Launching a community app for Glooma

A start-up company in the femtech industry

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Abstract

Title: “Launching a community app for Glooma: A start-up company in the femtech industry”

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This thesis explores femtech mobile app features, focusing on Glooma, a start-up company developing a breast self-exam device paired with a community app. The research aims to identify the most valued digital health features for women and assess their potential to increase engagement with femtech apps. Data was collected from 137 women, primarily in Portugal, through a survey evaluating interest in features across key health categories: Breast health/cancer self-check, Pregnancy Support, Postpartum & Babycare, Period Tracking and Fertility, Perimenopause/Menopause, Mental health, General Health & Wellness, and Sexual Health. The study analyzes how interest in specific features correlates with willingness-to-use.

The interest evaluated through the survey regarding the various features showed relatively high values, indicating that this seems to be a market with significant untapped potential. Certain features demonstrated a greater ability to promote the use of femtech apps more effectively than others. For example, features related to tracking health data and personal health management appear to generate more engagement compared to features like sharing forums and peer testimonials.

Keywords: Femtech, Glooma, Features, Willingness-to-use

Abstrato

Título: "Lançamento de uma app comunitária para a Glooma: Uma start-up na indústria femtech"

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Esta tese explora funcionalidades de aplicativos móveis na área de femtech, com foco na Glooma, uma start-up que está a desenvolver um dispositivo de auto-exame da mama combinado com uma app comunitária. A pesquisa tem como objetivo identificar as funcionalidades digitais de saúde mais valorizadas pelas mulheres e avaliar o seu potencial para aumentar melhorar as apps de femtech. Os dados foram obtidos de 137 mulheres, principalmente em Portugal, através de uma pesquisa que avaliou o interesse em funcionalidades em categorias-chave de saúde: Saúde mamária, Suporte à Gravidez, Cuidados Pós-parto e do Bebé, Rastreamento do Ciclo Menstrual e Fertilidade, Perimenopausa/Menopausa, Saúde Mental, Saúde Geral e Bem-Estar, e Saúde Sexual. O estudo analisa como o interesse em funcionalidades específicas se correlaciona com a disposição para utilizar uma app de femtech.

O interesse avaliado através do inquérito relativamente às várias funcionalidades apresentou valores relativamente elevados, o que indica que este é um mercado ainda com muito por explorar. Além disso, certas funcionalidades demonstraram ter uma capacidade mais eficiente de promover o uso de aplicações de femtech, como é o caso das funcionalidades relacionadas com o acompanhamento de dados de saúde e a gestão pessoal de saúde, que parecem gerar mais envolvimento do que funcionalidades do tipo fóruns de partilha e testemunhos de utilizadores.

Palavras-chave: Femtech, Glooma, Funcionalidades

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1. Introduction

Over time, concerns regarding health and well-being have increased with people looking more often for credible and up-to-date sources of information. These patterns make people more sensitive to the risk of contracting certain diseases, especially the ones that, when detected too late, might considerably increase the risk of death. Breast cancer is one of the cancers with highest incidence worldwide, being the 2nd most commonly occurring cancer with 2.3 million cases in 2022, and representing 11,6% of all the cases, being only surpassed by lung cancer. This cancer type is also the one that is most diagnosed in women by far, being the most common cancer for them in 157 countries out of 185 (World Health Organization, 2022). To get evidence of this kind of cancer, women (and men) might go to the doctor and do a breast check-up or mammography to detect if there are any anomalies with their breast tissues, and they should do self-exams at home or where they feel comfortable to be alert to signals that they need to seek professional assistance. Doing a self-exam from time to time is recommended by doctors, and it is an important method to check for the appearance of any abnormalities that might be alarming (World Health Organization, 1987). However, many women not only don´t go to the doctor that often, as they don´t do the self-exam because they forget, they don´t know how, or they feel insecure about the exam itself (as verified in a survey done by Glooma to 714 women). There are also cases of women that do the auto-exam but don´t give the relevance needed to its results, ignoring any anomalies that they might feel.

Being aware of these concerns, Glooma, which is a femtech (female technology) start-up company I am working with, decided to create a new product that aspires to address this issue. The product consists in a glove equipped with an electronic system. This device can be used for detecting and monitoring changes in breast tissue, so, using this glove, women have a mechanism at their disposal that performs the exam for them, and they can easily do the self-exam at any place they feel comfortable. The results of the exam are received in a mobile app that gives them information regarding the state of their breast tissue and the risk of having any dangerous abnormality, advising them to go to a doctor if the risk is considered relevant. The company is getting set to launch the glove in Europe and in the US, being still in the process of finishing the licensing and complying with regulatory issues.

Glooma intends to provide their customers with a product that decreases the risk of being diagnosed with a disease as dangerous as breast cancer at a later stage, and to promote

awareness and comfort for women. So, to create value for this customer segment, the company is planning to develop a community app that soon will be integrated in the main product (the glove). The objective of the app is to address women's health concerns and fulfill their needs with solutions, not only regarding breast cancer, but also other health areas that might be significant for them.

The challenges proposed by Glooma are to find mechanisms/features that can be integrated into this app to foster user engagement, to create a value proposition for this app (besides the glove usage), and to develop a business model that can give a response to women´s pains. During this project my primary emphasis will be on investigating the offerings in the domain of women´s digital health. I will examine the competitive landscape Glooma encounters with the introduction of a community app, analyzing existing offerings across femtech markets, and looking the sectors that can provide benefits to women via a digital platform, with a specific emphasis on mobile apps.

The project will be approached with the goal of creating value through the app by establishing a health and wellness community, and provide value to its users even before the launch of the glove, building a customer base. The aim of this thesis is to gather information on the digital health features currently utilized via smartphones and assess their significance in the context of women's health. In my investigation I will assess which types of features are more valued by women and which ones contribute the most to app adoption, so that I can provide meaningful recommendations that can enhance the company's offerings. The focus of the study will be on the two markets most pertinent to the company: the USA and Europe.

Given this, the main question I propose to answer through this study is: **Which digital health features would increase the willingness-to-use of a femtech app among potential users of Glooma?**

Research questions:

1. What are the primary segments within the femtech market, and where do community apps fit within these segments?
2. What is the competitive landscape like for Glooma´s new community app? Which types of mobile digital health features are available and how do they position in the market?

3. Which digital health features are more valued by women? Which ones would generate more engagement?

These research questions will guide me through my study, covering information that is useful to answer the main question in hand. The theoretical discussion done in the next chapter is related to the frameworks and the theoretical studies that are linked to these topics.

2. Theoretical discussion

2.1Femtech

Femtech is a term created by Ida Tin, the founder of the period and ovulation tracking app Clue (Wiederhold, 2021). This name comes from the combination of the words Female and Technology, and corresponds to the industry which primarily comprises services, products, and software designed to address the unique biological and medical needs of women. (Wiederhold, 2021).

The industry is marked by intense competition and a notably high mortality rate among startups (Chakraborty et al., 2024). However, the last 10 years have been a period of major advancements in this industry, where we have seen "an increasing number of apps and high-tech services that specifically address women's needs, including digital-driven fertility and menstruation tracking and solutions for pregnancy, postpartum, and menopause." (Wiederhold, 2021)

The femtech industry which is a segment of the health-tech sector is still an area that remains relatively under-researched literature wise, specially if we are looking for information on startups and service delivery in top journals (Chakraborty et al., 2021). One of the main topics being researched in this area is data privacy and cybersecurity, given that the increasing growth of femtech brings several concerns regarding the risk of mismanagement, misuse, and misappropriation of users' sensitive data (Mehrnezhad et al., 2022; Mcmillan, 2022). In light of these concerns, it is vital to intensify research on the legal and technological facets of femtech to safeguard user security and privacy, while also creating apps and products that fulfill customer needs for reliability and effectiveness (Mehrnezhad et al., 2022; Mcmillan, 2022).

The study of women´s preferences and experiences with digital technology within the scope of health is a relevant factor for companies in this industry. According to a study made, some of the features valued by women include "the affordances of instant and up-to-date information, the opportunity to search for information privately or anonymously, and the peer support that they could find online." and it was noticed that "Those women who used apps and wearable devices appreciated the opportunity to automatically monitor their bodies, engender motivation, and work toward health and fitness goals" (Lupton et al., 2019).

2.2 Data collection on product features

A method used in the literature for studying product features is the Kano Model which measures customer needs and satisfaction in relation to the features of a certain product or service. This model is applied through a two-dimensional questionnaire, in which the respondents are asked how they feel about having a specific feature, and how they feel about not having that specific feature in a 5-point scale (Kano et al., 1984). This methodology allows a product developer to categorize features as: attractive ones (attractive quality), mandatory ones (must-be quality), indifferent ones (indifferent quality), those that result in satisfaction when fulfilled and dissatisfaction when not fulfilled (one-dimensional quality), and those that result in dissatisfaction when fulfilled and satisfaction when not fulfilled (reverse quality) (Kano et al., 1984).

There are cases in which this methodology has been applied to study certain mobile app features (Rasche et al., 2018; Mei-Ling et al., 2018). In these studies, several features/ app attributes were selected and assessed using a two-dimensional questionnaire. This approach enabled them to evaluate the relative importance of each feature to the users. In one of them, the data obtained through the Kano Model methodology was used to study the impact on willingness-to-pay. This way, they could understand the relation between the quality attributed to each feature and the influence on user´s propensity to pay more for using the app. (Rasche et al., 2018)

However, for a study with the purpose of investigating a large number of features as the one I am doing, and for studying a type of product that isn´t yet widely known and used, this type of model might not be fully applicable. This is due to the large number of questions required to compose such a survey (2 questions per feature), and the lack of experience/ familiarity of the participants with femtech app features, which limits the depth of the study, given that Kano

Model is based on the evaluation of specific features by studying also the impact of its absence on potential users.

2.3 Measurement of app willingness-to-use

In the literature there are several studies on the evaluation of mobile apps and the factors that can lead to their adoption. However, many of them only evaluate the features or factors that might stimulate the utilization of a specific app, or an app directed to one specific aim/functionality (Rasche et al., 2018, Azevedo et al., 2015; Diaz et al., 2021). One model commonly used to study the adoption of information systems is the Technology acceptance model (TAM). This model was first presented as a tool for predicting the likelihood that information systems will be adopted by a group or organization, and across time it has been based in two main variables: Perceived ease of use (PEU) and Perceived usefulness (PU), which were found to be related with Attitude toward use (A), and consequently, Behavioural intention to use (BI) (Davis, 1989; Davis et al., 1989). The model has been tested over time for the inclusion of other external variables; nevertheless, the core ideology of the model remained unchanged, and it has grown into an important framework for comprehending the variables influencing people's decisions to adopt or reject modern technologies (Turner et al., 2010; Venkatesh et al., 2000).

TAM has been used in several studies to identify the factors that might lead to the adoption of mobile apps (Diaz et al., 2021; Bidmon et al., 2014; Palos-Sanchez et al., 2021). The methodology used in these studies is to design a questionnaire to assess the effect of several areas: PU and PEOU (as part of the baseline model); other variables that make sense for the specific study (such as Information Awareness or Perceived Innovativeness); Willingness-to-adopt/Willingness-to-pay for a certain type of app; and other relevant demographic variables as gender and age (Diaz et al., 2021; Bidmon et al., 2014; Palos-Sanchez et al., 2021). The relation between these variables is then assessed using regression analysis. Specifically, a study focused on mobile health apps found that Perceived usefulness (PU) was the most significant variable influencing the adoption of these types of apps in Spain (Palos-Sanchez et al., 2021). However, among the case studies present in the literature on this topic, there are no examples focused on understanding how the specific features of different health areas affect the willingness-to-use of an app (as I am doing for the femtech market). A considerable part of the existing research

aims to identify the factors that motivate users to adopt or use an app, without deeply investigating the interest on the app's features and specific type of content (Fan et al., 2024; Diaz et al., 2021; Bidmon et al., 2014; Palos-Sanchez et al., 2021).

In mobile app studies, a common metric used to evaluate the value that customers place on a specific app is their willingness-to-pay (Rasche et al., 2018; Bidmon et al., 2014). However, in a market particularly price sensitive as the one of the mobile health apps, in which the users see cost as a major barrier (Krebs et al., 2015), assessing interest through willingness-to-pay can distort the results obtained. Therefore, in this project my focus will be on willingness-to-use and not on willingness-to-pay.

Given that in this project I am studying which features would increase the willingness-to-use for a femtech app, there needs to be a way to assess this variable, obtaining data that measures the probability of using a hypothetical app (which covers a broad range of contents and features). In literature, there are studies that measure the usefulness and adoption of non-existent apps (Azevedo et al., 2015; Bidmon et al., 2014). Some methods to study this include generally asking survey participants if they would find an app developed for a specific purpose or need useful, indicating that it would be created according to their preferences, and using a "Yes" or "No" categorical variable to collect answers (Azevedo et al., 2015). Another approach is providing a brief description of the app's main function (leaving the rest to the participant's preference) and then asking for their willingness-to-use and willingness-to-pay through a 7-point Likert scale (Bidmon et al., 2014). To assess willingness-to-use in this study, and considering the various features I am examining, I will ask participants at the end of the survey to imagine an app based on the features they have evaluated and to select their likelihood of using it through a 7-point Likert scale. This approach allows for the collection of more detailed insights and provides a perspective on the respondents' likelihood of using such an app.

3. Methodology

In this thesis, the focus is into gathering information regarding the features that are being offered by digital health apps to women, namely in the femtech sector. These data will be subsequently used to assess the impact that those services have on women, studying the value they offer to them.

In a first stage, I studied the market by searching for public available information, looking for industry reports, company websites, and data available on Appstore and Google play store for some of the most significant apps in the market. During this process, the goal was to perform a benchmark analysis with available features and best practices in the sector. I have compiled the main features of these apps by examining the information provided by the developers, and by downloading them myself and testing those available in the App Store (the ones that do not require an upfront payment). Other source of information taken into consideration was the comments section present in the App store and Play store for the apps in study. To better understand the real value that these apps provide to their users, a log of the most frequent, and significant positive/negative comments was created for each app, including criticisms, compliments, and suggestions.

The selection of the apps was made based on the rankings of the App store and Google play store for two segments: *Medical* and *Health&Fitness*. To gain a perspective into the services that are offered to the target user base, I reviewed the apps that were present in the top-50 free ranking and top-25 paid ranking for the U.S, and some of the most significant European countries: Portugal, Spain, France, Germany, and U.K (appfigures, 2024). Given these conditions, the choice of the most relevant apps for this study was done according to three factors: Highest position on the rankings, presence in the largest number of countries, and focus on health/women's health themes (excluding corporate health apps - linked to hospital or health care provider profiles/accounts).

Following the app selection process, it was possible to divide them in 6 different categories: Pregnancy support; Postpartum&BabyCare; Period tracking and fertility; Mental health; General Health and Wellness; and Sexual Health (with 3-6 apps being attributed to each segment). However, there were 2 other categories being added to this study, which are

Perimenopause/Menopause, and Breast health/cancer self-check. These segments were also considered valuable for this study given the importance that both have in women´s life, with around 1 billion women expected to be experiencing Menopause by 2025 (Shifren et al., 2014), and breast cancer being the cancer with the highest incidence on women worldwide (World Health Organization, 2022). Furthermore, it is relevant for a company whose product is directly related to breast health, as Glooma, to be aware of the digital solutions available on this topic. The apps selected from these 2 categories were found through web research and available market studies, being chosen based on their ratings and range of features.

On a second stage, I have used the main features observed in this study, as well as the inputs collected through the analysis of the comments section of the app stores, to evaluate the opinion and the preferences of women. To achieve this, a survey has been done using the platform Qualtrics, with a link being subsequently distributed via social media and my private network. The target of this survey is women, and the variables in-study are the Interest on each feature, Demographic variables as age and life stage, and the Willingness-to-use of a femtech app – as the dependent variable in my model. All the items, except the demographic variables, were measured through a 7-point Likert scale, so that I can get a more detailed analysis compared to 5-point scale, and obtain a greater discrimination between different levels of agreement or disagreement, increasing sensitivity to get more in-depth results. The willingness-to-use was evaluated using with a question in the end of the survey: "If there was a women's health app in which several of the features that were questioned were integrated, including those that you declared to be of greatest interest, how likely would you be to use that app from 1 to 7?".

After collecting the data, the results of the survey were analysed through descriptive statistics and quantitative methods, using the statistics software SPSS. The main effects in-study are: (1) the relation between the demographics and the willingness-to-use a femtechapp, and (2) the relations between the interest on the features and the willingness-to-use a femtech app, which will be studied through regression analysis and statistical tests. As a result, conclusions can be drawn regarding women´s use of digital health functionalities. In the process of distributing the survey, randomization was not considered, as it is necessary for this study to ensure that information is obtained from various interest groups. Therefore, the goal is not to obtain a sample that is representative of the national population, but rather to include a representation of women from different life stages.

In the next chapter I will do an overview of the Femtech market, focusing on the digital health market landscape. In this analysis I will investigate the trends, the prospects and the main indicators that characterize this industry. After studying it as whole I will proceed to look into the digital health segments, focusing on the 8 main categories in focus, and the apps that compose them.

4. Data Analysis

4.1. Market Analysis

4.1.1. Femtech Market Overview

As seen before, the femtech market comprehends products, software and digital services that use technology to offer health solutions to women. Being a sector based on the solutions tailored to tackle women´s health issues, it is clearly a very large market, considering that women represent around half of the world´s population. Besides this, and given the reproductive biology and gender specific health conditions that are part of women´s lives, historically we can verify that women are more likely than men to seek out and utilize healthcare services (Bertakis et al., 2000; Pinkhasov et al., 2010). In 2015 the health expenses of women between the ages of 19 to 44 in the US were more than 80 percent higher than men in the same age group (U.S Department of Labor, 2018).

However, the demand from women is not adequately met by a wide range of services and functionalities designed to address the various health issues they face, which span from fertility and menstruation regulation, to maternal health follow-up, and menopause management. On the contrary, investment specifically directed at women's health in terms of developing new technological solutions represents a very small portion of medtech novel approvals worldwide. Only 2% of these approvals are dedicated to all female issues and conditions, excluding women's cancer, which itself accounts for an additional 2% of the market (McKinsey, 2022a). As illustrated, women's medtech continues to be treated as a niche market, despite its potential to generate solutions that meet the needs of billions of people.

The femtech market has been growing a lot in the last decade, with an increasing number of companies being found over the years (McKinsey, 2022b). In 2021 the market size was around

51 billion $, and this value is expected to increase at a CAGR of 8.1%, and reach 100 billion $ by 2030 (Statista, 2022a).

This market is predominantly dominated by North America, with U.S and Canada housing approximately half of the world's femtech companies (Statista, 2022b). The U.S also leads in femtech investment by a significant margin, reaching 11.2 billion dollars in 2022. This is considerably higher than Israel, the second-highest recipient of femtech investment, which secured 1.4 billion dollars (Statista, 2022c). Consequently, the United States is a pivotal player in the femtech industry. For many women's healthcare start-ups, achieving success is closely tied to their ability to scale within the U.S market, which surpasses all other countries in healthcare expenditure by a substantial margin (FT Adviser, 2023).

In the femtech industry, we can differentiate various companies based on the types of products they offer, as this industry encompasses a diverse range of distinct offerings. As illustrated in Figure 1, the three main types of products are: consumer products, devices, and apps/software (FemTech Analytics, 2022). Consumer products include advanced and exclusive consumer goods, which address women's well-being needs at different stages of their lives, such as menstrual products safe for the body and the environment or motherhood goods. Devices are designed to help monitor specific parts of the body and assist with health-related tasks, such as pregnancy monitoring, breastfeeding, or breast cancer self-checks, exemplified by Glooma's main product, the glove. Apps and software, which are the primary focus of this study, cover various areas ranging from period tracking and fertility to pregnancy support and menopause assistance.

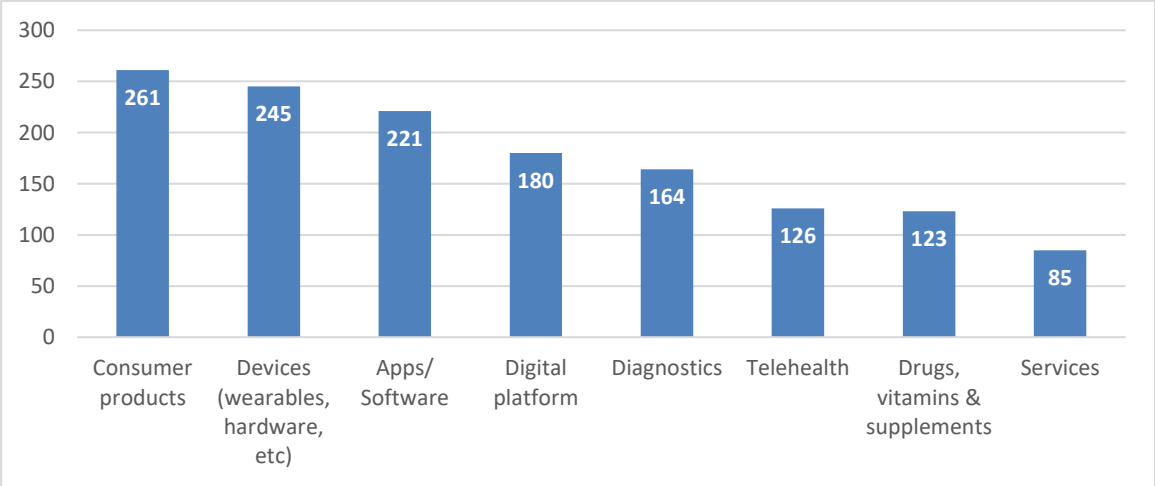

Fig. 1 Number of femtech companies worldwide, by product type - Source: Statista, 2022d

When analyzing the areas that compose the femtech sector, we can identify three main segments that together comprise around half of this market, as shown in Figure 2. These segments are: Pregnancy and Nursing – This period is one of the most tumultuous in a woman's life, and due to its complexity, it attracts a variety of products and services aimed at providing assistance throughout the different stages, from pregnancy monitoring and support to baby feeding and tracking; Reproductive Health & Contraception – This segment focuses on developing effective fertility support solutions as well as reliable contraception methods and related support services; Menstrual Health – Given that menstruation affects a large percentage of women worldwide on a monthly basis, it is associated with significant investment aimed at improving conditions, including solutions for menstruation tracking and providing a higher level of comfort.

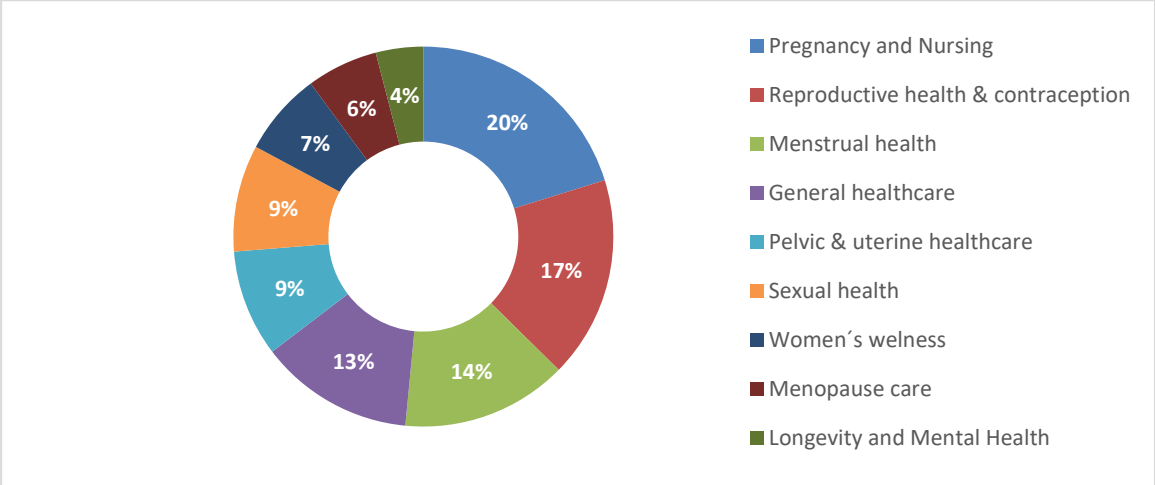

Fig. 2 Distribution of femtech companies worldwide, by subsector - Source: Statista, 2022e

4.1.2. Femtech Apps

After providing an overview of the femtech market, it is now important to direct our attention to the main market segment in focus in this study: femtech apps. As we observed in the chart in Figure 1, this is one of the segments that encompasses the most companies within this industry.

To identify the most significant apps being offered in this domain, an analysis was conducted on the App Store and Google Play Store rankings. This allowed for the selection of the most relevant apps, and for a deeper examination of their specific characteristics.

As discussed in the Methodology, the scope of this analysis includes two categories: Medical and Health & Fitness. The research parameters were set to the top 50 rankings for free apps and the top 25 rankings for paid apps, aiming to capture the most popular and widely used apps in the market. This approach is based on the understanding that paid apps represent a very small fraction of current offerings (Statista, 2024a; Statista, 2024b). Approximately 95% of mobile apps are offered for free, with many companies and developers maintaining this model or adopting monetization strategies such as freemium or subscription options.
Given Glooma´s interest in launching its product in the U.S and in Europe, the app rankings studied were the ones for the U.S, and for several significant European countries: Portugal, Spain, France, Germany, and the U.K.

After a thorough analysis of the highest-ranked apps for the several countries in scope, there were 6 femtech categories identified: Period tracking and fertility; Pregnancy support; Postpartum&BabyCare; Mental health; General Health and Wellness; and Sexual Health. However, the total number of categories included in this study is 8, with Perimenopause/Menopause and Breast health/cancer self-check also being part of it. These areas are considered very relevant for the overall female health paradigm and for Glooma's target group. Accordingly, additional research has been conducted to study the apps available in the market for these two areas.

4.1.2.1. Femtech Apps – Period Tracking and Fertility

Period Tracking and Fertility is one of the main femtech app categories, with the app Flo clearly standing out from the rest of the apps as the most downloaded app for this segment (Statista, 2023), and as the 5th most used Health&Fitness app worldwide (Statista, 2022f).

By analyzing the rankings of the two main app stores in the market, I was able to identify the highest-ranked apps for the countries under study. This analysis resulted in the selection of four Period Tracking and Fertility apps, which were the ones that stood out on the rankings of the several countries in scope.

In the table below we can check the app rankings, with "X" meaning that the app is out of scope for that country (for being out of the top-50/top-25), or is simply not available.

	Flo	My Calendar - Period Tracker	Period Calendar Period Tracker	Clue Period Tracker Period Calendar
Apple App Store ranking	Free Health&Fitness apps US - #18 PT - #31 SP - #27 UK - #11 GR - #16 FR - #24	Not in top-50	Free Health&Fitness apps US - X PT - #40 SP - #21 UK - X GR - #45 FR - #41	Free Medical apps US - X PT - #41 SP - #36 UK - X GR - X FR - #41
Google Play Store ranking	Free Health&Fitness apps US - #18 PT - #31 SP - #27 UK - #11 GR - #16 FR - #24	Free Medical apps US - #36 PT - #4 SP - #12 UK - #19 GR - #13 FR - #8	Free Health&Fitness apps US - X PT - X SP - #46 UK - X GR - #36 FR - X	Free Medical apps US - X PT - #46 SP - X UK - X GR - X FR - X

Fig. 3 Period Tracking and Fertility apps ranking for the countries in scope - Source: app figures, 2024

After testing the apps and identifying the features that they offer, I have listed those functionalities in the table of Fig.16, available in Appendix B. For this category, Flo corresponds to the most complete app, offering a significantly higher number of functionalities than the others.

All the apps present a similar tracking concept, varying in terms of number of tracking options, the user-friendliness of the layout, the accuracy of the prediction system, and some additional features that are valued by the users, such as the possibility of pairing with a partner, and the access to a community forum with several subjects.

4.1.2.2. Femtech Apps – Pregnancy Support

Pregnancy support apps include all the features designed to provide comfort, information, and tools for pregnant women to feel supported throughout their pregnancy journey.
There are several of these types of apps available to users, and they are particularly highly ranked in the Apple App Store compared to the Google Play Store. Among these apps, six were used as the basis for this study, with five being free and one paid.

	Pregnancy+	Contraction timer & counter 9m	Pregnancy and baby app - wemoms	Pregnancy and due date tracker	Pregnancy and baby tracker - WTE	Hear my baby heart beat app
Apple App Store ranking	Free Medical apps US - #18 PT - #4 SP - #10 UK - #5 GR - #7 FR - #5	Free Medical apps US - #27 PT - #9 SP - #24 UK - #20 GR - #14 FR - #14	Free Medical apps US - #24 PT - X SP - X UK - #12 GR - #9 FR - #7	Free Medical apps US - X PT - #6 SP - #36 UK - X GR - #19 FR - #16	Free Medical apps US - #10 PT - X SP - X UK - #35 GR - X FR - X	Paid Medical apps US - #2 PT - #15 SP - X UK - #5 GR - X FR - X
Google Play Store ranking	Not in top-50	Not in top-50	Not in top-50/ Not available	Not in top-50	Not in top-50	Not in top-25

Fig. 4 Pregnancy Support apps ranking for the countries in scope - Source: app figures, 2024

Generally, apps related to this topic aim to accompany women throughout the weeks of pregnancy, providing the necessary information for them to understand the phases they are going through and what they are feeling. Among the available functionalities, some apps like Hear My Baby Heartbeat and Contraction Timer & Counter 9m specialize in a specific function, while others seek to offer a more comprehensive experience. None of these apps significantly differentiate themselves in the market based on the number of features they offer. However, there are some variations among them that could be interesting to explore, such as the inclusion of product reviews for pregnancy and baby items, community forums, or a timeline with recommended exams. (More detailed analysis available in the table of Fig.17 - Appendix B).

4.1.2.3. Femtech Apps – Postpartum & Babycare

The Postpartum & Babycare segment composes all the types of apps that offer support to women in the period after pregnancy, namely assisting them with the several tasks that comprise motherhood, helping take care of the baby and providing the best conditions for their development.

From the apps leading the rankings there were two paid apps and three free apps selected in the Postpartum & Babycare area.

	The Wonder Weeks	Baby Shusher - the sleep miracle	Baby + / Your Baby Tracker	Huckleberry Baby and child	LactApp
Apple App Store ranking	Paid Health&Fitness apps US - #1 PT - #2 SP - #3 UK - #1 GR - #1 FR - #4	Paid Health&Fitness apps US - #21 PT - X SP - X UK - X GR - X FR - X	Free Medical apps US - X PT - #10 SP - #35 UK - #50 GR - #17 FR - #23	Free Medical apps US - #19 PT - X SP - X UK - #10 GR - X FR - X	Free Medical apps US - X PT - X SP - #22 UK - X GR - X FR - X
Google Play Store ranking	Paid Health&Fitness apps US - #1 PT - #1 SP - X UK - #1 GR - #1 FR - #2	Not in top-25	Not in top-50	Not in top-50	Free Medical apps US - X PT - X SP - #20 UK - X GR - X FR - X

Fig. 5 Postpartum & Babycare apps ranking for the countries in scope - Source: app figures, 2024

The apps used in this segment offer variety of distinct utilities. Comparable to Pregnancy Support apps, some of the offering in this domain is more specific, such as Baby Shusher, which provides a single function to help soothe a baby to sleep, while others aim to provide a general follow-up of the baby development, through tracking, articles, and information. The app Baby + / Your Baby Tracker offers the most extensive set of features, whereas the app Wonder Weeks provides the most specific content by focusing on child development stages, indicating when to expect mental changes in the baby that affect their behavior. (More detailed analysis available in the table of Fig.18 - Appendix B).

4.1.2.4. Femtech Apps – Perimenopause/ Menopause

Menopause is a period that millions of women go through worldwide, and even after its symptoms cease, it extends until the end of a woman's life, with this period being referred to as post-menopause. However, the solutions available, particularly in the form of mobile apps, are still limited, and there is very little accessible information on this topic, especially considering the portuguese context. Therefore, considering demographic factors such as the aging global population, with estimates suggesting that around 1 billion women will be experiencing the menopause period by 2025 (Shifren et al., 2014), it is essential to include the available offerings for this segment in this study.

Throughout the course of this study, the feedback I received from the participating women was very positive, demonstrating a great interest in the development of femtech solutions at the mobile app level. This feedback was particularly conveyed by women going through the perimenopause/menopause period, revealing an almost complete lack of awareness of the existence of digital solutions in this field

Given that demographic trends increasingly point to a rise in life expectancy, with the most common age to die currently reaching 87 years old (FT, 2024), it is evident that menopause and the post-menopausal period are beginning to occupy a much more significant portion of a woman's life. If there is such a wide range of offerings available for women during their fertile period, it makes sense that similar support should be available for their non-fertile period, especially if this starts to represent a considerably larger part of their life

The mobile apps studied for this segment were selected based on a systematic review of menopause apps focused on osteoporosis (a menopause symptom), in which a set of menopause mobile apps were assessed for quality using the MARS methodology (Paripoorani et al., 2023; Stoyanov et al., 2015). I have chosen three of the highest-ranked apps from this paper to be part of this study, and they will be used to understand women's interest in these types of features.

The main features present in these three apps are the tracking of menopause symptoms and triggers with personalized recommendations/plans to help deal with them, and articles provided by specialists. The app balance is the most complete one, providing several different contents to its users as Live Q&A sessions, or videos of menopause consultation examples.
The possibility of Tracking the HRT doses is a feature that is not available in any of these apps, but has been highlighted in the app store comment section as a useful feature for this type of apps. (More detailed analysis available in the table of Fig.19 - Appendix B).

4.1.2.5. Femtech Apps – Breast health/cancer self-check

Breast health is a key are when it comes to women's health, and taking necessary precautions is essential for preserving both physical and psychological well-being.

Breast cancer is the cancer with the highest incidence among women worldwide (World Health Organization, 2022). This highlights the importance of developing solutions aimed at preventing this disease and assisting women in their fight against it. For a company like Glooma, which focuses on products designed to assist women with breast cancer self-examinations, it is crucial to be aware of the digital solutions available in this area. Consequently, I decided to include apps dedicated to breast health/ cancer self-check in this study and analyse their features.

The apps selected for this category were found through web research on breast health apps, as well as using three papers that reviewed breast health/cancer mobile apps (Yang et al., 2023; Altmannshofer et al., 2024; Kanodia et al., 2023). While evaluating these apps we verify that they have an old-fashioned layout and a very limited number of features, except for Outcomes4mecancercare, which is the only one that does not have instructions for the breast self-check exam. This app is not only focused in the prevention part, but also in the treatment, and combines various types of different features, such as Early detection plan - Map showing what are the next steps after you feel a symptom, Takeaways from key breast cancer conferences, and Recorded webinars. (More detailed analysis available in the table of Fig.20 - Appendix B).

4.1.2.6. Femtech Apps – Mental health

Mental health is an increasingly discussed area of healthcare and is becoming more prominent in the society we live in. Therefore, it is important to consider this category while conducting this study, as it impacts women's health and well-being. Although it is not an area exclusively linked to women, it is an integral part of their lives and plays a crucial role in the quality of life.

Four of the highest-positioned Mental Health apps were chosen from the rankings and analysed in this study.

	Calm	**Breeze: Mental Health**	**Headspace: Meditation & Sleep**	**Finch : self care pet**
Apple App Store ranking	Free Health&Fitness apps	Free Health&Fitness apps	Not in top-50	Free Health&Fitness apps

	US - #12 PT - X SP - X UK - X GR - X FR - X	US - X PT - X SP - X UK - #27 GR - X FR - X		US - X PT - X SP - X UK - #26 GR - X FR - X
Google Play Store ranking	Free Health&Fitness apps US - #12 PT - X SP - X UK - #30 GR - X FR - X	Not in top-50	Free Health&Fitness apps US - X PT - X SP - #46 UK - X GR - #36 FR - X	Free Health&Fitness apps US - #27 PT - X SP - X UK - #47 GR - X FR - X

Fig. 6 Mental Health apps ranking for the countries in scope - Source: app figures, 2024

The main feature offered by this type of apps consists in the access to tracks of sounds and guided meditations that are directed for several purposes, such as relaxation, dealing with anxiety, having a better sleep, and focusing on tasks. The app Breeze: Mental Health is the only that does not provide this feature, having another common functionality which is a Mood tracker, and other different features as Mindfulness&relaxation games, or Psychology-backed self-tests. The app Finch: self-care pet is the one that presents the most distinct concept and layout, integrating gamification in the app, and associating missions and rewards with the accomplishment of the several mental health tasks that the app promotes. (More detailed analysis available in the table of Fig.21 - Appendix B).

4.1.2.7. Femtech Apps – General Health & Wellness

The area of General Health & Wellness applies to the segment of apps that helps users optimize the quality of their daily well-being activities, including categories as Fitness, Diet and food, and Sleep.

In the same sense as for the Mental Health apps, these types of apps are not exclusively linked to women, but they comprehend a significant part of the market for both sexes (as we can see by the following table, showing apps from categories like Fitness, Nutrition, Sleep, and Health tracking tin the top-10 rankings for several countries), and in that sense it is interesting to study their features and the impact they have on women solely.

	Better Me : Health Coaching	My Fitness Pal : Calorie Tracker	Health Kit	JustFit : Lazy workout & fitness	Shut Eye : sleep tracker
Apple App Store ranking	Free Health&Fitness apps US - #8 PT - #25 SP - #18 UK - #22 GR - #10 FR - #25	Free Health&Fitness apps US - #6 PT - #8 SP - #16 UK - #4 GR - #11 FR - #24	Not in top-50/ Not Available	Free Health&Fitness apps US - #4 PT - #3 SP - #7 UK - #2 GR - #1 FR - #3	Free Health&Fitness apps US - #1 PT - #7 SP - #15 UK - #11 GR - #33 FR - #15
Google Play Store ranking	Free Health&Fitness apps US - #9 PT - X SP - #48 UK - #36 GR - #42 FR - #40	Free Health&Fitness apps US - #14 PT - #26 SP - X UK - #10 GR - #43 FR - #7	Free Health&Fitness apps US - #1 PT - #1 SP - #1 UK - #1 GR - #3 FR - #4	Free Health&Fitness apps US - X PT - X SP - X UK - #9 GR - X FR - X	Free Health&Fitness apps US - #6 PT - X SP - X UK - 8 GR - X FR - X

Fig. 7 General Health & Wellness apps ranking for the countries in scope - Source: app figures, 2024

Among the apps being studied, Better Me: Health Coaching is the most comprehensive app, offering features such as tracking of calories and macros, tailored meal plans and recipes, and workout programs. Other apps like Health Kit, JustFit: Lazy Workout & Fitness, and Shut Eye: Sleep Tracker focus on a single type of feature. Respectively, these features are the recording of various health indicators such as blood pressure or blood sugar; workout programs for home or gym with personalized exercises and nutrition; and access to tracks of sounds to help falling asleep and insights and analysis of sleep quality. (More detailed analysis available in the table of Fig.22 - Appendix B).

4.1.2.8. Femtech Apps – Sexual Health

The Sexual Health segment includes apps that promote physical, mental, or social well-being in all aspects related to the reproductive system and its functions and processes.

The apps considered in this segment include functions related to pelvic health, contraceptive methods, and sex therapy. All of them have been selected due to their positions in the rankings,

except for Lover: Intimacy Coaching, which was found through web research on sexual health apps, and was added to this study given its specific characteristics.

	Squeezy	My therapy pill reminder	My ring - contraceptive ring	Lover: Intimacy Coaching
Apple App Store ranking	Paid Medical apps US - X PT - X SP - X UK - #1 GR - X FR - X	Not in top-50/ Not Available	Free Medical apps US - X PT - #31 SP - X UK - X GR - X FR - X	Not in top-50
Google Play Store ranking	Paid Medical apps US - #20 PT - #2 SP - X UK - #1 GR - X FR - X	Free Medical apps US - X PT - X SP - X UK - X GR - #15 FR - X	Free Health&Fitness apps US - X PT - X SP - #46 UK - X GR - #36 FR - X	Not in top-50

Fig. 8 Sexual Health apps ranking for the countries in scope - Source: app figures, 2024

The four apps in this study possess considerably different characteristics and features, Squeezy focuses on pelvic health through Kegel exercise plans, reminders, articles, and a bladder diary; My therapy pill reminder works as a personal health diary that tracks medication and several other indicators; My ring - contraceptive ring gives reliable instructions for inserting and removing the contraceptive ring, with reminders; Lover: Intimacy Coaching has scientifically approved courses and content that helps to overtake sexual health problems, and other features as a community forum, and possibility to pair the app with a partner. (More detailed analysis available in the table of Fig.23 - Appendix B).

4.1.3. Market Analysis Considerations

The Femtech market, despite its relative infancy, demonstrates substantial growth potential, driven by the increasing recognition of women's specific healthcare needs. As women make up half of the global population and have unique health concerns tied to reproductive biology and

gender-specific conditions, this market's significance cannot be understated. However, the industry's current state reflects a gap between demand and supply, there is a notable disparity between the demand for women's healthcare solutions and the current offerings available, especially in areas beyond Fertility and Maternal health. Key segments such as Menopause management and Breast health are still underexplored, presenting significant opportunities for innovation and market expansion. This gap highlights the need for further investment and research to develop comprehensive solutions that address the full spectrum of women's health needs, ensuring that Femtech can fulfill its potential to significantly impact women's health and well-being globally.

The U.S at the moment plays an important role in this industry, dominating the market both in terms of the number of companies and the scale of investment, with a substantial lead over other countries. This dominance underscores the strategic importance of the U.S. market for any Femtech start-up aiming to achieve substantial growth.

After analyzing the apps available, we can verify that there is a vast amount of health categories offering mobile app solutions useful to women. The demand for the apps from these several areas logically varies depending on certain demographics such as women life stage and country where they are being used. However, certain apps have already established themselves as leading platforms in several of the countries where they operate, such as the market leader, Flo, which integrates in its offerings not only a period tracking function, but also community features and content portfolios, creating a reliable multi-functional ecosystem. By covering several different features and providing them to customers through a user-friendly layout, apps as Flo or Pregnancy + lead their market categories, suggesting that many users value platforms that offer a holistic experience to users rather than single-purpose apps.

4.2. Sample Analysis

4.2.1. Descriptive analysis

4.2.1.1. Demographics and features

After selecting the most relevant apps and analyzing their specific characteristics, the main features for each category were identified. These features are now being used in a survey to

gather insights from women. The survey has been distributed via social media and through my personal contacts, reaching women at different life stages.

In order to differentiate the various respondents and gain a clearer understanding of their profiles, I collected several demographic variables. Respondents were asked about their gender, age, country of residence, and the type of profile they identify with.

The final sample was achieved after removing the survey responses that were not complete, the ones that answered "Male" to the question "What is your sex?", and the ones that did not answer "5" to the control question "To ensure that you are reading all the options carefully, please select 5 for this option". The final sample is composed by a total of 137 valid responses, and it is available in the Appendix section.

From the 137 respondents, 127 reside in Portugal (93%), 5 reside in the U.S, and the other 5 reside in Singapore, Australia, Switzerland, United Kingdom, and France.

As we can verify through the table below, the age distribution of the women who responded to the survey shows a significant concentration in the 45-54 age group, which accounts for the largest segment of respondents (48 out of 137). This is followed by the 25-34 and 35-44 age groups, with 27 and 24 respondents, respectively. The youngest (under 18) and oldest (65+) age groups are the least represented, with only 2 and 1 respondents, respectively.

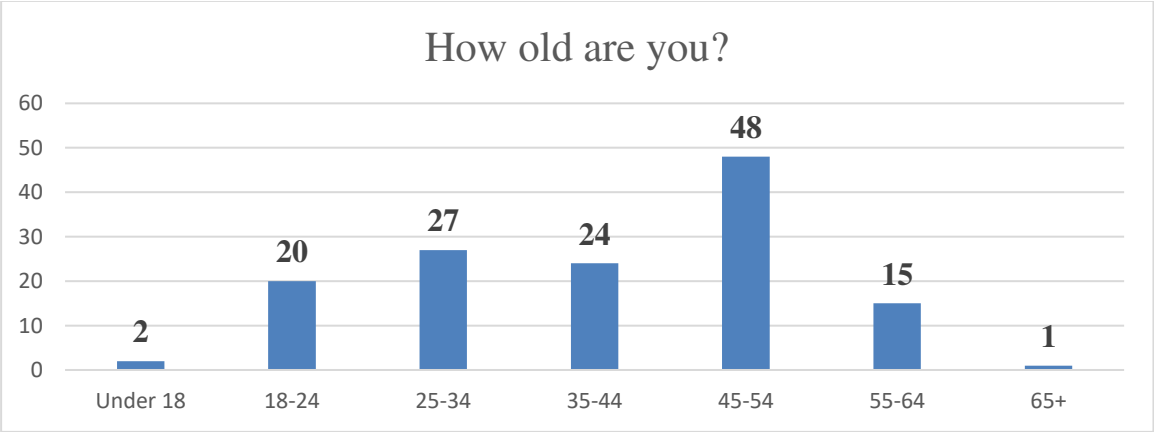

Fig. 9 Sample age distribution - Source: survey data

The age composition of the survey respondents was not intentionally selected; rather, it reflects the natural distribution resulting from sharing the survey through my personal network and social media channels. The primary demographic focus during the survey's execution was to

ensure responses from all profile types, aiming to represent women at different life stages (as depicted in Figure 18).

To ensure that the questions evaluating interest in various features were relevant and aligned with each respondent's current life stage, six profile types were selected to represent different phases of a woman's life. Not all respondents answered every question; instead, they were directed to the questions most suited to their profile type. This approach prevented the survey from becoming too lengthy and ensured that responses came from individuals familiar with the specific life stages and their associated challenges and needs, resulting in a more reliable sample. The six profile types used (as defined by Glooma) were: Avoiding Unexpected Pregnancy/Not Thinking About Pregnancy Yet, Trying to Conceive, Pregnant, Recent Mom, Perimenopause, and Menopause/Postmenopause

In the following table we can see the distribution of respondents according to their life stages. The Perimenopause group is the largest, with 37 respondents, followed closely by those Avoiding or not considering pregnancy, with 36 respondents (which encompasses women from a wide age range). The Menopause/Postmenopause group includes 27 respondents. Smaller segments include 16 Recent Moms, 11 Pregnant women, and 10 individuals trying to conceive. This distribution highlights a significant representation of women in midlife stages, particularly around menopause.

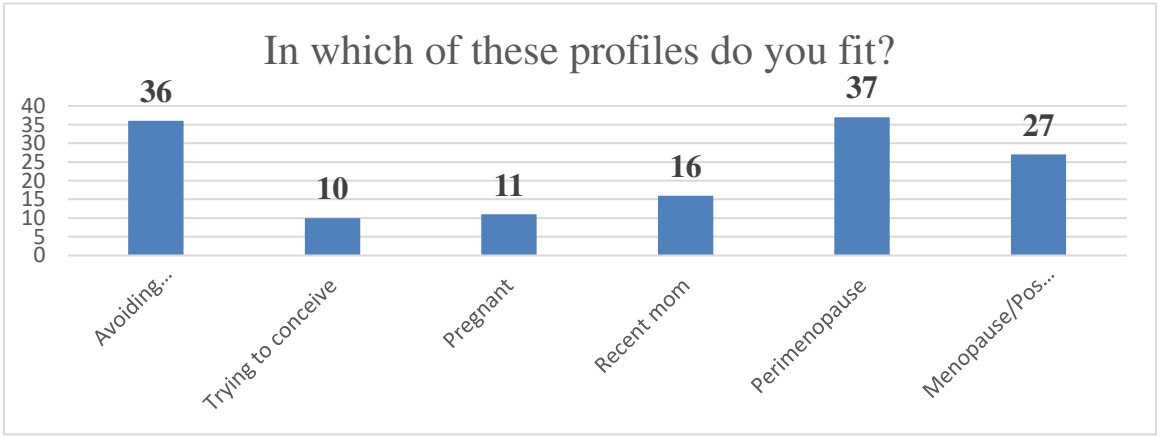

Fig. 10 Sample profile types - Source: survey data

In this survey, women were asked if they were using any apps related to the topics mentioned in this study, and if so, which ones. They were also asked which of those areas they would be interested in having covered by an app. As expected, Period tracking and fertility apps were the

most commonly used, with 42 respondents utilizing them. Flo emerged as the most popular app by a considerable margin, with 19 users reporting its use. Other frequently mentioned apps included Pregnancy +, used by 7 respondents, Clue, used by 6 respondents, and pre-installed health apps like Apple Health, Samsung Health, and Huawei Health, collectively used by 7 respondents. However, a significant portion of the respondents (75) do not use any of these types of apps, highlighting just how nascent this industry is, particularly in Portugal, where over 90% of the women participating in this study reside.

In terms of app interest, the General Health and Wellness category (encompassing Fitness, Diet and Food, and Sleep) garnered the most attention, with 75 respondents expressing interest. This was followed by the Mental Health category, which attracted 45 respondents, and the Menopause category, selected by 39 respondents. It is important to note that the interest in the Menopause category should be analysed considering that approximately 47% of our sample consists of individuals who are currently experiencing the period between Perimenopause and Postmenopause.

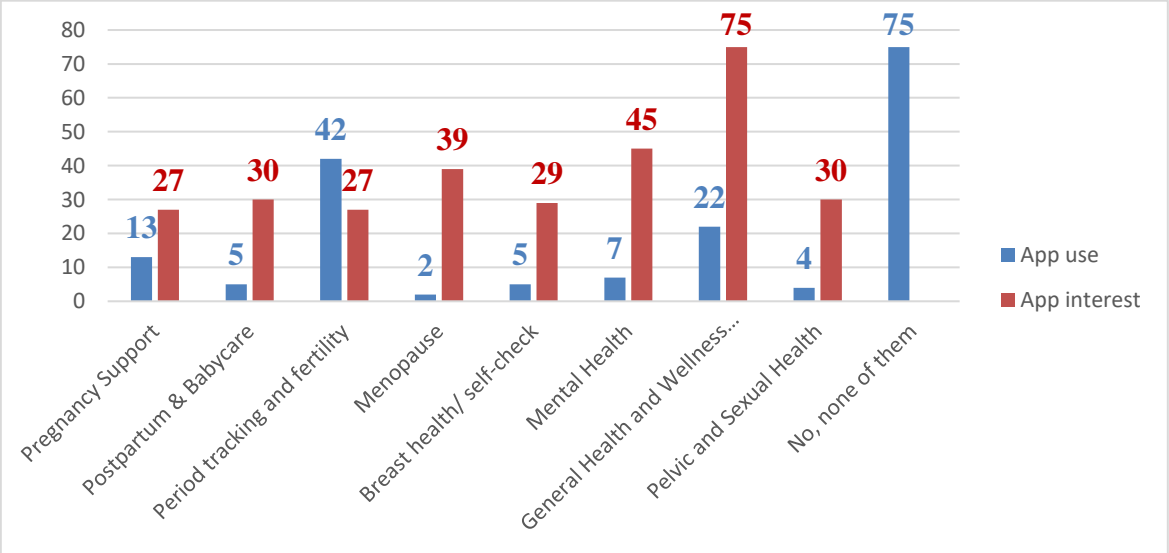

Fig. 11 Femtech app use and app interest in our sample - Source: survey data

Following the collection of demographic data, the respondents were presented with seven sets of questions focused on the features within different categories. The categories examined correspond to those outlined in section 4.1. The features that were selected for the survey were the ones identified as the most relevant during the market research process. These key features were then used to gauge the level of interest among women.

To streamline the survey, the feature groups were organized according to the eight categories under study (with Mental Health and General Health and Wellness combined into a single set of questions for practical reasons). The final category, Sexual Health, also includes additional general features that are applicable not only to this category but also to other types of apps, such as the "Option to pair your app with a partner" or the "Conversion of the data tracked in the health app into a PDF".

As previously mentioned, to gather responses from individuals that are familiar with the specific life stages, each woman was asked about the set of features most relevant to her profile type. In some instances, based on the interest they expressed in other categories, they were also queried about features related to those categories, as indicated in the table of Fig.20.

Prior to conducting this survey, I consulted women from various profiles to assess their interest in the different areas. The selection of features most suited for each profile was based on the feedback received from women, and on the potential usefulness that each category appears to have for each demographic. Categories such as Mental Health, General Health and Wellness, Breast Health/Cancer Self-Check, or Sexual Health can be beneficial to women of any age. Meanwhile, more specific categories like Pregnancy Support or Menopause are only relevant to individuals at particular life stages.

Type of profile	**Categories of Features asked**	**Categories also asked if respondent showed interest**
Avoiding Unexpected Pregnancy/Not Thinking About Pregnancy Yet	-Period tracking and fertility -Mental health/ General Health and Wellness - Breast health/cancer self-check -Sexual Health	
Trying to Conceive	-Period tracking and fertility -Mental health/ General Health and Wellness - Breast health/cancer self-check -Sexual Health	-Pregnancy support -Postpartum&BabyCare -Perimenopause/Menopause
Pregnant	-Pregnancy support -Postpartum&BabyCare -Mental health/ General Health and Wellness - Breast health/cancer self-check -Sexual Health	-Period tracking and fertility -Perimenopause/Menopause
Recent Mom	-Postpartum&BabyCare -Mental health/ General Health and Wellness	-Pregnancy support -Perimenopause/Menopause

	- Breast health/cancer self-check -Sexual Health	
Perimenopause	-Perimenopause/Menopause -Mental health/ General Health and Wellness - Breast health/cancer self-check -Sexual Health	
Menopause/Postmenopause	-Perimenopause/Menopause -Mental health/ General Health and Wellness - Breast health/cancer self-check -Sexual Health	

Fig. 12 Categories of features asked to each profile type in the survey - Source: survey

After gathering data through the survey, we can now analyze the women's interest in various features, and assess which types of functionalities garnered the most and least interest. The survey questions, along with the average scores assigned by the women for each feature, can be found in the Appendix.

After initially reviewing the survey results, we observe that there is only one feature that did not collect positive feedback by respondents. This pertains to the Sexual Health feature titled "Scientifically approved courses and content that help to overcome sexual health problems such as low sex drive or low sex quality." All other features scored above 4 (Neither interested nor uninterested) on a 1-7 scale, indicating a general interest from women in exploring these types of functionalities.

In the table below we can check the three highest-rated features for each of the categories in study, along with the average interest rates for each one, so that we can have an idea of the valuation of women regarding the functionalities gathered in this study.

Feature category	**Feature 1**	**Feature 2**	**Feature 3**
Pregnancy support **6.38**	Week-by-week info and articles about baby development stage and pregnancy symptoms **6.80**	Calculation of pregnancy due date and Pregnancy temporal line **6.65**	Suggestions of things to do in each pregnancy week **6.65**
Postpartum&BabyCare features **6.05**	Foods list to add notes about the baby´s reaction to the ones he has tried. **6.26**	Follow-up of the natural child development stages, informing you when to expect mental changes that	Baby shushing/sleeping sound that you can temporize in your phone and that efficiently calms

		affect his mood, sleep, behaviour, etc... **6.16**	them down and gets them to sleep **6.16**
General Health and Wellness and Mental Health features **5.50**	Workout Programs at home or at the gym for any level: personalized sets of exercises and nutrition **5.85**	Record your blood pressure, blood sugar, heart rate, and BMI**,** with graphs to observe the trends trough time **5.85**	Tailored meal plans and recipes to help you manage your symptoms, and/or adjust to your target calories and macros **5.70**
Perimenopause/Menopause features **5.32**	Recommendations of treatments and Reviews from other users regarding HRT&Medication, Supplements, and Alternative therapies **5.64**	Daily log of menopause symptoms, triggers, and activities (With graphs that identify factors affecting symptom changes over time, and personalized recommendations) **5.59**	Stories and Testimonies of other women going through menopause stages and treatments **5.30**
Period tracking and fertility features **5.25**	The prediction of your next menstruation days, giving you information about the cycle phase you are in. **6.09**	Receive Reminders to take your pills/medication**,** and warnings when you are almost out of pills and need a restock **5.66**	Charts that show the patterns of your period and symptoms changes over time **5.41**
Breast health/cancer self-check features **5.16**	Information about Prevention and Lifestyle tips to reduce breast cancer risk **5.89**	In case of disease, Tracking of your Medication and Symptoms, with recommendations to help dealing with Symptoms **5.74**	Early detection plan - Map showing what are the next steps after you feel a symptom **5.71**
Sexual Health and Other general features **4.71**	Conversion of the data tracked in the health app into a PDF that can be shown/sent to the doctor **5.50**	Kegel/pelvic muscles exercise plans (customizable) with visual and audio prompts, tracking of progress over time, and reminders to do the exercises **5.27**	Customizable Reminders for inserting and removing the Vaginal contraceptive ring, with reliable instruction **5.00**

Fig. 13 Average interest score per app segment and top-3 best voted - Source: survey

As shown in the table, Pregnancy Support features received the highest average interest, with strong demand for week-by-week informational content and baby development tracking, scoring 6.80 and 6.65, respectively. Postpartum & Baby Care features also scored highly, with an average interest of 6.05. Tracking a baby's reaction to foods and following natural child development stages garnered significant interest, emphasizing the importance of these features for postpartum engagement. These categories, focused on a specific life phase, had fewer responses, possibly contributing to their higher interest scores. Nonetheless, the high interest suggests their value for women at these stages.

Following these, General Health and Wellness, along with Mental Health, ranked next in average interest, aligning with broader trends. Demand for workout programs, nutrition

solutions, and health metric tracking scored 5.70 and 5.85, reflecting the societal shift toward a health-conscious lifestyle.

Perimenopause/Menopause features averaged 5.32, with a focus on treatment recommendations and symptom tracking, highlighting an opportunity to address this underserved market. Period Tracking and Fertility features scored 5.25, with menstrual cycle prediction and monitoring emerging as the most popular at 6.09, making it a key area for app development. Breast health and cancer self-check features showed moderate interest (5.16), with early detection and preventive health measures valued most.

Sexual Health and Other categories had the lowest interest (4.71), though pelvic exercises and data conversion to PDFs were highly rated as supplementary features. An anonymous chat forum for sharing experiences was met with relative indifference (4.37), but interest increased (80%) when specialists participated, suggesting that expert input is more valued than peer-to-peer communication.

4.2.1.2. Willingness-to-use

Now that we have analyzed the demographic characteristics of our sample and the respondents' interest in various types of features, we need to study the relationship between interest in these features and the willingness-to-use a femtech app that provides access to these functionalities. In the final part of the survey, respondents were asked the following question regarding their willingness-to-use: “If there was a women's health app that integrated several of the features you were asked about, including those you expressed the most interest in, how likely would you be to use that app on a scale from 1 to 7?”. Based on the results of this question, we will first have a look at the relationship between the demographics and the willingness-to-use, and then explore the relationships between the interest in the features and the willingness-to-use through regression analysis.

In the following graph, we analyze the distribution of responses to willingness-to-use across the various profiles under study. This variable was measured using a 1-7 Likert scale; however, since no responses were recorded with the value "2," it is not included in the legend.

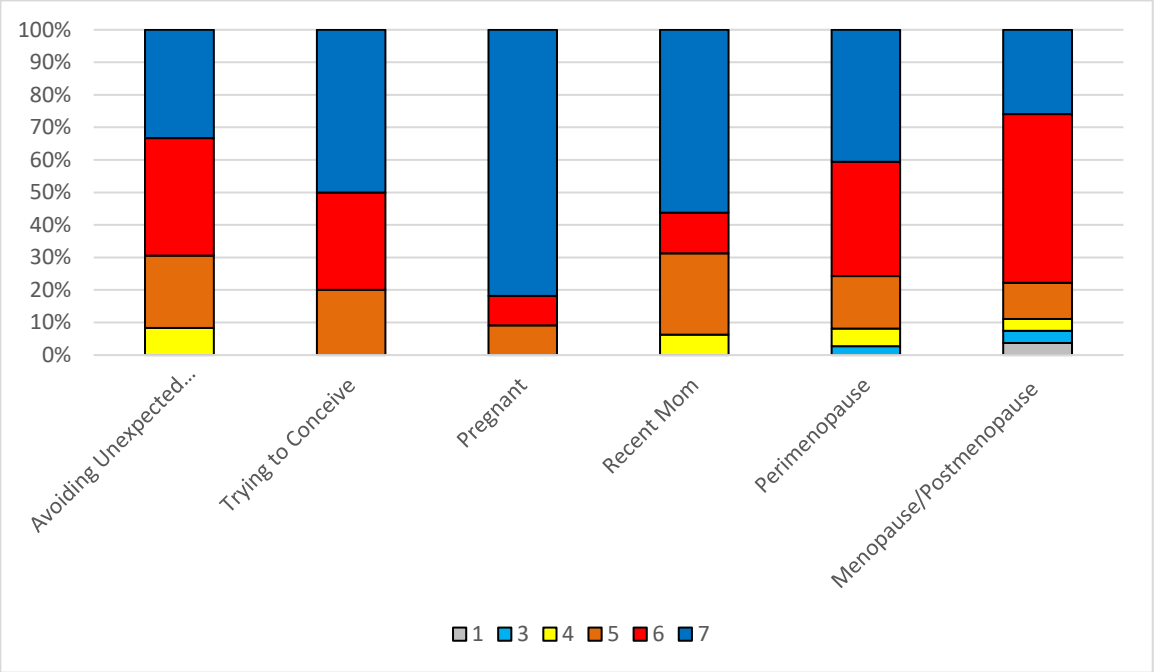

Fig. 14 Percentage of willingness-to-use scores per profile type - Source: survey data

As we can notice, the "Pregnant" and "Recent Mom" profiles show a high percentage of responses at the highest willingness-to-use score (7), indicating that participants within these profiles are generally very inclined to use the app. This trend results in average willingness-to-use values of 6.72 and 6.13, respectively. These findings align with the previously examined average interest scores for the Pregnancy Support and Postpartum & Baby Care categories, which were the highest among the various categories.

The "Avoiding Unexpected Pregnancy" and "Perimenopause profiles" have average willingness-to-use values of 5,94 and 6,05, and show a more balanced distribution of responses across various scores, indicating a generally strong but varied interest in the app. This may suggest that there is still room for improvement in the features targeted at these groups, so that users feel not just interested, but truly motivated to use the app.

The "Trying to conceive" category is the profile type with the fewest respondents, yet all willingness-to-use values are positive and show an increasing frequency along the scale, resulting in a high average willingness-to-use score of 6.3. This pattern suggests that participants in this group are highly inclined to use the app, with only a few showing moderate interest. The absence of responses in the lower scores indicates that the app's features are generally very well-received by this demographic.

Participants belonging to the "Menopause/Postmenopause" profile were the most hesitant about using the app, with values ranging from 1 ("Definitely wouldn't use") to 7 ("Would definitely use"), resulting in the lowest average willingness-to-use score of 5.78. This suggests that while most users in this category are quite interested in the app, a small subset might have reservations or feel that the features are less relevant to their need.

4.2.2 Impact of feature interest on willingness-to-use

After analyzing the willingness-to-use values for the different profile types, we now need to understand how the interest in the various features evaluated in this project relates to the likelihood of people adopting an app of this kind.

Given that the dependent variable (willingness-to-use) under study is an ordinal variable, as are the independent variables (interest in the various features), an Ordinal Logistic Regression was likely the best fit to study the relationship between these variables. In this analysis, I used the various features evaluated by the respondents to assess the impact that interest in these features has on the adoption of such an app

The ordinal regression was done to capture the effect that the highest scoring features (as seen in Fig.21) from the 3 broader app categories (General Health and Wellness and Mental Health, Breast Health/Cancer Self-Check, and Sexual Health/Other features) have on the dependent variable willingness-to-use. Another variable that was added to this model due to its relevance in the context of this market is the safeness respondents felt when entering their details while using a mobile female health app, rated from 1 to 7. Safeness is clearly a relevant factor in the adoption of digital health technologies, especially in the context of femtech apps, where personal and sensitive health information is involved (as discussed in section 2.1).

However, after running the ordinal regression model (available in the Appendix B), I was faced with a significant result for the Test of parallel lines, which showed a p-value of 0.048 (<0.05), meaning that the proportional odds assumption does not hold, and given this, we cannot take accurate conclusion from this model.

Test of Parallel Lines[a]

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	305,824			
General	249,798[b]	56,026[c]	40	,048

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a. Link function: Logit.

b. The log-likelihood value cannot be further increased after maximum number of step-halving.

c. The Chi-Square statistic is computed based on the log-likelihood value of the last iteration of the general model. Validity of the test is uncertain.

Fig. 15 Test of Parallel lines of the Ordinal Regression model - Source: SPSS and survey data

This way, I will analyze the impact that the interest on the main features studied have on the variable willingness-to-use through Chi-square tests. The Chi-square test, is a non-parametric method, determines associations between categorical variables and allows for practical conclusions without needing normal distribution. Therefore, our dependent variable, willingness-to-use, has been categorized into two groups: 1 = Low to Moderate willingness-to-use (1-5), and 2 = High willingness-to-use (6-7). The categorization of this variable was done primarily because, for this type of test, it is important that the variables have a considerable frequency of responses for each response group. However, since willingness-to-use showed relatively high values and there were very few responses for values between 1-3 (on the Likert scale from 1-7), dividing the data into Low/Mid Willingness-to-Use and High Willingness-to-Use allows us to have a significant number of responses for each group. This enables us to study the difference between the group where the probability of using the app is low or only moderate (1-5) and the group where there is indeed a high likelihood of using the app (6-7).

Our independent variable, which is the level of interest in each feature, has been categorized into three groups: 1 = Low interest (1-3), 2 = Moderate interest (4-5), and 3 = High interest (6-7). By using this structure, we will study the effect of varying levels of interest in specific

features, on the likelihood of having a high willingness-to-use the app. The features that I will test in this analysis are those that presented the highest average interest score for each category (as shown in the table in Fig. 21), to understand if the high interest demonstrated indeed translates into a higher likelihood of wanting to use the app.

In the table of the Fig.15 we can see the results of the series of Chi-square tests conducted to evaluate the association between feature interest levels and willingness-to-use for the most popular features in each category. Statistically significant results were found for certain features

Feature category	Feature	χ^2	p-value	Conclusion
General Health & Wellness and Mental Health (N=137)	Tailored meal plans and recipes	3.592	0.166	Not statistically significant
	Workout Programs	6.539	0.038	Statistically significant
	Record your blood pressure, blood sugar,..	7.766	0.021	Statistically significant
Perimenopause/Menopause (N=64)	Daily log of menopause symptoms	14.181	<0.001	Statistically significant
	Stories and Testimonies of other women	2.668	0.263	Not statistically significant
	Recommendations of treatments and Reviews	4.254	0.087	Not statistically significant
Breast health/cancer self-check (N=137)	Information about Prevention and Lifestyle tips	9.265	0.010	Statistically significant
	Early detection plan	8.627	0.013	Statistically significant
	Tracking of your Medication and Symptoms	12.620	0.002	Statistically significant

Sexual Health and Other general features (N=137)	Conversion of the data tracked in the health app into a PDF	18.546	< 0.001	Statistically significant
	Kegel/pelvic muscles exercise plans	7.984	0.018	Statistically significant
	Customizable Reminders Vaginal contraceptive ring	2.161	0.339	Not statistically significant
Period tracking and fertility (N=64)	The prediction of your next menstruation days	2.362	0.307	Not statistically significant
	Charts that show the patterns of your period	1.658	0.436	Not statistically significant
	Receive Reminders to take your pills/medication	3.264	0.196	Not statistically significant
Pregnancy support (N=20)	Calculation of pregnancy due date	0.392	0.561	Not statistically significant
	Week-by-week info and articles	0.186	0.666	Not statistically significant
	Suggestions of things to do in each pregnancy week	2.135	0.144	Not statistically significant
Postpartum & Baby Care (N=31)	Follow-up of natural child development stages	3.591	0.166	Not statistically significant
	Baby shushing/sleeping sound	4.916	0.086	Not statistically significant
	Foods list to add notes about the baby´s reaction	4.599	0.100	Not statistically significant

Fig. 15 Chi-square tests for interest in highest scoring features and willingness-to-use - Source: SPSS and survey data

In these tests we found statistically significant associations (at the 0.05 significance level) between the level of interest in specific features and the respondents' willingness-to-use the app.

Within these features, I was able to identify three groups of features that, due to the similarity in the type of services/tools they provide to users, can serve as indicators of the types of features that appeal to users, encouraging the use of a femtech app. These groups include: (1) features related to tracking health data and personal health management, through which users value the monitoring of their health metrics as well as the inputs and recommendations they receive, such as in the Daily log of menopause symptoms, conversion of the data to PDF for the doctor, and the recording of health metrics, (2) Breast Health features as information about prevention and lifestyle tips, early detection plans, and tracking of medication and symptoms in case of illness, and (3) features related to physical wellbeing and body exercises, such as workout plans and pelvic muscle exercise programs.

The complete results of all the tests can be found in the Appendix D, along with the crosstabulation tables. These tables helped confirm that for the statistically significant features, as the level of interest increases from low (1) to high (3), the number of respondents with high willingness-to-use also rises. This trend suggests a positive correlation between interest in these features and the willingness-to-use the app

In contrast, features that involved input from other users, such as user-generated content and mutual participation, did not show a significant impact on the likelihood of app adoption. Features like stories and testimonials from women undergoing menopause treatments or recommendations from other users on HRT and medication were not statistically significant in terms of willingness-to-use, with p-values exceeding 0.05. This pattern was further supported by the relatively low average interest scores for features like an anonymous chat forum or the option to share data with a partner about menstrual cycles and symptoms (as we can see in sample results – Appendix A), reinforcing the idea that peer-to-peer information exchange is not particularly effective in engaging users in the femtech app context.

The statistical tests conducted for the highest-scoring features in categories with smaller sample sizes, such as Pregnancy Support, Postpartum & Baby Care, and Period Tracking and Fertility, did not show a statistically significant relationship with the willingness-to-use variable based on the Chi-square tests. Therefore, subsequent Fisher's tests were also performed to minimize the impact of the small sample size on the results and to avoid missing any potential significant

relationships. However, for the features that did not demonstrate statistical significance through the Chi-square tests, the Fisher's tests yielded the same outcome. These results may suggest that there is no direct impact between the variables, though the sample sizes collected for these segments could have influenced the findings. This issue will be further addressed in the Limitations section of this thesis.

5. Limitations

This study analyzes the main femtech apps, selected based on App Store and Google Play Store rankings. These rankings are determined by several factors that identify the most popular or trending apps at any given time, including keywords in the app's name, user ratings, reviews, and the number of downloads. While these criteria help highlight the most relevant apps, they do not provide a complete measure of an app's quality or efficiency. Instead, they offer an indication of which apps are attracting the most user engagement, though this is not necessarily reflective of their content or technical capabilities.

Another limitation encountered during the execution of this thesis is related to the Ordinal Regression model failing to meet the proportional odds assumption, which showed that the model was not valid for our data. This prevented us from studying the effect of the coefficients of the various features on willingness-to-use in a more generalized way.

Given this, I relied on Chi-square tests to explore the relationship between interest in specific features and willingness-to-use. However, one of the key limitations encountered was the low response rate for the Pregnancy Support and Postpartum & Baby Care categories. The challenge of reaching individuals directly connected to these life stages—such as pregnant women and recent mothers—meant that the analysis of these features was limited by the smaller sample size. To achieve more comprehensive results, future studies in this industry will need to access larger and more diverse samples to focus in the in-depth effects within each profile type.

6. Conclusions & Recommendations

As discussed through the paper, the femtech market is still in its early stages and largely underexplored, especially in Portugal, where the percentage of people using femtech apps remains relatively low (with 55% of our sample not using any femtech app). From the feedback gathered during the distribution of the survey, it became evident that many participants are not aware of the range of apps available beyond the two main types: Period Tracking and Fertility apps and General Health and Wellness apps (focused on Fitness, Diet, Food, and Sleep).

The General Health and Wellness category (encompassing fitness, diet and nutrition, and sleep management) stood out as the one more respondents were interested in (75 out of 137). This trend mirrors the broader societal shift where individuals are increasingly focused on enhancing their physical well-being. The growing popularity of fitness activities, along with heightened awareness of diet and nutrition, reflects people's desire to better understand the impact of their daily habits and consumption choices on their bodies and overall health. As can be seen from the significant relationship we obtained between interest in the features pelvic muscle exercise plans and workout plans with the willingness-to-use an app

The most commonly used app category among the women in our sample was Period Tracking and Fertility, with Flo being the most popular choice. Flo's well-established presence, not only in Portugal but globally, as one of the most widely used femtech apps, makes it an ideal example of user-friendliness. Its design excels in tracking and monitoring data over time, and it enhances its core feature of tracking with additional content and community-driven functionalities, offering users a holistic experience, which makes it a good example for Glooma of how to structure a femtech app that successfully promotes user engagement.

However, it is clear that women are highly interested in a broader variety of areas and apps, as shown by the positive interest scores given by respondents to almost all the features included in the survey. Significant interest was focused on areas like Menopause, which remains largely underserved in terms of accessible information compared to other health topics, and given the global aging population, a strategic focus on the solutions for this group could present an opportunity for growth. Additionally, there is a growing demand for apps related to Mental Health, an area where more and more people are seeking resources and solutions.

In the survey done, the categories whose features had the highest interest scores were Pregnancy Support and Postpartum & Baby Care, highlighting that women in or approaching these life stages highly value solutions that help them navigate related challenges. The analysis of willingness-to-use also reflects this strong interest, with a high concentration of respondents from these profiles (pregnant women and recent moms) at the maximum score (Fig.21). However, due to the specificity of these life stages and the small number of responses, the sample size limited a more in-depth analysis of this effect.

Based on this study and the results obtained through the analysis made, there are several key aspects Glooma should consider when launching an app that provides value to its customers:

Broaden App Scope: The features in the breast health category achieved statistical significance in the chi-square tests conducted in our study, showing a high potential for promoting the use of a femtech app. However, since women demonstrated a lot of interest in the several app categories in-study, an app focused solely on breast health may not be sufficient to generate the level of engagement required for high retention rates, and to encourage users to access features regularly, Glooma could broaden its app's scope beyond the directly associated breast health content. By integrating some of the most sought-after femtech areas into the app, such as fertility tracking, general health and wellness, or mental health - especially features that focus on monitoring of health indicators and personal health management, providing also impactful recommendations - they could add more value for users. This broader scope would offer a more comprehensive experience, allowing users to track various health aspects, which could improve overall engagement and user satisfaction.

Develop Features Beyond Community: As demonstrated by the interest scores in our survey and the chi-square tests used to explore the relationship between features and willingness-to-use, community-based features such as sharing forums and peer testimonials do not appear to rank highly in terms of engagement. Users seem to prioritize expert-driven recommendations and personalized health insights, over shared experiences. In this sense, Glooma could focus on developing tools that provide quality individualized experiences rather than social interactions, focusing on features that make health management more efficient for users.

However, if Glooma sees community features as a central element to explore, the focus should be on interactions between users and health specialists, rather than simply fostering user-to-user communication. This approach would likely increase the perceived value of the community by providing expert guidance within the app (as evauated through the survey).

Strategically target specific life stages: While the app should provide comprehensive health support, it is essential to include features specifically designed for the key life stages of Glooma's primary customers. Tailoring functionalities to specific profiles, such as women entering menopause, pregnant women, or recent moms, can be an effective strategy. Although these features cater to a more niche group, they seem to be highly valued by users seeking support to track their symptoms and navigate through various phases of life. Offering specialized content and tools for these stages will foster a more engaging and relevant user experience.

By accessing the results of this study and considering the points mentioned above in the development of its community app, Glooma will be better prepared to attract and retain a larger number of users by aligning with market offerings and user interest.

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8. Appendix

Appendix A – Survey questions and results

Segmentation questions

How old are you?

- ○ Under 18 (1)
- ○ 18-24 years old (2)
- ○ 25-34 years old (3)
- ○ 35-44 years old (4)
- ○ 45-54 years old (5)
- ○ 55-64 years old (6)
- ○ 65+ years old (7)

In which country do you currently reside?

▼ Portugal (138) ... Zimbabwe (1357)

What is your sex?

- ○ Male (1)
- ○ Female (2)
- ○ Other (3)

In which of these profiles do you fit at the moment?
(The options are not necessarily in chronologic order)

- ○ Avoiding an unexpected pregnancy/ Not thinking about pregnancy yet (1)
- ○ I am Trying to conceive (2)
- ○ I am Pregnant (3)
- ○ I am a recent mom (4)
- ○ I am in Perimenopause (years leading up to menopause, and it is characterized by well-known symptoms like hot flashes, moodiness and weight gain) (5)
- ○ I am in Menopause/ Postmenopause (6)

Do you **currently use any apps** related to any of these topics?

- ☐ Pregnancy support (1)
- ☐ Postpartum & Baby Care (2)
- ☐ Period tracking and fertility (3)
- ☐ Menopause (4)
- ☐ Breast health/self-check (5)
- ☐ Mental health (6)
- ☐ General Health and Wellness (Fitness, Diet and Food, Sleep) (7)
- ☐ Pelvic and Sexual Health (8)
- ☐ No, none of them (9)

If Yes, which one/ones ?

_____

Which of those areas would **you be interested** to have in an app?

- ☐ -Pregnancy support (1)
- ☐ -Postpartum & Baby Care (2)
- ☐ -Period tracking and fertility (3)
- ☐ -Menopause (4)
- ☐ -Breast health/self-check (5)
- ☐ -Mental health (6)
- ☐ -General Health and Wellness (Fitness, Diet and Food, Sleep) (7)
- ☐ -Pelvic and Sexual Health (8)

-Period tracking and fertility features (64 respondents)

Nowadays, there are several Menstruation and Fertility tracking apps that you can use. By introducing info about your period cycle, and tracking several factors as your mood, sexual activity, or symptoms (as cravings, sore breast, etc..) you can get several accurate indications about your cycle

In a scale of 1-7 How interested would you be in having the following features in an app? (1- Not Interested at all; 4- Neither interested nor uninterested; 7-Very Interested)	Average
The prediction of your next menstruation days, giving you information about the cycle phase you are in.	6.09

Indication of your ovulation and fertility days, showing your chance of getting pregnant each day.	5.02
Charts that show the patterns of your period and symptoms changes over time	5.41
Receive customizable discreet notifications that give you indications about the beginning/end of your menstruation and ovulation.	5.16
Receive Reminders to take your pills/medication**,** and warnings when you are almost out of pills and need a restock	5.66
Certificated Video courses about menstruation, fertility, and sexual health topics	4.17
TOTAL	**5.25**

-Pregnancy support (20 respondents)

In a scale of 1-7 How interested would you be in having the following features in an app? (1- Not Interested at all; 4- Neither interested nor uninterested; 7-Very Interested)	Average
Calculation of pregnancy due date and Pregnancy temporal line **-** showing exams and tests to be done over time	6.65
Week-by-week info and articles about baby development stage and pregnancy symptoms	6.80
Suggestions of things to do in each pregnancy week (questions to ask the doctor, ways to be more comfortable, routines to avoid/adopt, activities to relax)	6.65
Interactive 3D baby model showing the changes in the size of the baby and his appearance across time	6.05
Schedule to input the exam dates and questions for the doctor	6.50
Contraction timer that measures the durations and the interval between them, giving suggestions about the time to go to the hospital	6.55
In-depth product reviews on pregnancy and baby products and expert buying guides	5.70
Amplification and isolation of the baby's sounds (kicks, heartbeat and more) by placing the phone close to your belly. (Assisting with anxiety during long periods without signs and allowing to share recordings with others)	6.15
TOTAL	**6.38**

-Postpartum&BabyCare features (31 respondents)

In a scale of 1-7 How interested would you be in having the following features in an app? (1- Not Interested at all; 4- Neither interested nor uninterested; 7-Very Interested)	Average
Tracking of baby activities such as sleep or breastfeeding, and summary charts that show the history and changes over time	6.06
Get information about baby changes and natural development week-by-week	6.00
Survey tests that can give you answers about some of your baby care concerns (“is my baby ready to eat solid food?”, “is my baby feeding well?”)	5.65

Follow-up of the natural child development stages**,** informing you when to expect mental changes that affect his mood, sleep, behaviour, etc... (Alerting you to potential crying phases linked to natural brain development)	6.16
Baby shushing/sleeping sound that you can temporize in your phone and that efficiently calms them down and gets them to sleep	6.16
Foods list to add notes about the baby´s reaction to the ones he has tried.	6.26
TOTAL	**6.05**

Choose the options that you would like to track using an app	Percentage	Count
Growth (weight/height/head size)	90%	27
breastfeeding time	63%	19
pumping time	43%	13
baby teeth counting	33%	10
baby hours of sleep	70%	21
baby temperature	50%	15
medication & vaccinations	90%	27
diaper changing	33%	10
medical appointments	90%	27
potty activities (pee, poo, mixed or accidents)	30%	9

-Perimenopause/Menopause features (64 respondents)

Many women feel that there isn´t much information available about the Menopause phase in general, being uninformed about the symptoms and the way to deal with them.

In a scale of 1-7 How interested would you be in having the following features in an app? (1- Not Interested at all; 4- Neither interested nor uninterested; 7-Very Interested)	Average
Daily log of menopause symptoms, triggers, and activities (With graphs that identify factors affecting symptom changes over time, and personalized recommendations)	5.59
Live Q&A sessions with general practitioners and menopause specialists	5.14
Videos of Consultation examples to help you better prepare yourself for the next healthcare appointment and discuss the treatment options.	4.98

Stories and Testimonies of other women going through menopause stages and treatments	5.30
Track the HRT (Hormone Replacement Therapy) doses you are on for the day. To help manage the hormonal balance and the symptoms	5.27
Recommendations of treatments and Reviews from other users regarding HRT&Medication, Supplements, and Alternative therapies	5.64
TOTAL	**5.32**

-Breast health/cancer self-check features (137 respondents)

In a scale of 1-7 How interested would you be in having the following features in an app? (1- Not Interested at all; 4- Neither interested nor uninterested; 7-Very Interested)	Average
Information about Prevention and Lifestyle tips to reduce breast cancer risk	5.89
Stories/Testimonies of people that have gone through breast cancer	4.50
Early detection plan - Map showing what are the next steps after you feel a symptom (screening examinations)	5.71
Breast cancer related News (prevention, treatments, investigations,..)	4.75
Recorded webinars (online talks with breast cancer experts)	4.36
In case of disease, Tracking of your Medication and Symptoms, with recommendations to help dealing with Symptoms	5.74
TOTAL	**5.16**

-General Health and Wellness and Mental Health features (137 respondents)

In a scale of 1-7 How interested would you be in having the following features in an app? (1- Not Interested at all; 4- Neither interested nor uninterested; 7-Very Interested)	Average
Sounds and guided meditations for relaxation, anxiety, sleep, and focus	5.35
Mindfulness&relaxation games	5.19
Calorie counter, water tracker and macro tracker - carbs, fat & protein breakdown (Add food manually, take a photo, or scan a barcode), and Get nutrition insights	5.04
Tailored meal plans and recipes to help you manage your symptoms, and/or adjust to your target calories and macros	5.70
Workout Programs at home or at the gym for any level: personalized sets of exercises (Yoga, walking, running, weight loss and muscle focused workouts) and nutrition	5.85
Record your blood pressure, blood sugar, heart rate, and BMI**,** with graphs to observe the trends trough time	5.85
TOTAL	**5.50**

-Sexual Health and Other general features (137 respondents)

In a scale of 1-7 How interested would you be in having the following features in an app? (1- Not Interested at all; 4- Neither interested nor uninterested; 7-Very Interested)	Average
Conversion of the data tracked in the health app into a PDF that can be shown/sent to the doctor (Menstruation symptoms/ baby activity/ menopause symptoms, ..)	5.50
Option to pair your app with a partner, so you can share with him info regarding your menstruation cycle and symptoms, or baby progress, or pregnancy symptoms	4.15
Kegel/pelvic muscles exercise plans (customizable) with visual and audio prompts, tracking of progress over time, and reminders to do the exercises	5.27
To ensure that you are reading all the options carefully, please select 5 for this option	5.00
Scientifically approved courses and content that help to overtake sexual health problems as low sex drive, or low sex quality	3.63
Customizable Reminders for inserting and removing the Vaginal contraceptive ring, with reliable instruction	5.00
TOTAL (excluding control question)	**4.71**

Many women feel good to have a space where they can discuss several themes without tabus. Some apps offer Chatting Forums in which you can anonymously share experiences with other women**.** In these forums you can exchange ideas about your health, your body and doubts, as tell stories, and support each other.

Anonymous chatting forum

In a scale of 1-7 How interested would you be in having the following feature in an app? (1- Not Interested at all; 4- Neither interested nor uninterested; 7-Very Interested)	Average
Anonymous chatting forum to share experiences, discuss topics and exchange opinions	4.37

Would you be more interested if there were also specialists participating in these chats to take the doubts?	Percentage	Count
Yes	80%	110
No, I would have the same interest	19%	26
No, I would be less interested	1%	1

Several apps contain health certificated Articles with expert advices and information about several health topics.

Articles

Which of these types of Articles would you be more interested in having easy access through an app?	Percentage	Count
Articles about Menstruation and fertility.	36%	49
Articles about Baby care (sleep, safety, feeding, crying) and Post partum recovery	36%	50
Articles and tips about pregnancy (medical procedures, nutrition and lifestyle, well-being, nutrition and lifestyle, exercise, parenting)	29%	40
Takeaways from key breast cancer conferences	28%	39
Articles about breast health, and the several screening exams and procedures	39%	54
Guides about the menopause phases, with expert advices about how to deal with the symptoms and daily lifestyle tips	58%	79
Articles about Pelvic Health	36%	50
Articles about Sexual Health - STIs; Contraceptive methods; sex drive and quality	36%	49

Safeness and Willingness-to-use

	Average
How safe would you feel entering your details while using a mobile female health app**?** (1-Very unsafe; 4-Neither safe nor unsafe 7-Very safe)	5.14

	Average
If there was a women's health app in which several of the features that were questioned to you were integrated, including those that you declared to be of greatest interest, how likely would you be to use that app from 1 to 7? (1-Definitely woudn´t use; 4-Would be undecided; 7-Would definitely use)	6.06

Appendix B – Tables of features

	Flo	My Calendar - Period Tracker	Period Calendar Period Tracker	Clue Period Tracker Period Calendar
Menstrual cycle tracking (tracking of symptoms and activities, and predicting the next menstruation days)	Yes	Yes	Yes	Yes
Indication of the ovulation and fertility days, showing the chance of getting pregnant each day.	Yes	Yes	Yes	Yes
Charts that show the patterns of the period and symptoms changes over time	Yes	Yes	Yes	Yes
Assistant chatbot (menstrual cycle symptoms, stages and sex life) - button-based	Yes	No	No	No
Certificated Video courses about menstruation, fertility, and sexual health topics	Yes	No	No	No
Science based articles by specialists about menstruation, fertility, and sexual health topics	Yes	No	No	Yes
Pill reminders	Yes	Yes	Yes	Yes
Notifications with indications about fertility, the beginning/end of the menstruation and ovulation.	Yes	Yes	Yes	Yes
Option to customize the notification text to make it discreet	Yes	No	Yes	Yes
Option to change the app to pregnancy mode or trying to conceive mode	Yes	Yes	Yes	Yes (and Perimenopause mode)
Conversion of the data tracked in the health app into a PDF that can be shown/sent to the doctor	Yes	Yes	Yes	Yes
Community forums with several subjects	Yes	No	No (only through the Web)	No
Possibility of pairing with a partner	Yes	No	No	Yes

Fig. 16 Period Tracking and Fertility apps features - Source: app use and web available data

	Pregnancy+	Contraction timer & counter 9m	Pregnancy and baby app - wemoms	Pregnancy and due date tracker	Pregnancy and baby tracker - WTE	Hear my baby heart beat app
Calculation of pregnancy due date	Yes	No	Yes	Yes	Yes	No
Pregnancy temporal line - showing exams and tests to be done over time	Yes	No	No	Yes	No	No
Week-by-week info and articles about baby development stage and pregnancy symptoms	Yes	No	Yes(only with a few details)	Yes	Yes	No
Track pregnancy symptoms, pregnancy weight, baby kick count, medication	Yes(only the weight)	No	No	Yes	Yes	No

Suggestions of things to do in each pregnancy week (questions to ask the doctor, ways to be more comfortable, routines to avoid/adopt, activities to relax)	Yes	No	No	No	No	No
Interactive 3D baby model showing the changes in the size of the baby and his appearance across time	Yes	No	Yes	Yes	Yes(images)	No
Schedule to input the exam dates and questions for the doctor	Yes	No	No	Yes	Yes	No
Contraction timer	Yes	Yes	No	Yes	No	No
In-depth product reviews on pregnancy and baby products and expert buying guides	No	No	No	No	Yes	No
Amplification and isolation of the baby's sounds (kicks, heartbeat and more) by placing the phone close to your belly. (Assisting with anxiety during long periods without signs and allowing to share recordings with others)	No	No	No	No	No	Yes
List of baby names	Yes	No	Yes	No	No	No
Kegel/pelvic muscles exercise	No	No	No	Yes	No	No
Articles by specialists about pregnancy, nutritional and lifestyle, to promote well-being during pregnancy	Yes	No	Yes	Yes	Yes	No
Option to change the app to trying to conceive mode or child tracking	No	No	Yes	Yes(for trying to conceive)	Yes	No
Conversion of the data tracked in the health app into a PDF that can be shown/sent to the doctor	No	No	No	Yes	No	No
Community forums with several subjects	No	No	Yes	No	Yes	No
Possibility of pairing with a partner	Yes	No	No	No	No	No

Fig. 17 Pregnancy Support apps features - Source: app use and web available data

	The Wonder Weeks	**Baby Shusher - the sleep miracle**	**Baby + / Your Baby Tracker**	**Huckleberry Baby and child**	**LactApp**
Tracking of baby activities such as sleep or breastfeeding, and summary charts that show the history and changes over time	Yes	No	Yes	Yes	Yes
Get information about baby changes and natural development week-by-week	Yes	No	Yes	No	No
Survey tests that can give answers about some of the baby care concerns (“is my baby ready to eat solid food?”, “is my baby feeding well?”)	No	No	No	No	Yes
Follow-up of the natural child development stages, informing you when to expect mental changes that affect his mood, sleep, behaviour, etc... (Alerting you to potential crying phases linked to natural brain development)	Yes	No	No	No	No
Baby shushing/sleeping sound that you can temporize in your phone and that efficiently calms them down and gets them to sleep	Yes(extra)	Yes	Yes (White noise sounds)	No	No
Foods list to add notes about the baby´s reaction to the ones he has tried	No	No	No	No	No

Schedule to input the exam dates and questions for the doctor	No	No	Yes	Yes	No
Pelvic floor exercises	No	No	Yes(Simple description)	No	No
Articles by specialists about baby care and baby development	No	No	Yes	No	Yes
Scheduling of online or presential consultations with baby feeding specialists	No	No	No	No	Yes
Conversion of the data tracked in the health app into a PDF that can be shown/sent to the doctor	Yes	No	Yes	Yes	No
Community forums with several subjects	No	No	No	No	No
Possibility of pairing with a partner	No	No	Yes	Yes	No

Fig. 18 Postpartum & Babycare apps features - Source: app use and web available

	Health & Her	**balance**	**Caria: Menopause & Midlife**
Daily log of menopause symptoms, triggers, and activities (With graphs that identify factors affecting symptom changes over time, and personalized recommendations)	Yes	Yes	Yes
Live Q&A sessions with general practitioners and menopause specialists	No	Yes	No
Videos of Consultation examples to help you better prepare yourself for the next healthcare appointment and discuss the treatment options.	No	Yes	No
Selling supplements through the app	Yes	No	No
Recommendations of treatments and Reviews from other users regarding HRT&Medication, Supplements, and Alternative therapies	No	Yes	Yes
Articles by specialists about the menopause phases, with advices about how to deal with the symptoms and daily lifestyle tips	Yes	Yes	Yes
Option to Schedule an online consultation with a menopause specialist	No	Yes	No
Daily Programs/Plans to help dealing with the symptoms	Yes	Yes	Yes
Pelvic floor exercises	No	Yes	Yes (Stretch routines)
Conversion of the data tracked in the health app into a PDF that can be shown/sent to the doctor	No	Yes	Yes
Community with Stories and Testimonies of other women going through menopause stages and related topics	No	Yes	Yes
Track the HRT (Hormone Replacement Therapy) doses you are on for the day. To help manage the hormonal balance and the symptoms (highlighted in the app store comments)	No	No	No

Fig. 19 Perimenopause/ Menopause apps features - Source: app use and web available data

	Keep a Breast	Know Your Lemons	breastcare – Brustbewusstsein	Feel for your life	Outcomes4mecancercare
Self-check exam instructions and Reminders	Yes	Yes	Yes	Yes	No
Information about Prevention and Lifestyle tips to reduce breast cancer risk	No	Yes(But Very little information)	Yes	Yes	Yes
Stories/Testimonies of people that have gone through breast cancer	Yes	No	Yes	No	Yes
Early detection plan - Map showing what are the next steps after you feel a symptom (screening examinations)	No	Yes	No	No	Yes(more focused in the treatment process)
Articles about breast health, and the several screening exams and procedures	No	No	Yes	Yes	Yes
Breast cancer related News (prevention, treatments, investigations,..)	No	No	No	No	Yes
Takeaways from key breast cancer conferences	No	No	No	No	Yes
Recorded webinars (online talks with breast cancer experts)	No	No	No	No	Yes
In case of disease, Tracking of your Medication and Symptoms, with recommendations to help dealing with Symptoms	No	No	No	No	Yes
Assistant chatbot that answers to the doubts and concerns	No	No	No	Yes	No
Conversion of the data tracked in the health app into a PDF that can be shown/sent to the doctor	No	No	No	No	Yes
Community forums with several subjects, from breast cancer experiences, to family and relationships	No	No	No	Yes(but no activity)	Yes

Fig. 20 Breast health/cancer self-check apps features - Source: app use and web available data

	Calm	Breeze: Mental Health	Headspace: Meditation & Sleep	Finch : self-care pet
Sounds and guided meditations for relaxation, anxiety, sleep, and focus	Yes	No	Yes	Yes
Mindfulness&relaxation games	No	Yes	No	No
Psychology-backed self-tests to several disorders as childhood trauma or ADHD	No	Yes	No	Yes (focused on anxiety, depression, body image, and more)
Mood tracker with graphs to analyse the change across time	No	Yes	Yes	Yes
Small courses explaining mental health topics as anxiety, panic disorders, depression,.	No	Yes	No	No
Daily Habit Tracker and Guided mood journaling	No	No	No	Yes
Option to find a therapist	No	Yes	No	No

Fig. 21 Mental Health apps features - Source: app use and web available data

	Better Me : Health Coaching	My Fitness Pal : Calorie Tracker	Health Kit	JustFit : Lazy workout & fitness	Shut Eye : sleep tracker
Calorie counter, water tracker and macro tracker - carbs, fat & protein breakdown (Add food manually, take a photo, or scan a barcode), and Get nutrition insights	Yes	Yes	No	No	No
Tailored meal plans and recipes to help you manage your symptoms, and/or adjust to your target calories and macros	Yes	Yes	No	No	No
Workout Programs at home or at the gym for any level: personalized sets of exercises (Yoga, walking, running, weight loss and muscle focused workouts) and nutrition	Yes	No	No	Yes	No
Record your blood pressure, blood sugar, heart rate, and BMI, with graphs to observe the trends trough time	No	No	Yes	No	No
Sounds to help falling asleep and sleep tracking features that provides insights and analysis of sleep quality	No	No	No	No	Yes

Fig. 22 General Health & Wellness apps features - Source: app use and web available data

	Squeezy	My therapy pill reminder	My ring - contraceptive ring	Lover: Intimacy Coaching
Kegel/pelvic muscles exercise plans (customizable) with visual and audio prompts, tracking of progress over time	Yes	No	No	No
Scientifically approved courses and content that help to overtake sexual health problems as low sex drive, or low sex quality	No	No	No	Yes
Personal health diary: Tracking of Medication, Medical measurements, Activities, Immune system values and cholesterol, Mood tracking and symptoms	No	Yes	No	No
Articles about Pelvic Health	Yes	No	No	No
Bladder diary to keep track of your symptoms, and liquid consumption	Yes	No	No	No
Reliable instructions for inserting and removing the contraceptive ring, and calendar with the important dates	No	No	Yes	No
Reminders	Yes(reminders of the Kegel exercises)	Yes(for 20+ measurements such as medication, weight control, blood pressure, or change of injection sites)	Yes(Customizable Reminders for inserting and removing the Vaginal contraceptive ring, with reliable instruction)	No
Game that helps to understand the turn-ons of the partner and this way enhance sex life	No	No	No	Yes
Conversion of the data tracked in the health app into a PDF that can be shown/sent to the doctor	No	Yes	No	No

Community forums with several subjects	No	No	No	Yes(questions are answered by an expert (Clinical Psychologist) and by other users)
Possibility of pairing with a partner	No	No	No	Yes

Fig. 23 Sexual Health apps features - Source: app use and web available data

Appendix C – Ordinal Regression

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval	
							Lower Bound	Upper Bound
Threshold	[Willingness_to_use = 1,00]	,726	1,427	,259	1	,611	-2,072	3,523
	[Willingness_to_use = 3,00]	2,121	1,137	3,482	1	,062	-,107	4,349
	[Willingness_to_use = 4,00]	3,741	1,072	12,174	1	<,001	1,640	5,843
	[Willingness_to_use = 5,00]	5,624	1,131	24,704	1	<,001	3,406	7,841
	[Willingness_to_use = 6,00]	7,419	1,204	37,964	1	<,001	5,059	9,779
Location	Safeness_app	,366	,127	8,231	1	,004	,116	,615
	Feature_GenWellness_4	-,091	,144	,403	1	,525	-,373	,191
	Feature_GenWellness_5	,118	,150	,626	1	,429	-,175	,412
	Feature_GenWellness_6	-,002	,147	,000	1	,987	-,290	,285
	Feature_Sexhealth_Oth_1	,407	,115	12,463	1	<,001	,181	,633
	Feature_Sexhealth_Oth_3	,050	,115	,188	1	,665	-,176	,275
	Feature_Sexhealth_Oth_6	,136	,082	2,728	1	,099	-,025	,297
	Feature_Breasthealth_1	,232	,184	1,586	1	,208	-,129	,592
	Feature_Breasthealth_3	-,014	,159	,008	1	,927	-,325	,296
	Feature_Breasthealth_6	,095	,140	,463	1	,496	-,179	,369

Link function: Logit.

Fig. 24 Ordinal regression model – Relation of the highest scoring General Health and Wellness, Sexual Health, and Breast Health features with willingness-to-use - Source: SPSS

Appendix D – Additional Chi-square and Fischer´s tests

<u>General Health and Wellness and Mental Health features:</u>

Feature_GenWellness_4_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_GenWellness_4_ Recoded	1,00	Count	6	8	14
		Expected Count	3,5	10,5	14,0
	2,00	Count	9	22	31
		Expected Count	7,7	23,3	31,0
	3,00	Count	19	73	92
		Expected Count	22,8	69,2	92,0
Total		Count	34	103	137
		Expected Count	34,0	103,0	137,0

Fig. 25 Crosstabulation for interest in feature "Tailored meal plans …" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3,592[a]	2	,166
Likelihood ratio	3,342	2	,188
N of Valid Cases	137		

a. 1 cells (16,7%) have expected count less than 5. The minimum expected count is 3,47.

Fig. 26 Chi-Square test for interest in feature "Tailored meal plans …" and willingness-to-use - Source: SPSS and survey data

Feature_Gen_Wellness_5_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Gen_Wellness_5 _Recoded	1,00	Count	7	6	13
		Expected Count	3,2	9,8	13,0
	2,00	Count	5	20	25
		Expected Count	6,2	18,8	25,0
	3,00	Count	22	77	99
		Expected Count	24,6	74,4	99,0
Total		Count	34	103	137
		Expected Count	34,0	103,0	137,0

Fig. 27 Crosstabulation for interest in feature "Workout Programs…" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6,539[a]	2	,038
Likelihood ratio	5,681	2	,058
N of Valid Cases	137		

a. 1 cells (16,7%) have expected count less than 5. The minimum expected count is 3,23.

Fig. 28 Chi-Square test for interest in feature "Workout Programs…" and willingness-to-use - Source: SPSS and survey data

Feature_GenWellness_6_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_GenWellness_6_ Recoded	1,00	Count	6	4	10
		Expected Count	2,5	7,5	10,0
	2,00	Count	5	25	30
		Expected Count	7,4	22,6	30,0
	3,00	Count	23	74	97
		Expected Count	24,1	72,9	97,0
Total		Count	34	103	137
		Expected Count	34,0	103,0	137,0

Fig. 29 Crosstabulation for interest in feature "Record your blood pressure…" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Chi-Square Tests
Pearson Chi-Square	7,766[a]	2	,021
Likelihood ratio	6,775	2	,034
N of Valid Cases	137		

a. 1 cells (16,7%) have expected count less than 5. The minimum expected count is 2,48.

Fig. 30 Chi-Square test for interest in feature "Record your blood pressure…" and willingness-to-use - Source: SPSS and survey data

Breast Health features:

Feature_Breasthealth_1_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Breasthealth_1_Recoded	1,00	Count	6	3	9
		Expected Count	2,2	6,8	9,0
	2,00	Count	8	24	32
		Expected Count	7,9	24,1	32,0
	3,00	Count	20	76	96
		Expected Count	23,8	72,2	96,0
Total		Count	34	103	137
		Expected Count	34,0	103,0	137,0

Fig. 31 Crosstabulation for interest in feature "Information about Prevention …" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	9,265[a]	2	,010
Likelihood Ratio	7,827	2	,020
N of Valid Cases	137		

a. 1 cells (16,7%) have expected count less than 5. The minimum expected count is 2,23.

Fig. 32 Chi-Square test for interest in feature "Information about Prevention …" and willingness-to-use - Source: SPSS and survey data

Feature_Breasthealth_3_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Breasthealth_3_Recoded	1,00	Count	8	7	15
		Expected Count	3,7	11,3	15,0
	2,00	Count	8	19	27
		Expected Count	6,7	20,3	27,0
	3,00	Count	18	77	95
		Expected Count	23,6	71,4	95,0
Total		Count	34	103	137
		Expected Count	34,0	103,0	137,0

Fig. 33 Crosstabulation for interest in feature "Early detection plan…" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	8,627[a]	2	,013
Likelihood Ratio	7,748	2	,021
N of Valid Cases	137		

a. 1 cells (16,7%) have expected count less than 5. The minimum expected count is 3,72.

Fig. 34 Chi-Square test for interest in feature "Early detection plan…" and willingness-to-use - Source: SPSS and survey data

Feature_Breasthealth_6_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Breasthealth_6_Recoded	1,00	Count	6	8	14
		Expected Count	3,5	10,5	14,0
	2,00	Count	13	16	29
		Expected Count	7,2	21,8	29,0
	3,00	Count	15	79	94
		Expected Count	23,3	70,7	94,0
Total		Count	34	103	137
		Expected Count	34,0	103,0	137,0

Fig. 35 Crosstabulation for interest in feature "Tracking of your Medication…" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	12,620[a]	2	,002
Likelihood Ratio	11,990	2	,002
N of Valid Cases	137		

a. 1 cells (16,7%) have expected count less than 5. The minimum expected count is 3,47.

Fig. 36 Chi-Square test for interest in feature "Tracking of your Medication…" and willingness-to-use - Source: SPSS and survey data

<u>Sexual Health and Other features:</u>

Feature_Sexhealth_Oth_1_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Sexhealth_Oth_1_Recoded	1,00	Count	9	6	15
		Expected Count	3,7	11,3	15,0
	2,00	Count	15	28	43
		Expected Count	10,7	32,3	43,0
	3,00	Count	10	69	79
		Expected Count	19,6	59,4	79,0
Total		Count	34	103	137
		Expected Count	34,0	103,0	137,0

Fig. 37 Crosstabulation for interest in feature "Conversion of the data tracked …" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	18,546[a]	2	<,001
Likelihood Ratio	17,705	2	<,001
N of Valid Cases	137		

a. 1 cells (16,7%) have expected count less than 5. The minimum expected count is 3,72.

Fig. 38 Chi-Square test for interest in feature "Conversion of the data tracked …" and willingness-to-use - Source: SPSS and survey data

Feature_Sexhealth_Oth_3_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Sexhealth_Oth_3_Recoded	1,00	Count	10	10	20
		Expected Count	5,0	15,0	20,0
	2,00	Count	10	37	47
		Expected Count	11,7	35,3	47,0
	3,00	Count	14	56	70
		Expected Count	17,4	52,6	70,0
Total		Count	34	103	137
		Expected Count	34,0	103,0	137,0

Fig. 39 Crosstabulation for interest in feature "Kegel/pelvic muscles exercise plans …" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7,984[a]	2	,018
Likelihood Ratio	7,092	2	,029
N of Valid Cases	137		

a. 1 cells (16,7%) have expected count less than 5. The minimum expected count is 4,96.

Fig. 40 Chi-Square test for interest in feature "Kegel/pelvic muscles exercise plans …" and willingness-to-use - Source: SPSS and survey data

Feature_Sexhealth_Oth_6_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Sexhealth_Oth_6_Recoded	1,00	Count	19	46	65
		Expected Count	16,1	48,9	65,0
	2,00	Count	6	31	37
		Expected Count	9,2	27,8	37,0
	3,00	Count	9	26	35
		Expected Count	8,7	26,3	35,0
Total		Count	34	103	137
		Expected Count	34,0	103,0	137,0

Fig. 41 Crosstabulation for interest in feature "Customizable Reminders …" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	2,161[a]	2	,339
Likelihood Ratio	2,279	2	,320
N of Valid Cases	137		

a. 0 cells (000,0%) have expected count less than 5. The minimum expected count is 8,69.

Fig. 42 Chi-Square test for interest in feature "Customizable Reminders …" and willingness-to-use - Source: SPSS and survey data

<u>Menopause features:</u>

Feature_Menopause_1_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Menopause_1_Recoded	1,00	Count	4	1	5
		Expected Count	1,2	3,8	5,0
	2,00	Count	7	13	20
		Expected Count	4,7	15,3	20,0
	3,00	Count	4	35	39
		Expected Count	9,1	29,9	39,0
Total		Count	15	49	64
		Expected Count	15,0	49,0	64,0

Fig. 43 Crosstabulation for interest in feature "Daily log of menopause symptoms …" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14,181[a]	2	<,001
Likelihood Ratio	13,002	2	,002
N of Valid Cases	64		

a. 3 cells (50,0%) have expected count less than 5. The minimum expected count is 1,17.

Fig. 44 Chi-Square test for interest in feature "Daily log of menopause symptoms …" and willingness-to-use - Source: SPSS and survey data

Feature_Menopause_4_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Menopause_4_Recoded	1,00	Count	2	5	7
		Expected Count	1,6	5,4	7,0
	2,00	Count	7	13	20
		Expected Count	4,7	15,3	20,0
	3,00	Count	6	31	37
		Expected Count	8,7	28,3	37,0
Total		Count	15	49	64
		Expected Count	15,0	49,0	64,0

Fig. 45 Crosstabulation for interest in feature "Stories and Testimonies…" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	2,668[a]	2	,263	,264
Likelihood Ratio	2,624	2	,269	,328
Fisher-Freeman-Halton Exact Test	2,849			,238
N of Valid Cases	64			

a. 2 cells (33,3%) have expected count less than 5. The minimum expected count is 1,64.

Fig. 46 Chi-Square and Fischer´s test for interest in feature "Stories and Testimonies…" and willingness-to-use - Source: SPSS and survey data

Feature_Menopause_6_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Menopause_6_Recoded	1,00	Count	2	3	5
		Expected Count	1,2	3,8	5,0
	2,00	Count	7	12	19
		Expected Count	4,5	14,5	19,0
	3,00	Count	6	34	40
		Expected Count	9,4	30,6	40,0
Total		Count	15	49	64
		Expected Count	15,0	49,0	64,0

Fig. 47 Crosstabulation for interest in feature "Recommendations of treatments…" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	4,254[a]	2	,119	,130
Likelihood Ratio	4,142	2	,126	,159
Fisher-Freeman-Halton Exact Test	4,501			,087
N of Valid Cases	64			

a. 3 cells (50,0%) have expected count less than 5. The minimum expected count is 1,17.

Fig. 48 Chi-Square and Fischer´s test for interest in feature "Recommendations of treatments…" and willingness-to-use - Source: SPSS and survey data

Period tracking and fertility features:

Feature_Fertilitytrack_1_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Fertilitytrack_1_Recoded	1,00	Count	2	1	3
		Expected Count	,8	2,2	3,0
	2,00	Count	4	10	14
		Expected Count	3,9	10,1	14,0
	3,00	Count	12	35	47
		Expected Count	13,2	33,8	47,0
Total		Count	18	46	64
		Expected Count	18,0	46,0	64,0

Fig. 49 Crosstabulation for interest in feature "The prediction of your next menstruation …" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	2,362[a]	2	,307	,342
Likelihood Ratio	2,076	2	,354	,497
Fisher-Freeman-Halton Exact Test	2,360			,386
N of Valid Cases	64			

a. 3 cells (50,0%) have expected count less than 5. The minimum expected count is ,84.

Fig. 50 Chi-Square and Fischer´s test for interest in feature "The prediction of your next menstruation…" and willingness-to-use - Source: SPSS and survey data

Feature_Fertilitytrack_3_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Fertilitytrack_3_Recoded	1,00	Count	4	5	9
		Expected Count	2,5	6,5	9,0
	2,00	Count	4	15	19
		Expected Count	5,3	13,7	19,0
	3,00	Count	10	26	36
		Expected Count	10,1	25,9	36,0
Total		Count	18	46	64
		Expected Count	18,0	46,0	64,0

Fig. 51 Crosstabulation for interest in feature "Charts that show the patterns …" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	1,658[a]	2	,436	,468
Likelihood Ratio	1,586	2	,453	,509
Fisher-Freeman-Halton Exact Test	1,691			,432
N of Valid Cases	64			

a. 1 cells (16,7%) have expected count less than 5. The minimum expected count is 2,53.

Fig. 52 Chi-Square and Fischer´s test for interest in feature "Charts that show the patterns…" and willingness-to-use - Source: SPSS and survey data

Feature_Fertilitytrack_5_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Fertilitytrack_5_Recoded	1,00	Count	5	5	10
		Expected Count	2,8	7,2	10,0
	2,00	Count	3	6	9
		Expected Count	2,5	6,5	9,0
	3,00	Count	10	35	45
		Expected Count	12,7	32,3	45,0
Total		Count	18	46	64
		Expected Count	18,0	46,0	64,0

Fig. 53 Crosstabulation for interest in feature "Receive Reminders to take your pills/medication …" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	3,264[a]	2	,196	,207
Likelihood Ratio	3,055	2	,217	,233
Fisher-Freeman-Halton Exact Test	3,327			,207
N of Valid Cases	64			

a. 2 cells (33,3%) have expected count less than 5. The minimum expected count is 2,53.

Fig. 54 Chi-Square and Fischer´s test for interest in feature "Receive Reminders to take your pills/medication…" and willingness-to-use - Source: SPSS and survey data

Pregnancy Support features:

Feature_Pregnancy_1_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Pregnancy_1_Recoded	2,00	Count	0	2	2
		Expected Count	,3	1,7	2,0
	3,00	Count	3	15	18
		Expected Count	2,7	15,3	18,0
Total		Count	3	17	20
		Expected Count	3,0	17,0	20,0

Fig. 55 Crosstabulation for interest in feature "Calculation of pregnancy due date …" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,392[a]	1	,531	1,000	,716
Continuity Correction[b]	,000	1	1,000		
Likelihood Ratio	,688	1	,407	1,000	,716
Fisher's Exact Test				1,000	,716
N of Valid Cases	20				

a. 3 cells (75,0%) have expected count less than 5. The minimum expected count is ,30.

b. Computed only for a 2x2 table

Fig. 56 Chi-Square and Fischer´s test for interest in feature "Calculation of pregnancy due date …" and willingness-to-use - Source: SPSS and survey data

Feature_Pregnancy_2_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Pregnancy_2_Recoded	2,00	Count	0	1	1
		Expected Count	,2	,9	1,0
	3,00	Count	3	16	19
		Expected Count	2,8	16,2	19,0
Total		Count	3	17	20
		Expected Count	3,0	17,0	20,0

Fig. 57 Crosstabulation for interest in feature "Week-by-week info and articles…" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	,186[a]	1	,666	1,000	,850
Continuity Correction[b]	,000	1	1,000		
Likelihood Ratio	,334	1	,563	1,000	,850
Fisher's Exact Test				1,000	,850
N of Valid Cases	20				

a. 3 cells (75,0%) have expected count less than 5. The minimum expected count is ,15.

b. Computed only for a 2x2 table

Fig. 58 Chi-Square and Fischer´s test for interest in feature "Week-by-week info and articles …" and willingness-to-use - Source: SPSS and survey data

Feature_Pregnancy_3_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_Pregnancy_3_Recoded	2,00	Count	1	1	2
		Expected Count	,3	1,7	2,0
	3,00	Count	2	16	18
		Expected Count	2,7	15,3	18,0
Total		Count	3	17	20
		Expected Count	3,0	17,0	20,0

Fig. 59 Crosstabulation for interest in feature "Suggestions of things to do …" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2,135[a]	1	,144	,284	,284
Continuity Correction[b]	,174	1	,676		
Likelihood Ratio	1,578	1	,209	,284	,284
Fisher's Exact Test				,284	,284
N of Valid Cases	20				

a. 3 cells (75,0%) have expected count less than 5. The minimum expected count is ,30.

b. Computed only for a 2x2 table

Fig. 60 Chi-Square and Fischer´s test for interest in feature "Suggestions of things to do…" and willingness-to-use - Source: SPSS and survey data

Postpartum&BabyCare features:

Feature_postpartum_3_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_postpartum_3_Recoded	1,00	Count	1	0	1
		Expected Count	,2	,8	1,0
	2,00	Count	1	5	6
		Expected Count	1,4	4,6	6,0
	3,00	Count	5	19	24
		Expected Count	5,4	18,6	24,0
Total		Count	7	24	31
		Expected Count	7,0	24,0	31,0

Fig. 61 Crosstabulation for interest in feature "Follow-up of the natural child…" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	3,591[a]	2	,166	,238
Likelihood Ratio	3,148	2	,207	,450
Fisher-Freeman-Halton Exact Test	2,943			,319
N of Valid Cases	31			

a. 4 cells (66,7%) have expected count less than 5. The minimum expected count is ,23.

Fig. 62 Chi-Square and Fischer´s test for interest in feature "Follow-up of the natural child…" and willingness-to-use - Source: SPSS and survey data

Feature_postpartum_4_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_postpartum_4_Recoded	1,00	Count	1	0	1
		Expected Count	,2	,8	1,0
	2,00	Count	2	3	5
		Expected Count	1,1	3,9	5,0
	3,00	Count	4	21	25
		Expected Count	5,6	19,4	25,0
Total		Count	7	24	31
		Expected Count	7,0	24,0	31,0

Fig. 63 Crosstabulation for interest in feature "Baby shushing/sleeping sound …" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	4,916[a]	2	,086	,177
Likelihood Ratio	4,404	2	,111	,177
Fisher-Freeman-Halton Exact Test	4,487			,110
N of Valid Cases	31			

a. 4 cells (66,7%) have expected count less than 5. The minimum expected count is ,23.

Fig. 64 Chi-Square and Fischer´s test for interest in feature "Baby shushing/sleeping sound…" and willingness-to-use - Source: SPSS and survey data

Feature_postpartum_5_Recoded * Willigness_Binary Crosstabulation

			Willigness_Binary		
			1,00	2,00	Total
Feature_postpartum_5_Recoded	1,00	Count	1	0	1
		Expected Count	,2	,8	1,0
	2,00	Count	0	4	4
		Expected Count	,9	3,1	4,0
	3,00	Count	6	20	26
		Expected Count	5,9	20,1	26,0
Total		Count	7	24	31
		Expected Count	7,0	24,0	31,0

Fig. 65 Crosstabulation for interest in feature "Foods list to add notes…" and willingness-to-use - Source: SPSS and survey data

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	4,599[a]	2	,100	,149
Likelihood Ratio	5,027	2	,081	,149
Fisher-Freeman-Halton Exact Test	3,473			,149
N of Valid Cases	31			

a. 4 cells (66,7%) have expected count less than 5. The minimum expected count is ,23.

Fig. 66 Chi-Square and Fischer´s test for interest in feature "Foods list to add notes…" and willingness-to-use - Source: SPSS and survey data