X, several services are provided by Company X to the customers as emphasized by the Innovation Manager[12]. These encompass a comprehensive customer service package, addressing logistical, administrative, and technical concerns. Additionally, they offer valuable assistance in utilizing the sensors, interpreting the data, and selecting appropriate pads. For instance, caregivers receive training in sensor usage, while prescribing nurses are educated on interpreting assessment data and selecting pads suitable for the patient's needs. Furthermore, Company X maintains an extensive portfolio of information about UI on their website, covering various aspects such as the condition itself, caregiving, pad selection, and sensor usage.

An essential step in comprehending a solution is to determine its classification. The solution falls under the category of a medical technical device, as defined by Swedish Medical Product Agency (2019). The agency explains that medical technical devices serve various medical purposes such as diagnosis, treatment, and monitoring of diseases or disabilities in humans. In addition, the solution can be classified as an IoMT. As described in section 1.1.3 a IoMT consists of a sensory object connected to the internet, through which it provides real-time health data to caregivers and patients.

[12] Innovation Manager, Company X, Interview via video call, 14 March 2024.

### 4.2.1 The value of Solution X

Solution X aims to provide value to its users in several different ways, as described by the Innovation Manager at Company X[13]. Through the assessment support provided by Solution X, the company aim to introduce structured and easy-to-follow routines for assessment and follow-up of UI care, resulting in personalized toilet routines and pad prescriptions. Clinical studies by Company X show that this personalization leads to more than 50% decrease of pad leakages as well as prescription of smaller pads than earlier believed necessary for nearly one in four users. This, in turn, leads to less burden for caregivers, lower pad costs, and increased comfort and dignity for patients. Furthermore, the Innovation Manager explains that the use of correct and smaller pads reduces waste, decreasing the environmental impact from UI care. The support with toilet schedules also emphasizes the patients' rights to use the bathroom and provides prescribing nurses with detailed leakage data and comprehensive documentation, enabling fact-based discussions and decisions in care planning. Moreover, the digital and analogous logbook functions enhance communication and documentation among caregivers.

Through the monitoring support in Solution X, caregivers get clear indications of when to change pads, eliminating the need to perform manual controls or worry over dampness while helping them change at the right time, according to the Innovation Manager[14]. This increases efficiency, reduces workload, and creates peace of mind for caregivers. The increased efficiency from not having to manually control pad dampness as well as minimizing unnecessary changes and leakages indirectly yields cost savings. Furthermore, the Innovation Manager argues that real-time monitoring eliminates the need for patients to be disturbed for unnecessary pad controls and reduces the risks of skin issues since the dampness of pads can be monitored.

[13] Innovation Manager, Company X, Interview via video call, 14 March 2024.

[14] Innovation Manager, Company X, Interview via video call, 14 March 2024.

In addition to supported assessments and monitoring, Solution X aims to support overall management of UI care through providing a platform for easier documentation and overview of UI, as described by the Innovation Manager[15]. Moreover, the education, instructions, and customer service provided with Solution X can contribute to increased knowledge of UI, UI care and pads.

## 4.3 Providing UI care

Following the discussion of the case solution and its potential benefits, this section provides insights into the current provision of UI care, without Solution X, to explore existing operational methods. It specifically examines how UI care is provided and who is involved as per the thesis framework. Each UI patient's journey is influenced by various factors, including the specific UI condition, the individual's circumstances and living arrangements. As described in section 4.1.2.2, the extent and type of LTC varies for patients over time, commonly progressing towards greater care needs in nursing homes. Given this diverse landscape, the journey of UI patients will initially be outlined broadly, followed by specific descriptions of how journeys differ based on the patients' living arrangements and the level of care assistance they require.

### 4.3.1 The general patient journey for UI care

The exact procedures for UI treatments vary slightly between regions and municipalities, however they commonly follow similar workflows. The Nikola network is an independent, national network promoting developed care for incontinence, bladder dysfunction and bowel dysfunction on regional and municipal levels. Nikola (n.d.) suggests a four-step approach to UI care: assessment, evaluation, treatment, and follow-up, as outlined in figure 4.5. These practices are detailed in the following sections, with additional insights from Region Uppsala and Region Skåne's public information as well as the interviewed incontinence coordinators.

[15] Innovation Manager, Company X, Interview via video call, 14 March 2024.


Figure 4.5: Overview of the UI care journey, adapted from Nikola (n.d.).

#### 4.3.1.1 Assessment

According to Region Uppsala (2022) the first point of contact for patients is typically with a doctor, nurse, urotherapist, or physiotherapist who initiates the assessment process, depending on their choice of healthcare provider. Incontinence coordinator B[16] explains that it is common for patients to initially encounter a primary care provider, such as a primary care center or home healthcare provider. However, they note that patients also have the option to directly consult specialists like gynecologists or urotherapists through an independent care request. According to the interviewed incontinence coordinators[17], it is most commonly a prescribing nurse who is responsible for the assessment and the following phases.

An assessment begins with understanding the patient's issues, needs, and resources (Nikola, n.d.). According to Region Uppsala (2022), the assessment aims to identify underlying causes, establish a diagnosis, and assess the severity of the condition. Nikola (n.d) underscores the importance of a fundamental assessment for all patients with suspected bladder dysfunction, including two primary components: *medical history taking* and *status check*. Medical history taking involves discussions between the patient and healthcare professional, wherein the patient articulates their symptoms, concerns, lifestyle factors, and medical background. Nikola further explains that the status check typically encompasses objective measurements and recordings of urinary patterns, leakages, fluid intake, and laboratory analysis of urine samples. For instance, Region Uppsala (2022) utilizes a bladder diary to record these metrics.

[16] Incontinence coordinator B, Interview via video call, 4 March 2024.

[17] Incontinence coordinators A-C, Interviews via video calls, 29 February 2024; 4 March 2024; 5 March 2024.

Moreover, all interviewed incontinence coordinators[18] mention leakage measurements as a central tool in UI assessments. In leakage measurements, patients typically wear pads for at least 48 hours. The weight of each pad is logged before and after use and is then utilized by healthcare professionals to analyze leakage frequency and volume. Ideally, patients perform these practical measurements themselves. However, as explained by incontinence coordinators A[19] and C[20], many patients require assistance with the measurements, typically those residing in nursing homes or receiving home care services. Moreover, all incontinence coordinators[21] emphasize that despite the ideal routines dictating that all patients should undergo assessments with leakage measurements, this crucial step is frequently overlooked by healthcare providers.

Incontinence coordinator B[22] explains that patients seeking primary care can be referred to specialist care for continued assessment if needed. While nurses execute most healthcare, doctors hold the overarching responsibility and are mainly involved in referrals to physio- and occupational therapists and specialists, according to Region Uppsala (2022). Region Uppsala and Region Skåne (2021) further explain that referrals should for example be done if there is suspicion of cancer, if the UI has emerged after prostate surgery, if the UI has appeared suddenly, if the patient experiences bladder pain, or if the patient has a neurologic injury. Moreover, Region Stockholm (2023) has certain referral routines for middle-aged women with certain types of UI. Incontinence coordinator A[23] highlights that referrals to specialist care are generally more

[18] Incontinence coordinators A-C, Interviews via video calls, 29 February 2024; 4 March 2024; 5 March 2024.

[19] Incontinence coordinator A, Interview via video call, 29 February 2024.

[20] Incontinence coordinator C, Interview via video call, 5 March 2024.

[21] Incontinence coordinators A-C, Interviews via video calls, 29 February 2024; 4 March 2024; 5 March 2024.

[22] Incontinence coordinator B, Interview via video call, 4 March 2024.

[23] Incontinence coordinator A, Interview via video call, 29 February 2024.

common among patients visiting primary care centers, in particular younger patients which are not included in the scope of the thesis.

#### 4.3.1.2 Evaluation

The second phase of UI care involves evaluating the patient's condition based on the results of the assessment. Region Uppsala (2022) describes that the objective of this phase is to establish a preliminary diagnosis and develop a care plan. The care plan is a comprehensive plan detailing the diagnosis, treatment goals, specific interventions, and a follow-up schedule, all designed to guide the management and monitoring of the patient's condition. Region Uppsala emphasizes the importance of specifying what, when, how, and by whom interventions will be carried out. In particular, the condition of elderly changes fast, and hence the care plan needs to be evaluated regularly.

A central part of care planning, highlighted by all incontinence coordinators[24], is the prescription of individually tailored UI aids, mainly pads, based on the patient's condition, needs, behavioral patterns, and size. Measurements from the assessment, including for example waist measurements and leakage measurements, guide the prescription of a suitable product. They further describe that the prescriber, most commonly an appointed nurse, chooses a product from the range of options made available by the procurement department. If the caregiver operates within the public sector, the products have been systematically chosen through a public procurement process, as described in section 4.1.1.3. The interviewed Assistant Manager, Center for Assistive Devices[25] emphasizes that exceptions can be made in specific individual cases, allowing patients to sometimes receive prescribed products outside the procured range. If the caregiver instead operates within the private sector, the selection of products may either align with the publicly procured products or be

[24] Incontinence coordinators A-C, Interviews via video calls, 29 February 2024; 4 March 2024; 5 March 2024.

[25] Assistant Manager, Center for Assistive Devices, Interview via video call, 4 March 2024.

independent, depending on the agreements between the healthcare provider and the respective municipality or region, according to the interviewed incontinence coordinators[26]. As mentioned in section 4.1.3.2, absorbent pads are free of charge for patients, however in some regions the patient pays for the evaluation and test products. All incontinence coordinators[27] emphasize that pads should never replace toilet visits and argue that it is important to support patients with individually adapted toilet schedules as part of the care plan.

#### 4.3.1.3 Treatment

During the treatment phase the care plan is implemented, and potential treatments are carried out. Significant variations exist in this phase among patients, as the care plan is tailored to each individual's condition and situation. As mentioned, the care plan execution commonly includes following toilet schedules using prescribed aids such as pads. As highlighted by the interviewed incontinence coordinators[28], many patients receive help with changing pads and handling pad leakages from informal caregivers or care assistants in home care services or nursing homes.

#### 4.3.1.4 Follow-up

The follow-up phase aims to assess the effectiveness of the treatments and care plan. Uppsala Region (2022) measures the results using quality indicators, including improvements in voiding patterns, decreased leakage, use of incontinence products, and achieving of set goals. Depending on whether the desired outcomes are met or not, the care plan is adjusted, or the patient gets dismissed. The interviewed incontinence specialist nurse [29] explains that aid

[26] Incontinence coordinators A-C, Interviews via video calls, 29 February 2024; 4 March 2024; 5 March 2024.

[27] Incontinence coordinators A-C, Interviews via video calls, 29 February 2024; 4 March 2024; 5 March 2024.

[28] Incontinence coordinators A-C, Interviews via video calls, 29 February 2024; 4 March 2024; 5 March 2024.

[29] Incontinence specialist nurse, Interview via video call, 27 February 2024.

prescriptions must be followed-up at least once a year according to law, however similar to leakage assessments, this step is often. Moreover, patients who have received specialist care can be referred to primary care for continued prescription and follow-up if the need for specialist care disappears (incontinence coordinator B[30] ; incontinence coordinator C[31]; Region Skåne, 2021).

### 4.3.2 UI care in different settings

While the general patient journey has been explained, it is important to note that it depends on the care setting. The urotherapist at Company X[32] emphasizes the patient's living situation and health condition as important factors affecting the care situation. A patient may reside either in their own ordinary home or in a nursing home, receiving varying levels of care depending on their needs. The sections below summarize the implications of the living situations and degrees of LTC on the four UI care phases.

#### 4.3.2.1 Ordinary home

For patients in an ordinary home setting, incontinence coordinator A[33] explains that the first point of contact is typically through primary care centers or home healthcare, depending on whether the patient's condition allows them to visit a primary care center or not. The interviewed incontinence specialist nurse [34] describes that the assessment phase is initiated by a nurse at the primary care center or within the home healthcare, whereafter potential measurements are carried out by the patient and, if needed, informal caregivers and/or home care services. For instance, they explain that patients with home healthcare commonly receive help from home care services and/or informal caregivers to change pads, weigh pads and log results in leakage measurements.

[30] Incontinence coordinator B, Interview via video call, 4 March 2024.

[31] Incontinence coordinator C, Interview via video call, 5 March 2024.

[32] Urotherapist, Company X, Interview via video call, 23 February 2024.

[33] Incontinence coordinator A, Interview via video call, 29 February 2024.

[34] Incontinence specialist nurse, Interview via video call, 27 February 2024.

Once the nurse has evaluated the assessment and created an individual care plan, the patient, informal caregivers, and home care services are involved in the ongoing treatment and following of the care plan, including using and changing the pads. According to the interviewed incontinence coordinators[35], patients living at home might care for themselves or receive care from home care services or informal caregivers, frequently or occasionally. As for the follow-up phase, the interviewed incontinence specialist nurse [36] continues to explain that home care services commonly recognize when adjustments are needed and notify the prescribing nurse, who can prescribe new absorbent pads. For patients without home care services, the incontinence specialist nurse implies that patients commonly initiate follow-up themselves.

#### 4.3.2.1 Nursing home

If a patient is instead living in a nursing home, the nursing home care assistants or nurses are commonly the ones notifying the UI and the first point of contact according to incontinence coordinator A[37]. Many UI patients may also have experienced UI in a home setting prior to transitioning to a nursing home, thus having interacted with different UI professionals previously, according to prescribing nurses A[38] and B[39]. They initiate assessments and are supported by the nursing home care assistants to perform potential measurements and leakage assessments. Similarly, prescribing nurses A and B explain that they are responsible for the evaluation and design of a care plan, whereafter nursing home care assistants perform the continuous care. Given that patients in nursing homes commonly have health conditions affecting their cognitive or physical abilities, e.g., dementia, they generally need extensive support with UI. Follow-

[35] Incontinence coordinators A-C, Interviews via video calls, 29 February 2024; 4 March 2024; 5 March 2024.

[36] Incontinence specialist nurse, Interview via video call, 27 February 2024.

[37] Incontinence coordinator A, Interview via video call, 29 February 2024.

[38] Prescribing nurse A, Nursing home, Interview via video call, 27 March 2024.

[39] Prescribing nurse B, Nursing home, Interview via video call, 28 March 2024.

up can be initiated by a nurse or a nursing home assistant. In contrast to the ordinary home settings, informal carers take a less active role in nursing home settings, as described by prescribing nurses A and B. However, it is not uncommon that they want to influence the professional caregivers.

# Chapter 5 – Analysis of what, how, and who

*In this chapter, analysis of the empirical findings of the thesis first phase is conducted, building on the set thesis structure and theoretical framework. This includes analyzing the value proposition (what), the patient journey (how), and the involved actors (who), building a foundation for the subsequent chapters.*

## 5.1 What?

This section aims to analyze Solution X in terms of what is being delivered to customers, as highlighted in the theoretical framework in figure 5.1. Building on the understanding of value propositions, products, and solutions, the three levels of a product model is used to analyze the value proposition of Company X.

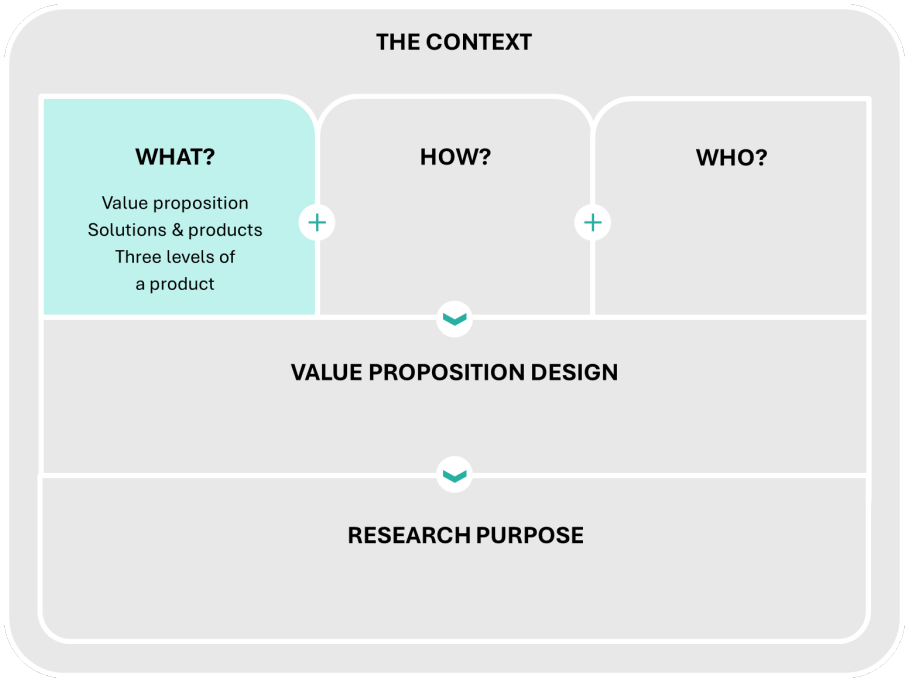


Figure 5.1: The *what*-analysis and corresponding theoretical models highlighted in the thesis's theoretical framework.

### 5.1.1 Three levels of a product

As explained in section 3.2.3, the three levels of a product by Kotler et al. (2005) can be used to describe a product on three levels: the core product, the actual product, and the augmented product. As discussed in section 3.2.1, the term *product* can be used for both tangible products, solutions, and blends thereof, making the three-level analysis applicable for Solution X.

The data in section 4.2 are utilized to identify the three levels of Solution X. A fundamental component of Company X's overarching value proposition is the facilitation of UI care management and provision. However, focusing on Solution X, seamless monitoring and assessment of UI emerges as the core solution as this is the job to be done with Solution X.

Moreover, the actual product level regards the main physical and digital attributes of Solution X. From the empirical findings, these can be identified as wearable and connected leakage sensors, real-time status updates and change notifications for UI pads, data and analytics on leakage patterns, data and tools for follow-up and evaluation of UI care plans, and a digital platform for documentation. These components constitute the tangible and intangible elements delivered to customers and users to actualize the core benefit of the solution, thereby making them part of the actual solution.

Finally, the augmented layer includes supplementary services associated with the actual and core product. Several such services are identified, including education on sensor handling and data interpretation, support for UI pad selection and care plan design, accessible instructions, and customer service. While not necessary for achieving the core benefits, these services enhance customer value, thus making them part of the augmented solution.

Together, the three levels of Solution X provide a comprehensive understanding of the solution and its attributes. This analysis is summarized in figure 5.2.

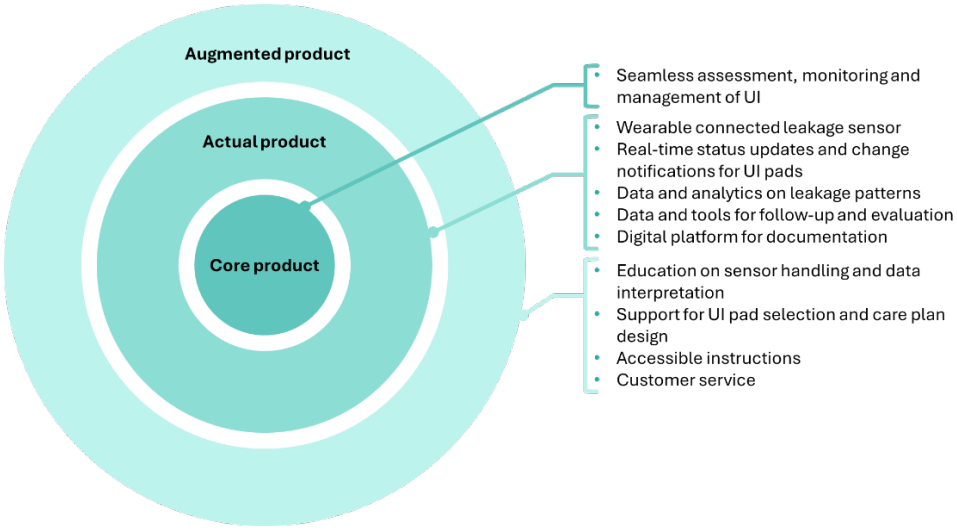


Figure 5.2: The three levels of Solution X.

## 5.2 How?

This section aims to analyze how UI care is currently provided in the three care scenarios, without involvement of Solution X. This is done through patient journey mapping in accordance with the theoretical framework in figure 5.3.

### 5.2.1 Patient journey mapping

As described in section 3.3.1 and suggested by Simonse et al. (2019), patient journey mapping is a tool that creates a people-centered understanding of patients' healthcare experiences. Jun et al. (2009) underscores that the swimlane map type particularly allows for understanding different actors and their responsibilities in the healthcare journey. The swimlane map represents each actor as a column in the map while outlining the sequential flow of activities undergone by the patient. Occasional activities and decisions are represented by dotted lines and boxes.

Building on the empirical findings gathered in section 4.3, patient journey maps for UI care can be sketched out. However, as noted by, for example, urotherapist

at Company X[40], the patient journey depends on the living situation and assistance needs of the patient. It is therefore essential to begin by creating a swimlane map describing the process determining what assistance the patient receives. The specific journeys for UI care in different care scenarios can then be mapped in further detail, beginning with the current target segments.

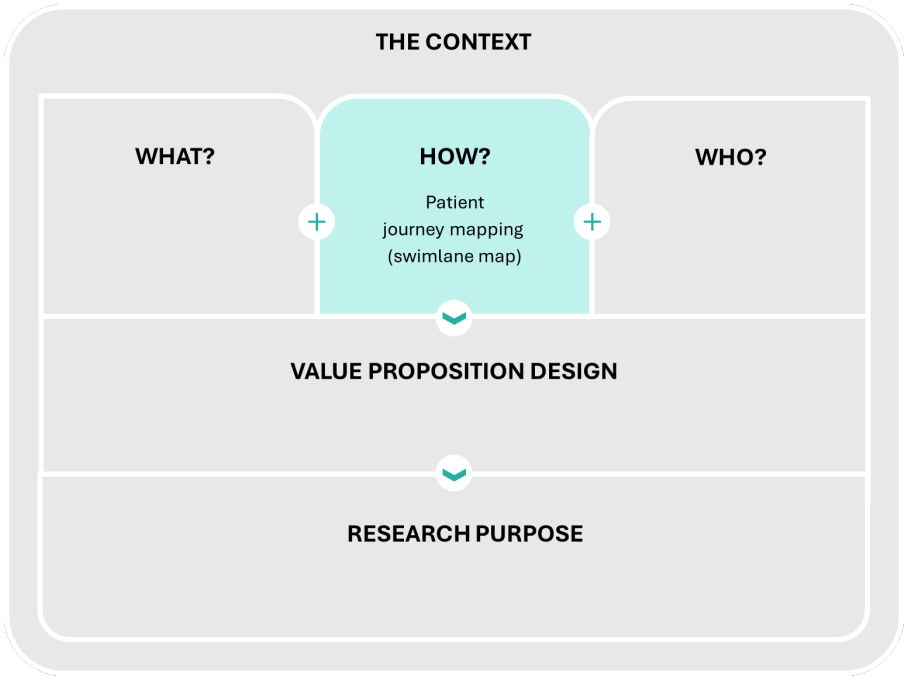


Figure 5.3: The *how*-analysis and corresponding theoretical models highlighted in the thesis's theoretical framework.

#### 5.2.1.1 Mapping the LTC evaluation process

Based on the description of the LTC evaluation process in section 4.1.2.1, a swimlane map for the evaluation can be created, as seen in figure 5.3. Each main actor that the patient encounters during the LTC evaluation process is represented by a column in the figure. As described in section 4.1.2.1, the need for formal assistance can be recognized by the patient, informal or formal caregivers, or healthcare providers. Subsequently an LTC evaluation is initiated

[40] Urotherapist, Company X, Interview via video call, 23 February 2024.

though an application or a meeting with a social worker, thus recognizing them as central profiles. Healthcare providers or informal caregivers are not always part of the problem recognition and are therefore represented by dotted boxes in the map in figure 5.3. Similarly, their participation in the needs assessment meeting might not be universal, whereas the involvement of the social worker is constant.

The social worker proceeds to make an informed decision regarding the type of LTC suitable for the patient. As elaborated in section 4.1.2, LTC can be provided by informal caregivers, home care services, or nursing homes, depending on the social worker's perception of the patient's needs. In addition, this ongoing care is represented by the three larger boxes in the three right columns in figure 5.4. UI care within these distinct scenarios is analyzed in the subsequent sections.

Should the patient be granted formal LTC, it becomes the responsibility of the social worker to conduct annual follow-up assessments of the patient's needs, as described in section 4.1.2.1. This iterative process creates a recurring cycle within the swimlane map. Subsequent reevaluations may lead to new LTC decisions, potentially relocating the patient to a different column within the map.

#### 5.2.1.2 Mapping UI care in informal home care

Patients who have not applied for formal LTC or have had their application declined typically receive informal home care. The various activities associated with UI care can be integrated into the swimlane map illustrated in figure 5.5 based on the data in section 4.3. As outlined in section 4.3.2.1, the prescribing nurse operates either within the primary care center or in home healthcare settings, determined by the patient's ability to visit the primary care center. Nevertheless, the same set of activities and responsibilities applies in either scenario.

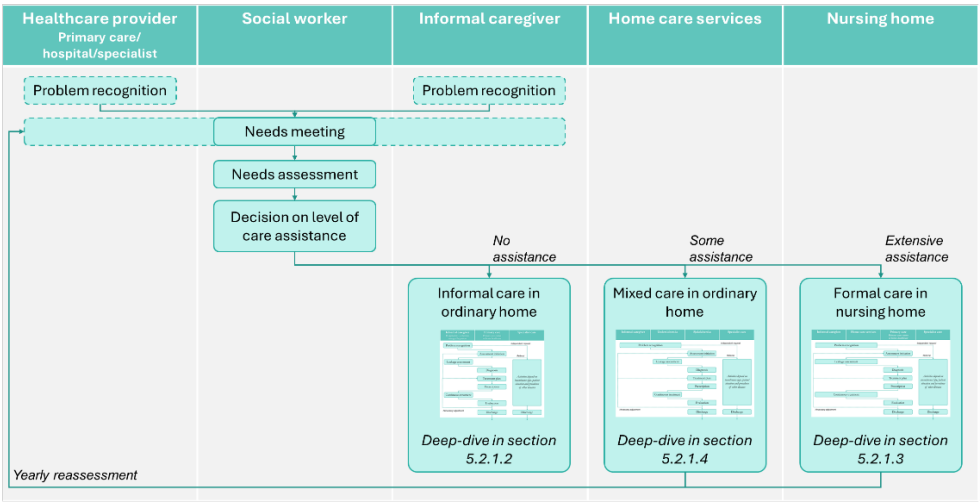


Figure 5.4: Swimlane map for the LTC evaluation process.

As described in section 4.3, the level of support required from informal caregivers varies among different patients. Although informal caregivers may participate in problem recognition, leakage assessments, and continuous care, the extent of their involvement can vary. Additionally, some patients may opt for or be referred to specialist care, which is included as a distinct column in the swimlane map. However, as noted in section 4.3.1, specialist care is less common within the target group of this thesis and its specifics vary depending on the patient's issues and is therefore not detailed further.

A significant insight from interviews is the notable variation in UI care routines among healthcare providers and patients. Leakage assessments and diagnoses are often the exception rather than the norm, and the same applies to evaluations. Consequently, these activities are represented by dotted boxes within the swimlane map. Instead, patients or informal caregivers commonly need to raise inquiries independently. Similarly, the leakage assessments are performed by the patient themself with support from the informal caregiver. Moreover, should an evaluation be conducted, it may lead to the initiation or development of a new assessment or treatment plan, which is shown by the dotted lines creating loops within the map.

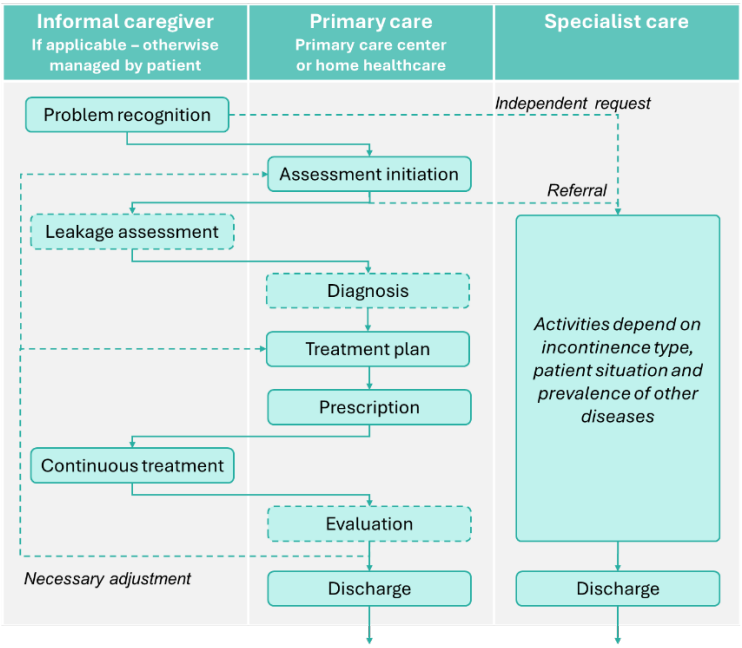


Figure 5.5: Swimlane map for informal home care.

#### 5.2.1.3 Mapping UI care in formal nursing home care

Patients requiring extensive care often qualify for admission to a nursing home, where they follow the UI care swimlane map illustrated in figure 5.6. While the activities in the previous swimlane map remain consistent in this map, differences arise in the columns representing involved parties, as indicated by the empirical findings outlined in section 4.3.2. Given that basic healthcare within nursing homes is primarily overseen by nurses on-site, the primary care column is replaced with a nursing home column. Similarly, the prevalence of care assistants in nursing homes results in an added column, overtaking some of the responsibilities of the informal caregiver in the previous section.

Moreover, the level of involvement from informal caregivers decreases in this care scenario compared to previous one, as shown in section 4.1.2. While informal caregivers may participate in communication with the nursing home

and ensure quality of care, nursing home services typically assume full responsibility for practical care tasks.

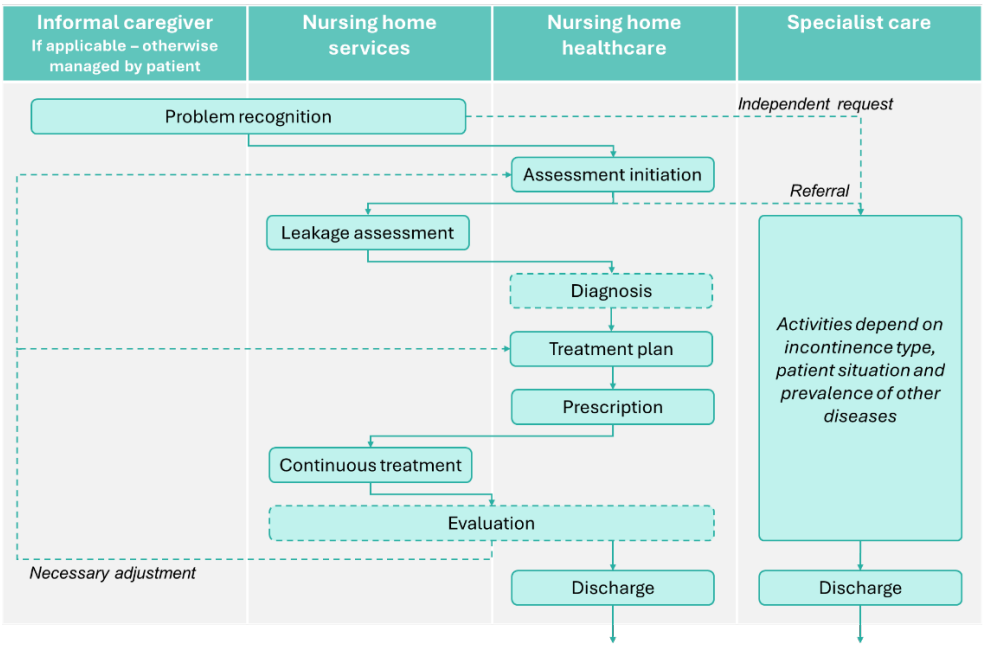


Figure 5.6: Swimlane map for formal nursing home care.

#### 5.2.1.4 Mapping UI care in mixed home care

Finally, a swimlane map for the new target segment is created. If an LTC evaluation shows that the patient needs formal assistance, but not as extensive as in a nursing home, the patient is eligible for home care services. This results in the swimlane map presented in figure 5.7, which shares many similarities with figures 5.5 and 5.6 in the previous sections. Depending on the assessment made by the social worker, the patient may receive varying degrees of home care services, as explained in section 4.1.2.1, leading to diverse care scenarios. This spectrum could range from comprehensive home care services that greatly reduce the need for informal care, to instances where home care services are provided less frequently, necessitating a larger responsibility for the patient or informal caregivers. The wide boxes spanning across the informal caregiver and

home care services columns in the swimlane map symbolize these diverse scenarios, where responsibilities may shift between columns.

The columns are similar to those in the nursing home swimlane map. However, in mixed home care, healthcare is rather provided by primary care or home healthcare and assistance by home care services, resulting in a shift of actors.

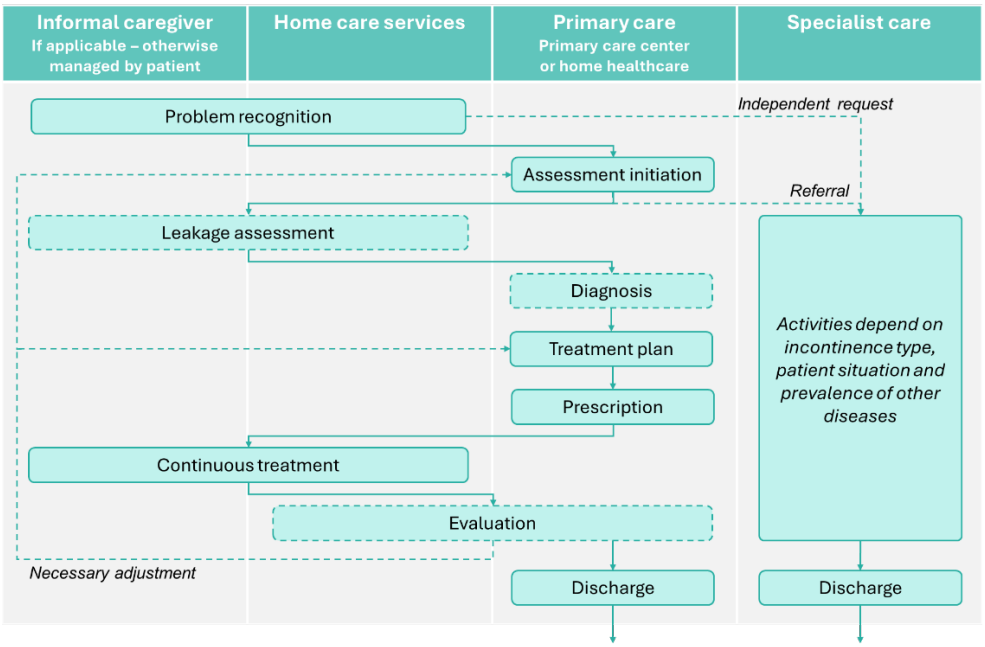


Figure 5.7: Swimlane map for mixed home care.

### 5.2.2 Summary of how

In summary, the empirical findings on UI care provision yield four distinct swimlane maps. The first map describes the LTC evaluation process, which determines how, where, and by whom the patient receives LTC in general and UI care in particular. Building on this, distinct maps for the three care scenarios included in the study (informal home care, formal nursing home care, and mixed home care) are created. Many similarities arise, for instance, the activities included in the three maps are identical since primary care centers, home healthcare and nursing home healthcare strive to follow the same routines.

Similarly, some steps of the UI care plan suggested by the Nikola network are commonly overlooked in all three scenarios.

However, differences arise when studying who is involved in the different UI care journeys. In the case of informal home care, the patient themselves and possible informal caregivers take the full care responsibility. In the case of formal nursing home care, the full care responsibility is allocated to nursing home services, limiting but not necessarily eliminating support from informal caregivers. In the case of mixed home care, the care responsibility is shared between the patient, informal caregivers, and home care services, where the distribution depends on the patient's needs and the social worker's decision.

Comparing the three scenarios side by side, mixed home care emerges as a transitional phase between the other two scenarios, often involving patients progressing towards greater care needs. While the other two care scenarios tend to assign full care responsibility to one actor (either informal caregivers or nursing home services), the mixed home care scenario stands out for its complexity, involving a combination of informal and formal caregivers.

## 5.3 Who?

This section aims to understand and decide which actors are of main interest for value proposition design. This is done though identifying, classifying, and mapping different stakeholders within or related to the buying organization, following the thesis structure and theoretical models as shown in figure 5.8.

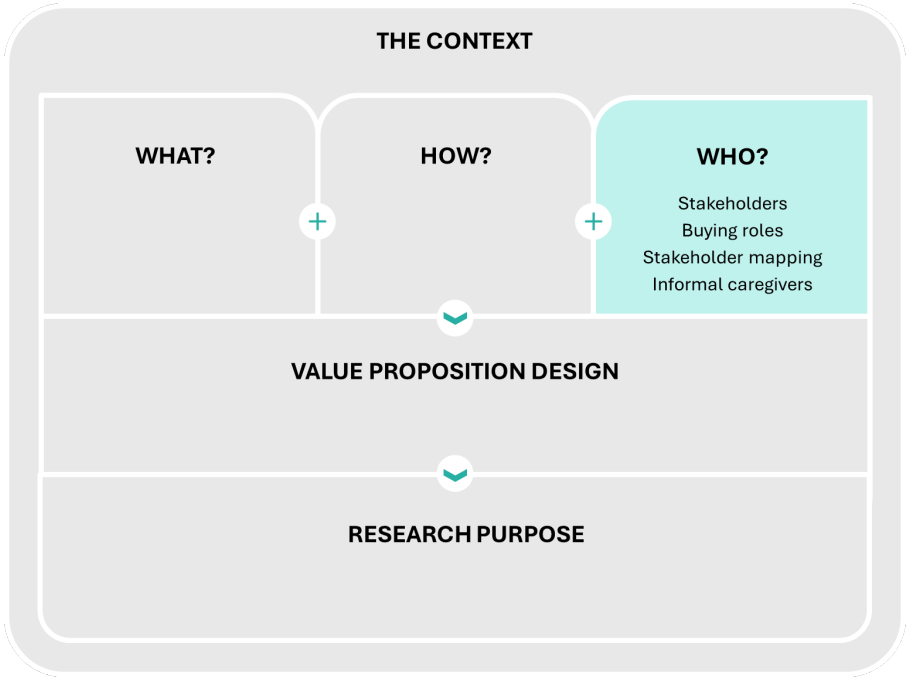


Figure 5.8: The *who*-analysis and corresponding theoretical models highlighted in the thesis's theoretical framework.

### 5.3.1 Buying roles

Numerous relevant actors can be identified from the context and patient journeys. Section 3.4.3 presented how Osterwalder et al. (2014) suggest classifying actors into six distinct roles. Since Solution X supports pad selection and care plan design, it is relevant to study the buying roles in these processes.

Initially, Osterwalder et al. (2014) recognize the end user, who ultimately utilizes the solution. In the case of pads, it is evident that the patient is the primary end user. Nevertheless, as shown in the how-analysis in section 5.2, both formal and informal caregivers may engage in handling and changing the pads, making them contributors to the utilization of pads. Consequently, informal caregivers and care assistants can also be seen as end users in UI care.

Secondly, Osterwalder et al. (2014) pinpoint the *decision makers*, who make purchasing decisions. As discussed in section 4.3 and illustrated in the patient

journey maps in section 5.2.1, prescribing nurses play an important role in selecting the appropriate pad for each patient, thus designating them as the primary decision makers in UI care. They assume the same roles in all discussed settings (i.e., in primary care centers, home healthcare, or nursing homes).

Thirdly, *influencers*, individuals whose opinions decision-makers consider, can be identified (Osterwalder et al., 2014). As detailed in section 4.3.1.1 and 4.3.2, prescribing nurses engage in discussions with patients and sometimes informal caregivers, thereby underscoring the significance of their opinions in pad selection. In addition, section 4.3.2 highlights how prescribing nurses receive and use extensive input from care assistants in home care services and nursing homes, thereby adding them to the list of influencers.

Furthermore, Osterwalder et al. (2014) identify the actors ultimately responsible for financing the purchase, called the *economic buyers*. If the patient's healthcare provider is a public actor or has agreements with the public, the Public Procurement Act applies as discussed in section 4.1.1.3. The empirical findings in section 4.3.1.2 discuss how products and pads selected through public procurement channels become available for purchase by nurses, thus the public procurement division can be classified as an economic buyer. For private healthcare providers, section 4.1.1.3 suggests that the role of the economic buyer could be less strict or defined, although often being a purchasing division.

Moreover, *saboteurs*, actors who disturb information flows in the purchasing process, can be identified (Osterwalder et al., 2014). As noted in the previous paragraph and detailed in section 4.1.1.3, the Public Procurement Act regulates purchasing processes and information flows. For example, suppliers are not allowed to contact individual prescribing nurses or care assistants with sales proposals but must limit their contact points to the public procurers. Consequently, the public procurer emerges as the saboteur in the case of UI care.

Lastly, actors with formal power to impact a buying decision, called *recommenders*, are identified (Osterwalder et al., 2014). As described in section 4.1.1.3, public procurers commonly use input from numerous actors. In some regions, structured approaches with questionnaires are used to gather input from prescribing nurses. All interviewed incontinence coordinators also mention focus groups, which could include for example nurses, aid experts, or environmental experts providing their formal input to the purchasers. Notably, the recommenders are distinguished from influencers by having formal power to affect the economic buyer, rather than having informal power to affect decision makers. While influencers in UI care (patients, informal caregivers, care assistants) lack formal impact over economic buyers' decisions, they do have influence on a recommender (prescribing nurses). This results in an impact chain not captured in the framework by Osterwalder et al., where the prescribing nurse is both decision maker and recommender.

Referring to the how-analysis in section 5.2, it becomes evident that all actors in the swimlane maps are considered relevant buying roles, with one exception being the social worker. Although significant, their influence on UI care is indirect rather than direct. Their primary function lies in determining the type of LTC the patient will receive, consequently shaping the specific care scenario encountered by the patient, as established in section 4.1.2.4. While the roles identified in the swimlane maps provide a valuable foundation for analyzing UI care buying roles, they do not provide a comprehensive view on their own. The roles of economic buyers, saboteurs, and partially recommenders were not included in the swimlane maps since these actors are more tied to procurement and do not interact directly with patients. However, as underscored in the empirical findings in section 4.1.1.3 and 4.3.1.2, they play a significant role in the UI buying process.

#### 5.3.1.1 Comparison of buying roles

The six distinct roles identified across the three researched care scenarios are summarized in table 5.1. Notably, the analysis reveals a high degree of similarity

among the roles across all scenarios, where economic buyers, saboteurs, and recommenders remain consistent. Likewise, a prescribing nurse consistently assumes the role of decision maker, although can belong to different organizations.

However, notable differences emerge when examining the roles of end users and influencers. As highlighted in the how-analysis in section 5.2, mixed home care presents a more complex end user profile compared to the other scenarios, as it encompasses elements of both. In the case of influencers, a similar pattern appears. The same influencers are prevalent in mixed home care and formal nursing home care, however, as discussed in section 4.1.2 and 5.2.1.4, the informal caregiver likely has greater influence in the former scenario.

Table 5.1: Buying roles within different care scenarios.

| **Role** | **Segments/care scenarios** | | |
|---|---|---|---|
| | Informal home care | Formal nursing home care | Mixed home care |
| End users | Patient, informal caregiver | Patient, care assistant | Patient, informal caregiver, care assistant |
| Influencers | Patient, informal caregiver | Patient, informal caregiver, care assistant | Patient, informal caregiver, care assistant |
| Decision makers | Prescribing nurse at home healthcare or primary care center | Prescribing nurse at nursing home | Prescribing nurse at home healthcare or primary care center |
| Economic buyers | Public procurer / procurement division | Public procurer / procurement division | Public procurer / procurement division |
| Saboteurs | Public procurer | Public procurer | Public procurer |
| Recommenders | Public procurement focus group, prescribing nurse | Public procurement focus group, prescribing nurse | Public procurement focus group, prescribing nurse |

### 5.3.2 Stakeholder mapping

In addition to the buying roles, the theoretical framework includes stakeholder mapping, as described in section 3.4.3. Johnson et al. (2017) explain that stakeholder mapping can be used to understand stakeholder dynamics from two different perspectives, power and interest, creating a matrix where different stakeholders can be placed.

For this thesis, it is relevant to understand who affects and who is interested in UI care, specifically regarding pad selection and care plan design, as captured in the buying roles in the preceding section. Through analyzing these actors from a stakeholder mapping perspective, they can be divided into four groups, as illustrated in figure 5.9.

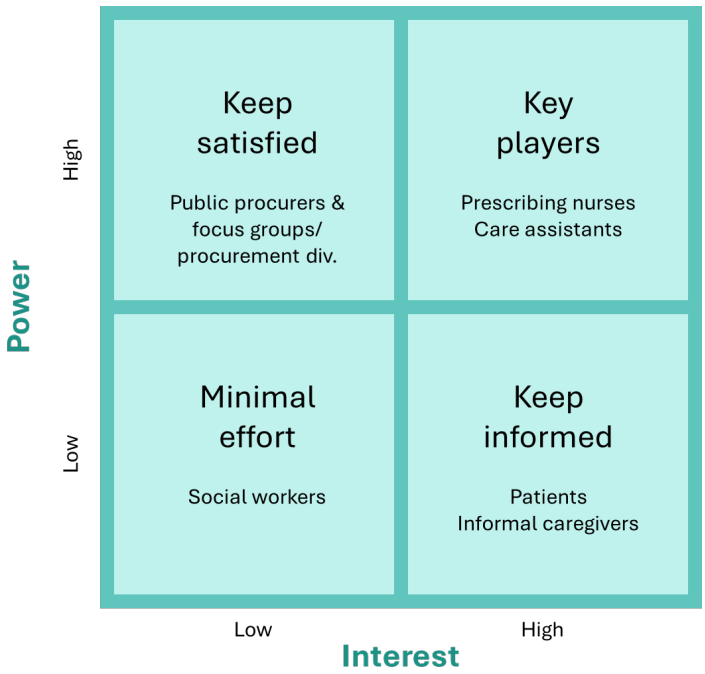


Figure 5.9: Stakeholder mapping of actors involved in UI care.

Firstly, the patient can be categorized as a stakeholder in the "keep informed" role, indicating a high level of interest but limited power over UI care. Analyzing the key factors that shape stakeholder interest as defined by Johnson et al. (2017), it becomes evident that patients naturally possess a significant interest. They are the primary recipients of care, making decisions crucial for their well-being, and they have established communication channels with the healthcare system. Due to reduced cognitive abilities, as mentioned in section 4.3.2.1, some patients may have reduced capacity to process information, which is a factor that implies decreased interest according to Johnson et al. However, as main recipients of care and users of pads, the patients are still presumed to have an overall high interest in their own UI care. Moreover, the analysis of buying roles classified patients as end users and influencers rather than decision makers, economic buyers, or recommenders due to their limited formal power over their care and healthcare. Consequently, patients can be categorized as stakeholders with relatively low power in the context of UI care.

Informal caregivers can be given the same categorization as patients based on similar arguments. As described in section 5.3.1, informal caregivers are considered end users in two of the care scenarios, implying direct impacts from decisions regarding for example pad choices and care plans. Even when they are not actively engaged in providing practical care, they may be emotionally invested in the well-being of the patient, thereby exhibiting a high level of interest. However, as indicated in the same section, informal caregivers commonly have less influence over UI care compared to patients, as they do not always participate in care meetings and lack formal decision-making authority.

Moreover, care assistants in home care services or nursing homes can be designated as "key players". Similar to informal caregivers, care assistants are identified as end users in two of the three care scenarios, implying a high interest in decisions concerning the care they deliver. While they are not the ultimate decision makers, they have significant influence over decisions. As discussed in

section 5.3.1, prescribing nurses heavily relies on the input and guidance provided by care assistants, to the extent that they are formally incorporated into the evaluation step in the swimlane maps in figures 5.6 and 5.7. Consequently, they emerge as key players in stakeholder mapping.

Prescribing nurses in primary care centers, home healthcare, or nursing homes can also be seen as "key players". As elaborated in section 4.3, the prescribing nurses' main responsibility is to support patients with UI through personalized care plans and prescribed aids and pads, implying a high interest. Furthermore, as established in section 5.3.1, prescribing nurses are seen as decision makers in all three care scenarios, making them an actor with high power over UI care.

Furthermore, actors with procurement responsibilities, including public procurers, public procurement focus groups, and procurement divisions, are classified as actors to "keep satisfied". They are seen as economic buyers and recommenders (see section 5.3.1), with considerable control of resources and large involvement in strategic decisions. This is particularly evident in determining what UI aids and pads are available for prescription, notably within public procurement settings, as explained in section 4.3.1.2. Consequently, their power over UI care is deemed significant regarding the sources of power explained in section 3.4.3 (Johnson et al., 2017). However, since public procurers' duties extend beyond UI care and they are not directly impacted by specific pad choices or care routines, their interest in UI care is considered low.

Finally, social workers can be classified as stakeholders warranting "minimal effort" engagement. While social workers have a large influence over the LTC a patient receives, as established in section 5.2.1.1, their interest and power over UI care are indirect rather than direct. Referring to the sources of interest and power described in section 3.4.3 (Johnson et al., 2017), social workers are not critically affected by UI care decisions and have no control, involvement, or knowledge in this specific domain.

Analyzing the dynamics of power and interest among stakeholders across the three distinct care scenarios reveals a consistent pattern. The level of involvement of certain actors, such as informal caregivers and care assistants, however, fluctuates across the scenarios. For instance, the care assistant's role is absent from the stakeholder map in informal home care. Similarly, the power and interests of informal caregivers decrease in formal nursing home care, as they are not considered end-users in this context.

### 5.3.3 Summary of who

In summary, the analysis of actors involved in UI care reveals a complex landscape characterized by many stakeholders. Patients stand out as a central figure across all care scenarios, serving as the end user highly invested in care outcomes. However, while they also act as influencers, their decision-making power is limited. Similarly, informal caregivers are engaged but lack formal decision-making authority. Notably, this role's influence, power, and interest fluctuate significantly depending on the care scenario and individual circumstances.

In contrast, care assistants in home care services and nursing homes have greater power over UI care, qualifying them as key players. Additionally, prescribing nurses consistently holds the role of decision makers and recommenders across all care scenarios. Their high level of power and interest make them significant players in shaping UI care.

Moreover, actors with procurement responsibilities, such as public procurement divisions, and focus groups, play critical roles in selecting available UI aids. While their power is substantial, their direct involvement in UI care and customization of specific care plans is low, resulting in a smaller interest in UI care. Similarly, social workers have large indirect power but no direct involvement in UI care.

## 5.4 Conclusion of analysis of what, how and who

This first analysis of the thesis has created a base for the forthcoming empirical study and analysis, by analyzing the three levels of Solution X, the UI patient journey, and the involved actors. This approach ultimately answers the questions of what, how, and who.

Firstly, Kotler et al.'s (2005) three level framework provides insights into the different elements of the solution and its core objective of facilitating seamless UI assessment and monitoring. Moreover, patient journey mapping with the swimlane technique offers a comprehensive understanding of different UI care journeys and the involved actors, as suggested by Jun et al. (2009). While beneficial, the swimlane does not show the degree of involvement from the patient in different activities, marking a limitation to the tool. The patient journey mapping helps identify several buying roles through the framework by Osterwalder et al. (2014). Notably, the analysis results in several actors shouldering each role, suggesting that the case of UI pad buying could contain nuances not captured by the framework. Nevertheless, the buying roles provide a structured way of identifying and understanding different actors and their power over UI care.

Stakeholder mapping, informed by the analysis of buying roles, shows the relative power and interest of different actors. Care assistants and prescribing nurses emerge as "key players", patients and informal caregivers as actors to "keep informed", public procurers/procurement divisions, and focus groups as actors to "keep satisfied" and social worker to give "minimal effort". While the framework provides valuable insights regarding the dynamics of the buying roles, the sources and indicators of interest and power suggested by Johnson et al. (2017) vary in relevance and are not always applicable in the care context.

Based on the analysis above, selected actors are deemed particularly relevant for further analysis and needs assessment using VPC. As shown in the stakeholder

mapping, care assistants and prescribing nurses are both seen as “key players” in UI care provision, making them highly relevant to be studied further. The actors to “keep satisfied”, i.e., procurement related actors, follow certain regulated procedures and commonly choose products and services based on several clearly defined criteria, as explained in section 4.1.1.3, making their needs more predictable and transparent. While they are important economic buyers and recommenders with high power, the analysis showed no significant variations in the roles depending on the different UI care scenarios. Similarly, the social worker has no direct or interest in UI care, with no notable variation across care scenarios. Therefore, their needs in UI care are not considered relevant.

The actors to “keep informed”, on the other hand, were shown to participate in different ways and with different interests in the three care scenarios, making them actors of interest to compare for the thesis’s purpose. As highlighted in section 5.3.1, the economic buyers consider the needs of nurses, who in their turn consider the needs of the actors to “keep informed” (patients and informal caregivers), indicating the prevalence of a user and patient focus throughout the care system. Including patients as a central customer role aligns with Lanning’s (Mahajan, 2019) view understanding of customers’ needs and desires is crucial when adapting a value proposition to a new target market, as discussed in Chapter 3. The studies by Borycki (2010), Wildevuur and Simonse (2015), and Gomes et al. (2022) also underscore the importance of incorporating the patient’s perspective to enhance the acceptance rate of new medical devices and systems. Similarly, acknowledging the role of informal caregivers resonates with research by Ekman et al. (2021) and Jegermalm and Joy Torgé (2021).

To conclude, the forthcoming sections will focus on the needs and wants of four selected actors within the context of the three care scenarios for LTC: the patient, the informal caregiver, the care assistant, and the prescribing nurse. By studying their perspectives, a patient-centric approach is taken for value proposition adaptation of an IoMT solution.

# Chapter 6 – Empirics on value proposition design

*In this chapter, empirical data for customer profiles for the different care scenarios and profiles are provided based on the VPC structure. This includes creating customer profiles for patients, informal caregivers, care assistants, and prescribing nurses in informal home care, formal nursing home care, and finally for the focus scenario of the thesis – mixed home care.*

## 6.1 Empirics overview

As proposed by Osterwalder et al. (2014) and explained in section 3.5, a comprehensive understanding of customers' needs can be achieved though creating a customer profile comprising three elements. Customer jobs encapsulate what the customers want to accomplish, pains comprise their challenges, and gains highlight their ambitions.

This chapter creates customer profiles for the selected relevant actors across the three care scenarios. First, customer profiles for the current target segments of Company X, informal home care and formal nursing home care, are created. The data presented is mainly gathered from Company X sources, including interviewees and internal reports. Since these care scenarios are not the focus of the thesis, less extensive data is presented. The data is utilized in the subsequent chapter to compare the needs in mixed home care with the current target segments, which is one of the main objectives of the thesis.

Empirical data for the mixed home care segment is then presented, which is the focal point of this thesis. Consequently, and as described in section 2.3.2, the mixed home care section relies on more extensive primary data from interviews. In the next chapter, this data is compared with data for the other care scenarios, and analyzed with regards to the value map of Solution X.

## 6.2 Informal home care

Beginning with informal home care, a current target segment of Company X, the empirical findings on customer jobs, pains and gains are mainly built on knowledge gathered from the company's internal reports, which is verified and expanded in interviews with Consumer Insight Managers[41], Senior Marketing Manager[42], and Sales Manager[43] at Company X. Insights from interviews are utilized to create customer profiles for the prescribing nurses, as these are lacking in internal reports.

### 6.2.1 Patients

All identified needs for patients in informal home care are listed in table 6.1. For patients receiving informal home care, Internal report A from Company X highlights the prevalence of both practical and emotional jobs. These patients want to receive personalized help with handling their UI care, and to be heard and respected by their caregivers. Moreover, Internal report A suggests that it is important for them to feel independent, capable, and normal. The interviewed Assistant Manager, Center for Assistive Devices[44] similarly argues that they wish to maintain their integrity throughout receiving UI care.

As for their pains, Internal report A highlights that it is common for patients to feel infantilized by their caregivers when they are not listened to. The same report also explains that patients commonly have a hard time accepting their new care needs, causing them to have issues with their self-image and feeling like a burden to informal caregivers and the healthcare system. On a similar note, it can be emotionally difficult to handle the shifting caregiving dynamics, when a parent starts depending on care from their child instead of the opposite. Internal report A also highlights that these patients find it uncomfortable and

[41] Consumer Insight Managers A-B, Company X, Interview via video call, 28 February 2024.

[42] Senior Marketing Manager, Company X, Interview via video call, 15 April 2024.

[43] Sales Manager, Company X, Interview via video call, 12 April 2024.

[44] Assistant Manager, Center for Assistive Devices, Interview via video call, 4 March 2024.

inconvenient to live with UI due to, for example, smell, dampness, and bulky pads. They commonly suffer from disturbed sleep due to pad controls, since informal caregivers have limited knowledge of pads' capacity and condition. Internal report B further explains that pad leakages can be embarrassing and make the patients upset, especially when occurring in public.

According to Internal report A, patients receiving informal home care wish to give back to their caregivers. Further gains are to receive personalized care that makes them feel hopeful about a future with UI, and to have good communication and relationships with the informal caregivers.

Table 6.1: Customer profile for patient in informal home care.

| **Customer jobs** | | |
|---|---|---|
| Be heard and respected<br>Get assistance with UI | Maintain integrity<br>Receive personalized care | To be treated like normal<br>To feel independent and capable |
| **Pains** | | |
| Dealing with shifting caregiving dynamics<br>Difficult accepting new self-image<br>Discomfort from pads | Disturbed sleep patterns<br>Feeling embarrassed and upset<br>Feeling infantilized by caregivers | Feeling like a burden<br>Inconvenient to handle pads and hygiene<br>No professional follow-up of prescriptions |
| **Gains** | | |
| Better relationships with caregivers | Easier communication with caregivers | Opportunities to give back to caregivers<br>Personalized care |

### 6.2.2 Informal caregivers

Needs for informal caregivers in informal home care are listed in table 6.2. While patients without home care services are typically relatively independent, the

interviewed incontinence coordinators[45] underscore that it is not uncommon that informal caregivers help change pads and emphasize their significant administrative and emotionally supportive roles. According to Internal report A, two of their main jobs are to give the best possible care, and to control the quality of the healthcare received. Consumer insight manager A[46] explains that informal caregivers commonly help patients influence their care and communicate with healthcare providers. According to Internal report A, they also see it as their task to avoid odor, skin irritation, and pad leakages, and ensure that the patients have the right pads. Ultimately, Internal reports A and B highlight that the informal caregivers act out of love to improve the patients' quality of life and well-being. As for their own emotional needs, Internal report A explains that informal caregivers want to feel valued and meaningful.

As for the pains, Internal report B shows that these informal caregivers find UI time consuming, inconvenient, physically and mentally exhausting, difficult, and in need of constant attention. It is therefore hard for them to leave the patient, to take them outside their home, and to get a full night's sleep, as explained in Internal report C. According to Internal report A and Consumer Insight Manager A at Company X[47], informal caregivers often feel lost due to the lack of knowledge of UI and the healthcare system, causing them to find their routines through ineffective trial-and-error-methods and question the quality of their care. Internal report C explains that the informal caregivers often worry about the pad status of the patient but feel intrusive when controlling the pad or asking about UI-related areas. The same report further remarks that pad leakages cause extensive extra work for the informal caregivers, as well as conflicts according to internal report B and Consumer Insight Manager A[48]. Taking a

[45] Incontinence coordinators A-C, Interviews via video calls, 29 February 2024; 4 March 2024; 5 March 2024.

[46] Consumer Insight Manager A, Company X, Interview via video call, 28 February 2024.

[47] Consumer Insight Manager A, Company X, Interview via video call, 28 February 2024.

[48] Consumer Insight Manager A, Company X, Interview via video call, 28 February 2024.

broader perspective, Internal report A discusses that UI can strain the general relationship between the informal caregiver and the patient, as a lot of frustration and negative emotions are involved. Furthermore, the informal caregiver can have an overarching worry and sadness for the patient's declining health condition, where UI contributes and indicates reduced well-being.

Continuing to the gains, Internal report B shows that informal caregivers commonly wish for practical support and advice, as well as time savings. Any support or aid should be convenient and easy-to-use, as Consumer Insight Manager A[49] argues that UI is not their top prioritization but rather an area that should demand minimal time and effort. Internal report C underscores that informal caregivers also want ease of mind when not with the patient, reducing the need for constant attention.

Table 6.2: Customer profile for informal caregiver in informal home care.

| **Customer jobs** | | |
|---|---|---|
| Avoid odor | Ensure that patient has the right pads | Love & respect a family member |
| Avoid pad leakages | Feeling valued and appreciated | Maintain patient's dignity & normality |
| Avoid skin irritation & infections | Give best possible care to patient | Make patient as comfortable as possible |
| Ensure quality of care | | |
| **Pains** | | |
| Difficult to find the right pad & routines | Feeling intrusive towards patient | Physically & mentally exhausting |
| Disturbed sleep patterns | Guilt & worry when leaving the patient | Strained relationship with patient |
| Fear of giving wrong or bad care | Handling of pad leakages | Time consuming & inconvenient |
| | Lack of knowledge of UI & health-care system | |

[49] Consumer Insight Manager A, Company X, Interview via video call, 28 February 2024.

| Gains | | |
|---|---|---|
| Convenient & easy-to-use aids | Ease of mind when away from the patient | Practical support & advise in UI care<br>Time savings |

### 6.2.3 Prescribing nurse

Needs of the prescribing nurses in informal home care are listed in table 6.3. As described in section 4.1.2.3, patients in informal home care commonly visit primary care centers when in need of healthcare. Prescribing nurses F[50] and G[51], both working in primary care centers, describe that their most important jobs are to provide personalized care, maintain patients' dignity, make the patients feel secure (e.g., by decreasing the risk for pad leakages), and ensure their comfort, well-being, and quality of life. Furthermore, an important job for both nurses is to select and prescribe suitable pads for their patients. Prescribing nurse F adds that they also strive to enhance patients' autonomy and independence, and both nurses F and G mention cost efficiency in prescriptions.

Severe pains of prescribing nurse F[52] includes lack of time for patient meetings and poorly adapted assessment routines for elderly. The routines of measuring and keeping detailed diaries are described as difficult for many elderly, certainly within their own homes and without assistance. Prescribing nurse G[53] also mentions the poorly adapted routines, specifically pointing towards language barriers for many patients. Both nurses argue that it can be difficult to interpret assessment results such as bladder diaries due to them often being filled incorrectly or partially. They also experience the waiting times as a significant pain since many patients must wait for weeks or months before receiving help with UI. Furthermore, prescribing nurse F mentions that it is a pain to switch pads when new brands and products are chosen though public procurement. On

[50] Prescribing nurse F, Primary care center, Interview via video call, 25 April 2024.
[51] Prescribing nurse G, Primary care center, Interview via video call, 7 May 2024.
[52] Prescribing nurse F, Primary care center, Interview via video call, 25 April 2024.
[53] Prescribing nurse G, Primary care center, Interview via video call, 7 May 2024.

a similar note, a pain for prescribing nurse G is the organizations restrictions on quantity of pads which is difficult to explain to patients. Having issues convincing patients to use smaller and fewer pads than they are used to is mentioned as another pain by both prescribing nurses, although less significant.

Finally, prescribing nurse F[54] wishes for increased status and prioritization of UI care as their most significant gain, followed by more convenient assessment routines. The desired gains of prescribing nurse G[55] include having low environmental impact from pads and having large flexibility and number of choices when prescribing pads. In addition, prescribing nurse G would like to see more convenient assessment tools for the patients, such as a digital solution.

Table 6.3: Customer profile for prescribing nurse (primary care center) in informal home care.

| **Customer jobs** | | |
|---|---|---|
| Avoid leakages<br>Coordinate with informal caregivers<br>Ensure comfort, well-being & quality of life | Ensure cost efficiency<br>Enhance patient autonomy<br>Listen to patients' opinions | Maintain patient's dignity<br>Make patient feel secure (e.g. about leakages)<br>Provide personalized care |
| **Pains** | | |
| Difficult to convince patient to use smaller pads Difficult to interpret assessment results<br>General lack of time & feelings of stress | Lack of education on UI among colleagues<br>Language barriers<br>Limitations on quantity of pads prescribed | Long waiting times for patients<br>New tenders resulting in changed prescriptions<br>Routines poorly adapted for elderly |
| **Gains** | | |
| Digital tools for assessments<br>Easier collaboration between caregivers | Increased flexibility & alternatives for prescriptions<br>Increased status and prioritization for UI | Lower environmental impact<br>More convenient assessment routines |

[54] Prescribing nurse F, Primary care center, Interview via video call, 25 April 2024.

[55] Prescribing nurse G, Primary care center, Interview via video call, 7 May 2024.

## 6.3 Formal nursing home care

Like the informal home care segment, formal nursing home care is a current target segment of Company X. Existing knowledge of the jobs, pains, and gains is therefore gathered from interviews and internal reports, of which the latter is verified and expanded in interviews with Consumer Insight Managers[56], Senior Marketing Manager[57], and Sales Manager[58] at Company X.

### 6.3.1 Patients

All identified needs for patients in formal nursing home care are listed in table 6.4. Two of the main jobs of patients in nursing homes are to get assistance with UI, and to be heard and respected by caregivers, as described by the interviewed incontinence specialist nurse [59]. Moreover, Internal report B underscores that another important customer job of patients in nursing homes is to facilitate for informal caregivers. Through staying in a nursing home, patients hope to relieve their caregivers though decreasing their stress and burden, reducing their feelings of shame, and increasing their happiness.

However, several pains emerge within the nursing home setting. As detailed in Internal report D, patients frequently express concerns about pad leakages and skin irritation, find pads uncomfortable, and are disturbed during sleep for pad controls. Another issue, according to Internal reports E and C, is the lack of reassessment of needs for new residents who already use pads, and the inadequate results of assessments serving as a weak basis for decision making. Consequently, many patients end up wearing unsuitable pads, increasing the risk for pad leakages. Moreover, Internal report C indicates inconsistencies in care provision among individual caregivers, long daily waiting times for assistance,

[56] Consumer Insight Managers A-B, Company X, Interview via video call, 28 February 2024.

[57] Senior Marketing Manager, Company X, Interview via video call, 15 April 2024.

[58] Sales Manager, Company X, Interview via video call, 12 April 2024.

[59] Incontinence specialist nurse, Interview via video call, 27 February 2024.

and limitations of patients' bathroom access. Finally, the interviewed Incontinence specialist nurse[60] observes that patients' emotions are often overseen in nursing homes.

Regarding the gains that patients aspire to achieve beyond their pains, Internal report E explains that many patients desire patience and company from caregivers. Remaining internal reports predominantly highlight jobs and pains rather than gains.

Table 6.4: Customer profile for patient in formal nursing home care.

| **Customer jobs** | | |
|---|---|---|
| Be heard and respected | Decrease burden for informal caregivers | Get assistance with UI |
| **Pains** | | |
| Discomfort from pad leakages | Long waiting times for daily care | Not getting to use the bathroom |
| Disturbed sleep patterns | Not feeling heard & respected | Poor assessment routines |
| Inconsistent care | | Worry about pad leakage |
| **Gains** | | |
| Increased patience from caregivers | More company from caregivers | |

### 6.3.2 Informal caregivers

Table 6.5 lists the needs of informal caregivers in formal nursing home care. They commonly strive to get relief from their care responsibility and reduce their worry for the patient's well-being, according to Consumer Insight Manager A[61]. Rather than performing practical care tasks, their jobs include quality controlling the professional care and ensuring that the patient receives the

[60] Incontinence specialist nurse, Interview via video call, 27 February 2024.

[61] Consumer Insight Manager A, Company X, Interview via video call, 28 February 2024.

support they need. Prescribing nurses A[62] and B[63] explain that while informal caregivers can be engaged in nursing home care, they typically do not offer many opinions on UI care.

Internal report C underscores numerous pains experienced by informal caregivers whose caretakers reside in nursing homes. For instance, they can be frustrated that the patient experiences daily waiting times and worry that pads are not changed often enough, causing discomfort. Moreover, the report mentions that informal caregivers feel guilty for not taking care of the patient themselves. Prescribing nurses A[64] and B[65] add that informal caregivers often feel worried and sad about the patients' worsening condition, commonly occurring parallel to transitioning to nursing home care. No gains for these informal caregivers are mentioned in internal reports.

Table 6.5: Customer profile for informal caregiver in formal nursing home care.

| **Customer jobs** | | |
|---|---|---|
| Ensure that patients' practical needs are met<br>Ensure quality of care | Get relief of care responsibility | Reduced worry for patient's well-being |
| **Pains** | | |
| Frustration over daily waiting times for patient<br>Guilt for not taking care of patient themselves | Worry about patient's worsening condition | Worry that pads are not changed often enough |
| **Gains** | | |
| - | | |

[62] Prescribing nurse A, Nursing home, Interview via video call, 27 March 2024.
[63] Prescribing nurse B, Nursing home, Interview via video call, 28 March 2024.
[64] Prescribing nurse A, Nursing home, Interview via video call, 27 March 2024.
[65] Prescribing nurse B, Nursing home, Interview via video call, 28 March 2024.

### 6.3.3 Care assistants

The identified needs for care assistants in nursing home care are listed in tebla 6.6. According to Internal report E, customer jobs for these care assistants include ensuring the patients' happiness and comfort, maintaining patients' sense of dignity, and delivering personalized care. Furthermore, they see it as their job to ensure that informal caregivers are content with the nursing home care. As for the care assistants themselves, Internal report C remarks that they want to feel important, needed, and independent in their work. As outlined in Internal report E, they also want to feel confident that they are doing a good job, through being reassured that patients receive high quality UI care.

The pains in performing these jobs include lack of time, which results in feelings of stress and insufficient time for tasks such as reflection and documentation, according to Internal report C. The report also suggests that care assistants can find it difficult to know when to change pads, since they lack knowledge of and trust in the pads. Another challenge mentioned in Internal reports C and E is that care plans are commonly not followed in nursing homes due to inconsistency between staff, fragmented communication, and inadequate training. Internal report E further highlights that assessments are seen as inconvenient and difficult to conduct, and interviewed Incontinence specialist nurse[66] means that UI is a low-prioritized area where follow-up routines are often absent. Moreover, Internal report E highlights that care assistants find their work physically and mentally challenging, worry about leakages, smell, and comfort, can have communication issues with patients, and sometimes lack motivation to provide the best possible care. The report also highlights a competence shortage among care assistants, particularly part-time or seasonal employees.

As outlined in Internal report C, nursing home care assistants would appreciate support in knowing when to change pads and support with prioritizing patients.

[66] Incontinence specialist nurse, Interview via video call, 27 February 2024.

Consumer Insight Manager B[67] argues that any support and aid should be convenient, efficient, and very easy to use. Internal report B further highlights that the care assistants wish to see a low environmental impact from UI care.

Table 6.6: Customer profile for care assistant in formal nursing home care.

| **Customer jobs** | | |
|---|---|---|
| Deliver personalized care<br>Ensure that informal caregivers are content | Ensure that patients are happy and comfortable<br>Feel important, needed and independent | Feel reassured that patients receive the best UI care<br>Maintain patients' sense of dignity |
| **Pains** | | |
| Difficult to communicate with patients<br>General lack of time & feelings of stress<br>Inconsistency between staff<br>Inconvenient to conduct assessments | Lack of communication between staff<br>Lack of education & knowledge of UI<br>Lack of motivation<br>Physically & mentally exhausting work | Physically & mentally exhausting work<br>Unsure when to change pads<br>Worry about leakage, smell & discomfort |
| **Gains** | | |
| Clearer indications on when to change<br>Convenient, efficient and easy-to-use aids | Lower environmental impact | Support with planning and prioritization of patients |

### 6.3.4 Prescribing nurses

The identified needs for prescribing nurses in nursing homes are listed in table 6.7. As highlighted in Internal report B, two of their main jobs are to understand patient needs and select aids that suit these needs. Additionally, prescribing nurses A[68] and B[69] argue that their jobs center around maintaining patients' dignity and enhancing their comfort, well-being, and quality of life. They work

[67] Consumer Insight Manager B, Company X, Interview via video call, 28 February 2024.

[68] Prescribing nurse A, Nursing home, Interview via video call, 27 March 2024.

[69] Prescribing nurse B, Nursing home, Interview via video call, 28 March 2024.

for patients' right to use the bathroom, aim to provide personalized care, and try to avoid skin irritation and infections for patients. As responsible for the patients' healthcare, they also aim to coordinate with other healthcare providers and ensure that informal caregivers are content. Moreover, the prescribing nurses aim for cost efficiency, as underscored by both Internal report D and prescribing nurses A and B.

A large pain for the prescribing nurses is the lack of time, resulting in high levels of stress and insufficient time for administration, patient meetings, and new initiatives, according to Internal reports B and C. While internal report B shows that prescribing nurses can find it difficult to interpret bladder diaries from assessments, prescribing nurses A and B argue that assessments are often not performed at all. Similarly, they lack routines for follow-up of prescriptions and UI in general, resulting in a lack of fact-based decisions. Internal report B further acknowledges that prescribing nurses commonly worry that care assistants do not care enough and ignore care plans and routines. This worry is shared by prescribing nurses A[70] and B[71], who argue that there can be a lack of shared vision with care assistants and that it is difficult to impact the care assistants' routines. For instance, they worry that patients' toilet access is not prioritized by care assistants. They also highlight a lack of education and knowledge of UI and UI care among themselves, but mainly among care assistants. Prescribing nurse A finally mentions that the limited number of pads to choose from makes it more difficult to find suitable, personalized aids.

Ideally, prescribing nurses A[72] and B[73] want UI care in nursing homes to be cost and time efficient, centered around established routines for assessment and follow-up, and always have toilet access as a top priority. Taking a

[70] Prescribing nurse A, Nursing home, Interview via video call, 27 March 2024.
[71] Prescribing nurse B, Nursing home, Interview via video call, 28 March 2024.
[72] Prescribing nurse A, Nursing home, Interview via video call, 27 March 2024.
[73] Prescribing nurse B, Nursing home, Interview via video call, 28 March 2024.

comprehensive and coordinated approach to each patients' UI needs would be a cornerstone in the ideal care scenario, according to prescribing nurse A. As further explained in Internal report D, prescribing nurses wish for less need to disturb patients during their sleep, having all UI information gathered in one platform with simple ordering functions, and having low environmental impact from UI care. Another gain would be to receive support in scheduling and knowing when to change pads, as detailed in Internal report C.

Table 6.7: Customer profile for prescribing nurse in formal nursing home care.

| **Customer jobs** | | |
|---|---|---|
| Avoid skin irritation and infections | Ensure comfort, well-being & quality of life | Ensure that patients get to use the toilet |
| Coordinate with other caregivers | Ensure cost efficiency | Maintain patient's dignity |
| | Ensure that informal caregivers are content | Provide personalized care |
| | | Select suitable aids for patients |
| **Pains** | | |
| Concern that patients do not get toilet access | General lack of time & feelings of stress | Lack of shared vision with care assistants |
| Difficult to influence care assistants' routines | Lack of education & knowledge of UI | Too few pad options to choose from |
| Difficult to initiate new routines | Lack of fact-based decisions | Worry that care assistants do not follow care plan |
| Difficult to interpret assessment results | Lack of routines for UI assessment | Worry that care assistants lack engagement |
| | Lack of routines for UI follow-up | |
| **Gains** | | |
| Comprehensive & coordinated UI care | Having established routines | Lower environmental impact |
| Cost savings | Having one platform for all UI information | Prescribing smaller & fewer pads |
| Decreased need to disturb patients at night | Letting all patients use the toilet | Time savings |

## 6.4 Mixed home care

The following section describes the jobs, pains, and gains of the actors within the care scenario of mixed home care. In contrast to the care scenario of informal home care and formal nursing home care, this care scenario is not a current target segment of company X. Hence, information about this segment is primarily gathered through numerous external interviews and complemented with information from interviewees at Company X. To create a deep understanding for this new potential target segment, all jobs, pains, and gains are categorized based on the ranking provided by the interviewees as suggested by Osterwalder et al. (2014).

### 6.4.1 Patients

All identified needs for patients in mixed home care are listed in table 6.8. As described by both interviewed patients[74], an important job is to feel independent and capable, and to be treated normally by caregivers, healthcare personnel, family, and friends. Additionally, they seek security knowing that leakages and smell will be avoided. Both patients emphasize the functional job of avoiding skin irritation and related issues. While both aim to prevent pad leakages and desire easy and discreet pad changes, they prioritize these jobs differently, with patient B ranking both jobs higher than patient A.

Similar to the most important customer jobs, the most significant pains for the interviewed patients[75] revolve around worry about leakages, access to the toilet, damp pads, and odor. Other significant pains include feeling infantilized by caregivers and embarrassed about UI and leakages. Some pains that the patients identify as important but less significant are the frustration of educating new care assistants about their care. Patient A describes how they must frequently instruct new care assistants about their tasks, which is frustrating and raises concerns regarding the quality of care. Moreover, patient B particularly

[74] Patients A-B, Interviews in person, 2 April 2024.

[75] Patients A-B, Interviews in person, 2 April 2024.

highlights the challenge from themself and their formal caregivers to establishing suitable toileting and pad routines. For both patients, the difficulty in accepting their reduced independence and feeling a lack of confidence due to their care needs is overarching. Although this is attributed to their general health condition and their need for home care services, their UI serves as a constant reminder of their reduced independence.

The significance of the pain related to skin issues varies between patients A and B[76], although both acknowledge it as a concern. Another area of discrepancy is pad deliveries, where patient B sees the embarrassment of receiving large pad deliveries outside their door as particularly significant. Patient A is less troubled by it and rather highlights the inconvenience of deliveries due to their limited mobility. Lastly, less important pains include difficulty obtaining knowledge about UI, issues with intimacy, and handling used pads.

Regarding the gains desired by patients within this segment, they include increased knowledge of UI and the opportunity to try new pads and solutions to find a better fit[77]. Additionally, both interviewed patients believe that an essential gain would be consistent care with observant care assistants. Some gains noted but considered less essential are functional improvements like easy pad changes, efficient pad storage, and discreet packaging and deliveries.

Table 6.8: Customer profile for patients in mixed home care.

| High significance | Middle significance | Low significance |
|---|---|---|
| **Customer jobs** | | |
| Avoid pad leakages<br>Avoid odor<br>Be treated like normal<br>Easy & discrete pad changes | Avoid skin irritation<br>Feel secure (e.g., that leakage will not occur) | - |

[76] Patients A-B, Interviews in person, 2 April 2024.

[77] Patients A-B, Interviews in person, 2 April 2024.

| | | |
|---|---|---|
| To feel independent & capable | | |
| **Pains** | | |
| Constant concern about leakages & toilet access<br>Feeling embarrassed for UI & leakages<br>Feeling infantilized by caregivers<br>Worry about odor<br>Worry about damp pads | Difficult to accept reduced independency<br>Difficult to find the right toilet & pad routines<br>Disappointed that the UI cannot be treated<br>Having to educate new care assistants<br>Inconvenient & embarrassing with large pad deliveries<br>Skin irritation from damp pads | Difficult to obtain knowledge of UI<br>Having to handle & dispose used pads<br>Issues with intimacy due to UI<br>Low confidence due to large care needs |
| **Gains** | | |
| Discrete pads<br>Increased knowledge of UI<br>More observant care assistants<br>Receiving more consistent care<br>Trying new pads & solutions | Discrete packages & deliveries<br>Easier pad changes<br>Easier storage of pads | - |

### 6.4.2 Informal caregivers

All identified needs for informal caregivers in mixed home care are listed in table 6.9. The jobs identified by the interviewed informal caregivers[78] revolve around the patients' feelings and well-being. They perceive themselves as emotional support and quality-controllers of the formal care, participating in practical UI care tasks only when necessary. Whereas both informal caregivers see emotional support as a job, the significance varies depending on the patient's support network. Moreover, both informal caregivers emphasize that the most crucial aspect of their role is maintaining the patient's dignity and normalcy. They aim to prevent odors and ensure discretion regarding UI for the patient's own sake.

[78] Informal caregivers A-B, Interviews via video calls, 26 March 2024; 3 April 2024.

Their motivation stems from their desire to give back to a family member. A critical part of the informal caregivers' role involves cooperating and communicating with both home care service and other informal caregivers. Informal caregiver A describes how they and their siblings regularly update each other about their parent's condition and care activities. Additionally, less significant jobs include assisting with demands on formal care, ensuring the patient's practical needs are met, and managing pad deliveries.

Pains experienced by the interviewed informal caregivers[79] are primarily concerned with the patient's well-being. They worry about odor, the quality of formal LTC, and the risk of the patient falling and injuring themselves during toilet visits. Moreover, assisting with pad changes is perceived as inconvenient, uncomfortable, and physically demanding. Despite this, caregiver A and B both feel guilty for not doing enough and struggle to determine whether they are providing optimal care. Less significant pains include concerns that the patients set low expectations on their care and conflicts regarding the level of LTC needed. Furthermore, both informal caregivers find external leakages sensitive and practically difficult to handle. They also find it hard to divide the care between different caregivers, both formal and informal. Informal caregiver A highlights that they are sometimes unsure what tasks fall under the responsibility of home care services. Caregiver B highlights that the division of care responsibilities with their siblings often results in conflicts. Finally, both informal caregivers think that initiating conversations about UI with patients is difficult, despite being able to discuss other health-related topics effortlessly.

As the informal caregivers[80] consider themselves quality controllers over the UI care provided, they are more attentive to pains than gains. The gains they seek involve discreet and user-friendly pads, as well as an open dialogue around UI. Additionally, they desire fair and dignified treatment for the elderly.

---

[79] Informal caregivers A-B, Interviews via video calls, 26 March 2024; 3 April 2024.

[80] Informal caregivers A-B, Interviews via video calls, 26 March 2024; 3 April 2024.

Table 6.9: Customer profile for informal caregivers in mixed home care.

| High significance | Middle significance | Low significance |
|---|---|---|
| **Customer jobs** | | |
| Avoid odor<br>Ensure discretion for patient<br>Maintain patient's dignity & normality | Cooperate with other informal caregivers<br>Ensuring that patients' practical needs are met<br>Provide emotional support<br>Give back to a family member<br>Have contact with home care services<br>Help make demands on the care | Help handle pad deliveries |
| **Pains** | | |
| Difficult to know how to provide best care<br>Guilt that they "should do more" for the patient<br>Inconvenient, uncomfortable & heavy to change pads<br>Worry about odor<br>Worry about quality of formal LTC<br>Worry that patient will fall during toilet visit | Odor from leakages & used pads<br>Conflicts about level of LTC needed<br>Difficult to divide work between caregivers<br>Lack of knowledge of UI & healthcare system<br>Sensitive to handle pad leakages<br>Worry that patient sets too low expectations | Difficult to initiate conversations about UI |
| **Gains** | | |
| Discrete & easy-to-use pads<br>Fair & dignified treatment of the elderly | A more open dialogue around UI | - |

### 6.4.3 Care assistants

All identified needs for care assistants in mixed home care are listed in table 6.10. Within mixed home care, interviewed care assistants in home care services[81] identify several jobs centered around the patient's well-being. They all agree that their primary job is to ensure the patient's comfort while accommodating their preferences. Additionally, a job is to communicate the patient's needs to the prescribing nurse, although they view this job as less critical. Furthermore, practical jobs such as preventing pad leakages and adhering to their daily schedules are important according to all care assistants in home care service. Care assistants A, B, and D particularly emphasize their need to feel valued, necessary, and independent in their daily roles.

The most significant pains for care assistants in home care services stem from overarching problems within home care services, leading to additional challenges. All care assistants[82] emphasize a general lack of time, feeling of stress, and physically and mentally exhausting work. Additionally, they all highlight that challenges emerge as there is a general lack of education and knowledge about UI care, and care assistant D highlights that it is a lot to remember and keep track of. In addition, care assistant A and B express that they have acquired most of their knowledge of UI from years of experience while they both think that especially the more junior care assistants lack knowledge of UI. Other significant pains include the worry about leakages, odor, and discomfort for the patient as well as inconvenient documentation methods.

Pains considered less significant are centered around challenges in daily work such as inflexibility in changing schedules and poor environment for care

[81] Care assistants A-E, Home care services, Interviews via video calls and in person, 20 March 2024; 20 March 2024; 27 March 2024; 4 April 2024; 16 April 2024.

[82] Care assistants A-E, Home care services, Interviews via video calls and in person, 20 March 2024; 20 March 2024; 27 March 2024; 4 April 2024; 16 April 2024.

activities. An additional pain mentioned by all care assistants[83] in home care services is the lack of and difficult-to-access documentation, however the severity of the pain differs depending on what solutions and routines are in place in each home care service organization. Additionally, the care assistants experience discomfort from handling intimate hygiene and find it difficult and uncomfortable to assess the need for pad changes, although they have gotten used to it. Other concerns include worries about the patient suffering from wet pads, low priority on improving UI care, and disruptions to the patient's sleep.

Furthermore, care assistants experience pains related to communication. All care assistants[84] highlight that there is a lack of formal communication channels and that it is difficult to maintain routines. Care assistants A and B also highlight that there is inadequate communication regarding pad orders, often resulting in wrong orders being placed. The communication issues are worsened by language barriers and hesitation to ask colleagues for help, as explained by care assistant B and D. Another challenge highlighted is the lack of motivation and engagement among some care assistants. The senior care assistant A perceives junior ones as reactive rather than proactive, while the more junior care assistants D expresses the absence of support and lack of knowledge about UI care as challenging.

Furthermore, all care assistants[85] state that there are no particular routines for either UI assessments or follow-up in home care services. This is not perceived as a concern by care assistants A, B, C and E, who are satisfied with the current method of trial-and-error to find suitable pads and routines. In contrast, care assistant A believes that junior care assistants find it challenging to select the

[83] Care assistants A-E, Home care services, Interviews via video calls and in person, 20 March 2024; 20 March 2024; 27 March 2024; 4 April 2024; 16 April 2024.

[84] Care assistants A-E, Home care services, Interviews via video calls and in person, 20 March 2024; 20 March 2024; 27 March 2024; 4 April 2024; 16 April 2024.

[85] Care assistants A-E, Home care services, Interviews via video calls and in person, 20 March 2024; 20 March 2024; 27 March 2024; 4 April 2024; 16 April 2024.

suitable pads and determine the appropriate time for pad changes and toilet visits. Hence, they believe that junior care assistants would benefit from more routines and guidance in assessment and follow-up, a belief shared by care assistant D. Moreover, care assistant B highlights leakage assessments are inconvenient to execute.

The gains desired by the care assistants within home care services[86] revolve around knowledge and responsibility for UI care. They all express a wish for greater knowledge about UI and different pad options. In addition, care assistants B and D want stricter requirements for undergoing training and having someone within home care services responsible for UI care. Additionally, the care assistants desire gains that can make their daily work easier, including time savings, permission to keep stock of pads, and simple instructions of pads. Care assistants D and E also emphasize the need for both digital tools and easily accessible, well-documented routines and guidelines. Furthermore, care assistants B and C highlight the desire to elevate the status of the care assistant profession in general.

Table 6.10: Customer profile for care assistants in mixed home care.

| High significance | Middle significance | Low significance |
|---|---|---|
| **Customer jobs** | | |
| Avoid pad leakages<br>Ensure that patient has the right pads<br>Listen to patient's preferences<br>Make patient as comfortable as possible | Ensure that patient has the right pads<br>Feel important, needed & independent<br>Follow the daily schedules | Communicate patient's needs to nurse |
| **Pains** | | |
| A lot to remember & keep track of* | Afraid to ask for help from colleagues | Difficult and uncomfortable to check need for pad change |

[86] Care assistants A-E, Home care services, Interviews via video calls and in person, 20 March 2024; 20 March 2024; 27 March 2024; 4 April 2024; 16 April 2024.

| | | |
|---|---|---|
| General lack of time & feelings of stress<br>Inconvenient documentation methods<br>Lack of education & knowledge of UI<br>Physically & mentally exhausting work<br>Worry about leakage, smell & discomfort | Cannot access all information about patient<br>Difficult to be flexible & change the schedule<br>Difficult to maintain routines<br>Lack of communication regarding pad orders<br>Lack of formal communication channels<br>Lack of motivation & engagement*<br>Lacking and difficult to access documentation<br>Poor environment for care activities<br>Unsure when to change pads<br>Worry that patients suffer from wet pads | Difficult to schedule toilet visits<br>Difficult to find the right pad<br>Discomfort from handling intimate hygiene<br>Having to disturb patient's sleep<br>Inconvenient to do leakage assessments<br>Lack of routines for UI assessment<br>Lack of routines for UI follow-up<br>Language barriers<br>Low priority on improving UI care<br>Many different organizations to coordinate with |
| **Gains** | | |
| Being allowed to have stock of pads<br>Engaged & committed care assistants<br>Having someone responsible for UI care<br>Increased knowledge of UI<br>Stricter requirements to undergo trainings<br>Time savings | Accessibly documented routines & guidelines<br>Increased status for the care assistant profession<br>More knowledge about different pad options<br>Reduce need for changing of bedding and laundry | A more open dialogue around UI<br>Simplify descriptions of pads<br>Usage of digital tools |

### 6.4.4 Prescribing nurses

To capture the differing needs of prescribing nurses in mixed home care, in both primary care centers and home healthcare, two distinct customer profiles are created in table 6.11 and 6.12, respectively.

Starting with the prescribing nurses at primary care centers, nurses F[87] and G[88] highlight that the challenges observed in informal home care, detailed in section 6.2.3, also apply in mixed home care settings. Nurse F adds coordinating with home care services as a customer job in mixed home care, however, also identifies the lack of effective communication channels and collaboration with home care services as pains. Nurse G shares from experience that they have limited interaction with home care services but notes that their support can be beneficial when available.

Continuing with prescribing nurses in home healthcare, nurses C[89], D[90], and E[91] emphasize that their primary job is maintaining the patient's dignity and ensuring the patient feels secure regarding the prevention of leakages, odor, and skin issues. Furthermore, the nurses aim to provide personalized care for each patient. A crucial aspect emphasized by nurses C-E is ensuring that patients access toilet facilities. Additional jobs considered less significant include ensuring cost efficiency and coordinating with other caregivers. Nurses C-E also noted several care-related jobs, such as preventing pad leakages, enhancing patient autonomy, and preventing skin irritation and infections.

The pains expressed by prescribing nurses C[92], D[93], and E[94] reveal a complex relationship between them and the care assistants in home care services. Simultaneously, they all express a general lack of time and feelings of stress. Despite being responsible for prescribing UI aids, prescribing nurses C and E feel they have limited control over prescriptions due to time constraints and a lack of

[87] Prescribing nurse F, Primary care center, Interview via video call, 25 April 2024.
[88] Prescribing nurse G, Primary care center, Interview via video call, 7 May 2024.
[89] Prescribing nurse C, Home healthcare, Interview via video call, 28 March 2024.
[90] Prescribing nurse D, Home healthcare, Interview via video call, 4 April 2024.
[91] Prescribing nurse E, Home healthcare, Interview via video call, 4 April 2024.
[92] Prescribing nurse C, Home healthcare, Interview via video call, 28 March 2024.
[93] Prescribing nurse D, Home healthcare, Interview via video call, 4 April 2024.
[94] Prescribing nurse E, Home healthcare, Interview via video call, 4 April 2024.

authority. Nurse C and E emphasize the absence of a shared vision with home care services and the difficulty in influencing the routines of the care assistants. Despite being responsible for the care plan, nurses C-E find it challenging to initiate new routines for patients, as these are carried out by both formal and informal caregivers. In addition, the nurses find it painful to deal with the varying levels of motivation and engagement among the care assistants. Moreover, regulations prevent prescribing nurses from sharing all relevant information with home care services. Additionally, nurses C-E believe that the coordination between caregivers is insufficient, and the involvement of many individual caregivers for each patient poses challenges.

Furthermore, the prescribing nurses in home healthcare[95, 96, 97] experience pains connected to their responsibilities and the patient's well-being. For instance, prescribing nurses C and D highlight that a significant pain is their concern that the patient does not have adequate access to the toilet. In addition, they all find it problematic that there is a lack of routines for both UI assessment and follow-up and that UI care, diagnosis, and treatment are of low priority. Furthermore, they highlight that it is difficult to access doctors as they are part of different organizations. Additionally, all interviewed home healthcare nurses feel that both their own and the care assistants' education on UI is inadequate. The prescribing nurses C and D struggle to make fact-based decisions for the patients and find it hard to deal with the many differing opinions on pad choices.

Moving on to the gains desired by the prescribing nurses within home healthcare in mixed home care. All three interviewees[98, 99, 100] desire increased knowledge for

[95] Prescribing nurse C, Home healthcare, Interview via video call, 28 March 2024.
[96] Prescribing nurse D, Home healthcare, Interview via video call, 4 April 2024.
[97] Prescribing nurse E, Home healthcare, Interview via video call, 4 April 2024.
[98] Prescribing nurse C, Home healthcare, Interview via video call, 28 March 2024.
[99] Prescribing nurse D, Home healthcare, Interview via video call, 4 April 2024.
[100] Prescribing nurse E, Home healthcare, Interview via video call, 4 April 2024.

themselves and the care assistants regarding UI, as well as more comprehensive and coordinated UI care. Other desired gains, though less essential, include more convenient assessment routines in combination with efficient and user-friendly aids. Furthermore, nurses D and E desire lower costs for UI care and a reduction of wasted pads. Nurses C and E seek reassurance that all patients undergo proper assessments and want increased motivation among care assistants.

Table 6.11: Customer profile for prescribing nurses in primary care center in mixed home care.

| High significance | Middle significance | Low significance |
|---|---|---|
| **Customer jobs** | | |
| Ensure comfort, well-being & quality of life<br>Maintain patient's dignity<br>Make patient feel secure (e.g. about leakages)<br>Provide personalized care | Avoid pad leakages<br>Coordinate with other caregivers<br>Enhance patient autonomy | Ensure cost efficiency |
| **Pains** | | |
| General lack of time & feelings of stress<br>Routines poorly adapted for elderly<br>Long waiting times for patients | Difficult to interpret assessment results<br>Lack of formal communication channels with other caregivers<br>Language barriers<br>New tenders resulting in changed prescriptions<br>Strict prescription guidelines | Difficult to convince patient to use smaller pads<br>Lack of education on UI among colleagues |
| **Gains** | | |
| Increased status and prioritization for UI | Easier collaboration between caregivers<br>Increased flexibility & alternatives for prescriptions<br>Lower environmental impact<br>More convenient assessment routines | Digital tools for assessments |

Table 6.12: Customer profile for prescribing nurses in home healthcare in mixed home care.

| Low significance | Middle significance | High significance |
|---|---|---|
| **Customer jobs** | | |
| Ensure that patients get to use the toilet<br>Maintain patient's dignity<br>Make patient feel secure (e.g. about leakages)<br>Provide personalized care | Avoid pad leakages<br>Coordinate with other caregivers<br>Ensure cost efficiency<br>Enhance patient's autonomy | Avoid skin irritation and infections |
| **Pains** | | |
| Concern that patients do not get toilet access<br>Difficult to influence care assistants' routines<br>General lack of time & feelings of stress<br>Lack of education on UI in home care services<br>Lack of routines for UI assessment<br>Lack of shared vision with home care services | Cannot share all information with home care services<br>Difficult to initiate new routines<br>Insufficient coordination between caregivers<br>Lack of routines for UI follow-up<br>Low priority on UI care, diagnosis, and treatment<br>Lots of prescriptions but low control<br>Varying motivation & engagement among carers | Lack of education on UI for nurses<br>Lack of fact-based decisions<br>Limited access to doctors<br>Many individual caregivers involved<br>New tenders resulting in changed prescriptions |
| **Gains** | | |
| Comprehensive & coordinated UI care<br>Increased knowledge of UI care | Feel good that all patients undergo assessment Lower cost for UI care More convenient assessment routines | Convenient, efficient & easy-to-use aids<br>Fewer wasted pads<br>Increased motivation among caregivers |

# Chapter 7 – Analysis of value proposition design

*In this chapter, the VPC is used to analyze the needs to consider when adapting an IoMT solution for the mixed home care market, as per the thesis framework highlighted in figure 7.1. First, the different customer profiles from the previous section are compared to identify similarities and differences between mixed home care and the current target segments. Second, the VPC value map is created for Solution X. Finally, the fit between the value map and the customer profiles for mixed home care is explored.*

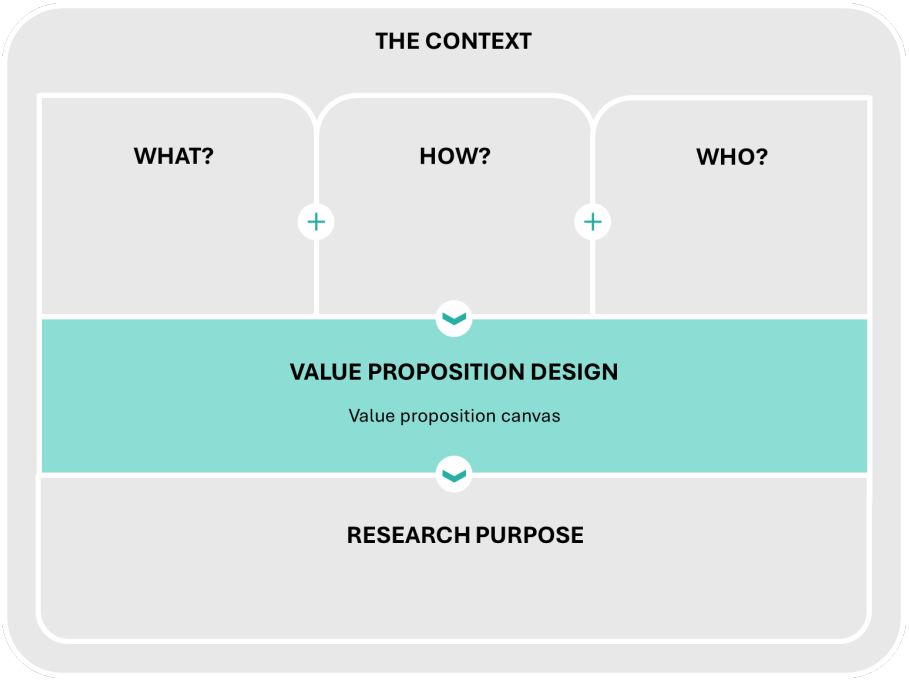


Figure 7.1: The value proposition design-analysis and corresponding theoretical model highlighted in the thesis's theoretical framework.

## 7.1 Comparing customer profiles

This section compares the different customer profiles to examine their similarities and differences. Specifically, tying back to the thesis's purpose, it

aims to highlight the unique needs in the mixed home care scenario and explore how it distinguishes from other scenarios. The comparison is performed profile by profile, to create understanding for how each actor's needs changes depending on the care scenario. Before comparing the specific customer profiles across care scenarios, overarching aspects that set mixed home care apart from the other care scenarios are summarized.

### 7.1.1 Unique aspects of mixed home care

Several characteristics that set mixed home care apart from informal home care and formal nursing home care are highlighted in the interviews described in section 6.4. Although both informal and mixed home care is provided in the patients' ordinary home, mixed home care stands out for its many involved caregivers and the presence of multiple healthcare organizations.

Additionally, the mixed home care scenario also stands out through the organization of formal care. For instance, compared to nursing homes, home care services have a higher ratio of care assistants per patient, more inflexible schedules, and must travel between patient visits. Moreover, mixed home care involves multiple organizations providing care, introducing an additional layer of complexity and potential challenges in coordination and information sharing. Lastly, several home care services exhibit inconvenient documentation routines compared to nursing homes due to mobility. Overall, these unique features of mixed home care contribute to the discrepancies experienced by patients, informal caregivers, care assistants, and prescribing nurses within mixed home care.

### 7.1.2 Patient

Across all care scenarios, patients share similar experiences and have common goals regarding UI care. Generally, they seek to be treated with dignity and live normal lives while feeling secure that their UI care and aids will prevent leakage, odors, and skin issues. They all desire discreet and well-functioning pads. In the

informal home care setting, patients are particularly attentive to challenges related to their relationship and communication with informal caregivers. In contrast, patients in mixed home care are primarily concerned with challenges related to their formal caregivers. They particularly seek more consistent and attentive care where caregivers are knowledgeable about UI and patient's preferences and needs. While consistency is crucial across all care scenarios, it emerges as a greater pain in mixed home care as there is a greater involvement of multiple caregivers and a greater lack of knowledge. Moreover, the patients in mixed home care underscore the need for support in finding the right routines for pad changes and toilet visits to increase their independence and well-being.

### 7.1.3 Informal caregiver

Although the extent and type of care provided vary across different care scenarios, informal caregivers share common goals. Their primary focus is the patient and their well-being. Above all, they all seek reassurance that the patient receives proper care and is treated with dignity and respect. Informal caregivers within mixed home care particularly emphasize their role as quality controllers of the care provided.

Across all care scenarios, informal caregivers are troubled by their limited knowledge about the healthcare system and UI care. Additionally, though the extent of the care varies between scenarios, informal caregivers experience physical and mental exhaustion due to their caregiving responsibilities. Both informal caregivers in mixed home care and formal nursing home care are concerned with the quality of formal care. Similarly, they express feelings of shame that they are not doing enough for the patient and are instead having someone else care for them. Moreover, the informal caregivers within mixed home care are challenged by the multitude of caregivers involved, as well as the coordination and communication between them.

### 7.1.4 Care assistant

The care assistant role is prevalent in mixed and formal care scenarios, where they share common goals and encounter similar challenges. Their primary goal is to ensure the comfort of the patient and prevent leakages. Likewise, both care assistants in nursing homes and home care services are concerned about patient discomfort and experience stress and time pressure. They also face challenges related to the lack of routines and proper documentation. While the internal reports show that care assistants in nursing homes find it inconvenient to perform assessments and sometimes lack routines for it, most of the interviewed care assistants in home care services express no pain or gain related to assessments. Instead, they are content with their current trial-and-error-methods for pad selection. Additionally, both care assistants in nursing homes and home care services experience a lack of knowledge and training in UI care, struggling to determine if pads are fitted correctly and when they require changing. Both groups highlight issues with inconsistent engagement among colleagues, which complicates their work, along with limitations in communication and handover routines.

While care assistants in nursing homes and home care services encounter similar challenges, care assistants in home care services experience them to a greater extent. They are particularly burdened by inflexible schedules, extensive care responsibilities, and lack of support from colleagues. Moreover, they perceive larger knowledge gaps within their organization regarding UI care and struggle to find suitable pads and routines for each patient. Communication challenges are larger in home care services due to involvement from multiple organizations and individuals, resulting in miscommunication about care and pad orders. Care assistants in home care services also struggle with feelings of guilt for not providing optimal care and for lacking time to engage with patients socially.

### 7.1.5 Prescribing nurse

Prescribing nurses in the various care settings are associated with different healthcare providers, namely primary care centers, nursing homes and home healthcare. Despite the diversity of their work environments, their fundamental responsibilities remain unchanged. Common among all scenarios is the prescribing nurses' commitment to delivering personalized care to patients, maintaining the patient's dignity, and ensuring they have appropriate pads. They are particularly concerned with facilitating patients' access to toilets. In contrast to other roles, prescribing nurses are concerned about the costs associated with UI care, especially those related to aids.

While the jobs are similar across care settings, the pains differ. For instance, the challenges faced by prescribing nurses in mixed home care vary widely depending on the healthcare provider, whether it be primary care center or home healthcare. This largely stems from differences in patients' health statuses and the level of collaboration with home care services. Patients receiving home health care generally exhibit more physical and mental impairments, and nurses in home health care are more involved with home care services and experience pains associated with that collaboration. On the other hand, prescribing nurses at primary care centers encounter similar challenges regardless of whether the patient receives home care services, as their involvement with home care services is low.

Similar to care assistants, the prescribing nurses experience stress and time pressure due to their extensive responsibilities and the high volume of prescriptions they manage. For nurses in home health care and nursing homes, a significant challenge is aligning their vision for UI care with that of care assistants. Prescribing nurses strive for a more comprehensive and coordinated approach to UI care, including conducting thorough assessments for each patient and prioritizing toilet visits. Rather than prescribing pads based on experience, they want fact-based decisions. However, they all encounter

difficulties in implementing new routines for care assistants and express concerns about the level of knowledge and engagement among care assistants.

While prescribing nurses within nursing homes operate under the same organization and work in closer proximity to care assistants, those in mixed home care belong to different organizations. Furthermore, as previously mentioned, home care services have more individual caregivers per patient. These factors collectively pose challenges for communication among caregivers, patients, and prescribing nurses. For example, prescribing nurses in mixed home care working in home health care encounter additional difficulties in influencing care assistants' routines and conducting leakage assessments compared to nursing homes. In addition to these challenges, care assistants and prescribing nurses in mixed home care are unable to share all patient information due to their organizational differences, further complicating communication and collaboration. Additionally, prescribing nurses in mixed home care working at home health care express feelings of limited control over prescriptions, despite this being their responsibility. They often rely on the advice of care assistants rather than conducting thorough assessments.

### 7.1.6 Summary of profile comparison

In summary, the customer profiles share many similarities across the three studied care scenarios. Regardless of the care scenario, patients, care assistants, and prescribing nurses share a similar view of the jobs. However, variations in the extent and nature of care provided by informal caregivers contribute to differences in their perception of their primary jobs across scenarios, where the informal caregivers in mixed home care and formal nursing home care see themselves as quality controllers of care rather than the primary caregiver. Additionally, all roles across all care scenarios share a dedication to the well-being and dignity of the patient. In contrast, many differences arise in the challenges faced due to variations in the organization and management of care. However, a common challenge across all scenarios is the lack of knowledge about UI care

and a feeling of stress and time pressure for caregivers and prescribing nurses. Additionally, there is a universal need for improved communication and collaboration among all customer profiles, where the involved actors differ across care scenarios.

The greatest differences between customer profiles emerge for the care assistant and prescribing nurse profiles. While many pains are recurring across care scenarios, they are commonly expressed as more severe in the mixed home care scenario than in formal nursing home care. The extensive challenges can, in general, be explained by the organizational factors setting the scenarios apart. Mixed home care is shown to be more difficult to coordinate, less flexible, involve more individual caregivers, and have greater challenges with lacking knowledge and education. This is especially challenging for prescribing nurses in mixed home care working in home health care. While prescribing nurses experience lack of common goals with care assistants in both home care services and nursing homes, the study indicates that the goals vary wider in the case of mixed home care. For instance, a great pain of all prescribing nurses is that assessments are not performed, but only a few care assistant in home care services mention lack of formal assessments as a pain. Additionally, prescribing nurses in mixed home care working in home health care find it more difficult to affect care assistants since they are commonly part of different organizations, making the pain of lacking alignment more severe.

In conclusion, while the customer profiles within mixed home care exhibit numerous similarities with those in the two current target segments of Company X, several distinctions emerge. Particularly notable are the differences in the challenges faced by informal caregivers, care assistants, and prescribing nurses within this context. Hence, there is a need to examine the alignment of the current value proposition of Solution X with the needs of this new target segment of mixed home care.

## 7.2 Value map

The second part of the VPC by Osterwalder et al. (2014) is the value map, comprising products and services, pain relievers, and gain creators. As described in section 3.5.2.2, the purpose of the value map is to provide a structured approach to describing a certain value proposition, to later evaluate its fit with the jobs, pains, and gains of specific customer profiles. The value map for Solution X is summarized in table 7.1.

In line with the thesis framework, the value proposition of Solution X was analyzed in section 5.1 using Kotler et al.'s three levels of a product, categorizing the products and services it comprises into three different levels. These products and services are transferred into the products and services part of the value map, as seen in table 7.1. However, the value map calls for additional analysis of the benefits of Solution X, dividing them into pain relievers and gain creators.

Several benefits described in section 4.2.1 aim to address challenges such as the pains described by the profiles in Chapter 6 and can therefore be classified as pain relievers. For instance, ensuring fewer pad leakages, time savings, less need to disturb patients for controls and unnecessary changes, dignity for patients, and decreased risk for skin issues, which are all mentioned as pains. Furthermore, it addresses the difficulty in knowing when to change pads and having lack of fact-based decisions, assessment and follow-up routines, personalization, documentation, care overview, and knowledge of the UI domain.

While gain creators do not address problems and challenges, they add value to customers by making their lives easier, enhancing the long-term value of the solution. Solution X benefits in section 4.2.1 that go beyond targeting pains include cost and time efficiency, small environmental impact, and precise data on leakage patterns. Moreover, the solution can facilitate communication and scheduling, and enable mobile long-distance monitoring opportunities, which

are attributes that could all facilitate the lives of customers although are not articulated as pains.

Table 7.1: The value map of Solution X.

| **Products & services** | | |
|---|---|---|
| Customer service<br>Data & tools for follow-up & evaluation<br>Data & analytics on leakage patterns | Digital platform for documentation<br>Education on sensor handling & data interpretation | Real-time updates & change notifications<br>Support for UI pad selection & care plan design<br>Wearable connected leakage sensor |
| **Pain relievers** | | |
| Decreased risk for skin irritation & infections<br>Easier documentation & overview of UI<br>Easier to know when to change<br>Enablement of fact-based decisions<br>Fewer pad leakages | Increased comfort for patient<br>Increased integrity for patient<br>Increased knowledge of UI, UI care & pads<br>Increased peace of mind for caregivers | Increased personalization of toilet routines<br>Less need to disturb patient<br>More convenient leakage assessments<br>Structured & easy-to-follow routines for UI care<br>Time savings |
| **Gain creators** | | |
| Cost savings<br>Easier communication for caregivers | Easier scheduling for caregivers<br>Fewer pad leakages<br>Increased efficiency | Mobile/long distance monitoring of pads<br>More precise data on leakage |

## 7.3 The fit

Having explored both the customer profiles and the value map of Solution X, creating complete VPCs, the fit between the two sides of the VPCs can be evaluated. As suggested by Osterwalder et al. (2014), a *problem-solution fit* can be evaluated through assessing whether each job, pain, or gain, is targeted in the value map, and likewise whether all products and solutions, pain relievers, and gain creators are needed in the customer profile. To identify needs to be

considered when adapting Solution X to the mixed home care situation, the fit with the customer profiles for mixed home care is explored, profile by profile. Building on the understanding of customer needs and the current value proposition, each job, pain, and gain is classified as either addressed, partially addressed, or not addressed by Solution X. These classifications are illustrated in detail in Appendix B and summarized and discussed below.

### 7.3.1 Patient

Beginning with the patients' jobs, the analysis presented in Appendix B.1.1 shows that nearly all jobs could be either fully or partially addressed by Solution X as it is today. As shown in the value map, Solution X can result in decreased leakages, less worry for skin irritation, and increased security for the patient, thereby resolving three jobs. Several jobs ranked as important are seen as partially addressed by Solution X, namely easy and discrete pad changes, avoidance of odor, and to be treated like normal. While Solution X alone is unlikely to completely resolve these jobs, it can help through indicating when to change, promoting small pads, avoiding leakages and therefore odor, and decreasing the need to disturb the patient, thus allowing them to be treated more like normal. The job of feeling independent and capable is the only job not addressed by Solution X, as the solution does not reduce care needs.

As for the patients' pains, most of the pains with high and medium severity can potentially be fully or partially addressed with Solution X. Like the jobs, Solution X can provide significant help with resolving pains regarding pad dampness and finding routines. It can also indirectly reduce the risk of odor through right change times and fewer leakages, as well as reducing the feelings of embarrassment and concerns regarding leakages. Solution X is therefore seen as partially addressing these pains. Similarly, Solution X would reduce the needs for patients to educate care assistants about UI care, since they would be able to easily access necessary information through Solution X. Continuing to the pains not addressed by Solution X, these mainly include emotional pains and pains

with less severity. For instance, the pain relievers identified for Solution X are unlikely to help the patient feel less infantilized, help with pad deliveries, resolve their UI condition, strengthen their confidence, or help with intimacy.

Studying the patients' wanted gains, most are partially or not addressed by Solution X. Usage of better designed care plans and pad monitoring could contribute to more consistent care. Similarly, assessments with Solution X often result in prescription of smaller pads, leading to increased discretion, and the monitoring facilitates pad changes and controls. However, the gain creators of Solution X do not include increased knowledge among patients, more observant care assistants, easier storage, or discrete pad deliveries. Still, the patients' wish to try new pads and solutions matches well with the introduction of Solution X.

In general, a good fit emerges between the patients' functional needs and Solution X. However, some of their needs would only be partially or not addressed by Solution X, mainly issues with caregivers and emotional needs concerning for example feelings of embarrassment and low self-esteem.

### 7.3.2 Informal caregiver

Among the informal caregivers' jobs, all jobs with high importance could be partially addressed using Solution X. As discussed in the previous section, the assessment and monitoring support provided by Solution X can contribute to a sense of normality, avoidance of odor, and discretion for the patient, which informal caregivers value highly. It can also help them cooperate with other informal caregivers, as Solution X allows for shared usage. However, remaining middle and low importance jobs are not addressed by Solution X, such as helping the CGR provide emotional support, having contact with home care services, or controlling and making demands on the care.

Continuing to the pains of informal caregivers, around half of the pains with high and middle severity could be partially resolved using Solution X. Through

support from care plans, pad monitoring, and information about UI care, informal caregivers can feel more confident in the care they provide and can feel reassured that the patients receive proper UI care. Furthermore, the solution can create increased knowledge, reduce odor, and make handling of UI more convenient, as highlighted in the value map. As Solution X can help significantly reduce pad leakages, this is the only directly addressed need for the informal caregivers. However, several pains of varying severity remain unaddressed by Solution X, no pain relievers reduce the worry for falling, feelings of guilt, or worry that the patient sets too low demands. Neither does it significantly help avoid conflicts about level of LTC, support division of work between informal caregivers, or initiate conversations about UI.

The three gains identified for informal caregivers are all seen as partially addressed by Solution X, at it enhances dignified treatment of elderly, discretion, and open dialogues. However, this does not mean that these gains would be completely achieved. For example, dignified treatment of elderly includes more parameters than UI care.

In summary, few needs of the informal caregivers would be fully addressed with the implementation of Solution X. Many of their largest needs are emotional rather than functional and include aspects beyond UI, thus not being completely addressed by Solution X. Instead, most of the needs with the highest significance for the informal caregivers are partially addressed through indirect benefits.

### 7.3.3 Care assistant

Among half of the jobs ranked with high and middle importance for care assistants in home care services are seen as addressed by Solution X. As discussed in the value map, the solution can significantly decrease pad leakages and create comfort for the patient, two important jobs for care assistants. However, no part of Solution X regards increased adherence to patients' preferences. Moreover, Solution X is unlikely to help the care assistants feel important, needed, and

independent or help them stick to their daily schedule. With support for pad selection being one of the main services included in the solution, it fits the middle importance job of ensuring that patients have the right pads. Furthermore, with the measurement and documentation opportunities in Solution X, the low importance job of communicating patients' needs to nurse is partially addressed.

Continuing to the numerous pains identified for care assistants, a third of pains with high severity can be addressed by Solution X as it is today. The pain relivers of increased comfort and peace of mind address the worry about leakage, smell and discomfort experienced by care assistants. Studying the remaining severe pains, Solution X can result in time savings, although not necessarily eliminating feelings of stress, help care assistants keep track of their work through documentation and information and provide easier documentation for UI. Furthermore, the pain reliever of increased knowledge of UI addresses the pain of lack of education and knowledge. Even though Solution X targets these pains, they would not be addressed completely as they regard areas beyond UI care.

As for the pains with middle severity, two could be addressed by Solution X. As explained through the value map, the monitoring and change notifications help knowing when pads are wet and need to be changed. Furthermore, Solution X is found to partially address several documentation and communication related pains, through providing easy information and documentation. Furthermore, Solution X provides practical support for facilitating re-assessments but offers limited guidance on when follow-ups are suitable and needed, thus only partially addressing this pain. However, several pains remain unaddressed, namely the difficulty to be flexible, difficulty to maintain routines, lack of motivation, difficulty to ask for help, poor care environment, and having regulations for sharing information with nurses. Relievers for these pains are not found among the pain relivers in the value map.

Notably, Solution X resolves more of the pains with low severity than middle or high. For instance, the value map clearly states that it helps find the right pad, decreases the need to disturb the patient for pad checks, provides convenient routines for assessment, and supports care schedules, thus addressing the corresponding pains. However, no pain relievers regard the low priority on UI care, language barriers, discomfort from handling intimate hygiene, or easing the inconvenience from having several organizations involved.

Finally, around half of the gains for care assistants in home care services could be addressed with Solution X, although only a few with high importance. While Solution X can contribute to increased knowledge of UI and potentially to time savings, it does target stricter requirements for trainings, having someone responsible for UI care, being allowed to have stock of pads, or having more engaged care assistants. These gains clearly regard home care services management and regulations, which are not part of the needs addressed by Solution X. Moreover, Solution X can provide more knowledge about pad options though the educations and pad selection support offered, reduce the need for changing of bedding through decreased leakages, and provide accessible documented routines and guidelines through applications and websites. No gain creator, however, helps increase the status for the profession or create a more open dialogue around UI, as seen in the value map.

To summarize, most jobs, pains, and gains that specifically regard UI care, documentation, and communication could be addressed by Solution X as it is today. However, it is evident that many of the most important pains and gains regarding home care services in general remain unaddressed by Solution X, posing a potential challenge for its success among care assistants.

### 7.3.4 Prescribing nurse

Studying the jobs of prescribing nurses within mixed home care, it is deemed that they can all be addressed or partially addressed by Solution X, as seen in the

tables in Appendix B.1.4. Through comparison with the value map, it is evident that the solution helps maintaining the patients' dignity, improving well-being, providing personalized care, and making the patient feeling secure, which are important jobs in both home healthcare and primary care centers. Furthermore, the support with developing toilet schedules could help nurses in home healthcare ensure that patients get to use the toilet, although is not likely to do the job alone as toilet access can depend on other actors (i.e., informal caregivers or care assistants). Among the middle and low importance jobs, there is a direct fit between the value map and the jobs of cost efficiency, avoiding pad leakages, and avoiding skin issues. The solution could also help enhance the patients' autonomy and support the nurses in coordinating with other caregivers through cooperative platforms and tailored data, however these jobs are not directly targeted by the features of Solution X.

As for the pains of prescribing nurses, several pains across all three severity levels are directly addressed by pain relievers in the value map. Namely, the lack of routines and education for care assistants with high severity, lack of control over prescription and insufficient coordination with middle severity are pains of prescribing nurses in home healthcare that could be addressed by Solution X. Moreover, as previously discussed, the pains of stress and concern that patients do not get toilet access are seen as partially addressed by the solution. Additionally, the pains of poorly adapted routines for elderly, difficult interpretation of assessment results, lack of education for nurses and language barriers expressed by prescribing nurses in primary care centers can be at least partially addressed. Moreover, Solution X provides practical support for facilitating re-assessments but offers limited guidance on when follow-ups are suitable and needed, thus only partially addressing this pain.

Several pains, however, remain unaddressed by Solution X, as they have no direct fit in the value map. Two critical challenges for prescribing nurses in home healthcare are the lack of shared vision with home care services and the difficulty

in influencing care assistants' routines, issues to which Solution X provides no support. Similarly, no pain reliver in the value map makes UI diagnosis and treatment more prioritized, impacts regulations controlling the information barriers between prescribing nurses and home care services, creates organizational support for implementation of new routines, makes caregivers more engaged, reduces the number of involved caregivers, or increases access to doctors. Similarly, no pain reliever of Solution X reduces waiting times for patients in primary care centers or makes prescription guidelines less strict.

Finally, a strong majority of the prescribing nurses' gains can be addressed directly with Solution X. The value map includes increased knowledge, convenient assessment routines, lower costs, convenient aids, less waste, and less environmental impact. The wish of nurses in home healthcare to have a comprehensive and coordinated UI care is supported by the solution though assessment support and data, however, demands the attention and engagement of multiple actors and is therefore seen as partially addressed. Finally, the only unaddressed gain for prescribing nurses in home healthcare is the wish for increased motivation among caregivers, which is not matched by any of the features in the value map. Notably, it is of low prioritization for the nurses. For primary care centers, the wishes for increased status for UI care and increased flexibility in prescriptions are not addressed by Solution X's value map.

To summarize, the current configuration of Solution X fits the prescribing nurse customer profile well, as it meets nearly all its jobs and gains at least partially. Specifically, the needs regarding comfort for patients, increased knowledge and control, and convenient routines for assessments and pad selections are directly addressed. However, several pains remain unaddressed by Solution X, particularly for nurses in home healthcare, of which most regard cooperation with home care services.

### 7.3.5 Summary of fit

Having examined how Solution X fits with various customer needs, several considerations for adaptation of the value proposition emerge. The assessment tool within Solution X effectively addresses critical concerns for prescribing nurses in home healthcare, such as convenient assessment routines. While the interviewed nurses in primary care centers do not experience a lack of routines, they do express needs for a better adapted and easier interpreted assessment method. The assessment tool also caters to other customer profiles by reducing patient discomfort and caregiver concern. In addition, the tool can be utilized for re-assessment and follow-up. Consequently, maintaining the assessment tool within Solution X is crucial for the mixed home care segment. To meet the unaddressed needs, the assessment tool could be enhanced by incorporating patient preferences, addressing language barriers, and providing guides for different types of pad options and follow-up routines.

However, care assistants generally do not perceive the lack of assessment and follow-up routines as an issue, revealing a challenge with differing viewpoints from nurses particularly in home healthcare. Moreover, broader challenges like time constraints, implementing and maintaining routines, and having many individual staff with varying education and engagement persist, impacting the feasibility of Solution X's value proposition for home care services. While the assessment tool succeeds in addressing many UI specific needs, it has limited power to address the broader needs and challenges within home care services, since these are mainly organizational and go beyond the UI domain. Although these needs cannot be directly addressed, they must be considered in the adaptation of Solution X, as they could significantly influence the solution's usability and effectiveness.

Furthermore, the demand for real-time monitoring features varies among customer profiles. As clarified in the previous sections, the tool can address pains regarding pad leakages, skin irritation, inconsistent care, having to disturb the

patient during nighttime, constant concern, documentation of UI, uncomfortable pad controls, and not knowing when to change, as well as gains regarding time savings and less waste. While the tool might not be directly used by informal caregivers or prescribing nurses, it can contribute to many aspects they value such as patient well-being, cost efficiency, time efficiency, reduced waste, and possibly support nurses through more data for fact-based decisions. Consequently, the monitoring tool is also seen as beneficial in the mixed home care segment.

However, most care assistants find the current manual approach to checking and changing pads on scheduled visits to be sufficient or regard them as needs with low to middle significance. Furthermore, the job and pain of following fixed schedules in home care services conflict with the real-time notifications in the monitoring tool. No interviewee expresses the need for notifications but can rather benefit from knowing the current dampness of the pad to avoid manual controls during both daytime and nighttime and optimize changing times. As mixed home care is particularly complex with many individual caregivers involved, the tool must be adapted for extensive collaboration to address pains with coordination and communication.

Finally, the surrounding functions including customer service, documentation opportunities, and education consistently meet the needs of all customer profiles. They are therefore seen as important features to maintain when adapting the value proposition for mixed home care. Several partially addressed and unaddressed needs of the profiles suggest that this part of the value proposition could be expanded. For instance, services to inform and reassure patients and informal caregivers would soothe their needs and easy and accessible communication tools and educational support would be valued by all profiles.

## 7.4 Conclusion of value proposition design

The second and final analysis of the thesis utilizes Osterwalder et al.'s (2014) VPC to examine the needs to consider in the adaptation of Solution X to the mixed home care market, as per the final step in the thesis framework highlighted in figure 7.3.

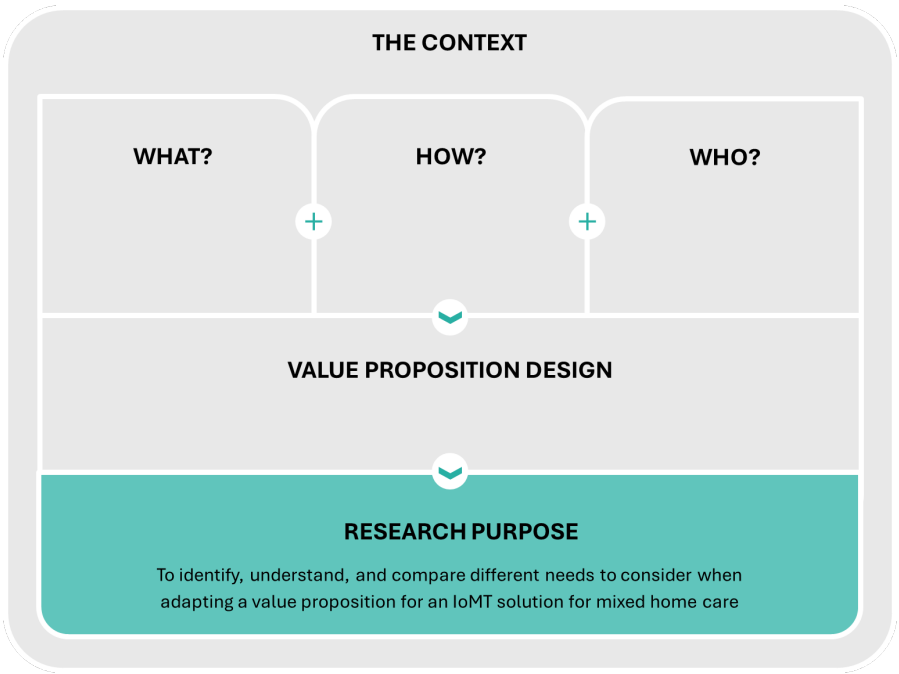


Figure 7.2: The research purpose highlighted in the thesis's theoretical framework.

### 7.4.1 Applying the value proposition canvas

Throughout the data collection and analysis, Osterwalder et al.'s (2014) VPC serves as a useful tool in gaining a comprehensive view of the customer needs, as it looks beyond challenges to also include jobs and gains. As discussed by Shaw (2018), it performs well in understanding the value of end users. Notably, more pains than gains were generally identified within all customer profiles, and these were seen as most critical by the interviewees. However, the VPC and Osterwalder et al. provide limited guidance in how pains and gains should be valued and prioritized in relation to each other. Similarly, Osterwalder et al.

provide limited support in how customer jobs should be evaluated with regards to products and services in the value map, thereby acknowledging one of the VPC disadvantages mentioned by Sibalija et al. (2021).

### 7.4.2 Value proposition design of Solution X

The comparison and fit analysis show that many fundamental needs, particularly needs directly regarding UI care, are the same across mixed home care and the current target segments. To a large extent, these needs can be addressed by Solution X in its current form. For example, it effectively meets the significant needs for patient comfort and well-being, avoided pad leakages, convenient assessment routines, and simplified pad changes, suggesting that no or limited adaptation is necessary within these areas. Notably, all three main parts of the offering, i.e., the assessment tool, real-time monitoring tool, and surrounding functions, are contributing to this value.

However, the analysis also reveals that actors in mixed home care have several unique and unaddressed needs, suggesting that it is necessary to adapt Solution X's value proposition with regards to certain needs. These needs can be divided into four main categories: reassurance, routines, communication and documentation, and knowledge.

Firstly, all customer profiles require different types of reassurance. Beyond reassurance about avoided leakages, skin issues, and odor, both patients and informal caregivers need confidence in the quality of care. Care assistants seek assurance that patients are comfortable and not experiencing wet pads, while prescribing nurses want to ensure they provide good care and that care assistants adhere to care plans. In the adaptation of the value proposition of Solution X it should be considered how reassurance can be provided for the different actors.

Furthermore, prescribing nurses express a need for UI care routines, including assessment and follow-up, but face challenges in implementing routines with

home care services. Solution X should support the creation of comprehensive UI care routines and facilitate their integration and use among care assistants. It must be easy to learn, usable by many users simultaneously, and promote consistency. Additionally, Solution X should be easily integrated within existing routines in mixed home care. For instance, the adaptation of the real-time monitoring tool should consider the care assistants' fixed schedules, which often do not allow for unplanned visits. Instead, the monitoring tool could be used to reduce the need for manual wetness controls.

Moreover, prescribing nurses and care assistants desire better communication and documentation in mixed home care. Solution X should therefore enable convenient coordination among individuals and organizations involved in UI care, support on-the-go documentation and handovers among care assistants, and facilitate communication about patient preferences between care assistants and prescribing nurses.

Finally, there is a significant need for increased knowledge and education about UI care across all profiles in mixed home care. Care assistants report insufficient onboarding, and patients, informal caregivers, and prescribing nurses express concerns about their own and care assistants' knowledge. The educational resources connected to Solution X should therefore be expanded and made easily accessible.

### 7.4.3 Value proposition design of IoMT

The thesis presents a case study of an IoMT solution in UI care, however, it aims to offer insights applicable to other IoMT solutions in mixed home care. Throughout the study, UI emerges as a sensitive and inconvenient issue for all customer profiles, with leakages posing practical challenges. Interview findings reveal low prioritization on UI assessment, follow-up, diagnosis, and treatment, highlighting specific concerns in the UI domain. However, several conclusions

regard the adaptation of IoMT value propositions in mixed home care from a broader perspective, allowing for more general conclusions.

The study establishes that many general needs among different actors are similar, regardless of the care scenario. For instance, all actors put the well-being and dignity of the patient at the center and seek facilitated collaboration with caregivers. Moreover, the four overarching unique needs to consider when adapting Solution X for mixed home care go beyond UI and can therefore be applied to general IoMT value propositions. Consequently, the study suggests that general IoMT solutions in mixed home care can benefit from addressing the needs for reassurance, routines, communication and documentation, and knowledge.

Firstly, IoMT solutions in mixed home care should consider the need for reassurance among all actors since concerns about patient well-being and quality of care extend beyond UI. IoMT solutions could use their data to notify and inform caregivers about the care provided, meeting the need for reassurance. Notably, this need is not mentioned in the identified precious research.

Secondly, IoMT solutions should fit into existing routines and schedules in mixed home care and support in maintaining consistent care, both needs that extend beyond the UI domain. Hence, IoMT solutions should be easy to integrate and usable by multiple caregivers. The conclusion to adhere to and facilitate existing routines aligns with Shaw et al. (2018) and Persson et al. (2023), who advocate for not viewing digital innovations in isolation, but also considering the users and their routines. While the introduction of convenient routines is identified as a large need in UI, neither this study nor previous research indicates that lack of established routines is a pain in other domains.

Moreover, the needs for seamless communication and documentation extend beyond UI, suggesting that support can be integrated into general IoMT

solutions for mixed home care. This includes creating formal communication channels, making data accessible for fact-based decisions, and enabling on-the-go documentation, ensuring all actors are involved in care provision. These needs, along with routine related needs, can be considered organizational matters. Previous research (Gjesten et al., 2017; Nilsen et al., 2016; Persson et al., 2023) similarly emphasizes considering organizational challenges and needs in healthcare settings when designing digital solutions. However, this study suggests that these needs are particularly severe in mixed home care, highlighting the enhanced need for simplicity and routine adherence in this market. Moreover, it shares the viewpoint of Persson et al. (2023) underscoring the need for easier information access, documentation, and communication in home care.

Finally, the study identifies a need for increased knowledge and education for informal caregivers and care assistants, where there is a desire to include easily accessible information and on-the-go education in IoMT solutions. User-friendly IoMT tools can also help care assistants provide personalized and consistent care, reducing the reliance on extensive experience. As with the need for reassurance, this need is not mentioned in the identified previous research, thus adding to the understanding of needs to consider in IoMT adaptation.

In conclusion, the research finds that while many needs are consistent across care scenarios, reassurance, routine adherence, communication and documentation, and knowledge require special attention in mixed home care. Routine adherence and communication align with general healthcare digitalization needs identified in previous research, but this study places greater emphasis on their importance in mixed home care. Additionally, it highlights two needs not discussed before: reassurance and knowledge. Previous studies commonly mention resistance to digital tools (Nilsen et al., 2016; Persson et al., 2023), however this study rather indicates a positive attitude towards IoMT in mixed home care.

# Chapter 8 – Summary and discussion

*This chapter aims to summarize the thesis and discuss its limitations, its contributions, and potential further research.*

## 8.1 Summary

Healthcare systems face significant challenges due to staffing shortages and the necessity to reduce costs, intensified by a demographic shift towards an ageing population demanding increased LTC. More individuals seek care at home, often receiving mixed care where both formal and informal caregivers are involved. With the technological advancements, IoMT solutions offer opportunities to enhance effectiveness and personalize care within patients' homes.

This thesis aims to identify, understand, and compare different needs to consider when designing a value proposition for an IoMT solution for mixed home care. This is achieved through an abductive case study focusing on Solution X within the UI healthcare domain in Sweden. A theoretical framework derived from previous research on value propositions, patient journeys, buying roles, stakeholders, and value proposition design guides the data collection and analysis.

The descriptive phase provides understanding of the Swedish healthcare system, UI, and LTC. It outlines how UI care is delivered and who is involved in the three care scenarios of informal home care, formal nursing home care, and mixed home care, with a focus on the latter as per thesis's purpose. This phase gathers secondary data from healthcare authorities and primary data through interviews with Company X employees and healthcare professionals. Furthermore, it identifies four key actors to study further: patients, informal caregivers, care assistants (when prevalent), and prescribing nurses.

The exploratory phase examines the needs of key actors across the care scenarios, using the VPC to identify customer jobs, pains, and gains. Data regarding the focus scenario, mixed home care, is collected through interviews with the key actors, while data for the other two scenarios is collected from previous studies from Company X and complementing interviews.

While many fundamental and UI specific needs are similar across care scenarios, four overarching needs to consider when adapting Solution X to mixed home care are identified though the comparison and analysis of problem-solution fit. Looking beyond Solution X and the UI domain, similar conclusions can be drawn for general IoMT solutions for mixed home care.

Firstly, actors in mixed home care seek reassurance regarding the patients' well-being and the quality of care, which could be addressed though sharing selected data gathered by the IoMT solutions. Secondly, IoMT solutions must be adapted to suit existing routines within mixed home care, acknowledging the inflexible schedules, need for multiple users, and the difficulty in initiating new routines. Thirdly, there is a significant need for convenient communication and documentation methods. IoMT solutions can help establish communication channels, provide data for fact-based decisions, and facilitate accessible, on-the-go documentation as part of the augmented solution. Finally, actors in mixed home care express an extensive need for knowledge and education, where IoMT solutions can incorporate accessible guides and educational material. There is also an opportunity for IoMT solutions to reduce the need for care assistants to rely on experience through providing user-friendly support in everyday tasks.

Routine adherence and communication are consistent with general healthcare digitalization needs identified in previous research, but this study emphasizes their significance in mixed home care. Additionally, it introduces two previously undiscussed needs: reassurance and accessible knowledge.

## 8.2 Limitations

Despite efforts to enhance the reliability and validity of the research, limitations affecting its credibility remain. Data collection faces constraints such as limited interviews due to time restrictions and challenges in accessing healthcare professionals. Additionally, the stigma associated with UI complicates the identification of suitable patients and informal caregivers for interviews. While the authors aimed for geographical spread of interviewees, expanded spread including more regions and municipalities would improve the generalizability of the findings.

Moreover, the comparative part of the research relies on internal reports from Company X, derived from focus interviews and surveys with over 4,300 respondents, yet these are not only for the Swedish market, nor specifically aligned with this study's objectives, and could contain biases from Company X employees working closely with Solution X. To address this, interviews with Swedish market experts and prescribing nurses in both informal and formal nursing home care have been conducted to validate the findings. Additionally, the value map in the VPC was constructed using knowledge from Company X alone, due to the focus of the thesis rather being the needs in the customer profiles. While their knowledge is largely based on scientific studies, no triangulation or verification is performed in this study.

In addition to the constraints in data collection, the analysis itself faces certain limitations. For instance, the data used to construct customer profiles is not uniformly gathered as it uses both primary and secondary data, where the secondary sources have had different purposes and asked other questions than in the interviews conducted in this study. For example, Internal reports A-D focus on challenges, which can be translated to pains, but do not have jobs or gains as part of the primary focus. Consequently, discrepancies may arise when comparing the profiles later on. Furthermore, the customer profiles for mixed home care are solely derived from interviews with open-ended questions. This

approach may overlook significant aspects such as specific jobs, pains, and gains experienced by the participants but not explicitly mentioned during the interviews, as the authors aimed to avoid specific and bias probing questions. As a result, the comparison between customer profiles and the subsequent value mapping may not accurately reflect the entirety of their experiences.

## 8.3 Contribution of knowledge

From this thesis, the academia has received new research in the field of adapting value propositions for IoMT to mixed home care, a care form that is likely to grow in the future. It offers a comprehensive examination of the specific needs within mixed home care and the associated challenges in creating effective value propositions.

Moreover, the thesis provides industry professionals with an in-depth understanding of the unique needs within mixed home care and shows how these considerations can advise the development of value propositions. Consequently, this work holds relevance for any industry actor seeking to introduce IoMT solutions into the mixed home care sector. Additionally, it suggests VPC as a practical tool for assessing the alignment of existing value propositions with new markets or target segments, providing a tangible example of VPC application within the industry.

## 8.4 Further research

Building on the contributions and findings of this thesis, several opportunities for future research emerge. While this thesis offers insights into the needs of four key customer profiles in the mixed home care market, expanding research to include additional stakeholders such as public procurers would enhance market knowledge. Furthermore, building on the VPCs in this thesis, future research could investigate subsequent phases of the value proposition design process, such as prototyping and testing, specifically focusing on IoMT solutions in the mixed home care market to assess their practical feasibility.

Additionally, this thesis underscores several challenges associated with implementing IoMT solutions in a mixed home care context. Given the thesis's emphasis on these challenges in value proposition design, conducting more comprehensive studies on purchasing decisions, buying processes, and adoption processes within mixed home care, particularly focusing on home care services, would benefit the understanding in this area. This could include investigating compensation models and clarifying the role of the economic buyer of IoMT solutions in mixed home care.

Considering the shift towards integrated care and the many similar fundamental needs of customer profiles across various forms of LTC, further research into the seamless utilization of IoMT solutions across different LTC settings and providers would be valuable. This could involve mapping patient journeys throughout the LTC system, including transitions between different types of LTC, and exploring how IoMT solutions can support these transitions.

Interviews conducted during this study highlighted questions regarding platform integration. Given the ongoing digitalization and increasing adoption of IoMT, the use of digital tools and number of digital platforms increase. More research regarding how different IoMT solutions can be integrated and efficiently utilized within mixed home care and LTC settings would provide insights into designing value propositions for future integrated IoMT solutions.

Moreover, shifting focus to the UI healthcare domain, insights from interviewees and secondary data revealed diverse patient journeys and LTC configurations across Sweden. Further mapping of this would be crucial for gaining a greater understanding of current UI care and care system arrangements, leading to enhanced customer knowledge. For instance, the findings of this thesis suggest that few patients undergo assessments, warranting further research to understand the extent of this occurrence.

# References

*This chapter lists the references utilized throughout the thesis in alphabetical order.*

Barton, E., Freeman, T., Baum, F., Javanparast, S. and Lawless, A. (2019). The feasibility and potential use of case-tracked client journeys in primary healthcare: a pilot study. *BMJ Open*, 9(5). doi: 10.1136/bmjopen-2018-024419.

Borycki, E.M., Kushniruk, A.W., Wagner, E. and Kletke, R. (2020). Patient journey mapping: Integrating digital technologies into the journey. *Knowledge Management & E-Learning: An International Journal*, 12(4), pp.521–535. doi: 10.34105/j.kmel.2020.12.029.

Broese van Groenou, M.B., Jacobs, M., Zwart-Olde, I. and Deeg, D.J.H. (2015). Mixed care networks of community-dwelling older adults with physical health impairments in the Netherlands. *Health & Social Care in the Community*, 24(1), pp.95–104. doi: 10.1111/hsc.12199.

Bulto, L.N., Davies, E., Kelly, J. and Hendriks, J.M. (2024). Patient journey mapping: emerging methods for understanding and improving patient experiences of health systems and services. *European Journal of Cardiovascular Nursing*. doi: 10.1093/eurjcn/zvae012.

Cardona, M., Solanki, V.K. and Cena, C.E.G. (2021). *Internet of Medical Things: Paradigm of Wearable Devices*. 1st ed. *CRC Press.* doi: 10.1201/9780429296864.

Castree, N., Kitchin, R. and Rogers, A. (2013). *A dictionary of human geography.* 1st ed. Oxford: Oxford University Press.

Chui, M., Collins, M. and Patel, M. (2021). *The Internet of Things: Catching up to an accelerating opportunity*. [online] Available at: https://www.mckinsey.com/~/media/mckinsey/business%20functions/mckinsey%20digital/our%20insights/iot%20value%20set%20to%20accelerate%20through%202030%20where%20and%20how%20to%20capture%20it/the-internet-of-things-catching-up-to-an-accelerating-opportunity-final.pdf [Accessed 20 Feb. 2024].

Dantu, R., Dissanayake, I. and Nerur, S. (2021). Exploratory Analysis of Internet of Things (IoT) in Healthcare: A Topic Modelling & Co-citation Approaches. *Information Systems Management,* 38(1), pp.62–78. doi: 10.1080/10580530.2020.1746982.

Davies, E.L., Bulto, L.N., Walsh, A., Pollock, D., Langton, V.M., Laing, R.E., Graham, A., Arnold-Chamney, M. and Kelly, J. (2022). Reporting and conducting patient journey mapping research in healthcare: A scoping review. *Journal of Advanced Nursing*, 79(1), pp.83–100. doi: 10.1111/jan.15479.

Ekman, B., McKee, K., Vicente, J., Magnusson, L. and Hanson, E. (2021). Cost analysis of informal care: estimates from a national cross-sectional survey in Sweden. *BMC Health Services Research*, 21(1). doi: 10.1186/s12913-021-07264-9.

Franzén, K. and Samuelsson, E. (2018). *Urininkontinens | Läkemedelsboken*. [online] Available at: https://old.lakemedelsboken.se/kapitel/nefrologi-urologi/urininkontinens.html [Accessed 8 Mar. 2024].

Frennert, S. (2019). Hitting a moving target: digital transformation and welfare technology in Swedish municipal eldercare. *Disability and Rehabilitation: Assistive Technology*, 16(1), pp.1–9. doi: 10.1080/17483107.2019.1642393.

Gjestsen, M.T., Wiig, S. and Testad, I. (2017). What are the key contextual factors when preparing for successful implementation of assistive living technology in primary elderly care? A case study from Norway. *BMJ Open*, 7(9). doi: 10.1136/bmjopen-2016-015455.

Gomes, J.F., Iivari, M., Koivumäki, T., Immonen, M., Jansson, M., Pikkarainen, M., Rasmus, K. and Xu, Y. (2022). Care Pathway as the Basis for Collaborative Business Model Innovation in Healthcare. *Collaborative Networks in Digitalization and Society 5.0*, 662, pp.337–347. doi: 10.1007/978-3-031-14844-6_27.

Health Direct (2023). *Urinary system*. [online] Available at: https://www.healthdirect.gov.au/urinary-system#:~:text=Key%20facts [Accessed 10 Mar. 2024].

Hjalmarson, I. (2014). *Vem ska bestämma vad i hemtjänsten?* [online] Available at: https://akademssr.se/sites/default/files/files/vem_ska_bestamma_vad_i_hemtjansten_aldrecentrum.pdf [Accessed 10 Apr. 2024].

International Continence Society (n.d.). *Urinary incontinence*. [online] Available at: https://www.ics.org/glossary/symptom/urinaryincontinence [Accessed 20 Feb. 2024].

Janlöv, N., Blume, S., Glenngård, A. H., Hanspers, K., Anell, A. and Merkur, S.. (2023). Health system review Sweden. *Health Systems in Transition*, [online] 25(4). Available at: https://iris.who.int/bitstream/handle/10665/372708/9789289059473-eng.pdf?sequence=8.

Janusinfo (2023). *Riktlinjer för behandling av urininkontinens.* [online] Available at: https://janusinfo.se/behandling/expertgruppsutlatanden/urinvagssjukdomar/urinvagssjukdomar/riktlinjerforbehandlingavurininkontinens.5.6081a39c160e9b3873180d1.html [Accessed 10 Mar. 2023].

Jegermalm, M. and Torgé, C.J. (2021). Three caregiver profiles: who are they, what do they do, and who are their co-carers? *European Journal of Social Work*, 26(3), pp.466–479. doi: 10.1080/13691457.2021.2016647.

Johnson, G., Wittington, R., Scholes, K., Angwin, D. and Regner, P. (2017). *Exploring Strategy : Text and Cases.* 11th ed. Harlow, England: Pearson Education.

Jun, G.T., Ward, J., Morris, Z. and Clarkson, J. (2009). Health care process modelling: which method when? *International Journal for Quality in Health Care*, 21(3), pp.214–224. doi: 10.1093/intqhc/mzp016.

Kotler, P., Wong, V., Saunders, J. and Armstrong, G. (2005). *Principles of Marketing*. Harlow: Prentice Hall.

Koul, S. (2022). Influence and implementation of Industry 4.0 in health care. *Elsevier*, pp.3–21. doi: 10.1016/b978-0-323-88468-6.00002-4.

Kunskapsguiden (2020). *Ansökan om bistånd enligt SoL*. [online] Available at: https://kunskapsguiden.se/omraden-och-teman/aldre/bistand-enligt-socialtjanstlagen-for-aldre-personer/ansokan-om-bistand-enligt-4-kap.-1--sol/ [Accessed 3 Apr. 2024].

Lehnert, Günther, O.H., Hajek, A., Riedel-Heller, S.G. and König, H.H. (2018). Preferences for Home- and Community-Based Long-Term Care Services in Germany: A Discrete Choice Experiment. *The European Journal of Health Economics*, [online] 19(9), pp.1213–1223. Available at: https://www.jstor.org/stable/45156961 [Accessed 20 Feb. 2024].

Lekvall, P. and Wahlbin, C. (2001). *Information för marknadsföringsbeslut*. 4th ed. Göteborg: IHM förlag.

Mahajan, G. (2019). Interview with Michael J. Lanning on Value Proposition (& Value Delivery). *Journal of Creating Value*, 5(2), pp.237–241. doi: 10.1177/2394964319890508.

Malani, R. (2023). *2024 health systems outlook: A host of challenges ahead | McKinsey*. [online] Available at: https://www.mckinsey.com/industries/healthcare/our-insights/2024-health-systems-outlook-a-host-of-challenges-ahead [Accessed 14 Feb. 2023].

Milsom, I. and Gyhagen, M. (2019). The prevalence of urinary incontinence. *Climacteric*, 22(3), pp.217–222. doi: 10.1080/13697137.2018.1543263.

Mitnick, L., Herbert, J., Machnada, N., Rousseau, N., Cohen, E., Shah, H., Chaves, L.W.F., Buvat, J., Dalla Vecchia, E. and KVJ, S. (2022). *Intelligent products and services - Unlock the opportunity of a connected business.* [online] Available at: https://prod.ucwe.capgemini.com/wp-content/uploads/2022/09/Intelligent-Products-Services-Report.pdf [Accessed 2 Mar. 2024].

National Agency for Public Procurement (n.d.). *Tröskelvärden och direktupphandlingsgränser*. [online] Available at: https://www.upphandlingsmyndigheten.se/regler-och-lagstiftning/troskelvarden-och-direktupphandlingsgranser/ [Accessed 3 Apr. 2024].

National Board of Health and Welfare (2016a). *Din rätt till vård och omsorg*. [online] Available at: https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/vagledning/2016-5-5.pdf [Accessed 21 Mar. 2024].

National Board of Health and Welfare (2016b). *Blåsdysfunktion hos äldre personer*. [online] Available at: https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/ovrigt/2016-9-33.pdf [Accessed 21 Mar. 2024].

National Board of Health and Welfare (2019). *About the Swedish healthcare system*. [online] Available at: https://www.socialstyrelsen.se/en/about-us/healthcare-for-visitors-to-sweden/about-the-swedish-healthcare-system/ [Accessed 20 Mar. 2024].

National Board of Health and Welthfare (2023). *Hälso-och sjukvård i hemmet*. [online] Available at: https://www.socialstyrelsen.se/globalassets/sharepoint-dokument/artikelkatalog/kunskapsstod/2023-3-8458.pdf.

Nikola (n.d.). *Kvalitetsprogram - process*. [online] Available at: https://nikola.nu/kvalitetsprogram/vuxen-blasa/utreda-vuxen-blasa [Accessed 8 Apr. 2024].

Nilsen, E.R., Dugstad, J., Eide, H., Gullslett, M.K. and Eide, T. (2016). Exploring resistance to implementation of welfare technology in municipal healthcare services – a longitudinal case study. *BMC Health Services Research*, 16(1). doi: 10.1186/s12913-016-1913-5.

Nyholm, L. and Björkman, I. (2021). *För en god och jämlik hälso- och sjukvård på särskilt boende*. [online] Handen: Nestor FoU Center. Available at: https://www.nestorfou.se/assets/For-en-god-och-jamlik-halso-och-sjukvard-pa-sarskilt-boende.pdf [Accessed 10 Apr. 2024].

OECD (2021). *Health for the People, by the People*. Paris: OECD Publishing. doi: 10.1787/c259e79a-en.

OECD (2023a). *Health at a Glance 2023*. Paris: OECD Publishing. doi: 10.1787/7a7afb35-en.

OECD (2023b). *Beyond Applause? Improving Working Conditions in Long-Tem Care*. Paris: OECD Publishing. doi: 10.1787/27d33ab3-%20en.

OECD (2023c). *Integrating Care to Prevent and Manage Chronic Diseases*. Paris: OECD Publishing. doi: 10.1787/9acc1b1d-en.

Osterwalder, A. and Pigneur, Y. (2010). *Business Model Generation: a Handbook for visionaries, Game changers, and Challengers*. Hoboken, New Jersey: John Wiley & Sons.

Osterwalder, A., Pigneur, Y., Bernarda, G. and Smith, A. (2014). *Value Proposition Design : How to Create Products and Services Customers Want.* Somerset: John Wiley & Sons.

Persson, J., Larsson, R., Erlingsdottir, G. and Rydenfält, C. (2023). How Digital Systems Are Used in Swedish Home Care Nursing Practice. *CIN: Computers, Informatics, Nursing*, 41(8). doi: 10.1097/cin.0000000000001006.

Pizzol, D., Demurtas, J., Celotto, S., Maggi, S., Smith, L., Angiolelli, G., Trott, M., Yang, L. and Veronese, N. (2020). Urinary incontinence and quality of life: a systematic review and meta-analysis. *Aging Clinical and Experimental Research*, 33(1), pp.25–35. doi: 10.1007/s40520-020-01712-y.

Region Skåne (2021). *Urininkontinens hos kvinnor*. [online] Available at: https://vardgivare.skane.se/vardriktlinjer/kvinnosjukdomar-och-forlossning/ako/urininkontinens-hos-kvinnor/ [Accessed 13 Apr. 2024].

Region Stockholm (2019). *Kvinnlig urininkontinens.* [online] Available at: https://kunskapsstodforvardgivare.se/omraden/urinvagssjukdomar/regionala-vardprogram/kvinnlig-urininkontinens [Accessed 12 Mar. 2024].

Region Stockholm (2023). *Befolkningsprognos*. [online] Available at: https://www.regionstockholm.se/regional-utveckling/statistik-och-analys/befolkning/befolkningsprognos [Accessed 12 Jun. 2024].

Region Uppsala (2022). *Urininkontinens och blåsfunktionsstörning - kliniska riktlinjer*. [online] Available at: https://publikdocplus.regionuppsala.se/Home/GetDocument?containerName=e0c73411-be4b-4fee-ac09-640f9e2c5d83&reference=DocPlusSTYR-4727&docId=DocPlusSTYR-4727&filename=Urininkontinens%20och%20bl%C3%A5sfunktionsst%C3%B6rning%20-%20kliniska%20riktlinjer.pdf [Accessed 12 Apr. 2024].

Renyi, M., Lindwedel-Reime, U., Blattert, L., Teuteberg, F. and Kunze, C. (2020). Collaboration applications for mixed home care — A systematic review of evaluations and outcomes. *International Journal of Technology Assessment in Health Care*, 36(4), pp.395–403. doi: 10.1017/s0266462320000458.

Robson, C. and McCartan, K. (2016). *Real World Research*. 4th ed. West Sussex: John Wiley & Sons Ltd.

Rocard, E. and Llena-Nozal, A. (2022). *Supporting informal carers of older people: Policies to leave no carer behind*. *OECD Health Working Papers*, Paris: OECD Publishing. doi: 10.1787/0f0c0d52-en.

Rodriguez, M. (2014). Use of informal and formal care among community dwelling dependent elderly in Spain. *The European Journal of Public Health*, 24(4), pp.668–673. doi: 10.1093/eurpub/ckt088.

SALAR (2023). *Så styrs sjukvården i Sverige*. [online] Available at: https://skr.se/skr/halsasjukvard/vardochbehandling/ansvarsfordelningsjukvard.64151.html [Accessed 20 Mar. 2024].

SALAR (2024). *Patientavgifter i hälso- och sjukvården i alla regioner 2024*. [online] Available at: https://skr.se/skr/halsasjukvard/ekonomiavgifter/patientavgifter.14668.html [Accessed 21 Mar. 2024].

Saunders, M., Lewis, P. and Thornhill, A. (2007). *Research methods for business students*. 4th ed. Harlow: Pearson Education.

Seniorval (n.d.). *Äldreboende*. [online] Available at: https://seniorval.se/bra-att-veta/boende/aldreboende [Accessed 8 Apr. 2024].

Seniorval (n.d.). *Biståndshandläggarens roll*. [online] Available at: https://seniorval.se/bra-att-veta/boende/aldreboende/bistandshandlaggarens-roll [Accessed 8 Apr. 2024].

Shaw, J. (2018). Beyond 'implementation': digital health innovation and service design. *NPJ Digital Medicine*, 1(48). doi: 10.1038/s41746-018-0059-8.

Sibalija, J., Barrett, D., Subasri, M., Bitacola, L. and Kim, R.B. (2021). Understanding Value in a Healthcare setting: an Application of the Business Model Canvas. *Methodological Innovations*, 14(3). doi: 10.1177/20597991211050477.

Siegel, S. (2023). *2024 Global Health Care Outlook*. [online] Available at: https://www.deloitte.com/global/en/Industries/life-sciences-health-care/analysis/global-health-care-outlook.html [Accessed 15 Feb. 2024].

Simonse, L., Albayrak, A. and Starre, S. (2019). Patient journey method for integrated service design. *Design for Health*, 3(1), pp.82–97. doi: 10.1080/24735132.2019.1582741.

Swedish Agency for Health and Care Service Analysis (2015). *Hemtjänst, vård- och omsorgsboende eller mitt emellan? Ett kunskapsunderlag för planering av morgondagens äldreomsorg*. [online] Available at: https://www.vardanalys.se/wp-content/uploads/2015/11/Rapport-2015-8-Hemtj%C3%A4nst-v%C3%A5rd-och-omsorgsboende-eller-mitt-emellan.pdf [Accessed 10 Apr. 2024].

Swedish Competition Authority (n.d.). *LOU i korthet*. [online] Available at: https://www.konkurrensverket.se/upphandling/lagar-och-regler/lou-i-korthet/ [Accessed 3 Apr. 2024].

Swedish Competition Authority (2022). *Upphandlingsreglerna - en introduktion*. [online] Available at: https://www.konkurrensverket.se/informationsmaterial/rapportlista/upphandlingsreglerna--en-introduktion/ [Accessed 3 Apr. 2024].

Swedish eHealth Agency (2023). *Höjt tak i högkostnadsskyddet 2024 • E-hälsomyndigheten*. [online] Available at: https://www.ehalsomyndigheten.se/privat/e-recept/hogkostnadsskydd/hojt-tak-i-hogkostnadsskyddet-2024/ [Accessed 2 Apr. 2024].

Swedish Healthcare Guide (2021). *Att få hjälpmedel vid inkontinens*. [online] Available at: https://www.1177.se/Skane/undersokning-behandling/hjalpmedel/inkontinens/att-fa-hjalpmedel-vid-inkontinens/#:~:text=Du%20betalar%20ingen%20avgift%20f%C3%B6r%20inkontinenshj%C3%A4lpmedel [Accessed 8 Apr. 2024].

Swedish Medical Product Agency (2019). *Är det en medicinteknisk produkt?* [online] Available at: https://www.lakemedelsverket.se/sv/medicinteknik/tillverka/ar-det-en-medicinteknisk-produkt#hmainbody1 [Accessed 25 Apr. 2024].

Vandermerwe, S. and Rada, J. (1988). Servitization of business: Adding value by adding services. *European Management Journal*, 6(4), pp.314–324. doi: 10.1016/0263-2373(88)90033-3.

Vargo, S.L. and Lusch, R.F. (2012). *Toward a better understanding of the role of value in markets and marketing*. Bingley, U.K.: Emerald.

WHO (2021). *Global strategy on digital health 2020-2025*. Geneva: WHO. ISBN: 978-92-4-002092-4.

WHO (2022). *Ageing and Health*. [online] Available at: https://www.who.int/news-room/fact-sheets/detail/ageing-and-health [Accessed 14 Feb. 2024].

WHO (n.d.a). *Health workforce*. [online] Available at: https://www.who.int/health-topics/health-workforce#tab=tab_1 [Accessed 14 Feb. 2024].

WHO (n.d.b) *Global Health Expenditure Database.* [online] https://apps.who.int/nha/database/Select/Indicators/en [Accessed 16 Feb. 2024].

Wicklund, E. (2023). 5 Healthcare Trends to Watch in 2023 [Electronic version]. *HealthLeaders Magazine*, 26(1), pp.6–9.

Wildevuur, S.E. and Simonse, L.W. (2015). Information and Communication Technology–Enabled Person-Centered Care for the 'Big Five' Chronic Conditions: Scoping Review. *Journal of Medical Internet Research*, 17(3), p.77. doi: 10.2196/jmir.3687.

World Economic Forum (2023). *Global Health and Healthcare Strategic Outlook: Shaping the Future of Health and Healthcare*. [online] Available at: https://www.weforum.org/publications/global-health-and-healthcare-strategic-outlook-shaping-the-future-of-health-and-healthcare/ [Accessed 18 Feb. 2024].

Yin, R.K. (2018). *Case Study Research and Applications: Design and Methods*. 6th ed. Thousand Oaks, California: Sage Publications.

# Appendix A – About Urinary incontinence

*This appendix provides additional contextual information about the Swedish healthcare system.*

## A.1 Urinary incontinence

The urinary system has a vital function in the body. According to Health Direct (2023) it prevents waste and toxins from building up in the blood, controls the level of salt in the blood and water in the body, regulates the blood pressure, and aids in the production of vitamin D and red blood cells. Within the system, the two kidneys filter the blood to make urine, which is then stored in the bladder finally exits the body through the urethra during urination. The urotherapist at Company X[101] explains that as the bladder fills, nerve receptors send signals up the spine to the brain's pontine micturition center, where a decision is made to either empty the bladder or continue to fill the bladder. This decision results in coordinated actions of muscles and sphincters either allowing urine to pass or not. Health Direct (2023) highlights that to urinate normally, all parts of the urinary system must work together. According to the urotherapist at Company X[102] around one to two liters of urine is produced every 24 hours. During this time people normally urinate around 300-500 ml four to eight times.

There are various types of UI characterized by differences in symptoms, causes, triggers, and frequency of leakages. The interviewed urotherapist at Company X[103] identifies six main types of UI, as outlined in Table A.3. Furthermore, they explain that the leakage patterns vary among the distinct UI types. Patients with stress UI and overflow UI often experience more frequent but smaller episodes of urinary leakage. In contrast, individuals with urge UI, neurogenic bladder, and functional UI tend to encounter fewer but larger leakage episodes. Franzen

[101] Urotherapist, Company X, Interview via video call, 23 February 2024.
[102] Urotherapist, Company X, Interview via video call, 23 February 2024.
[103] Urotherapist, Company X, Interview via video call, 23 February 2024.

and Samuelsson (2018) empathize that the risk for UI increases with several risk factors, including age, gender, number of pregnancies, smoking, obesity, chronic respiratory diseases, neurological diseases, and gynecological surgery.

Table A.1: Different UI types with corresponding descriptions.

| **UI type** | **Description** |
|---|---|
| Stress UI | Leakage triggered by exertion, sneezing, or coughing |
| Urge UI | Leakage associated with a sudden urge to urinate |
| Mixed UI | Both leakage during exertion and leakage with urges |
| Overflow UI | Leakage due to difficulty emptying the bladder |
| Neurogenic bladder | Lack of control of the urination due to brain, spinal cord, or nerve condition |
| Functional UI | Difficulty reaching the toilet due to physical abilities |

In addition to categorizing patients based on the type of UI, further divisions can be made according to age and gender. Franzen and Samuelsson (2018) classify patients into three age groups: children, adults, and the elderly, delineated by age brackets of 0-18, 19-65, and 65+. Within the adult segment, a further breakdown is made between women and men. These divisions help identify groups with similar experiences, lifestyles, and common causes and treatments for UI. A third categorization of patients is determined by their level of care needs. According to Consumer Insight Manager B[104], patients at Company X can be categorized into six groups based on their cognitive and physical abilities, which impact their ability to manage their incontinence independently. These groups exhibit varying requirements for external assistance in toileting and product changes. As a result, Consumer Insight Manager B explains that they have different needs and often use different incontinence products.

[104] Consumer Insight Manager B, Company X, Interview via video call, 28 February 2024.

# Appendix B – Problem-solution fit

*This appendix constitutes the detailed analysis of the problem-solution fit between Solution X and the needs of customer profiles in mixed home care.*

## B.1 Fit between Solution X and mixed home care needs

This section presents customer profiles for the mixed home care segment, see tables B.1-B.5. The customer profiles include ranking of jobs, pains, and gains, as described in section 2.3.2.2. In cases where some interviewees find an attribute to be of higher importance than others, the higher importance is showcased. In cases where large discrepancies in ranking occur, an average is showcased, including a denotation. Similarly, the addressability of the needs with Solution X's current value proposition is shown, representing the problem-solution fit.

### B.1.1 Patient

Table B.1: Customer profile for patient in mixed home care showing their significance and fit with Solution X's current value proposition.
*Is ranked as both high and low significance by different interviewees and is hence classified as middle significant.

| High significance | Middle significance | Low significance |
|---|---|---|
| **Customer jobs** | | |
| *Addressed:*<br>Avoid pad leakages<br>*Partially addressed:*<br>Avoid odor<br>Be treated like normal<br>Easy & discrete pad changes<br>*Not addressed:*<br>To feel independent & capable | *Addressed:*<br>Avoid skin irritation<br>Feel secure (e.g., that leakage will not occur)<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>- | - *Addressed:*<br>-<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>- |
| **Pains** | | |
| *Addressed:*<br>Worry about damp pads<br>*Partially addressed:*<br>Constant concern about leakages & toilet access | *Addressed:*<br>Difficult to find the right toilet & pad routines<br>Skin irritation from damp pads* | *Addressed:*<br>-<br>*Partially addressed:*<br>-<br>*Not addressed:* |

| | | |
|---|---|---|
| Feeling embarrassed for UI & leakages<br>Worry about odor<br>*Not addressed:*<br>Feeling infantilized by caregivers | *Partially addressed:*<br>Having to educate new care assistants<br>*Not addressed:*<br>Difficult to accept reduced independency<br>Disappointed that UI cannot be treated<br>Inconvenient & embarrassing with large pad deliveries | Difficult to obtain knowledge of UI<br>Having to handle & dispose used pads<br>Issues with intimacy due to UI<br>Low confidence due to large care needs |
| **Gains** | | |
| *Addressed:*<br>Trying new pads & solutions<br>*Partially addressed:*<br>Discrete pads<br>Receiving more consistent care<br>*Not addressed:*<br>Increased knowledge of UI<br>More observant care assistants | *Addressed:*<br>-<br>*Partially addressed:*<br>Easier pad changes<br>*Not addressed:*<br>Discrete packages & deliveries*<br>Easier storage of pads | *Addressed:*<br>-<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>- |

## B.3.2 Informal caregivers

Table B.2: Customer profile for informal caregiver in mixed home care showing their significance and fit with Solution X's current value proposition.

| High significance | Middle significance | Low significance |
|---|---|---|
| **Customer jobs** | | |
| *Addressed:*<br>-<br>*Partially addressed:*<br>Avoid odor<br>Ensure discretion for patient<br>Maintain patient's dignity & normality<br>*Not addressed:*<br>- | *Addressed:*<br>-<br>*Partially addressed:*<br>Cooperate with other informal caregivers<br>*Not addressed:*<br>Ensuring that patients' practical needs are met<br>Provide emotional support | *Addressed:*<br>-<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>Help handle pad deliveries |

| | | |
|---|---|---|
| | Give back to a family member<br>Have contact with home care services<br>Help make demands on the care | |
| **Pains** | | |
| *Addressed:*<br>-<br>*Partially addressed:*<br>Difficult to know how to provide best care<br>Inconvenient, uncomfortable & heavy to change pads<br>Worry about odor<br>Worry about quality of formal LTC<br>*Not addressed:*<br>Guilt that they "should do more" for the patient<br>Worry that patient will fall during toilet visit | *Addressed:*<br>Sensitive to handle pad leakages<br>*Partially addressed:*<br>Odor from leakages & used pads<br>Lack of knowledge of UI & healthcare system<br>*Not addressed:*<br>Conflicts about level of LTC needed<br>Difficult to divide work between caregivers<br>Worry that patient sets too low expectations | *Addressed:*<br>-<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>Difficult to initiate conversations about UI |
| **Gains** | | |
| *Addressed:*<br>-<br>*Partially addressed:*<br>Discrete & easy-to-use pads<br>Fair & dignified treatment of the elderly<br>*Not addressed:*<br>- | *Addressed:*<br>-<br>*Partially addressed:*<br>A more open dialogue around UI<br>*Not addressed:*<br>- | *Addressed:*<br>-<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>- |

### B.3.3 Care assistants

Table B.3: Customer profile for care assistants in mixed home care showing their significance and fit with Solution X's current value proposition.
*Is ranked as both high and low significance by different interviewees, and is hence classified as middle significant.

| High significance | Middle significance | Low significance |
|---|---|---|
| **Customer jobs** | | |
| *Addressed:*<br>Avoid pad leakages<br>Make patient as comfortable as possible<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>Listen to patient's preferences | *Addressed:*<br>Ensure that patient has the right pads<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>Feel important, needed & independent<br>Follow the daily schedules | *Addressed:*<br>-<br>*Partially addressed:*<br>Communicate patient's needs to nurse<br>*Not addressed:*<br>- |
| **Pains** | | |
| *Addressed:*<br>Worry about leakage, smell & discomfort<br>*Partially addressed:*<br>Lack of education & knowledge of UI<br>A lot to remember & keep track of*<br>General lack of time & feelings of stress<br>Inconvenient documentation methods<br>*Not addressed:*<br>Physically & mentally exhausting work | *Addressed:*<br>Unsure when to change pads<br>Worry that patients suffer from wet pads<br>*Partially addressed:*<br>Lack of communication regarding pad orders<br>Lack of formal communication channels<br>Lacking and difficult to access documentation<br>*Not addressed:*<br>Afraid to ask for help from colleagues<br>Cannot access all information about patient<br>Difficult to be flexible & change the schedule<br>Difficult to maintain routines | *Addressed:*<br>Difficult and uncomfortable to check need for pad change<br>Difficult to schedule toilet visits<br>Difficult to find the right pad<br>Inconvenient to do leakage assessments<br>Lack of routines for UI assessment<br>*Partially addressed:*<br>Having to disturb patient's sleep<br>Lack of routines for UI follow-up<br>*Not addressed:*<br>Discomfort from handling intimate hygiene<br>Language barriers |

| | | |
|---|---|---|
| | Lack of motivation & engagement*<br>Poor environment for care activities | Low priority on improving UI care<br>Many different organizations to coordinate with |
| **Gains** | | |
| *Addressed:*<br>Increased knowledge of UI<br>*Partially addressed:*<br>Time savings<br>*Not addressed:*<br>Being allowed to have stock of pads<br>Engaged & committed care assistants<br>Having someone responsible for UI care<br>Stricter requirements to undergo trainings | *Addressed:*<br>Accessibly documented routines & guidelines<br>More knowledge about different pad options<br>Reduce need for changing of bedding and laundry<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>Increased status for the care assistant profession | *Addressed:*<br>Usage of digital tools<br>*Partially addressed:*<br>Simplify descriptions of pads<br>*Not addressed:*<br>A more open dialogue around UI |

### B.3.4 Prescribing nurse

Table B.4: Customer profile for prescribing nurse, working in primary care center, in mixed home care showing their significance and fit with Solution X's current value proposition.

| High significance | Middle significance | Low significance |
|---|---|---|
| **Customer jobs** | | |
| *Addressed:*<br>Ensure comfort, well-being & quality of life<br>Maintain patient's dignity<br>Make patient feel secure (e.g. about leakages)<br>Provide personalized care<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>- | *Addressed:*<br>Avoid pad leakages<br>*Partially addressed:*<br>Coordinate with other caregivers<br>Enhance patient autonomy<br>*Not addressed:*<br>- | *Addressed:*<br>Ensure cost efficiency<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>- |
| **Pains** | | |
| *Addressed:*<br>-<br>*Partially addressed:* | *Addressed:*<br>Difficult to interpret assessment results<br>*Partially addressed:* | *Addressed:*<br>Difficult to convince patient to use smaller pads<br>*Partially addressed:* |

| | | |
|---|---|---|
| General lack of time & feelings of stress<br>Routines poorly adapted for elderly<br>*Not addressed:*<br>Long waiting times for patients | Language barriers<br>*Not addressed:*<br>Lack of formal communication channels with other caregivers<br>New tenders resulting in changed prescriptions<br>Strict prescription guidelines | -<br>*Not addressed:*<br>Lack of education on UI among colleagues |
| **Gains** | | |
| *Addressed:*<br>-<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>Increased status and prioritization for UI | *Addressed:*<br>Easier collaboration between caregivers<br>Lower environmental impact<br>More convenient assessment routines<br><br>*Partially addressed:*<br>-<br>*Not addressed:*<br>Increased flexibility & alternatives for prescriptions | *Addressed:*<br>Digital tools for assessments<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>- |

Table B.5: Customer profile for prescribing nurse, working in home healthcare, in mixed home care showing their significance and fit with Solution X's current value proposition.

| Low significance | Middle significance | High significance |
|---|---|---|
| **Customer jobs** | | |
| *Addressed:*<br>Maintain patient's dignity<br>Provide personalized care<br>Make patient feel secure (e.g. about leakages)<br>*Partially addressed:*<br>Ensure that patients get to use the toilet<br>*Not addressed:*<br>- | *Addressed:*<br>Avoid pad leakages<br>Ensure cost efficiency<br>*Partially addressed:*<br>Enhance patient's autonomy<br>Coordinate with other caregivers<br>*Not addressed:*<br>- | *Addressed:*<br>Avoid skin irritation and infections<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>- |
| **Pains** | | |
| *Addressed:*<br>Lack of routines for UI assessment<br>*Partially addressed:* | *Addressed:*<br>Lots of prescriptions but low control<br>*Partially addressed:* | *Addressed:*<br>Lack of fact-based decisions<br>*Partially addressed:* |

| | | |
|---|---|---|
| Lack of education on UI in home care services<br>Concern that patients do not get toilet access<br>General lack of time & feelings of stress<br>*Not addressed:*<br>Difficult to influence care assistants' routines<br>Lack of shared vision with home care services | Lack of routines for UI follow-up<br>*Not addressed:*<br>Cannot share all information with home care services<br>Difficult to initiate new routines<br>Insufficient coordination between caregivers<br>Low priority on UI care, diagnosis, and treatment<br>Varying motivation & engagement among carers | Lack of education on UI for nurses<br>*Not addressed:*<br>Limited access to doctors<br>Many individual caregivers involved<br>New tenders resulting in changed prescriptions |
| **Gains** | | |
| *Addressed:*<br>Increased knowledge of UI care<br>*Partially addressed:*<br>Comprehensive & coordinated UI care<br>*Not addressed:*<br>- | *Addressed:*<br>Feel good that all patients undergo assessment<br>Lower cost for UI care<br>More convenient assessment routines<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>- | *Addressed:*<br>Convenient, efficient & easy-to-use aids<br>Fewer wasted pads<br>*Partially addressed:*<br>-<br>*Not addressed:*<br>Increased motivation among caregivers |

# Appendix C – Interview guides

*This appendix includes the recurring interview guides for regional incontinence coordinators, patients, informal caregivers, care assistants, and prescribing nurses.*

## C.1 Regional incontinence coordinator

*Bakgrund*

Vill du presentera vem du är och din nuvarande roll

*Vårdresan*

Hur ser en generell vårdresa ut för en patient med UI?

Hur kommer UI-patienter in i vården?

Vårdcentral? Kvinnohälsa? Specialistmottagningar? Akuten?

Vårdboenden?

Vilka aktörer kommer hen i kontakt med?

Hur går remisser? Vem träffar de och när?

Ser processen ungefär likadan ut överallt i Sverige? Skillnader?

Hur inblandade är anhöriga/informella vårdare i UI?

På särskilt boende? I hemmet?

*Ansvariga aktörer*

Vilka roller är ansvariga för inkontinensvården?

Kan du beskriva vilka de är och deras generella ansvar.

Vilka aktörer är beslutsfattande i vårdresan?

Hur ser processen ut för förskrivning av inkontinenshjälpmedel?

Vem är ansvarig för exakta valet av produkter?

Om man skulle implementera digitala inkontinenshjälpmedel - vem hade förskrivit det?

Vem har möjlighet att påverka att det förskrivs digitala inkontinenshjälpmedel?

*Upphandling*

Hur ser processen ut för upphandling av inkontinenshjälpmedel?

Vem påverkar valet av produkter som upphandlas?

Hur fungerar upphandling för privata aktörer?

Om man skulle upphandla en digital lösning/plattform - hade det sett annorlunda ut?

Vad hade krävts för att en sådan upphandling skulle kunna bli av?

## C.2 Patient

*Bakgrund*

Kan du beskriva din nuvarande situation?

Vilken typ av inkontinens har du?

Vilken typ av vård får du?

Vem får du vård av?

Vilken typ av inkontinensskydd och hjälpmedel använder du?

*Jobs*

Vilka problem kopplade till din inkontinens vill du få lösta?

Funktionella, sociala, emotionella aspekter?

Vilken känsla strävar du efter att uppnå?

Hos dig själv? Hos andra?

Sammanfattningsvis har vi identifierat flera syften, vi kommer nu nämna dem och så får du rangordna vilka som är viktiga, mittemellan och mindre viktiga.

Är det något du tycker ska adderas?

*Pains*

Idag, i inkontinensvård, vilka problem upplever du?

Hur väl fungerar nuvarande skydd?

Hur väl fungerar nuvarande rutiner?

Vilka hinder finns för att ge bästa möjliga vård?

Har du någon oro kopplat till vården du får idag?

I samarbetet med andra vårdare - ser du någon utmaning eller skav där?

Formella vårdgivare? Informella vårdgivare?

Sammanfattningsvis har vi identifierat flera besvär, vi kommer nu nämna dem och så får du rangordna vilka som är viktiga, mittemellan och mindre viktiga.

Är det något du tycker ska adderas?

*Gains*

Hur skulle du önska att inkontinensvården såg ut – i den bästa av världar?

Vad behövs för att nå dit?

Vad skulle göra din situation med inkontinensvård enklare/bättre?

I samarbetet med andra vårdare - vad funkar bra? Vad hade underlättat?

Formella vårdgivare? Informella vårdgivare?

Sammanfattningsvis har vi identifierat flera önskemål, vi kommer nu nämna dem och så får du rangordna vilka som är viktiga, mittemellan och mindre viktiga.

Är det något du tycker ska adderas?

## C.3 Informal caregiver

*Bakgrund*

Kan du beskriva din nuvarande situation som anhörig till en person med UI?

Vad är din relation till personen?

Kan du beskriva deras nuvarande situation med inkontinens?

På vilket sätt är du involverad?

Praktisk hjälp? Administrativ hjälp? Emotionellt stöd?

Vem mer är involverad i vården?

Formella vårdgivare? Informella vårdgivare?

*Jobs*

Vad vill du åstadkomma genom att vara involverad i vården och inkontinensvården?

Funktionella, sociala, emotionella aspekter?

Vilken känsla strävar du efter att uppnå?

Hos dig själv? Hos andra?

Vilka behov och krav försöker du möta?

Från din anhöriga, andra anhöriga, omvårdnadspersonal?

Sammanfattningsvis har vi identifierat flera syften, vi kommer nu nämna dem och så får du rangordna vilka som är viktiga, mittemellan och mindre viktiga.

Är det något du tycker ska adderas?

*Pains*

Idag, i utförandet av inkontinensvård, vilka problem upplever du?

Hur väl fungerar nuvarande skydd?

Hur väl fungerar nuvarande rutiner?

Vilka hinder finns för att personen ska få bästa möjliga vård?

Har du någon oro kopplat till vården som ges idag?

I samarbetet med andra vårdare - ser du någon utmaning eller skav där?

Formella vårdgivare? Informella vårdgivare?

Sammanfattningsvis har vi identifierat flera besvär, vi kommer nu nämna dem och så får du rangordna vilka som är viktiga, mittemellan och mindre viktiga.

Är det något du tycker ska adderas?

*Gains*

Hur skulle du önska att inkontinensvården såg ut – i den bästa av världar?

Vad behövs för att nå dit?

Vad skulle göra din roll eller ditt jobb med inkontinensvård enklare/bättre?

I samarbetet med andra vårdare - vad funkar bra? Vad hade underlättat?

Formella vårdgivare? Informella vårdgivare?

Sammanfattningsvis har vi identifierat flera önskemål, vi kommer nu nämna dem och så får du rangordna vilka som är viktiga, mittemellan och mindre viktiga.

Är det något du tycker ska adderas?

## C.4 Care assistant

*Bakgrund*

Kan du beskriva din nuvarande roll?

Vilken typ av vård ger du och till vem?

Vilket typ av ansvar har du?

Hur länge har du arbetat i denna roll?

Hur ser samarbetet ut med andra vårdgivare?

Formella vårdgivare? Informella vårdgivare

*Jobs*

Vad vill man åstadkomma med inkontinensvården?

Funktionella, sociala, emotionella aspekter?

Vilken känsla strävar du efter att uppnå?

Hos dig själv? Hos andra?

Vilka behov och krav försöker du möta?

Från organisationen, patienter, anhöriga, annan omvårdnadspersonal?

Sammanfattningsvis har vi identifierat flera syften, vi kommer nu nämna dem och så får du rangordna vilka som är viktiga, mittemellan och mindre viktiga.

Är det något du tycker ska adderas?

*Pains*

Idag, i utförandet av inkontinensvård, vilka problem upplever du?

Hur väl fungerar nuvarande skydd?

Hur väl fungerar nuvarande rutiner?

Vilka hinder finns för att ge bästa möjliga vård?

Har du någon oro kopplat till vården du ger idag?

I samarbetet med andra vårdare - ser du någon utmaning eller skav där?

Formella vårdgivare? Informella vårdgivare?

Sammanfattningsvis har vi identifierat flera besvär, vi kommer nu nämna dem och så får du rangordna vilka som är viktiga, mittemellan och mindre viktiga.

Är det något du tycker ska adderas?

*Gains*

Hur skulle du önska att inkontinensvården såg ut – i den bästa av världar?

Vad behövs för att nå dit?

Vad skulle göra ditt jobb med inkontinensvård enklare/bättre?

I samarbetet med andra vårdare - vad funkar bra? Vad hade underlättat?

Formella vårdgivare? Informella vårdgivare?

Sammanfattningsvis har vi identifierat flera önskemål, vi kommer nu nämna dem och så får du rangordna vilka som är viktiga, mittemellan och mindre viktiga.

Är det något du tycker ska adderas?

## C.5 Prescribing nurse

*Bakgrund*

Kan du beskriva din nuvarande roll?

Vilken typ av vård ger du och till vem?

Vilket typ av ansvar har du?

Hur länge har du arbetat i denna roll?

Hur ser samarbetet ut med andra vårdgivare?

Formella vårdgivare? Informella vårdgivare

*Jobs*

Vad vill man åstadkomma med inkontinensvården?

Funktionella, sociala, emotionella aspekter?

Vilken känsla strävar du efter att uppnå?

Hos dig själv? Hos andra?

Vilka behov och krav försöker du möta?

Från organisationen, patienter, anhöriga, annan omvårdnadspersonal?

Sammanfattningsvis har vi identifierat flera syften, vi kommer nu nämna dem och så får du rangordna vilka som är viktiga, mittemellan och mindre viktiga.

Är det något du tycker ska adderas?

*Pains*

Idag, i utförandet av inkontinensvård, vilka problem upplever du?

Hur väl fungerar nuvarande skydd?

Hur väl fungerar nuvarande rutiner?

Vilka hinder finns för att ge bästa möjliga vård?

Har du någon oro kopplat till vården du ger idag?

I samarbetet med andra vårdare - ser du någon utmaning eller skav där?

Formella vårdgivare? Informella vårdgivare?

Sammanfattningsvis har vi identifierat flera besvär, vi kommer nu nämna dem och så får du rangordna vilka som är viktiga, mittemellan och mindre viktiga.

Är det något du tycker ska adderas?

*Gains*

Hur skulle du önska att inkontinensvården såg ut – i den bästa av världar?

Vad behövs för att nå dit?

Vad skulle göra ditt jobb med inkontinensvård enklare/bättre?

I samarbetet med andra vårdare - vad funkar bra? Vad hade underlättat?

Formella vårdgivare? Informella vårdgivare?

Sammanfattningsvis har vi identifierat flera önskemål, vi kommer nu nämna dem och så får du rangordna vilka som är viktiga, mittemellan och mindre viktiga.

Är det något du tycker ska adderas?

# Appendix D – List of tables and figures

## D.1 List of tables

## D.2 List of figures