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Minimizing frustrations: designing webforms with the user in mind in service management software

Master's thesis in Interaction Design

Supervisor: Ole Edward Wattne

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ABSTRACT

The following paper presents the results of research conducted in collaboration with Asolvi, a leading provider of service management software in Nordics and Europe. The paper's scope is limited to a desktop solution called Evatic, designed for service engineers to reduce manual data input, improve processing, and increase operational efficiency. Such intricacy leads to a vast majority of web forms in the interface that need to be completed by the user, creating an overall complexity of the interface. This combination increases user annoyance and makes it impossible to use the software without preliminary training. Thus, the research aims to identify how webforms can enhance usability, which webform elements should be prioritized, and how it can be designed with the user in mind. The research is limited to interface patterns such as grids, layouts, and form fields, aiming to reduce cognitive load and user frustration. The findings of this research can be extrapolated to other areas of software development with a focus on complicated functionality interfaces.

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PREFACE

This research was conducted in collaboration with Asolvi, a Norwegian software company that specializes in field service management solutions for various industries, including printing, fire and security, foodservice, road traffic, and more. The company's main objective is to simplify the daily routines and administrative tasks of service teams through workflow automation, field service mobility, and paperwork reduction. Established in Trondheim in 1991, Asolvi has grown significantly, bringing together ten leading field service management companies, including Evatic, Tesseract, WS Software, Purpose Software, Vantage Computing, PC Data, Tivapp, Perform IT, MyMobileWorkers, and, most recently, Protecus. Thus, the company now offers ten software products that cater to different aspects of field service management needs, from desktop software to mobile solutions, providing in-depth insights into user operations, time and cost savings, and overall engineer productivity (Asolvi, 2023).

The following research will focus on improving the desktop solution called Evatic, particularly on one of its modules that is used for processing service requests. Initially, the company focused on developing Evatic for the printing market in the mid-90s. The software produced during that period was primarily geared toward the mindset of technicians and developers, making it challenging for ordinary users to download and use the products without prior training or guidance. However, modern software has come a long way since then, shifting its primary target from developers to users and giving rise to the user-centered design mindset described in the works of Donald Norman (Norman, 1986, Norman, 2013). Asolvi has embraced this new approach to design and has started redesigning some of its existing products, primarily relying on a user experience and data-driven approach.

The main challenge Asolvi faces is that the existing version of Evatic is a complex solution with extensive functionality, complicated user flows, and

overloaded interfaces. To shift the focus from developers to users, the company sought help from this research. Thus, although it is impossible to cover all aspects of design in master's thesis, the scope of this research will be limited to simplifying forms and minimizing the number of fields, as well as investigating the proper choice of a grid and layout that can assist in creating both a functional and user-friendly interface.

INTRODUCTION

The most common question one might ask about field service (or simply service) management software is what it is and what it does. It is simultaneously an easy and difficult question to answer. According to Gartner, a technological research and consulting firm that conducts research on technology, *field service management* is a separate market within the broader category of customer service and support, encompassing a wide range of industries, including telecommunications, healthcare, gas utilities, heavy engineering, mining, property maintenance, postal and packaging, copy printing, coffee vending, fire, and security, among others (Gartner, 2023).

Another report, published by the technological giant IBM, states that the market consists of *two user groups* that work closely together. The first user group is the worker (technician or engineer) who is dispatched to different locations to install, maintain or repair equipment, systems or assets. The second user group is the service manager who keeps track of resources and coordinate the work of the first user group (IBM, 2022).

The *main activities* that both user groups can be involved include scheduling (service appointments, work completion timelines etc.), dispatch management (coordination of technicians sent out), work order management (assignments of work orders from creation through completion to customer invoicing), inventory management (keeping track of parts and supplies), contract management (managing contracts with the customers and ensuring service level agreements), installation, repair, and maintenance of specific equipment and systems (IBM, 2022). The majority of these activities can be performed remotely and/or at the physical premises.

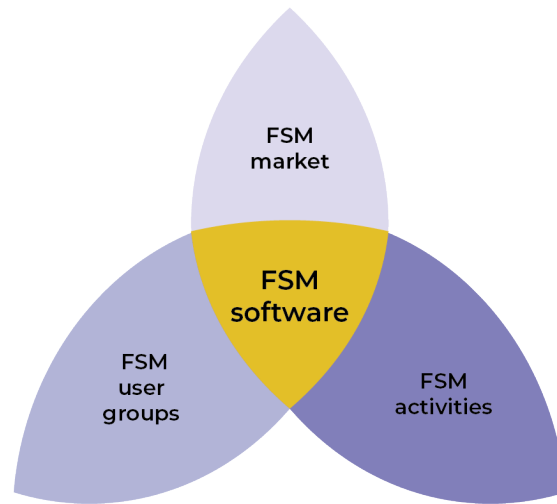


Fig. 1. Four main components of field service management (FSM).

Source: Author's drawing

The successful completion of an activity is linked to several factors, including selecting the right (qualified and skilled) engineer, ensuring the necessary tools and inventory, scheduling, arranging transportation, planning the optimal route, and accommodating the premise-in-need availability. Given that the activities often represent complex tasks combined with each other or performed by one person (especially common in small companies where one person can perform both engineer and manager tasks), they might face challenges, are vulnerable to human errors, and involve human factors. A report conducted by the field service management company FieldCircle described the most common challenges nowadays, some of which are related to software design and are worth mentioning below (Yogesh, 2022).

Thus, work order management and the scheduling conflicts are frequent. These conflicts can appear as overlapping events, double-booking (when two engineers are booked for the same premise), unavailable time slots (when the engineers is already engaged in another event) or can be related to the tasks (or jobs) unclarity, allocation and inspection issues, recording. Such conflicts might lead to the increased cost of service delivery and customer dissatisfaction rates.

Another challenge often lies in administrative management, including salaries, administrative costs, office supplies, utilities, accounting, invoicing, and payments. If some information is missed or the user needs to use different software, it becomes difficult to see the whole picture. Travel costs, in the form of petrol bills and automobile usage, can also be added to this category. Nowadays, sending an engineer to a premise might be of high price, and many companies try to reduce costs by solving issues remotely.

Communication issues are also common. Field service managers often rely on phone calls and emails to communicate with the customers and with the engineers on premises, and they can experience problems, such as bad network coverage or an inability to establish proper human communication. The IBM report also mentioned challenges such as underskilled workers, high operational costs, and a *lack of technology* (IBM, 2022). The last challenge is of high importance for the following research.

Field service management, which had previously remained detached from technological advancements for an extended period, has recently experienced significant growth. This relatively new branch has begun to embrace technology and has started to rapidly develop. In recent years, the so-called field service management software has been introduced to the market with the goal of overcoming the above-mentioned challenges. According to a 2017 study conducted by Field Service Digital, 84% of respondents at that time were using mobile applications to automate workload, and 76% were relying on field service management software to improve customer service and increase income (StableKernel, 2017).

Numerous players have emerged, some providing universal solutions with rich functionality and customizable features, while others focus more on specific industries with a deep approach towards custom-made functions and industry-specific policies and specifications.

From a technological perspective, modern software can be mobile or desktop cloud-based, providing access to real-time communication and satellite connectivity, allowing technicians to capture images on their

tablets and phones, access data from remote assets, and evaluate issues online in real-time. In recent years, new trends such as VR and AR have emerged, making it possible to reduce the number of physical visits to premises. Another type of software also exists, called on-premise; however, in today's wireless environment, it can be considered outdated and will not be further described.

Field service management software should offer rich functionality, be intuitive enough to meet the needs of different users, easy to use, and relatively affordable. Moreover, it should have a visually appealing graphic interface designed with the user in mind. Unfortunately, in many cases, the focus is on functionality at the expense of creating an optimal user experience. As a result, the UX and UI of such software can be poorly implemented or lacking in certain key aspects. Some developing or small companies may not consider design as valuable for improving customer experience, viewing it as an unnecessary expense or not fully understanding its impact on customers and potential users. However, it's essential to recognize that a well-designed UX and UI can significantly enhance the user experience of a software product, making it more intuitive and easier to use (Emvisage, 2022).

One company recently shared the results of a case study that demonstrated how good UX can improve user performance. They highlighted a modification made to their mobile app for technicians, which involved relocating the small button used to add new tasks to a drop-down menu along with other commands. Although this might seem like a minor adjustment, it significantly enhanced the app's appearance, reduced visual clutter, and decreased the likelihood of unintentionally adding tasks. The team conducted tests that showed how technicians preferred the more streamlined appearance, finding it easier to add tasks than before (NextServiceSoftware, 2022).

In today's highly competitive business landscape, companies that prioritize UX and UI design can gain a significant competitive advantage over those

that do not. For that reason, the further development and investigation of UX/UI in field service management represents a rich field of study from different angles. One such angle, that will be in the scope of the present research, is linked to design, information architecture, and psychology. The aim of this research is to identify how design can minimize user frustrations when working with complex software, specifically service management software. The primary design elements under investigation are the grid, layout and information fields, which can be collectively referred to as a webform. The research questions are as follows:

1. How can webforms impact user experience in service management software?
2. Which webform elements should be given high priority in minimizing human frustrations when designing service management software for the user?
3. How can webforms be designed with the user in mind for service management software?

The research questions will be investigated by analyzing and designing the Customer module in Evatic, which is a complex software system developed by Asolvi.

BACKGROUND

Webforms play a crucial role in software interactions, serving for various purposes, including registration, subscription, feedback, checkout, ordering, searching, and data sharing, among others (Schwesinger, 2017). There are several definitions of webforms available in the literature. According to one definition, a form is any type of physical interface that collects information from one party and delivers it to another party, resulting in a service provided (Enders, 2016, p. 2). According to another definition, a form is a web page with boxes where the user can type information (Jarrett & Gaffney, 2009, p. 5), or it is an interactive tool that collects information from various sources, mainly organizations, within context and for the needs of users (Wroblewski, 2008, p. 10).

Researchers have identified five primary types of forms on the modern web. The first and most common is the registration form, which typically has four fields and is designed to collect user information. The second type is the checkout form, which is an extension of the registration form with multiple steps, but can be overwhelming for the user due to the cognitive load it requires. The third type is the login form, which is used to provide users access to the website. The search form is another commonly used form that typically includes three elements: a label, search input, and submit button. Finally, the filter form is similar to a paper-based questionnaire and contains checkboxes and radio buttons with preliminary information (Silver, 2018). In the field service management software, all types of forms exist, combining into complex webforms or tables and including layout (grid), information organization, navigation, and colour as the main design elements.

The use of classification systems for forms can help shape their design and user experience for UX researchers and developers. One system consists of three dimensions: words (textual information), layout (visual design), and flow (user form interaction) (Enders, 2016, p. 5). Another theory suggests three layers: relationship (the organization asking the questions and the

respondent), conversation (the questions, instructions, and form organization), and appearance (text arrangement, inputs, color, and typography) (Jarrett & Gaffney, 2009, p. 6).

On a fundamental level, a form is composed of labels, input fields, actions, and messaging (such as help, errors, and success). Birman notes that a form is essentially a sentence, and if the operator extracts data fields correctly, the output will form a coherent sentence, referencing postal forms that necessitate mandatory information such as the magazine title, subscription period, subscriber's name, and address, among other details (Birman, 2022).

The webform contains both mandatory and optional information, as well as common elements such as input fields with one or multiple rows separated by lines, radio buttons with underlined mandatory options, and square checkboxes, among others. The graphical and visual language of these elements serves as a guide for the user on how to utilize them. The user can intuitively understand that lines are for textual inputs, while square frames are for selecting options.

In determining the arrangement of elements and content on the screen, making it easier for users to navigate the software, the grid system is essential (Tondreau, 2019) in webform design. In design for screens, various types of grid systems are used to create layouts. These are fixed grid, fluid grid, hybrid grid, and column grid. Fixed grid utilizes a fixed width and height and is suitable for desktop screens where the screen size is consistent. However, this approach is less popular in modern web design due to its inflexibility. Fluid grid, on the other hand, uses proportional measurements to adjust the size and position of elements on the screen, making it adaptable to different screen sizes. It is a popular design approach for modern web design as it enables designers to create a responsive layout that can adjust to different devices (McFarland, 2012). Hybrid grid combines the fixed and fluid grid systems to create a layout that can adapt to different screen sizes while maintaining a fixed width. This design approach is suitable for interfaces that have a fixed layout but

need to adjust to different screen sizes. Column grid, lastly, is a layout design that employs a set number of columns to organize content on the screen (Banus, 2022). This design approach is popular in print design, where columns are used to organize text. In web design, column grids are often used in combination with other grid types to organize content on the screen, making it easier for users to navigate the website (Samara, 2017). One of the most popular layout approaches nowadays is the card-based layout. A card-based layout is a design approach where information is presented in the form of cards, similar to a deck of cards. This design has become increasingly popular in recent years due to its ability to organize information in a visually appealing and easy-to-read manner. A card-based layout has several benefits. It allows for easy navigation by organizing content into specific cards, which makes it easier for users to find what they're looking for quickly. This approach is particularly helpful for mobile devices, where screen space is limited. Additionally, a card-based layout is flexible and can adapt to different types of content, such as text, images, or video. This flexibility is useful for interfaces that have a lot of diverse content. By presenting information in a visually appealing way, a card-based layout can increase user engagement. It's also easy to update with new content, as adding a new card won't disrupt the overall design of the website. Finally, a card-based layout is responsive, which means it can adapt to different screen sizes, making it particularly useful for mobile devices (Babich, 2016a). When opting for a card-based layout, it is important to consider the different types available. One option is the grid layout, which arranges cards in a grid pattern and is versatile for various content types (Bisht, 2020). Another option is the masonry layout, where cards create a waterfall effect and is ideal for websites with a lot of visual content (Barefoot, 2017; Andrew, 2020). A staggered layout creates an asymmetrical look and can establish a unique visual identity (Erandi, 2023). Lastly, the carousel layout presents cards in a slideshow and is useful for websites with a lot of content that requires easy navigation (Bootstrap, 2023).

Another important parameter that is linked to layout is the overall density, which refers to the percentage of available character spaces being used on the screen. A higher density of information on the screen can increase search time and errors. Therefore, it is recommended to use appropriate abbreviations, concise wording, tabular formats with column headings, and avoid unnecessary information to minimize overall density (Wickens et al., 2004). Along with overall density, local density is also important to consider. Local density refers to the number of filled character spaces near other characters and can significantly affect usability. To decrease local density and make the information more readable, blank lines and separating items on a line should be used. Tullis found that gradually increasing the local density can improve performance up to a point (Tullis, 1983). However, if the information becomes too crowded, performance will deteriorate. It is necessary to strike a balance between overall and local density to create an effective and user-friendly display of information on computer screens. Also, features like high contrast text, larger font sizes, that influenced users' human factors, such as perception, memory, and decision-making, also come into play (Chackraborty, 2021).

One of the important aspects in minimizing frustrations that is linked to overall appearance of the webform design is the colour. Studies have shown that colour has possible effects on objects recognition, enhancing learning, education, and marketing. Research showed that when participants were demonstrated colour images they named them faster than black-and-white images (Ostergaard, Davidoff, 1985). One study also verified that colour had an impact in object recognition when participants were presented information on the appropriate surface colour (Bramão et al., 2010). In marketing and brand identity studies it was shown that colour can improve brand recognition by up to 80 percent (Morton, 2010). Psychological investigations in advertisement revealed that colour influenced human attention, positive attitude towards the product, pressuring decision making, and making the advertiser message more attractive (Moore et al., 2005). In the educational field it is believed that colour could motivate

students to learn thus improving their academic performance (Adawiah, Aidura, 2012). Besides, colour as a strong cognitive information channel can play a major role in improving memory performance and perception (Wichmann, 2002). It was also reported that participants showed better recognition of the neutral scenes in the coloured surroundings. Similar results were reached in a study, when participants showed better performance on colours over black-and-white condition. The authors concluded that colour can stimulate visual memory (Smilek et al., 2002, Spence et al. 2006). If attention is focused on a certain stimulus, chances of this stimulus to be transferred to a permanent memory storage are higher, and colour plays a huge role in attention arousal (Sternberg, 2009). For instance, red colour had important influences on behavior and performance attainment suggesting to use it carefully in the different contexts (Elliot et al., 2007). Another research demonstrated that red (versus blue) induced an avoidance motivation, performance and memory enhancement on detail-oriented tasks, such as proof reading, in participants, whereas blue enhanced performance on a creative and brainstorming task (Mehta et al., 2009). Green colour is often associated with nature and represents freshness, growth, and vitality and is commonly used to indicate success, confirmation, or positive actions, as well as sense of safety and security (Briki & Majed, 2019). The combination of neutral greys and bold dark green makes people feel relaxed and creates a positive and engaging experience reducing eye strain (Oberfeld & Wilms, 2015).

MATERIALS AND METHODS

It is important to note that there is no precise design methodology for building complicated software interfaces. For that reason, the combined techniques and research methods from different disciplines, such as user-centered design, software engineering, and psychology, were used to properly answer the research questions.

Research questions

- How can webforms impact user experience in service management software?
- Which webform elements should be given high priority in minimizing human frustrations when designing service management software for the user?
- How can webforms be designed with the user in mind for service management software?

Methods

The research questions will be explored through an analysis of existing literature that emphasizes psychological, usability, and design sources related to human factors as the primary topic. To address these questions practically, methods such as heuristic evaluation (Nielsen, 2020), information architecture analysis (Morville, Rosenfeld, 2006; Spenser, 2010), user interviews (Baxter and Courage, 2005), personas (Cooper, 2014), Jobs To Be Done (Ulwick, 2016), and use cases (Sharp et. al., 2019) will be employed. Additionally, the development of visuals will be undertaken, and they will be combined into a UI kit and wireframes. The

overall design process will be based on the frameworks that will be discussed in detail below.

Frameworks

In the rapidly evolving IT industry, combining multiple frameworks has been found to be an effective approach for achieving superior outcomes. The initial framework called 'Design Thinking' has its origins in the design industry (Ambrose and Harris, 2010). This methodology involves a series of steps that prioritize the creation of human-centered designs, which involve understanding the needs and problems of end-users through empathy. The process begins with identifying the users and analyzing their personas and specific pain points. Subsequently, a designer generates ideas to address these problems, challenging assumptions throughout the process. Once the ideas are generated, designer proceeds with creating lo-fi prototypes for discussion with colleagues, followed by hi-fi prototypes for internal pre-testing, and finally visual designs for testing with real users. The prototypes are tested by gathering feedback from focus groups or actual users, and based on the results, the design is refined or returned to previous stages if necessary (Ambrose and Harris, 2010).

Another framework that has gained significant traction in software industry in recent years is called the Lean UX. It is a collaborative design framework that prioritizes the use of data to drive decisions instead of relying on assumptions through three key stages, starting with defining outcomes and conducting user research to generate ideas and create visual aids such as sketches and storyboards to communicate the proposed solution. The Make stage involves creating minimum viable products such as wireframes, UI designs, mockups, and prototypes while developing value propositions and hypotheses to support the proposed solution. Finally, the analyzes of data and analytics, usability testing, and stakeholder and user feedback are gathered to evaluate the product's effectiveness, which is then used to improve the solution through iterations (Gothelf and Seiden, 2021).

Methods

Based on the frameworks, the several methods were used to achieve the practical results. Thus, heuristic evaluation is often used in UX design to evaluate the usability and effectiveness of a digital product or interface (Nielsen, 2020). It involves evaluating the design against a set of heuristic principles or guidelines, typically derived from cognitive psychology and human-computer interaction research. This evaluation is conducted by an expert or group of experts, who identify usability issues and potential improvements based on their experience and knowledge of the user interface. By identifying these issues early in the design process, heuristic evaluation can help improve the user experience and lead to more effective and efficient digital products (Nielsen, 2020).

In order to gain insight into users' experiences with the software, a series of interviews is conducted. The goal of the sessions is to understand how customers actually use the software, what functions they use most frequently, what are their main pain points, how they would like to see the improved version, and what functions they rely on less frequently or find unnecessary (Baxter and Courage, 2005, p. 248–316).

To create a user-centered products, personas are used. They are fictional characters created to represent the different user segments who might interact with a product. In UX design, personas are a powerful tool to help designers empathize with users and understand their needs, motivations, and behaviors. Personas are based on user research, and they help designers create designs that are tailored to the needs of specific users (Cooper, 2014, p. 62–97).

Another valuable method is called The Jobs to be Done. Its origin lies in the cross-section of engineering and creation process. It is based on the idea that customers don't buy services because of their features or benefits, but because they are trying to get a specific job done in their lives. This means that designer needs to focus on understanding those jobs, and then design services that can help to achieve those jobs (Livio, 2018). This method has

been used by companies in various industries, e.g., Coca Cola or Microsoft (Ulwick, 2016). For that reason, this method will be chosen rather than the popular user story mapping framework, as Evatic is a multifaceted software system that caters to a diverse range of jobs and industries and, as such, requires the incorporation of additional functionality.

To capture the interaction between the user and the software, focusing on functional requirements in a step-by-step manner, use cases will be used. Such detailed descriptions of user interactions in terms of steps are advantageous in expanding basic requirement statements (Sharp et. al., 2019).

The brand research will also be used to be sure that the new design follows the company's strategy and vision (Wheeler, 2018), as well as visual analysis of popular software (Levy, 2021).

For the final user testing the observation in the field methodology will be chosen focusing on three key elements. These elements provide a clear structure for observation, including identifying who is using the technology, where it is being used, and what activities are being performed with it. Such method enables more effective and efficient observations, helping to ensure that relevant information is captured and analyzed appropriately (Sharp et al., 2019).

The prototype will be developed and presented in Figma. Link: <https://www.figma.com/file/gUJTXHZaxYJLT6SQf45a7s/ServiceModule?type=design&node-id=112%3A99&t=HBa09S58C3s0tlcW-1>

Materials

The Evatic software has been selected to address the research questions. It is a cloud-based desktop browser-oriented application that supports large displays with a resolution of 1440 width. However, this research will solely focus on the design of the software for large displays, even though it can also be accessed through smaller displays. The company currently provides

a special mobile solution for the mobile experience, which is beyond the scope of this thesis.

As a complex system, Evatic encompasses various modules, including contract administration, invoicing, field service, help desk, installation, stock management, reporting, and after-sales service, and serves multiple industries, such as IT services, Workplace Technology, Coffee and Vending, Print and Food Service Equipment. It serves as a database to keep track of all customers, machines, contracts, pictures, fixed and unfixed problems, and provides access to all necessary information from any point at any time, thereby reducing the need for physical archiving and paperwork.

The research will focus on redesigning the Customer module, which is used to maintain problem tickets from customers (Fig. 2—4). The module allows for the collection of notes from the customer to reduce paperwork and transfers maintenance jobs to a digital format for easy and fast processing. With the Customer module, tickets can be created with basic information about the problem and actions performed by technicians during calls with the customer. The module also enables users to create offers for in-person visits to fix the problem on-site by providing contract information and customer details, such as name, machine type, and described problems.

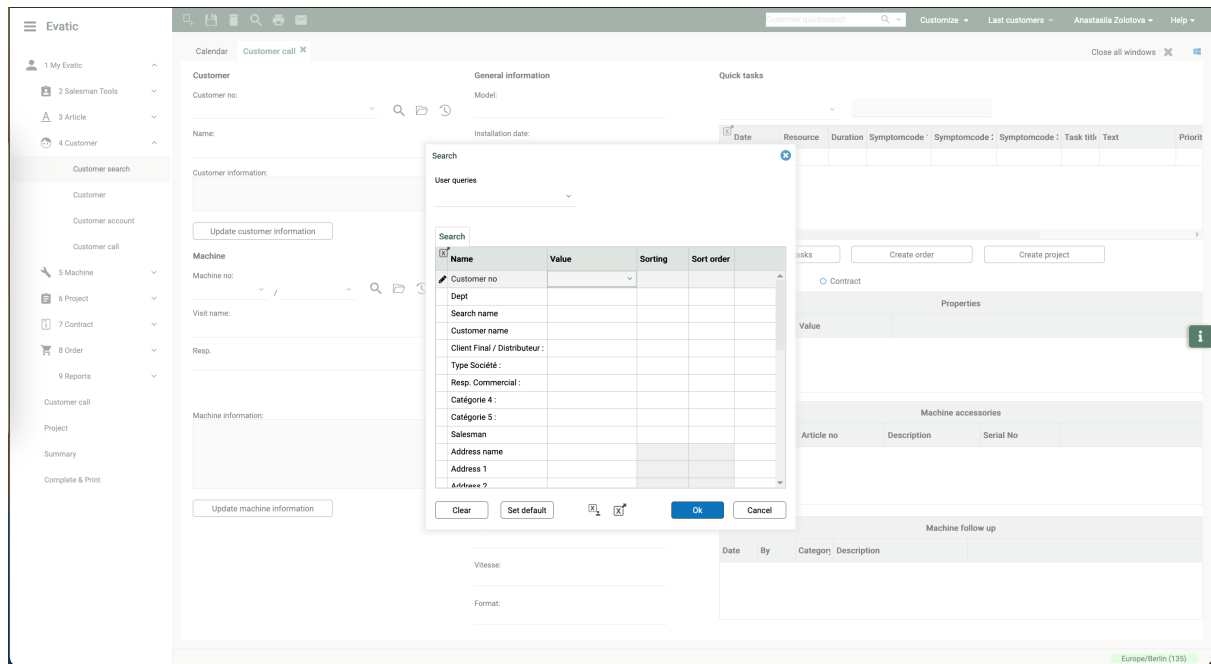


Fig. 2. The current Customer module of Evatic. Desktop platform in 1440 resolution. Search window

Source: Asolvi

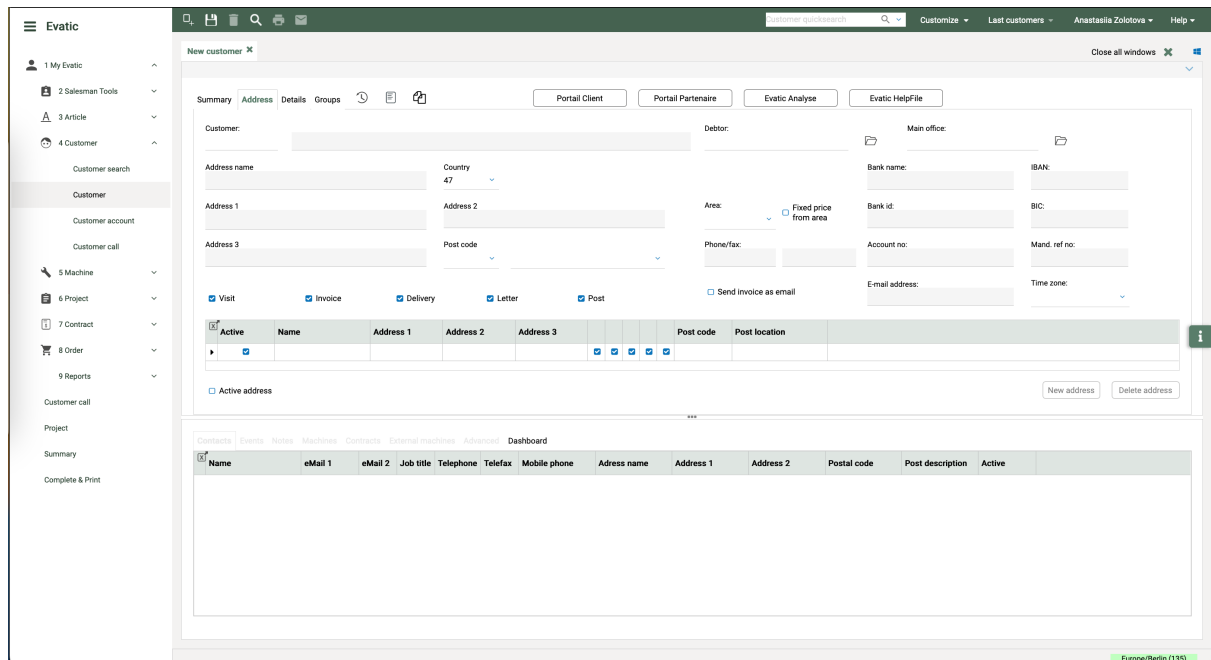


Fig. 3. The current Customer module of Evatic. Desktop platform in 1440 resolution. 'Create new customer' window

Source: Asolvi

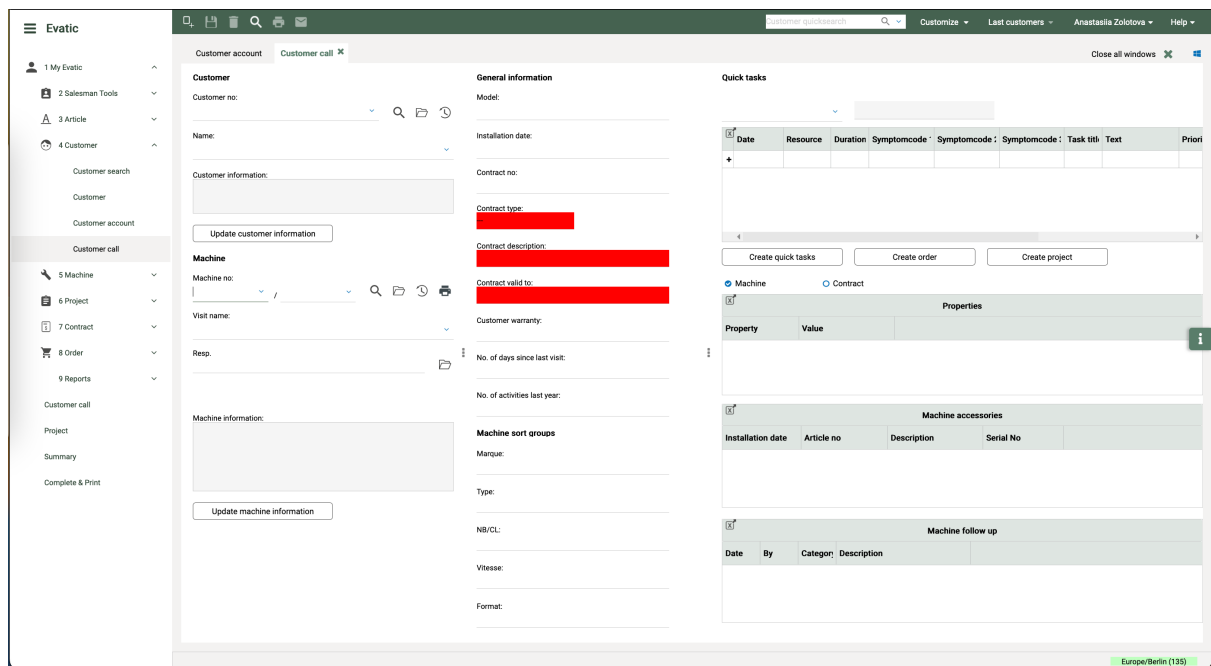


Fig. 4. The current Customer module of Evatic. Desktop platform in 1440 resolution. 'Create new customer call' window

Source: Asolvi

RESULTS

By utilizing the materials and methodologies explained in the preceding chapter, a heuristic evaluation was performed on the Evatic Customer module by a single expert. The analysis of user feedback facilitated the creation of the Evatic user persona, and the generation of Jobs To Be Done along with typical use cases. Additionally, the visual analysis of selected software examples allowed for trend identification and served as a source of inspiration. An examination of the Asolvi brand identity supported the development of the appropriate UI kit, which further advanced the newly proposed design for Evatic. This culminated in user testing conducted in conjunction with the described design frameworks.

Evatic Customer Module: Heuristic Evaluation

Heuristics	Violation	Recommendation	Severity
1. Visibility of system status	1. There is indication of where the user is currently is through tabs, however the tab label is small and is not clearly visible 2. No breadcrumbs	As the current version is in the browser more breadcrumbs and better visible tabing system	2
2. Match between system and the real world	Some labeling and functionality, button names are written in a techy or industry specific language	However, this is not a crucial problem, but labelling system can be performed in a more user friendly and simple way, avoid using very specific terminology and/or abbreviations	1

		that might create confusion among some groups of users	
3. User control and freedom	Tabs can be easily closed using x button or the browser window can be closed	N/A	0
4. Consistency and standards	The application itself is consistent and follows the current design scheme and user flows	N/A	0
5. Error prevention	Sometimes when some action is initiated in the system its status is not clearly visible, often the user does not know if the system responded or not	Show notifications and system messages	3
6. Recognition rather than recall	In some cases the buttons stay without labeling so its difficult to memorize what button is responsible for what action	Provide hints, clear labels	2
7. Flexibility and efficiency of use	Even though there are some customizable options, the software itself remains outdated, not flexible enough, requires a lot of clicks, and responds with a delay	Simplify and unite functions	3
8. Aesthetic and minimalist design	Design is outdated and not following the recent trends in UI design, such	Simplify the user flows and polish	3

	as modern aesthetics, intuitive user interactions, and cohesive visual elements. Interface contains information that is rarely needed with extra unit of information	design according to minimalistic principles	
9. Help users recognize, diagnose, and recover from errors	The error messages are visible only in the critical situation, see above #5	N/A	2
10. Help and documentation	The software contains an implemented online support and helping guide for the users	N/A	0

Fig. 5. Heuristic evaluation of the Evatic Customer Module by a single expert (Nielsen, 2020)

Evatic Customer Module: Analysis of User Feedback

To gain insight into the user experience with the Evatic Customer module, a sequence of interviews were conducted with eight customers. These interviews entailed speak-out-loud sessions wherein customers were requested to exhibit how they utilize and operate the software. Sessions were subsequently analyzed to identify pain points. The interface problems were distinguished and are summarized as follows:

- The layout is inflexible, necessitating horizontal scrolling through the screen to access required fields.
- Several fields containing critical information are inaccessible due to an inflexible grid.
- Tables are rigid and not fluid.

- Considerable information on the screen is concealed, and the rows of the table must be manually adjusted to make it visible. Not all fields are necessary and in use all the time, and users prefer a minimal and straightforward design that can be customized when necessary.
- The design is developer-oriented and somewhat outdated and unfriendly towards the average user.
- The language of the problem descriptions is not clear and simple.
- The layout is unsuitable for different types of displays.

Overall, the Evatic is challenging to use, as it requires to perform multiple clicks to access the necessary functions, which is found annoying.

Evatic Customer Module: Information Architecture

The current research was focused on redesigning the Customer search, Customer, and Customer call pages of the Evatic Customer module. Other modules are beyond the scope of this research and will not be described further (fig. 6).

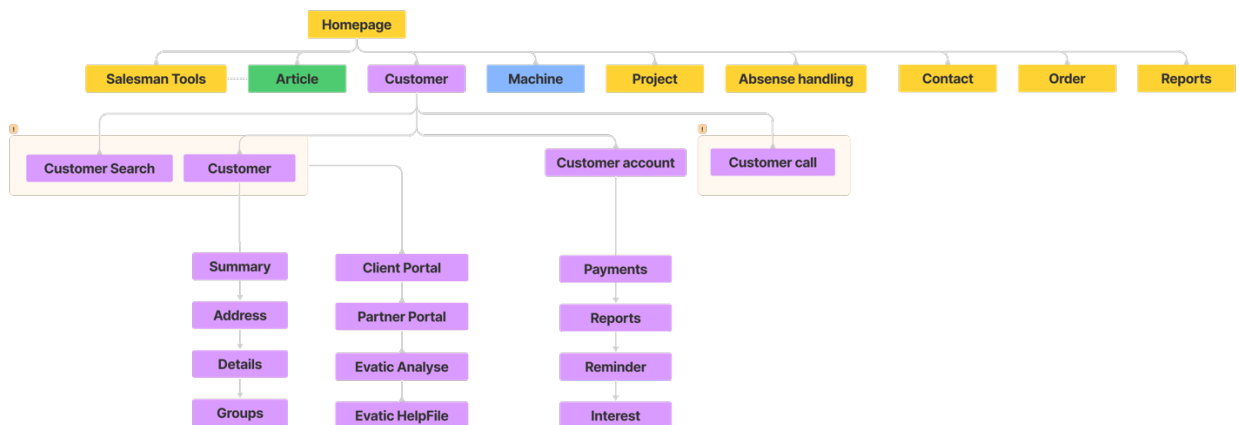


Fig. 6. The old Customer module information architecture

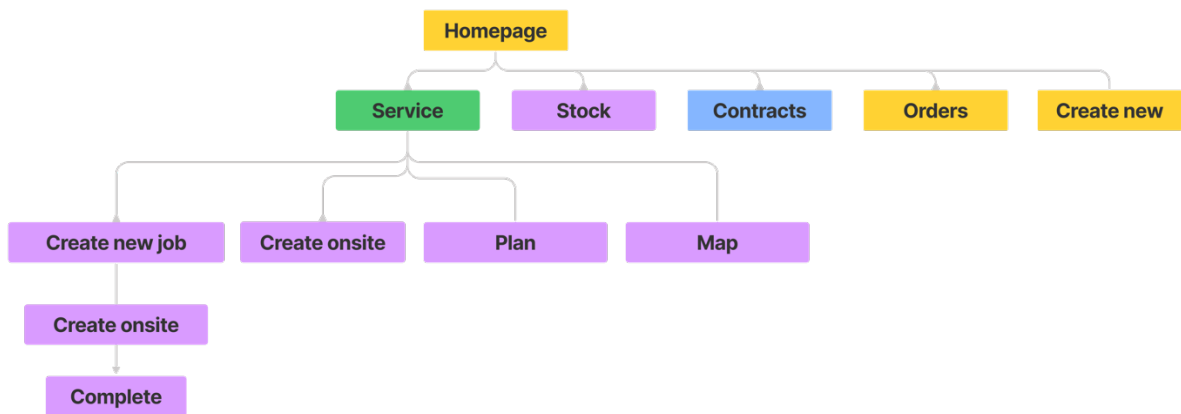


Fig. 7. The new Customer module information architecture

The new information architecture was based on the data gathered through user feedback sessions and redesigned to meet the users' request for a simpler and more intuitive flow, minimizing the number of clicks and unnecessary steps (fig. 7). Thus, modules that were separated and contained actions as separate pages in the old version have been consolidated into a single umbrella module dedicated to each function of the software. The customer search page, which in the old version was represented as a separate window (see fig. 2), is now a field included in the customer call page, minimizing the extra step for the user to find the customer they need. This architecture also provides flexibility, and in the future, it will be possible to build new blocks of modules within Customer or any other module. Also, this architecture simplifies the system making it more user-oriented rather than technical.

Evatic Customer Module: Persona

For Evatic persona creation (fig. 8), user interviews were primarily used supported with the secondary research with expert opinion.

Thus, field service engineering is a profession that requires a combination of soft and hard skills, problem-solving abilities, professional expertise,

attention to detail and ability to work hard for long hours both in the office and on premise (Graffis, 1965).

The primary role of an engineer is to maintain and support products or machines installed on the customer side. This requires knowledge of the equipment, premises, inventory, and users. One of the most valuable qualities of an engineer is their background and experience. Additionally, a good engineer should be curious and interested in new technologies, staying up to date with the latest trends in equipment design, maintenance, methodology, and more. They should also possess strong communication skills, including proficiency in multiple languages, as well as good research skills. When it comes to supporting products or machines in the customer side, the engineer must be competent, self-reliant, alert, and resourceful. They should be able to adapt quickly to new environments and test equipment in various scenarios. If the engineer is working on-premises, they should be able to solve problems online, responding to customer phone calls or emails, and fixing issues without having direct access to the machinery. The same skills are required, but the understanding of the equipment and communication skills may need to be even deeper in these situations. While having a degree or being accredited by a college of engineering may be beneficial, it is not always necessary. Many companies provide practical technical training for its engineers.

The allocation of engineers to field or on-premises work may depend on the size of the company, with larger companies having separate teams, while smaller companies may have a single engineer handling both types of work.



Fig. 8. Evatic persona

Evatic Customer Module: Jobs To Be Done for the Evatic Persona

1. When I am using the service management software, I want to be able to quickly access the module I need in order to fulfill the request when customer calls me with the problem.

2. When I am using the service management software, I want to be able to see the information on the screen with minimal scrolling in order to solve the customer problem as soon as possible and switch to another customer call.
3. When I am at the office and getting a call from a customer, I want to be able to solve their issue online, in order to save money and fix the issue quickly.
4. When I am getting a call from a customer whose machine I am maintaining, I want to be able to track their problem in order to get access to it later.
5. When I am getting a call from a customer whose machine I am maintaining, I want to be able to track their problem in order to further transfer this information to another technician later.
6. When I am getting a call from a customer whose machine I am maintaining, I want to be able to see the customer details, the machine information and contract in order to get a full information about their problem and help them solve the issue.
7. When I am getting a call from a customer whose machine I am maintaining, I want to be able to schedule appointments for engineers in order for them to visit customer facilities in an appropriate time.
8. When I am getting a call from a customer whose machine I am maintaining, I want to be able to see the history in order to keep track of what was happening with the machine before.
9. When I am using the service management software, I want to be able to analyze data and generate reports in order to track the performance of the service department and identify areas for improvement.
10. When I am using the service management software, I want to be able to manage inventory and logistics in order to ensure that the engineering team has the necessary equipment and supplies to perform their duties.

Evatic Customer Module: Use Cases

The persona and Jobs To Be Done were used to write specific use cases (Benyon, 2014). The most valuable tasks for users were the following:

1. *Create new service request card*

- 1.1. Open the desktop browser
- 1.2. Type in the URL address
- 1.3. Log in to the Evatic system using unique credentials
- 1.4. Search for a customer/machine using numbers and letters
- 1.5. Retrieve the search results
- 1.6. If the customer/machine is found, click "Yes"
- 1.7. Be on a call with the customer and ask them questions about the problem
- 1.8. Fill in the necessary fields in Evatic, including customer and machine details, problem description, priority level, etc.
- 1.9. If the issue is solved in the call, click "Solved"
- 1.10. If not, click "Create Offline Job"
- 1.11. To finish the job, click "Complete".

2. *Create new information card*

- 2.1. Click on the "Create New" button
- 2.2. Choose the type of card (company, machine, customer)
- 2.3. Fill in the details (customer information, machine information, contract details, etc.)
- 2.4. Click "Save".

3. *Search for existing cards*

- 3.1. Click on the "Search" button
- 3.2. Choose the type of card (company, machine, customer)
- 3.3. Enter search criteria (name, ID number, etc.)
- 3.4. Click "Search" 3.5. View the search results.

Visual Analysis

Some software examples were chosen for analysis to observe how the information architecture is grouped, what design patterns are used, and what design components and layouts are utilized. The tone and copy of the software, as well as its good and bad features, were also evaluated. The best practices were taken as inspiration (side bar navigation panels, card design).

Example 1. Adobe InDesign Home page

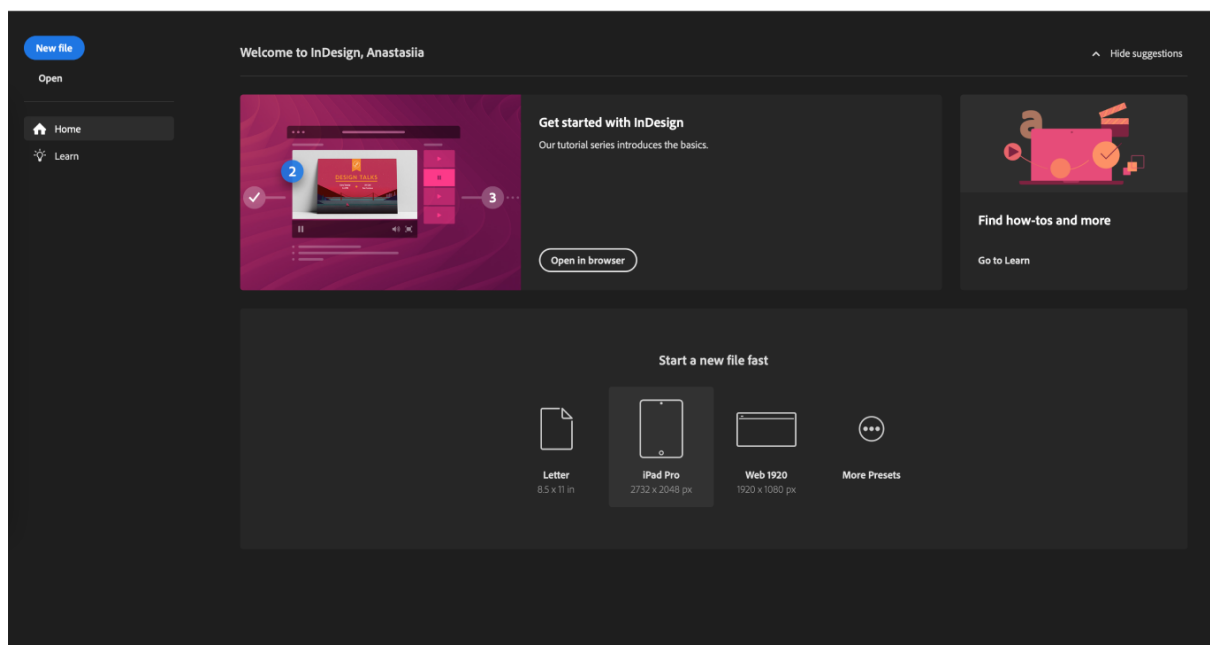


Fig. 9. Adobe InDesign Home page

Source: Adobe Inc.

1. Value proposition: InDesign is a desktop publishing and page layout design software application produced by Adobe Inc.
2. Key advantage: InDesign has a strong brand and is well-known in the field. Professionals trust it when it comes to creating works such as posters, flyers, brochures, magazines, newspapers, presentations, books, and eBooks.

3. Overall impression: The InDesign homepage has a sleek and modern design that looks professional and polished.
4. Colour scheme: The colour scheme uses a combination of black and greys, with occasional pops of pink, violet, orange and blue to draw attention to specific elements. The colours are not too bright, but they are not overly muted either, giving the site a clean and contemporary feel. Shades of grey chosen as a background colour create boldness but at the same time allow flexibility with mixing different accent colours as is done with the call to action in blue that becomes clearly visible on the screen.
5. Typography: The headings and labels use a combination of bold and normal weight sans-serif font. Where needed, italic style is used to distinguish the hierarchy of information and add an extra glimpse. The text is legible and easy to read, with no special effects or gimmicks.
6. Layout: The InDesign homepage is based on a card layout that divides the screen into several modules, creating visual distinction of information architecture and a feeling of flexibility and control. The card layout allows for a minimalistic look, with spacing and composition aligned with horizontal lines. All calls-to-action elements appear clearly visible on the screen and are made consistently with rounded corners. The active status of the button is also hovered.
7. Navigation: The global navigation is positioned on the left side of the screen, allowing the user to switch between actions or move within the application. Additionally, local navigation provides access to functionality such as creating new files, filtering and accessing recently created files.
8. Imagery: The InDesign homepage is limited in imagery and mostly consists of icons to convey abstracts of actions.
9. Branding: The InDesign homepage features the company's logo in the header and uses consistent colours and typography throughout.

The branding elements fit seamlessly into the overall design, adding to the site's professional appearance.

10. Unique features: One unique feature of the homepage is the use of hovering effect in transitions between actionable elements, which adds a touch of interactivity and sophistication to the user experience. Using lines as design elements creates a unified appearance that can remain from one side to book spreads, and at the same time, rectangular cards create an allusion with the grid that is a common element in the printing industry that InDesign targets.

Example 2. Jira Service Management

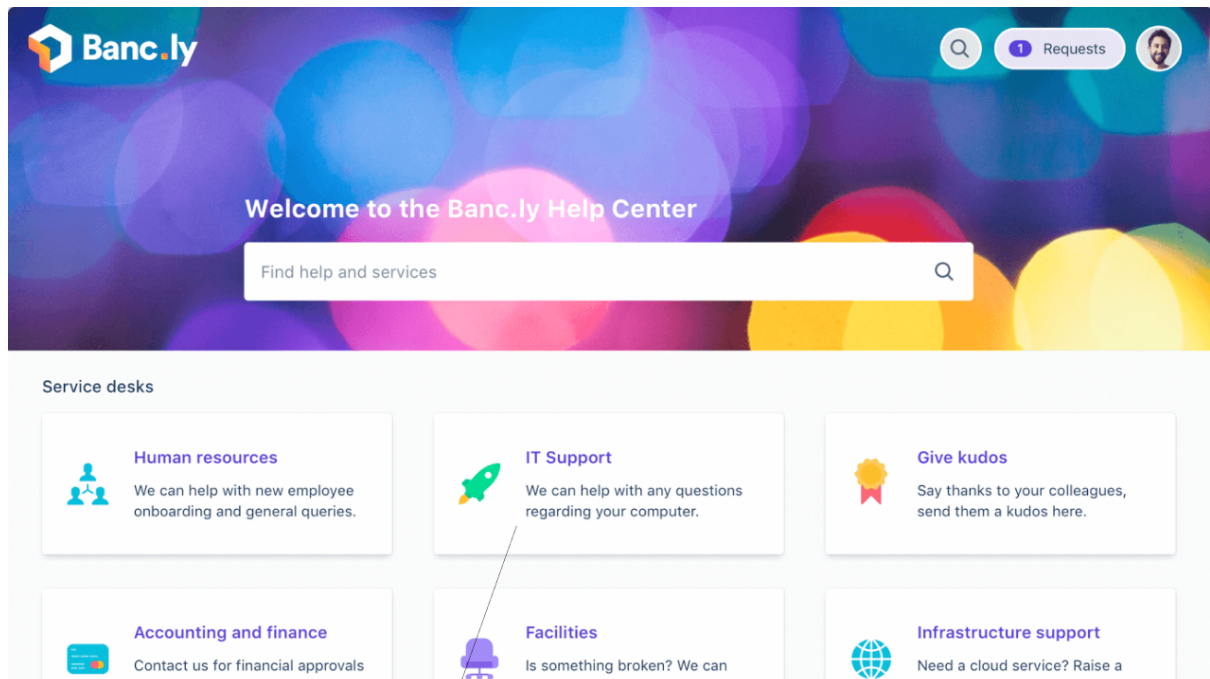


Fig. 10. Jira Service Management Dashboard

Source: Atlassian Inc.

1. Value proposition: Jira Service Management is a cloud and browser-based service management tool designed to help deliver services quickly, bring visibility to work, and accelerate the flow of work between development, IT, and business teams. It is produced by Atlassian Inc.

2. Key advantage: Strong brand - well known in the IT field, with experts using the company's various products for various tasks. The software is fast, secure, and in line with modern IT trends. It allows customization for customer needs.
3. Overall impression: The website design may seem frivolous for a business-oriented software, but it helps create a feeling of support and trust - the main components of the company's value proposition to help eliminate daily life tasks with its products.
4. Colour scheme: The website uses neutral shades of grey, which are distant from Adobe's example. The main colours are concentrated on the main picture, icons, and label colours, creating accents where needed and a positive, friendly, and 'inviting to collaborate' mood for the user. The chosen colours also reflect a gamified environment, which helps the user not feel overloaded and distracted from the complicated software with rich functionality.
5. Typography: The headings and labels use a combination of bold and normal weight sans-serif font. The text is legible and easy to read, without any special effects or gimmicks.
6. Layout: The onboarding page example shown represents one possible example of a customizable page when the user is logged into the system. The abstract colourful picture is made big on the screen to attract the user's attention and create a positive mood, reflecting the concepts of mindfulness, focus, and flow. The software being a browser cloud-based application, it is flexible and adjustable to different platforms, such as desktop, mobile, or tablet, and Jira provides full flexibility with its fluid grid. The layout is card-based, with each card providing access to extended functionality and different modules. However, the wide spacing might create a feeling of distance and disunity for modules, and the top menu is inconsistent with the buttons below the screen, which have rounded corners, creating an unintentional feeling of imbalance.

7. Navigation: The global navigation is placed at the top, providing access to the search option, notifications, profile settings, and information about the company's logo, which is possibly clickable. The main element on the screen is the local search within the module, making it easier for the user to explore the system and find information faster and more efficiently. The local navigation consists of cards that give access to different modules of the system.
8. Imagery: The Jira onboarding page is rich in imagery. The central, bright picture immediately attracts the user's attention and can be changed according to preference. Supportive images are also icons that convey abstract actions.
9. Branding: The Jira onboarding page features the company's logo in the header, and the rest is tailored to the particular user or company.
10. Unique features: N/A.

Example 3. Zendesk

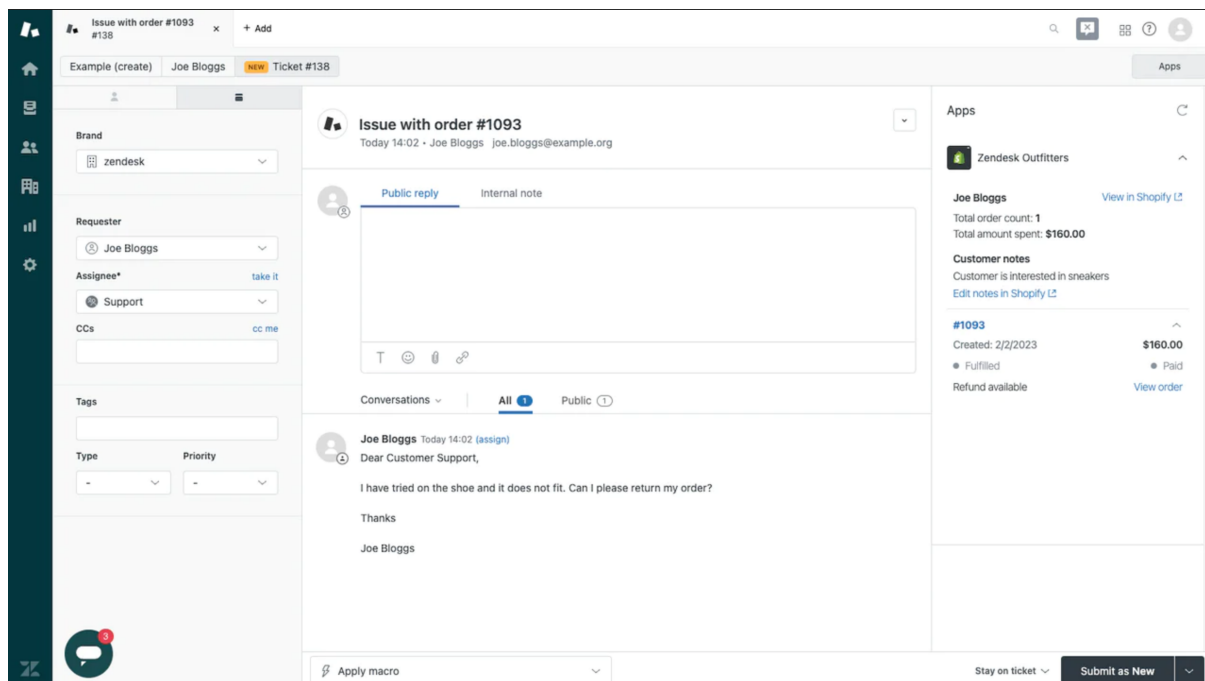


Fig. 11. Zendesk Customer Call screen

Source: Zendesk Inc.

1. *Value proposition:* cloud and browser-based customer service software trusted by 200K+ customers. Make customers happy via text, mobile, phone, email, live chat, social media. Produced by Zendesk Inc.
2. Key advantage: Award-winning software, which is stated on their website (Zendesk, 2023).
3. *Overall impression:* Design looks simple and pleasant to the eye, however a lot of small design elements such as icons, lines, coloured fields create a 'messy' appearance, which can be difficult for the user to navigate through and add a level of frustration.
4. *Colour scheme:* website utilizes a neutral colour scheme with shades of grey to create a professional and sleek look. The neutral background helps to make the colourful icons and labels pop, drawing attention to the important parts of the website. Additionally, the grey tones provide a calming and approachable environment, which is essential for software that is designed to simplify complex tasks. In contrast, the use of bold dark green creates a sense of urgency and draws attention to important buttons and calls to action.
5. *Typography:* The headings and labels use a combination of bold and normal weight sans-serif font. The text is legible and easy to read, with no special effects or gimmicks.
6. *Layout:* This module screen is designed using a card-based approach, with rectangular boxes used to differentiate between different types of information. The left-sided navigation is made visible using a bold accent color, which draws the user's attention away from other information on the screen. There are several call-to-action buttons, both primary and secondary, with primary ones located at the bottom. However, the line at the bottom of the screen blocks user access to the primary call-to-action, as it is a pattern commonly used for concluding or finalizing something in sources such as official documentation, sign-in forms, or books.

7. **Navigation:** The global navigation is positioned on the left, while local navigation allows the user to perform different actions in the system. Local navigation is also positioned as a right-side bar allowing access to the additional functions.
8. **Imagery:** The Zendesk page only contains supportive images, such as icons or user profile pictures, which create a minimalistic and simple look.
9. **Branding:** The Zendesk page features the company's logo in the bottom of the left side bar, the rest is made tailored to the particular user or company.
10. **Unique features:** N/A.

Summary of Visual Design Elements

The analysis of design elements of the modern software incorporates various key elements to enhance the user experience and inspire.

Firstly, to ensure a clean and simple layout, a card-based design is implemented, which is both functional and aesthetically pleasing. Negative space is also utilized to create a balanced and uncluttered appearance, contributing to a more enjoyable browsing experience.

The use of colour is strategic, drawing attention to important information and highlighting key areas. Icons and symbols are also utilized to create a more visually engaging interface, helping users navigate more easily.

Consistency in font choice is also important, with the use of sans-serif fonts throughout providing a cohesive and modern feel.

High-quality images are also employed to add visual interest and enhance the overall design.

Finally, side bars are used for navigation, ensuring that users can quickly and easily access different areas of the software without becoming lost or confused.

Analysis of the Asolvi Brand

In order to create software that reflects the brand it represents, an analysis and definition of the brand image was conducted. This involved identifying the company's mission statement, and defining its core values, as well as visual identity establishing its brand values.

Company's Mission Statement

The mission of Asolvi is to empower businesses with smart technology solutions that make their service management more efficient and effective. Asolvi achieves this mission by providing software solutions that automate and optimize field service operations, enabling businesses to streamline their workflows, reduce costs, and improve customer satisfaction (Asolvi, 2023).

Their software solutions are designed to be easy to use and customizable to meet the unique needs of each customer. Asolvi's mission is to help businesses of all sizes and industries to achieve their service management goals, whether it be through improved scheduling and dispatch, real-time tracking of field technicians, or better management of inventory and resources.

Company's Core Values

Asolvi is a company that provides software solutions for service management and field service automation. Their values are centered around delivering high-quality, reliable, and innovative software solutions to their customers. Here are some of the key values:

1. **Customer-centricity:** Asolvi places a strong emphasis on understanding and meeting the needs of their customers. They strive to deliver software solutions that are tailored to the specific needs of

each customer, and they work closely with their clients to ensure their satisfaction.

2. Innovation: Asolvi is committed to staying at the forefront of their industry by continually developing and improving their software solutions. They invest in research and development to ensure that their products are innovative and cutting-edge.
3. Integrity: Asolvi operates with the utmost integrity in all their business dealings. They are transparent and honest with their customers, employees, and stakeholders, and they strive to build long-term relationships based on trust and mutual respect.
4. Agility: Asolvi is an agile company that is able to adapt quickly to changing market conditions and customer needs. They are responsive to feedback from their customers and are always looking for ways to improve their software solutions and customer service.

Company's Visual Identity

Asolvi's logotype is a simple and modern design that reflects the company's identity as a reliable and innovative software provider. The logotype features the company name in a bold sans-serif font, with a small hexagon icon made up of five triangles of different colours to the right reflecting the extension of the letter "i".



Fig. 12. Corporate logotype

Source: Asolvi Internal Design Guidelines

Asolvi's primary colour palette consists of a deep cold green. These colours are used consistently throughout Asolvi's marketing materials, website, and some of the software interfaces to create a cohesive and recognizable visual identity. In addition to the primary colours, Asolvi also uses a range of secondary colours to add depth and variety to its visual identity. These secondary colours include shades of green, and gray, as well as orange and yellow which complement the primary colours and provide flexibility in design (fig. 13). Overall, Asolvi's visual identity is designed to communicate the company's values (Internal Design Guidelines Book).



*Fig. 13. Corporate Colour System.
Source: Asolvi Internal Design Guidelines*



Evatic

Fig. 14. Evatic logotype

Source: Asolvi Internal Design Guidelines

Evatic's colour palette consists of a warm shade of green that is reminiscent of the colour of fresh, healthy grass (fig. 14). It is a medium-toned green colour that is not too dark or too light and is in the same colour range as the company's logotype. A more detailed overview of the colour palette is beyond the scope of the current research, so the updated design will be based on the current Evatic colours.

Evatic Customer Module: UI Kit

The following UI kit represents a collection of pre-designed user interface elements that can be used to create a consistent and cohesive design of the module. It includes buttons, icons, typography, and imagery. Such elements as icons, buttons, and cards, were designed from scratch. All buttons are presented in two states – active and hover – making the design more enjoyable for the users as this effect creates the feeling that the software is *alive* and always ready to interact with the user (fig. 15).

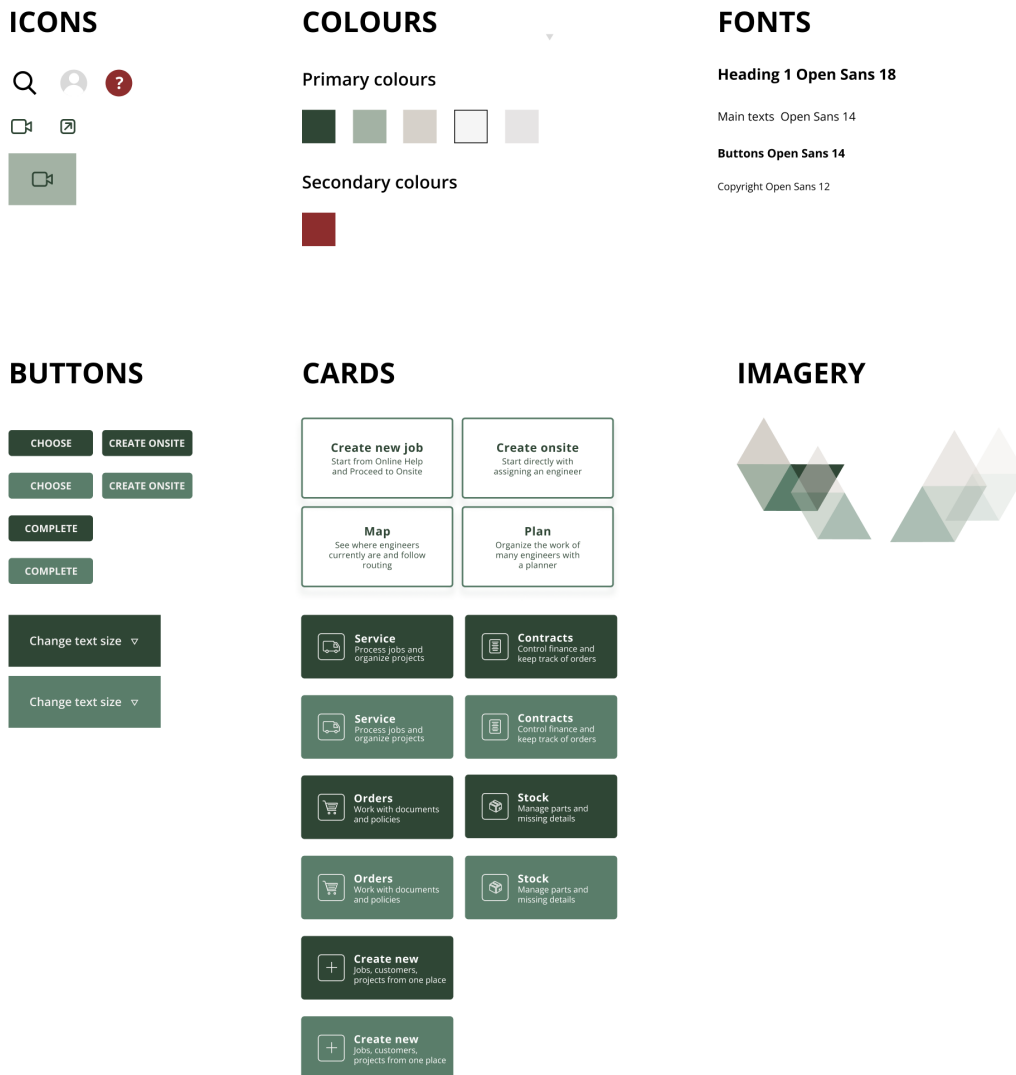


Fig. 15. Evatic Customer module UI Kit

Evatic Customer Module: Wireframes

The wireframes were informed by user research that identified several key pain points with the existing interface (fig. 16–19).

One of the primary issues that users experienced was the inflexible layout, which required horizontal scrolling and made it difficult to access critical information. To address this, a card-based layout and minimized textual fields were incorporated to make the interface more user-friendly and easier to navigate.

Another issue that users identified was the rigidity of the tables, which made it difficult to view all the necessary information at once. To solve this problem, a more fluid design was created that allows users to adjust the rows manually and customize the interface according to their specific needs.

In addition to these changes, a more minimalistic and straightforward design was implemented that would be inviting and easy to use. It was recognized that not all fields are necessary all the time, so the design was made customizable and adaptable to the specific needs of each user.

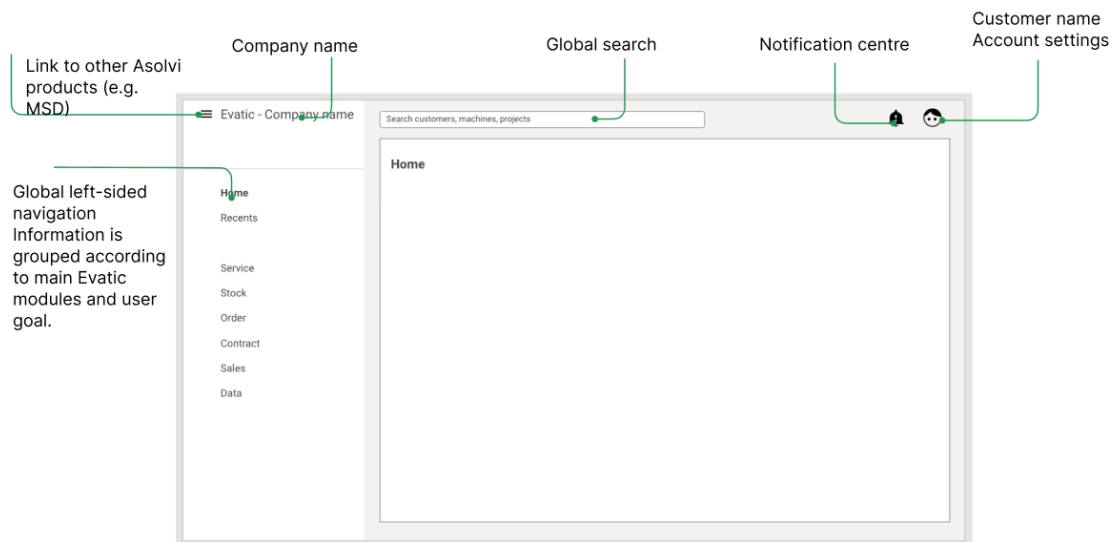


Fig. 16. Evatic Customer module Home / Welcome Screen Wireframe

From the SM homescreen user can start searching with machine number/customer name or see the list of service requests

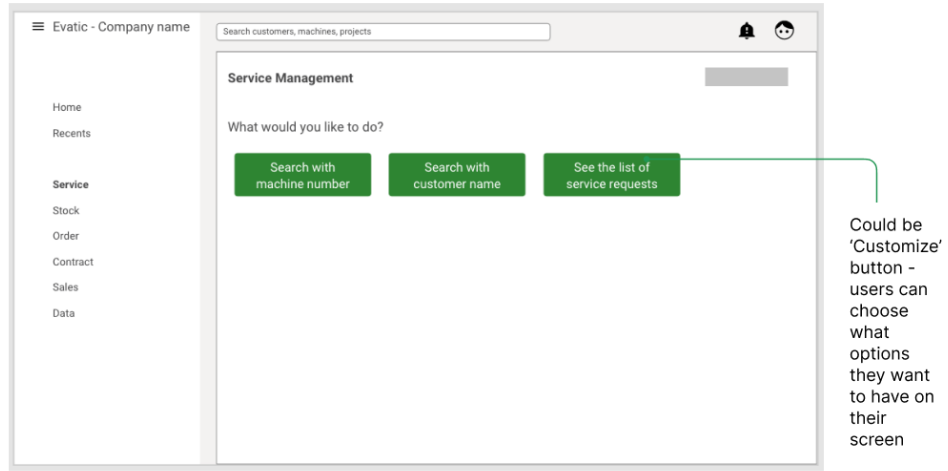


Fig. 17. Evatic Customer module Start Page Wireframe. Idea 1

From the SM homescreen user can start searching with machine number/customer name or see the list of service requests or other options (can be customizable by the customer according to their needs)

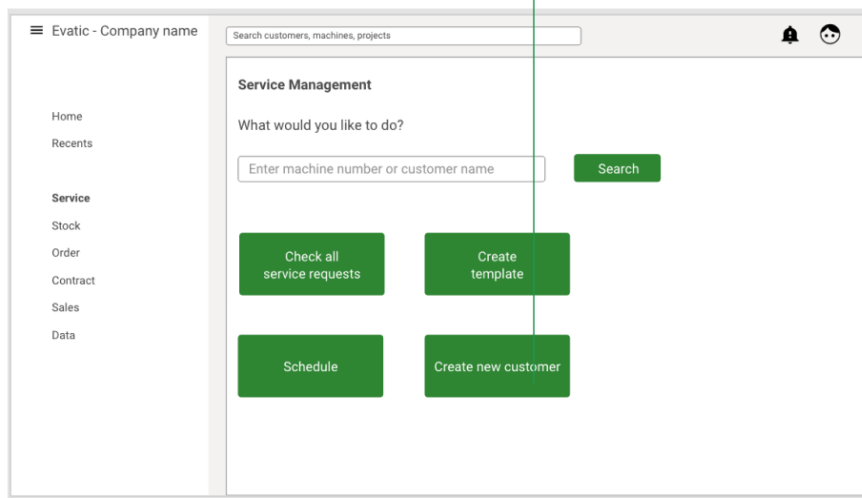


Fig. 18. Evatic Customer module Start Page Wireframe. Idea 2

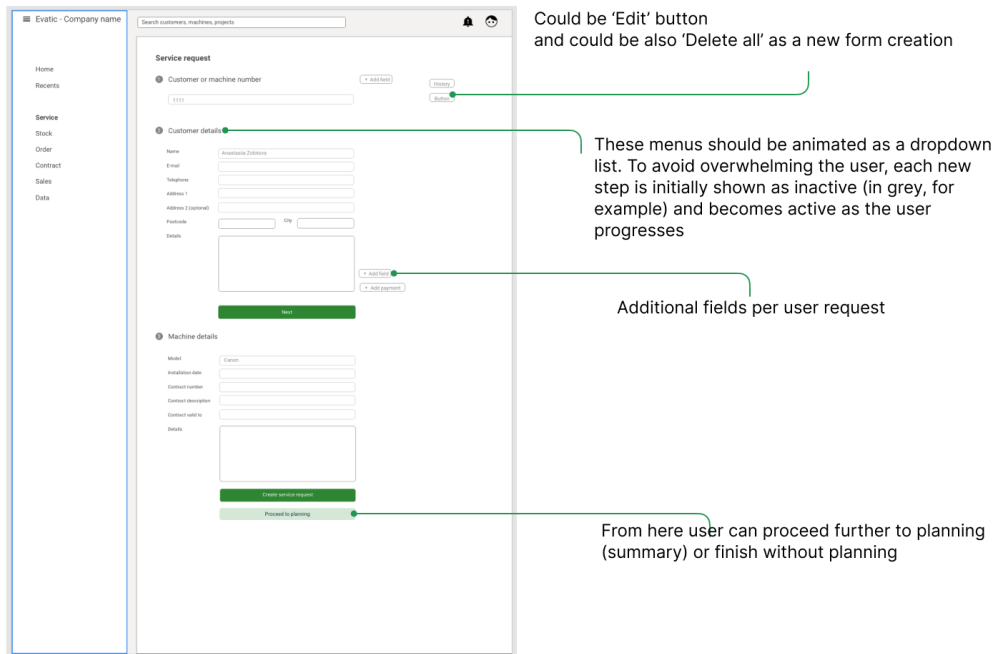


Fig. 19. Evatic Customer module Customer Information Wireframe. Idea 1

Evatic Customer Module: Redesigned Screens

The navigation menu is located on the left as a side panel, allowing the user to navigate through different modules of the software. At the top, there is a clickable logo that takes the user back to the Home screen whenever needed, a global search option, an option to change the text size, and the user profile. From the center of the screen, the user can access different modules of the software by clicking on different cards and customize those modules they do not need. Additionally, an additional card allows the user to create a new page for a customer, machine, or project (fig. 20).

To provide access to different functionalities of the module designed to create service jobs quickly and easily the service page was redesigned. Users can create a new job to solve the problem online or create a new onsite job if an engineer's presence is required at the facility. They can also plan and map jobs. Both options are shown for demonstration purposes only and are not designed further (fig. 21).

When the user clicks on the "Create new job" card, they are redirected to the current page where they can quickly and easily process the upcoming request from the customer seeking technical assistance on their facility. The user is on a call with the customer. On this screen, they can first search for the customer's name or machine number and then click the "Choose" button (fig. 22).

After the user chooses the information about the customer, an overview will be displayed. This information cannot be edited as it is retrieved from the system database and is only intended to provide supportive information for the user during the call. On the same screen, the user can fill in the necessary information about the customer issue in the Job Information section. There are two active buttons: Create Onsite Request, which means the issue could not be solved online and an engineer is needed on the customer's site, and Complete, which is clicked if the issue has been solved online. In addition, there is a right-side panel for additional functions. Currently, only the Camera button is displayed, allowing the user to access the customer's facility using their camera to see the live conditions. This panel can also be used for additional options and provides flexibility. The space for the camera is located on the right side of the screen. If more space is needed, the user can extend the Job Information screen by clicking the icon at the top (fig. 23).

If the user was not able to solve the issue online, they click the "Create onsite" button and are redirected to this page. It contains the same customer information, but the Job Information section now has fewer fields and includes "Visit date" and "Assign an engineer" dropdowns for selecting the preferred date and an available engineer to be sent to the customer. When this information is complete, the user has two buttons - "See Project" and "Assign". Clicking "Assign" completes this step and clicking "See Project" will redirect the user to the history of this customer (fig. 24).

The new design was intended to deal with a heavy information load; thus it was based on using colour and typography to differentiate the text hierarchy, making it easier for users to identify important information

quickly and improve the overall readability and comprehension of the application. To further enhance the user experience, the application offers the option to modify the text size, enabling users to customize the appearance and design to suit their preferences. This design feature ensures that the application's design is universal and adaptable to different monitors which was one of the users requests.

The card-based layout is another element of the application that contributes to its flexibility. By arranging information into small, distinct units or cards, users can easily navigate and interact with the application. The cards can be easily moved, added, or removed, making the layout highly adaptable to changes in content or design.

Evatic is a cloud-based and browser-based software that eliminates the need for redundant features such as Back, Close, and Save (accompanied by system notification of the system status). These functions are already integrated into the user's browser, making the application more efficient and user-friendly.

The use of color and overview in the application's design is reminiscent of traditional paper office or corporate documentation, where the company's information is presented in the header and additional details are provided in the central part. This design also draws inspiration from the webform itself, which is considered a means of communication between users and the application. Birman notes that webforms are messages in themselves, and therefore, the application's design aims to create a clear and concise message for users (Birman, 2022). Furthermore, in the future, this design element can facilitate additional options, such as exporting information to PDF or DOC format, allowing users to receive a beautiful printed overview of their customers on paper. In the new design all design elements work together to create a cohesive and user-friendly application.

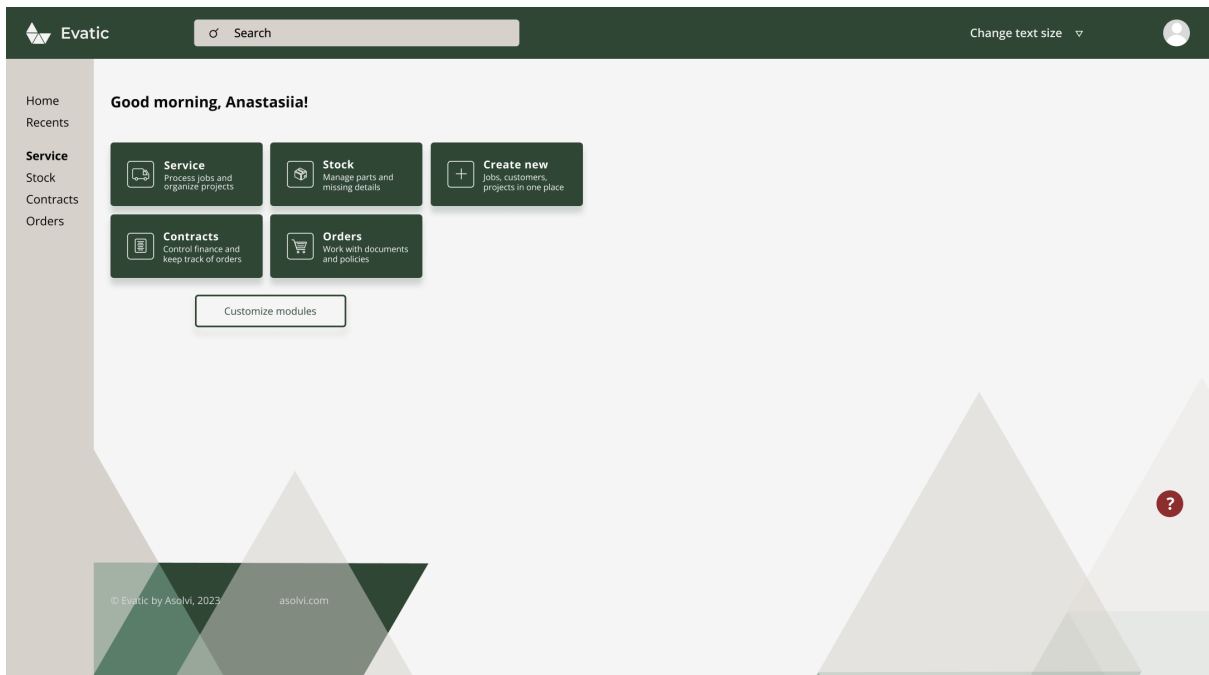


Fig. 20. Evatic. New design. Home screen

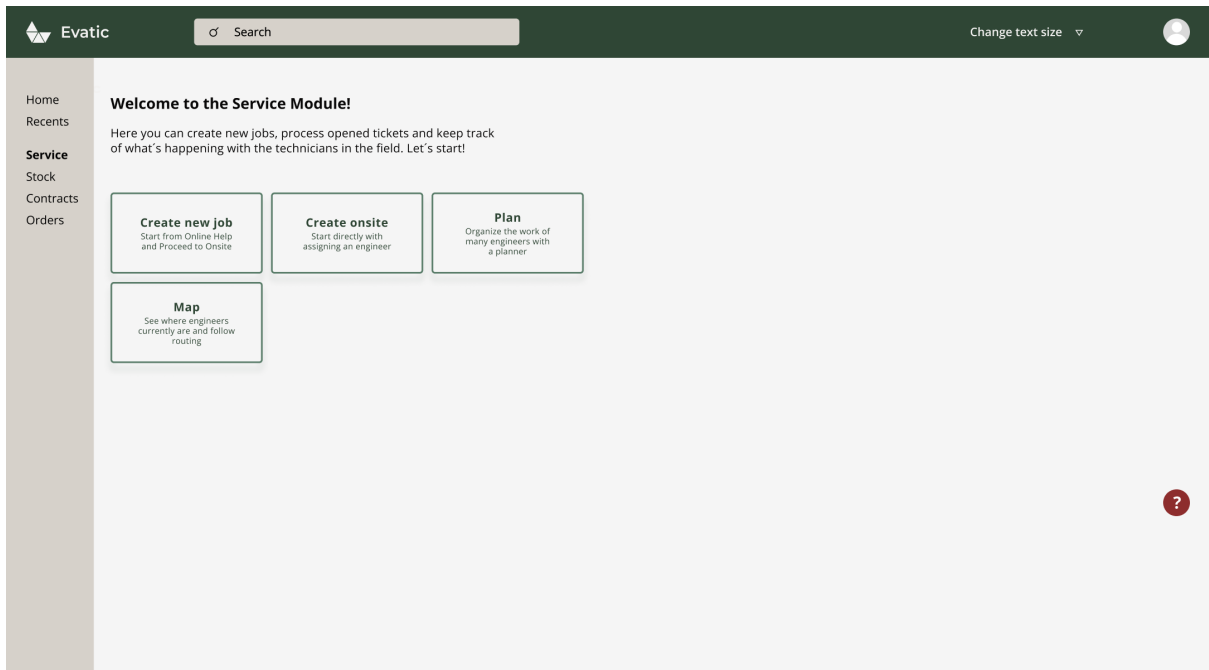


Fig. 21. Evatic. New design. Customer module page

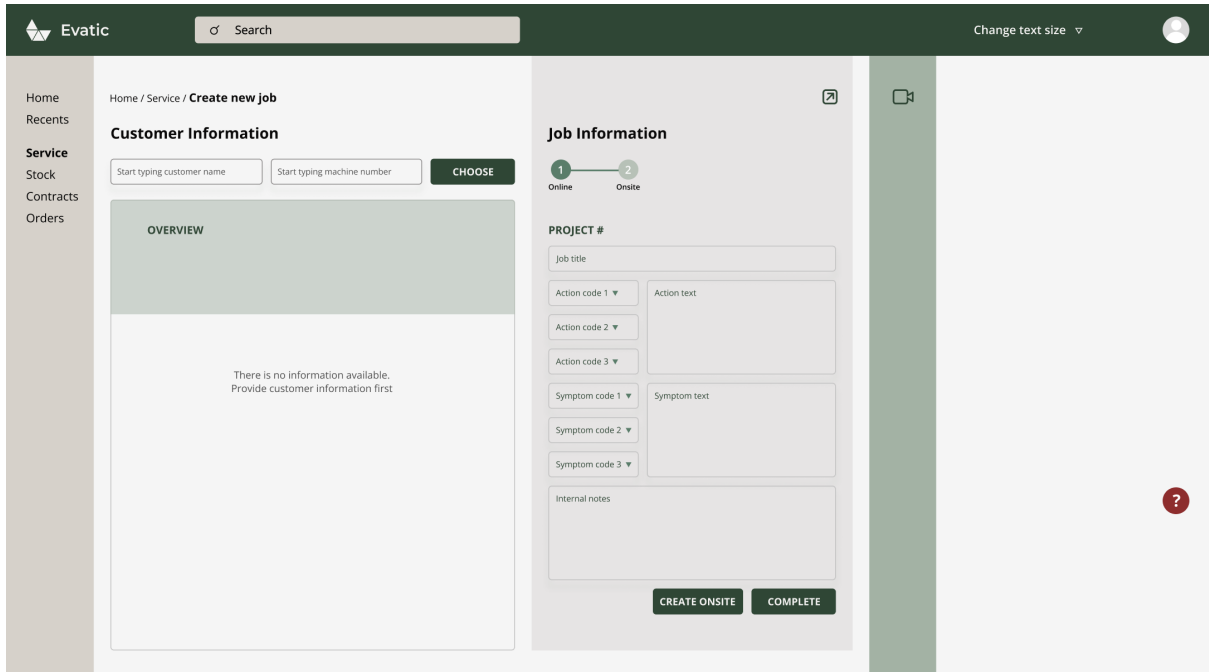


Fig. 22. Evatic. New design. Create new job page

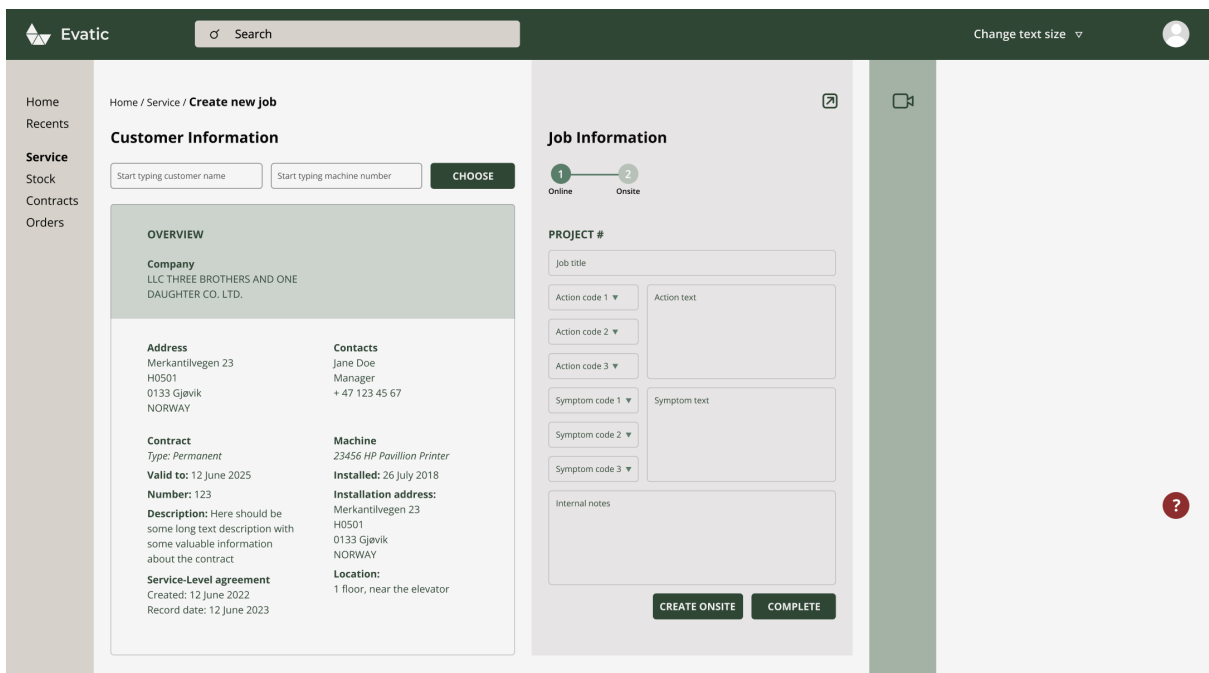


Fig. 23. Evatic. New design. Create new job page

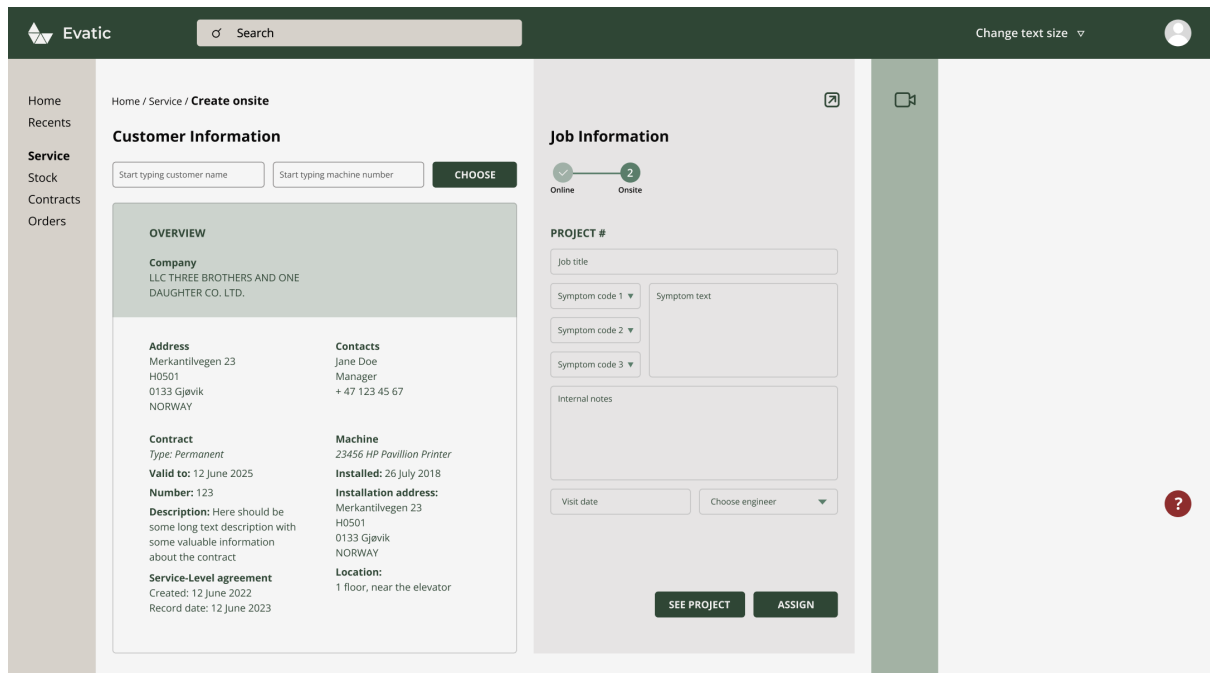


Fig. 24. Evatic. New design. Create onsite

User Testing of Redesigned Screens

The field observation was chosen as a method of testing the new design. The sessions were conducted with six users, even though the Nielsen Norman Group recommends a number of five users as the optimal number for discovering almost all usability problems (Nielsen, 2012). The decision to include an additional user was made in order to gather more feedback. The first four sessions were held online using Google Meet and Microsoft Teams for screen sharing, with the Figma clickable prototype accessible on a laptop. The last two sessions were conducted in person with the users. Each session lasted for half an hour. Before the users accessed the prototype, a brief introduction was given, and they were provided with simple exercises to complete using the software. The main goal of the user sessions was to determine if the system's functionality was achieved and to gather feedback on the overall design. The answers were then summarized in written form.

Main exercises:

1. Imagine a woman calls you with a problem with her printer. She is a returning customer, and you need to create a new job for her. While examining the prototype pages, how would you complete this action?
2. Let's return to the woman who called with a printer problem. You have now created a new job but realized that you cannot resolve it online. While reviewing the prototype, can you explain what steps you would take?

Additional questions:

1. Let's imagine you need to quickly find information within the system. While examining the prototype, how would you go about doing it?
2. Imagine what would happen if you clicked on the "Change Font Size" and "User Icon" options.
3. Imagine what will happen if you click on the "Customize Modules" button.
4. What do you think the purpose of the 1-2 step progress bar is?
5. How did you feel while navigating through the prototype?

User 1

The first exercise took approximately 10 minutes. The user started from the Home page and correctly identified the Customer module, although it took some time for them to become familiar with it. They then proceeded to the next page where they quickly identified the card that needed attention. Moving on to the next screen, it took a while for the user to familiarize themselves with it. They went directly to the Job Information section of the screen, assuming that they had completed all the fields. Finally, the user correctly assumed that they should click the "Complete" button.

The second exercise was approached with more confidence. However, the user noticed that it wasn't clear what would happen if they clicked on the "See Project" button.

Additional questions:

1. To quickly find something in the system, the user would utilize the search bar located at the top of the screen.
2. If he were to click on the "change font size" button, he would anticipate a drop-down menu displaying options to adjust the font size. Similarly, if he clicked on the user icon, he would expect to see a menu presenting choices to manage settings.
3. If he were to click on the "customize modules" button, he would anticipate the ability to modify the modules.
4. The progress bar serves as a helpful visual aid, providing information on the user's current position.
5. The user did not experience any strong negative sentiments about the prototype. They perceived it as modest yet responsive.

User 2

The first exercise took approximately 12 minutes. The user initiated from the Home page. She expressed unfamiliarity and felt a bit stressed, mentioning that she had no prior experience with the software and didn't want to appear "stupid." To alleviate her stress, reassurance was provided that everything was going well. She was then advised to look at the Customer module card. From there she assumes to start from the Create New Job card. Surprisingly for the tester, on the subsequent screen, this user began her actions by utilizing the search options. When asked about her approach, she explained that she read the information on the screen, which stated that customer information should be provided first. Assuming that the necessary information was provided, she completed all the required fields. The user then proceeded to click on the "Complete" button. Upon being redirected to the second exercise, the user correctly clicked on "Create Onsite." No issues or difficulties were observed on this page.

Additional questions:

1. To quickly find something in the system, she would utilize the search bar located at the top of the screen.

2. If she were to click on the "change font size" button, she would anticipate a drop-down menu appearing. Similarly, if she clicked on the user icon, she would expect to see options available to manage her account.
3. If she were to click on the "Customize modules" button, she would assume that she would have the ability to modify the cards.
4. In her opinion, the progress bar served the purpose of indicating the number of steps.
5. The user noticed a pleasing design and expressed her liking for the colors, describing them as "good for the eye" and not distracting.

User 3

The first two exercises took approximately 15 minutes. This particular user initiated the process from the Service module; however, she experienced confusion regarding the labels on the buttons and desired more specificity. Consequently, the first exercise took some time to proceed. Nonetheless, the user successfully clicked on the "Create New" button, and the remaining steps were completed without any issues.

Additional questions:

1. She would utilize the search bar located at the top of the screen to quickly locate items within the system.
2. Upon clicking the "change font size" button, she would anticipate encountering options related to altering the font. Similarly, if she clicked on the user icon, she would expect to find choices to manage her account.
3. The user presumed that the "Customize" button would provide options to enlarge, decrease, or delete certain elements.
4. The progress bar caused confusion for the user. She felt that it duplicated information and didn't comprehend its purpose. Additionally, she likened it to a question mark icon, which she perceived as helpful and easily understandable.

5. The font was clear and easy to read, and the colors were neither overly bright nor too dull. However, she mentioned that the dark green background at the top appeared as black due to differences in monitor settings. This was considered a valuable observation, as each user may have unique monitor configurations. Therefore, adjustments should be made accordingly for individual users.

However, the user provided valuable feedback regarding the user flow without being prompted with additional questions. According to her perspective, she would prefer to search through the history/contracts to find the customer's address and phone number and determine if they were an existing customer right from the start, thus avoiding using the Search module itself. Instead, she would rather utilize the search field at the top. Additionally, the user inquired about where to find information regarding whether the machine had already been repaired. The user correctly identified that using the browser's back arrow would lead to the desired information, and she consistently utilized this method throughout the testing session. Furthermore, the user accurately recognized the purpose of the magnifying glass icon, which opened the camera window.

User 4

This user possessed prior experience with similar software, resulting in the first two exercises being swiftly completed within 5 minutes, without encountering any issues or difficulties. The user correctly assumed that the left-side navigation panel also allows for navigation within the search module, and perceived the cards as resembling invitation buttons. Creating a new job was easily understandable to the user, who would click on that option. Subsequently, the user would begin typing the name or machine and expected to see a prompt with a search option and a subsequent select option.

Additional questions:

1. To quickly locate something within the system, the user would utilize the search bar located at the top of the screen.
2. Clicking on the "change font size" button would modify the text size or perform a similar action, while clicking on the user icon would provide access to settings, account details, or the option to log out.
3. The "Customize" button would grant the user the ability to add or delete modules, with small icons or ticks appearing at the top of each card to facilitate modification, deselection, or deletion.
4. The progress bar serves the purpose of tracking the progress of a particular task or step within the system.
5. The layout is aesthetically pleasing and clean, with a segregated split view for information and job details. The user suggested maximizing the white space on the right side would be beneficial until the camera function becomes available.

User 5

The first exercise was completed in approximately 4 minutes. The user initiated from the Home page and proceeded to create a new job. On the subsequent screen, she successfully selected the customer option, clicked the "Choose" button, and then clicked "Complete." The second exercise was also effortlessly completed without any difficulties.

Additional questions:

1. To quickly locate something within the system, the user would utilize the search bar.
2. If she were to click on the "change font size" button, she would expect to find an option to adjust the font size. The user icon, on the other hand, is intended for profile settings.
3. If she were to click on the "customize modules" button, she would anticipate being able to personalize the interface by creating new modules or deleting existing ones.

4. The progress bar was unclear to the user. She suggested removing the supportive text, as it was confusing regarding the meaning of these hints. Drawing from her previous experience, she would expect to see only the step counter without any additional text in this section.
5. Overall, the user liked the layout, but she found the white space on the right side to be confusing. She expected there to be something else or desired explanatory information, as the current arrangement gave her the impression that "something is missing." She suggested extending the white space. Additionally, she recommended placing the help button at the top or bottom, rather than in-between other elements.

User 6

This user, being an experienced software developer, provided a wealth of valuable feedback throughout the testing session. The first two main questions were completed in approximately 10 minutes. The user mentioned that he would start either from the Service card, as it contained a hint, or from the Create new card. On the next step, he proceeded from the first card, Create new job, as it was obvious to him based on the hint provided. He then navigated through the fields and completed the necessary information in the Job Information section. He concluded by selecting the Assign option. For the second question, the user assumed that he would click on the Assign engineer button.

Additional questions:

1. He would utilize the keyboard shortcut to open a new tab and perform a search from there.
2. Clicking on the "change font size" button would adjust the text size. The user expected to see either a zoom slider with plus and minus buttons (similar to Word) or a size selector with percentage options

for adjusting the font size. Clicking on the user icon would open the account settings.

3. The "Customize" button would allow him to modify the modules or rearrange their order.
4. The progress bar was confusing to the user. The supportive text accompanying the progress bar did not clarify its meaning or indicate the current step. The user found it non-trivial to understand that it was a step counter, and the mandatory nature of both options was not visually obvious.
5. The layout was praised as good by the user. They appreciated the use of a limited number of colors, describing it as "IKEA style." The layout was perceived as clean and balanced in terms of space usage. The user also liked the inclusion of breadcrumbs. Additionally, the font was considered clear and of good quality.

The user suggested some improvements, such as replacing dropdown menus with radio buttons when only two options are available, considering the use of toggles or choice boxes, and providing shortcuts for buttons to make actions more apparent. The user also recommended considering language translation and how the interface would adapt to other languages, such as German, where larger wording might be required.

Improvements

All the users who participated in the user sessions expressed that the software was generally user-friendly and intuitive. However, there were a few areas identified for improvement and further consideration.

The first user's different approach to completing the first two steps highlighted the need for improvements. For future iterations, it would be beneficial to consider displaying the Job Information screen in a dimmed mode or making the first field inactive until the user selects customer information. Providing a notification or guidance in such cases can help ensure a smoother user experience. However, it is important to conduct

additional testing to ensure that these changes are correctly understood by proficient users who are familiar with the software.

Another valuable input came from a user regarding the "See Project" option, even though it was not part of the questionnaire. The user inquired about the system's reaction after selecting this option and what would happen next. This feedback should be considered in future design improvements by providing user notifications and making the option available only after the engineer assignment is completed.

Another possible direction for testing is to explore an alternative option on the onsite screen, where the user is shown the customer's location and can check if there is a technician available in the area to visit them in person. Additionally, there is a suggestion to remove or redesign the progress bar, as three participants found it confusing. Improving the design to accommodate longer sentences and different language requirements, such as German, can also enhance the overall user experience. The current prototype excludes hints with shortcuts, system notifications, and animation effects, which could be considered as further improvements in the design process.

By addressing these areas for improvement and considering user feedback, the software can be refined to provide an even better user experience.

DISCUSSION

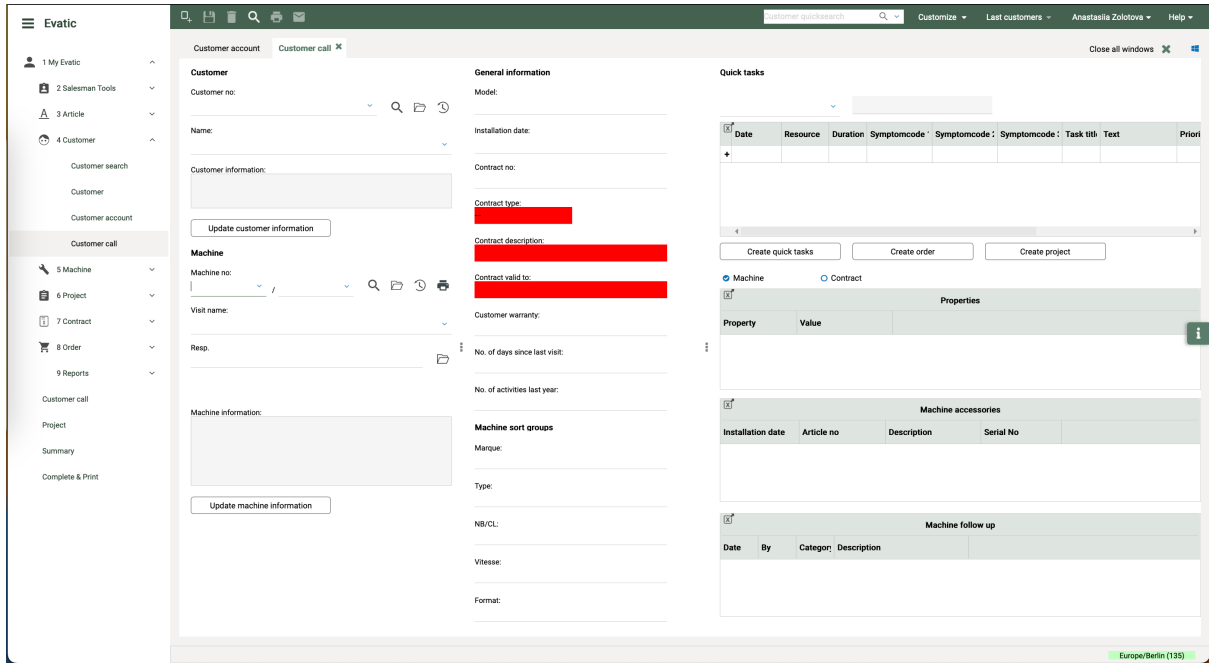
The present research aimed to identify how webforms can enhance usability, which webform elements should be prioritized, and how it can be designed with the user in mind, specifically focusing on the complex software, such as service management software.

Previous studies have demonstrated that the usability and the way of how users interact with the webform can be influenced by a variety of factors, collectively referred to as human factors (Human Factors for Engineers, 2004). Human factors refer to how people interact with products, equipment, facilities, procedures, and environments involved in their work and play a crucial role in how well users, and in particular engineers, can complete tasks and perform their jobs (Cumming, 1974). In close connection with human factors, human errors occur when people make mistakes that lead to unintended consequences, such as accidents or system failures (Kohn et al., 2000). Thus, software nowadays has the potential to both increase and decrease human errors. The ease of use, visual design, and accessibility of the software can influence how quickly users can learn and use the software effectively (Maguire, 2013).

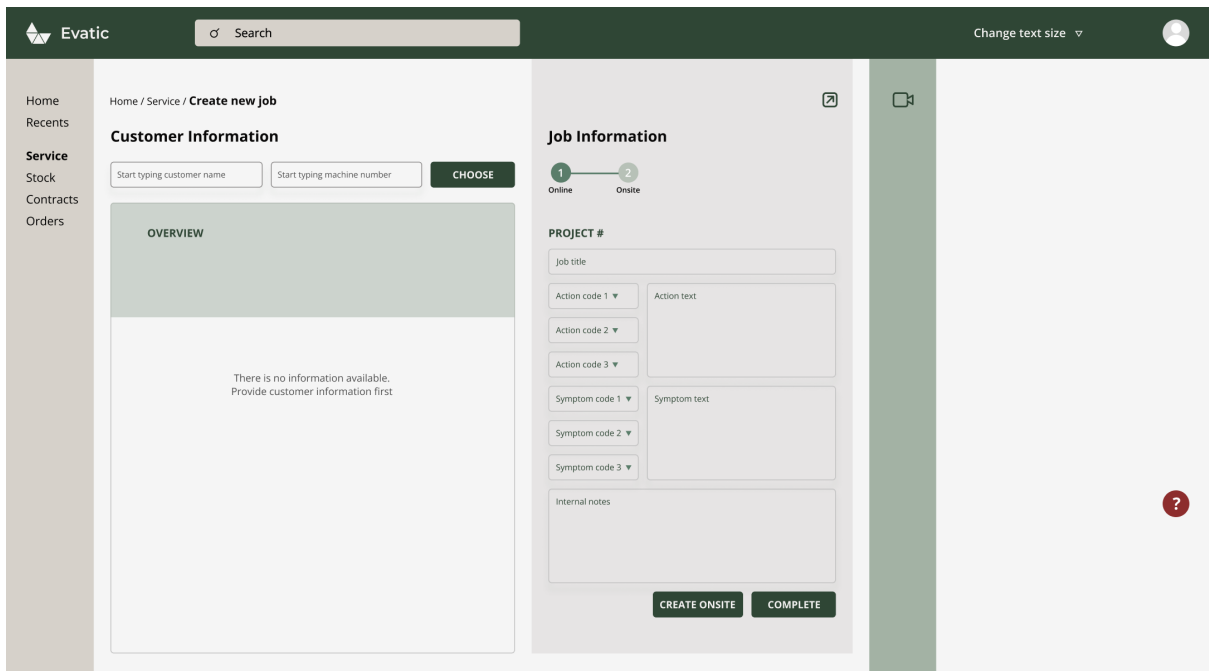
The present research has identified that badly designed web forms in complex software, such as service management software, have a significant impact on human errors, usability, and interface effectiveness, leading to increased user frustration. The research focused on analyzing user feedback and conducting a heuristic evaluation of Evatic, a chosen service management software, revealing various issues with the current version. These issues primarily revolve around such design elements as the grid, layout, and information fields, collectively referred to as web forms, which contribute to user frustrations and interaction difficulties. The identified issues include the inability to scale the form, an inflexible layout and grid requiring horizontal scrolling to access necessary fields, and an overall outdated and unfriendly design. Additionally, poorly designed web

forms can cause user frustration through excessive clicking, manual input, and information overload from unnecessary fields.

To address these challenges and enhance usability, a user-centered design approach was emphasized through careful user research and early user involvement in the design process. It was established that the layout and complexity of a form significantly impact usability and user flow, as supported by studies (Cruz-Benito et al., 2018). Additionally, the use of white space design can evoke different psychological feelings and enhance visual thinking (Zong & Wang, 2008). In the redesign process, the aim was to minimize information overload by excluding unnecessary fields that users deemed unimportant in their daily interactions with the software. Furthermore, the interface was designed with "air space" using color and spacing techniques to create a minimalistic and simplified interaction experience that is not overwhelmed with excessive information (fig. 25).



a

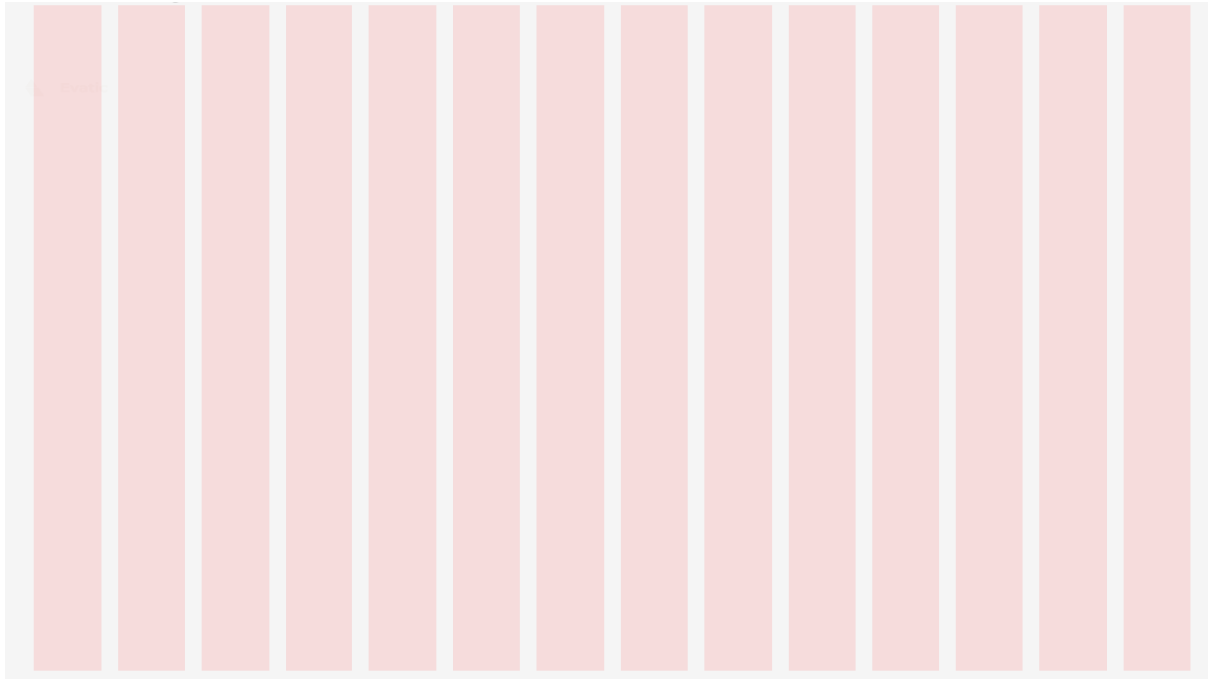


b

Fig. 25, a-b. Two different ways of presenting the information at the interface level using colours and typography. One makes it easier to find relevant fields and complete the task.

Source: a – Asolvi, b – redesigned version

In our design, we have implemented a fluid column grid as a priority design element due to its numerous advantages and in response to complaints from users about the inflexibility of the current grid in Evatic (fig. 26). The fluid column grid offers a flexible layout that can adjust to any screen size by using proportional measurements to adjust the size and position of elements on the screen. Even though the Evatic software is primarily designed for use on large displays, this design approach allows for the creation of a responsive page that can adapt to different devices, including smartphones. This offers the flexibility to develop a layout that maintains a visually appealing appearance on any device, should the need arise in the future. The grid parameters were carefully considered and established as follows: for desktop screens with a size of 1440 pixels, the grid contains 14 rows, with a 24-pixel margin and a 20-pixel gutter. Additionally, the module size was set to 4 pixels to simplify the calculation process for developers. The grid offers numerous benefits, including greater flexibility and ease of use for designers, developers, and end-users alike. The uniform dimensions and structure of the grid provide a neat appearance while ensuring consistency and visual order, especially when working with a team. The grid parameters allow for easy detection of any errors or discrepancies, as an extraneous pixel can be quickly identified. In this way, developers can easily understand design intent and ensure the module functions as expected, and it is easily adjustable to accommodate various screen sizes. Furthermore, the grid's design creates sufficient white space without overloading the user with it, ensuring that the software's primary focus remains on functionality. Users participated in the testing session stated that the design based on this grid is clean, functional, and user-friendly.



*Fig. 26. The grid system for the Evatic Customer module. Resolution:
1440 x 800*

Whereas the grid is a tool it is closely related to another design element, called layout, helping to create system and consistency. Layout is crucial when it comes to display, especially in the context of modern software that can be accessed through various devices, such as large displays, tablets, and mobiles. The choice of layout can have a significant impact on the way information is processed by humans (Elam, 2004; Samara, 2017). For the Evatic software, the combined card-based grid layout was chosen as a new design element. The card-based grid layout provides flexibility and simplicity in development (fig. 27, 28). Research has shown that the card-based layout has an easily scannable nature, presenting information in a structured and organized manner. It allows users to quickly grasp necessary information and act, resulting in a more efficient and satisfying user experience (Djamasbi, et al., 2011), as proven in the current field study of users interacting with the new design of Evatic. Most users quickly identified the correct cards supported by the labeling system. This layout avoids overloading users with unnecessary effects and animations that are not needed in task-oriented software. By avoiding unnecessary effects and

animations, card-based grid layouts can reduce cognitive load on users. Focusing on task-oriented software, where efficiency and productivity are key, a streamlined and distraction-free interface can help users focus on completing their tasks effectively (Babich, 2016b).

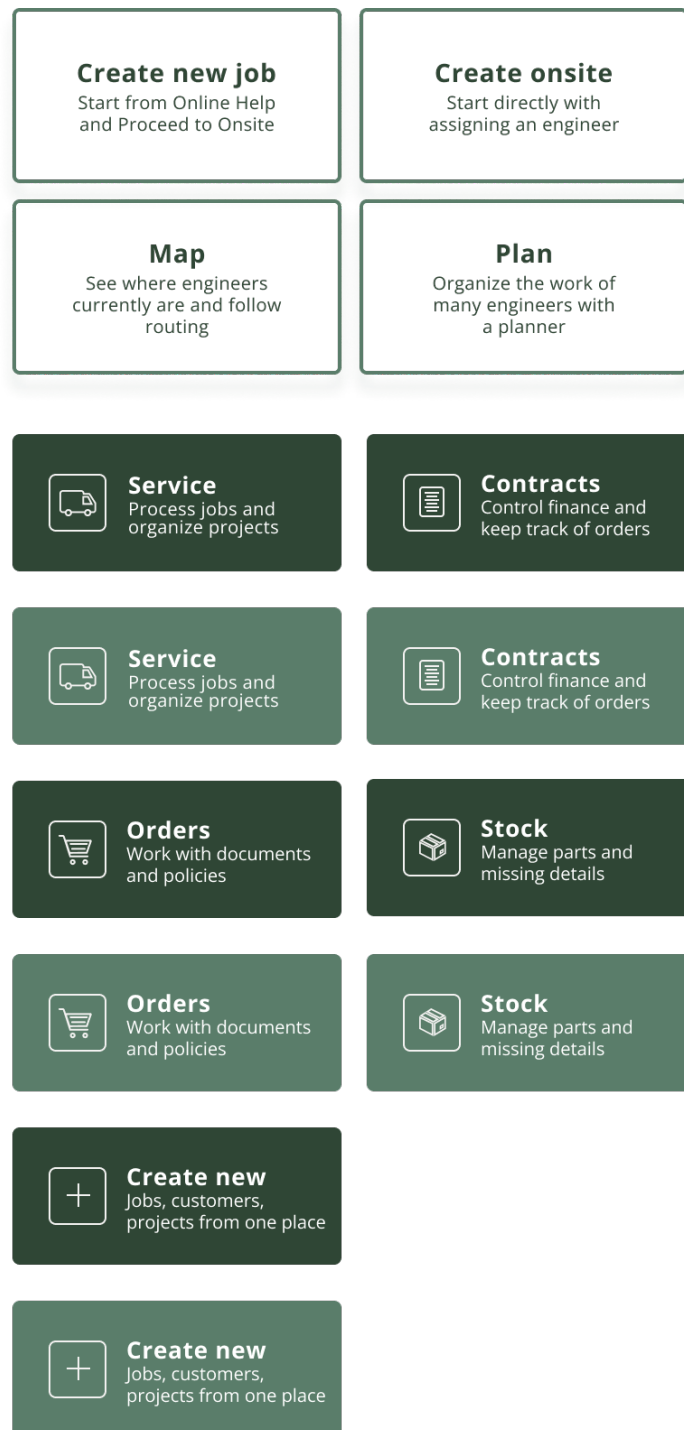


Fig. 27. Cards for Evatic Customer module shown separately

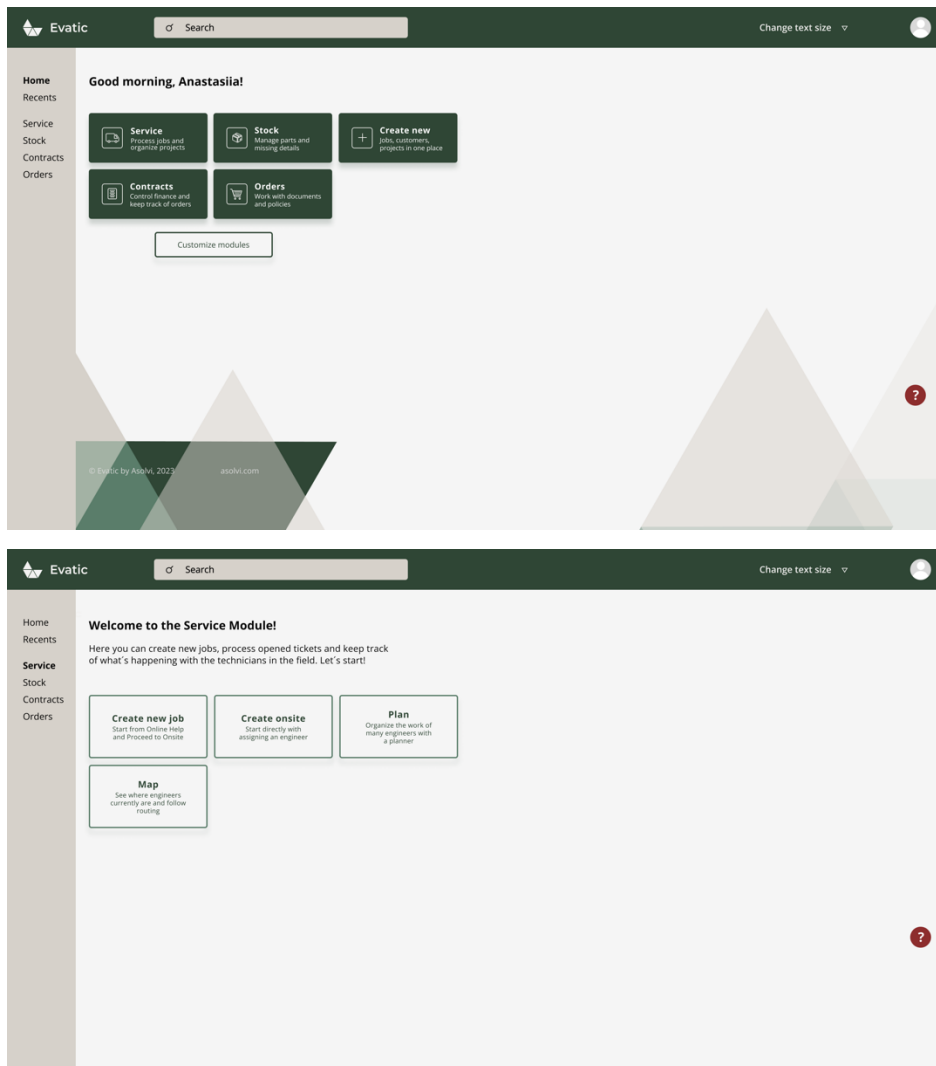


Fig. 28 a, b. Card-based grid layout shown on the screen

Also, to reduce complexity, Tullis proposed organizing information into distinct columns and aligning the elements with a column can help (Tullis, 1983). Research conducted by Wolf further supported this idea by indicating that search times are faster for items arranged in columns of text compared to when the material is presented as a horizontal list of running text. This research suggests that visual organization through the use of columns can help users to more easily and quickly identify relevant information. This kind of organization can also reduce cognitive load and minimize the likelihood of errors (Wolf, 1986; fig. 29).

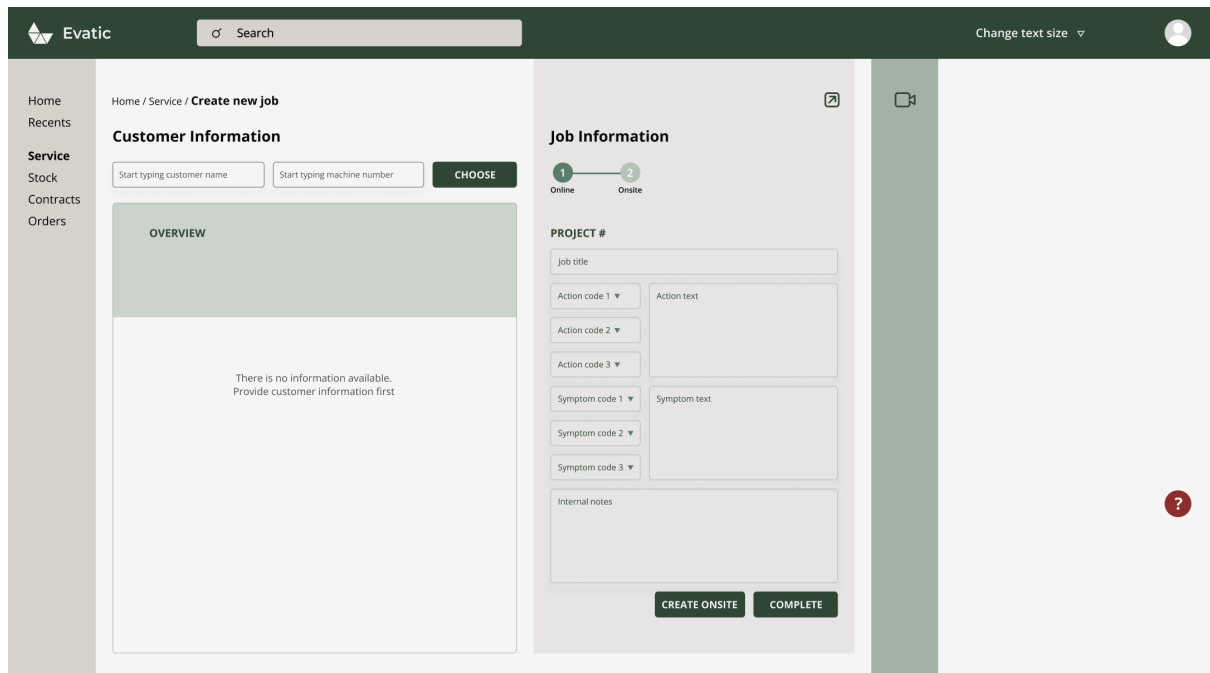
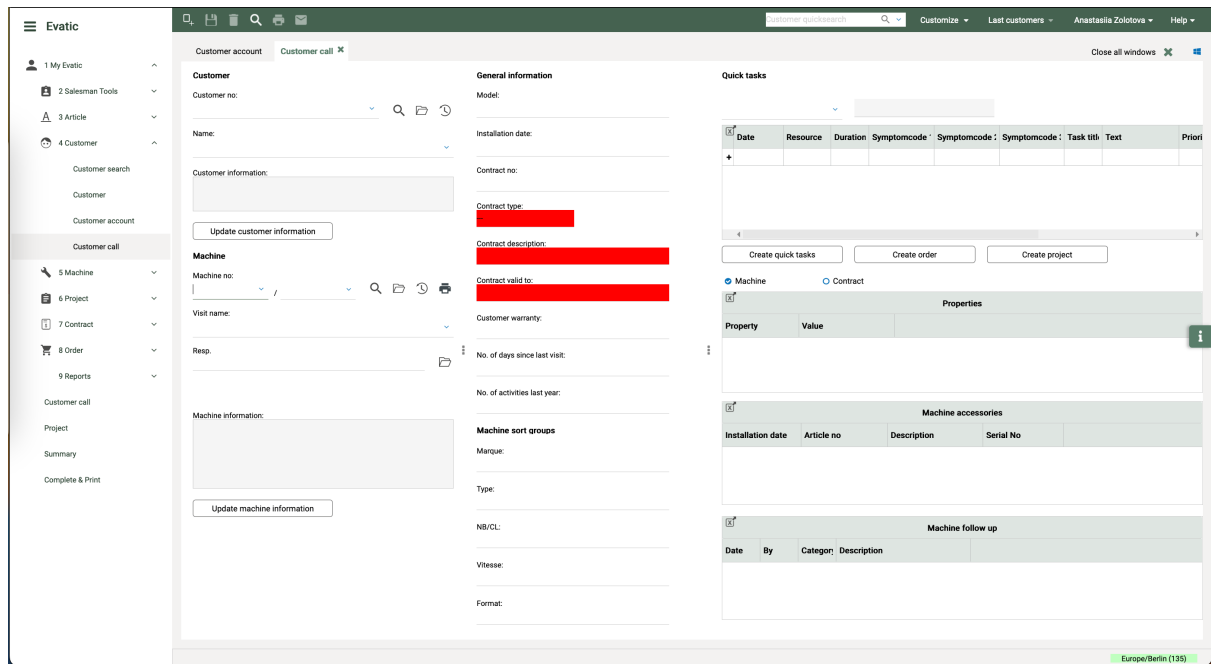
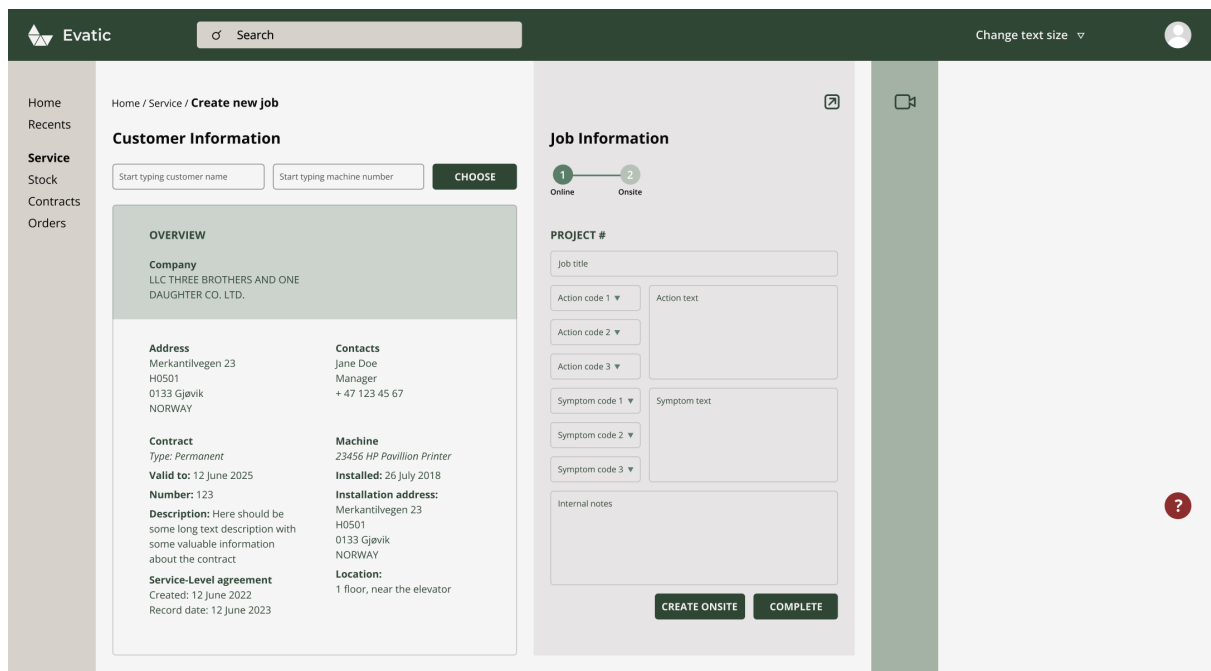


Fig. 29. Structuring information in columns to reduce complexity

The typography for Evatic Customer module was based on the Open Sans typeface, which is a web-safe sans-serif humanistic style typeface. This typeface is considered the most legible and readable and is free to use (Latin, 2017). It has a good contrast and comes with a variety of font weights and font styles that are compatible with headings and body text (fig. 30, a-b).



a



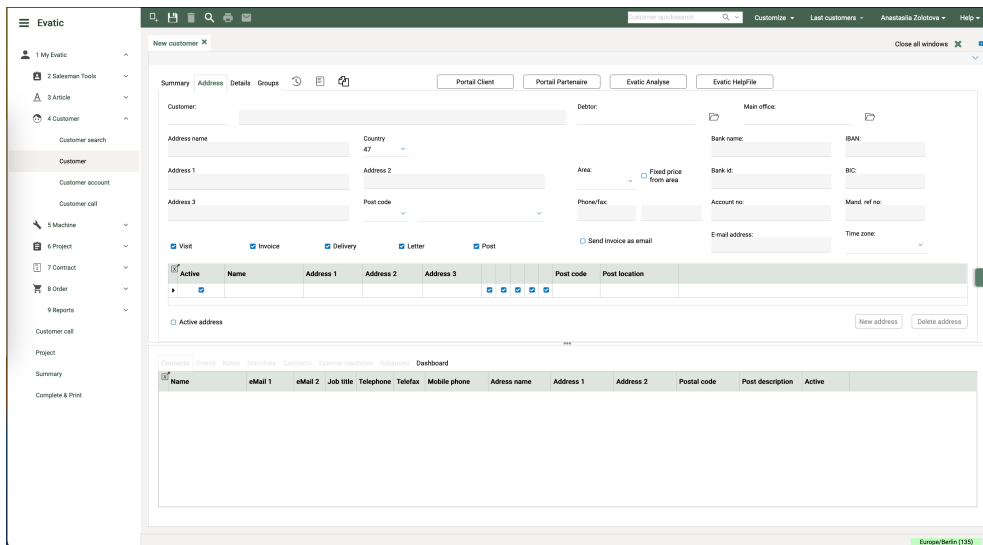
b

Fig. 30 a, b. Implementing the new typography to allow for good contrast ratio and density of textual information within the fields.

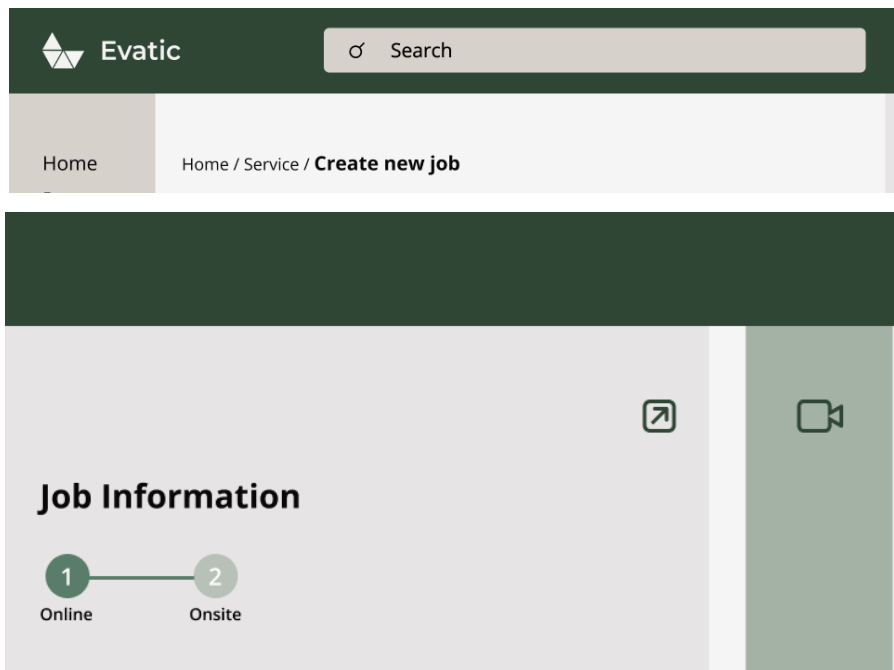
Source: a - Asolvi, b – redesigned version

To navigate through the grid, scrolling was used as a fundamental aspect of web design and an essential tool for navigating complex interfaces, organizing content on a page, and making it easier for users to find the information they need. Vertical scrolling is the most common type and is used to scroll up and down a web page. Horizontal scrolling is less common and is typically used to showcase a wide range of content, such as images or videos. However, it can be challenging for users to navigate and can create usability issues, as was observed during the user session for the current version of Evatic. In the new design, scrolling was minimized, but if it is needed further in the process, it can be easily implemented through vertical and horizontal scrolling, with horizontal scrolling used less frequently by dividing the content into different sections and using scrolling to navigate between them.

To enhance the user experience, it is recommended to use clear navigation elements such as visible navigation menus and breadcrumb trails. These elements were absent in the old design but have been implemented in the new design to improve user navigation and make it easier to find information (fig. 31, a-b).



a



b

Fig. 31 a-b. Implementation of breadcrumbs and navigation hints through icons to assist users in navigating the software
Source: a - Asolvi, b – redesigned version

The colors were chosen based on the current colors used in Evatic itself and its logo, both of which are based on the Web Content Accessibility Guidelines (W3C Recommendation, 2018). The green hue is associated with nature and growth, adding a touch of excitement and energy to the overall design. The feedback gathered from users showed that the combination of neutral grays and bold dark green creates a positive and engaging experience for them, helping to build trust in both the software and the company behind it. However, red was chosen over green to visually highlight important options of the software such as the help button (fig. 32, a-b).



a



b

Fig. 32 a-b. To ensure that important options of the software, such as the help button, stand out visually, a secondary color was chosen. Red was chosen over green for this purpose

Source: a - Asolvi, b – redesigned version

The following research has provided insights into the impact of webforms on human factors in service management software. The research questions aimed to investigate how webforms impact human factors in service management software, identify which webform elements should be given high priority when designing service management software for the user, and provide recommendations on how to design webforms with the user in mind for service management software.

The study has found that webforms have a significant impact on the usability and efficiency of service management software. The use of well-designed webforms can help to reduce the cognitive load on users, enhance their experience, and improve their efficiency when using service management software.

The study has identified several crucial elements that should be prioritized in webform design: flexibility, minimal information overload, information architecture, change text size option, card layout, and exclusion of redundant functions. These elements can help to enhance the user experience and improve the efficiency of service management software. A design that prioritizes these elements can be the key to providing an interface that is user-friendly, intuitive, and efficient.

Despite the findings of this study, there are some limitations that need to be considered. Firstly, the research was conducted on only one module of the software; therefore, the generalizability of the results to other modules may be limited. Further studies on different modules are necessary to validate the effectiveness of the proposed design suggestions.

Secondly, the sample size of users involved in the research was relatively small. Although efforts were made to recruit a diverse range of participants, the results may not be representative of the entire user population. Future studies could involve a larger sample size or recruit participants from a broader range of experiences.

Besides, the study focused only on three user interface patterns - grids, layouts, and form field minimization. Other interface patterns such as iconography, color schemes, and typography were briefly covered. Future

research could explore the impact of these additional interface patterns on user experience and identify further areas for improvement.

Additionally, further research could investigate alternative layout designs that address some limitations of card-based design, such as limiting the amount of information that can be presented on a single card and maintaining visual consistency across all cards.

Another avenue for future research is exploring the impact of scrolling on user experience, particularly on mobile devices. Navigation challenges, limited content visibility, and usability issues associated with scrolling should be taken into consideration. The study could also investigate alternative navigational elements that can improve the user experience. Asolvi as a company has ten different service management solutions in various countries, and thus the influence of cultural differences in color perception should be considered, as different cultures may associate different meanings with particular colors (Ulusoy, et al., 2018; Madden, et al., 2000). Future studies could investigate how color choices affect user experience in different cultural contexts.

Finally, future research could expand the study to include other devices such as tablets and mobile devices to better understand how users interact with the software across different platforms.

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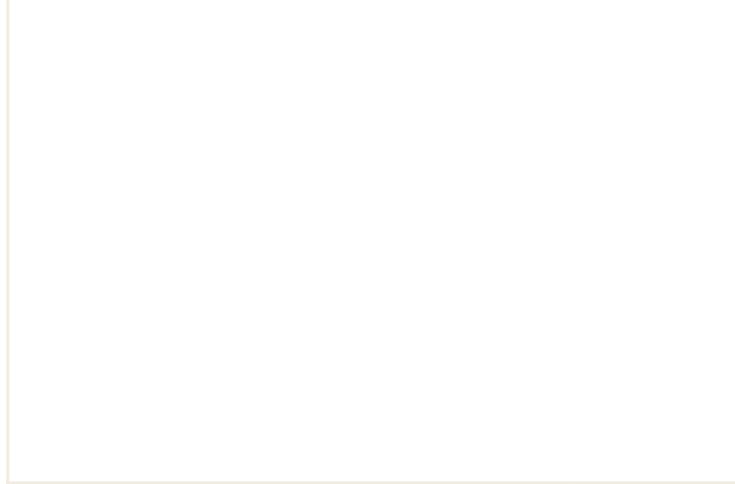
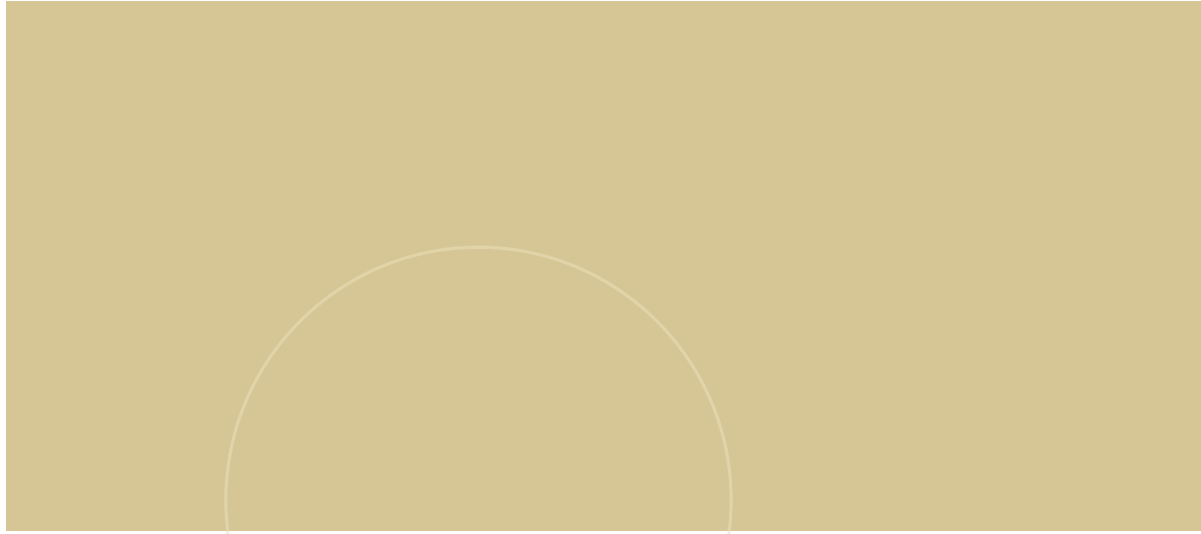
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