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The role of website analytics in identifying user experience (UX) improvements

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This thesis is based on the research on how web analytics data can be helpful for website User Experience (UX) optimization. The aim of the research was to showcase how it can show gaps in the current UX state of a business's website and what kind of conclusions can be done based on web analytics data.

There were several books and journal articles used in order to understand the connection between Digital Measurement, Design Thinking, User Experience and Web Design.

The research has been carried out in a qualitative manner and consisted of two parts: interviews and a case study. The aim of the interviews was to gain an understanding of how web analytics is used in different companies for UX improvement. The aim of the case study was to showcase how web analytics data can show gaps in a website's UX.

Based on the research results, it is clear that web analytics data is a meaningful source of information about website UX when working on a company's website design. Web analytics data helps to point to the existing problems on the website which can lead to the worse User Experience as well as it allows to see how visitors interact with the website over time.

One of the main challenges of using web analytics data for UX improvement is that while the data might show the gaps in the website UX, a direct answer on how much users are satisfied with the website cannot be gotten by using analytics data only. Another challenge is the fast pace of website technologies development, which makes it hard for the web analytics industry to keep up with the progress in order to provide a wide range of metrics which can be tracked.

Keywords	user experience, customer experience, design thinking, web analytics, digital measurement

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1 Introduction

1.1 Background

Nowadays, it is hard to imagine modern life without websites. When someone gets interested in a brand, one of the most common decisions to learn more about it is to find the website of the company. According to Hosting Facts, there are 342 million registered domain names registered around the world as well as there are 1.94 billion websites published in the world. It means that for businesses of today's world, having a website is the new normal while for the people it is the new normal to check information from the websites.

Having a website, however, it not enough and it some cases it might only hurt a business. Nowadays, website is a "face" of the business and how visitors feel about it will depend on how they feel about the business. If a visitor had a bad experience, there is 88 percent chance (EConsultancy, 2012) that he or she will never return to the website. For this reason, website User Experience (UX) plays an important role in the website design process.

The aim of this research is to gain an understanding of how web analytics data is used by the web designers for UX improvements as well as how such data can show the gaps in the website UX.

Throughout the research, the author will answer the following questions:

1) What is the view of designers on analytics data?

- How important the website UX is?

2) How can analytics data be used in UX improvement?

- How does analytics data can help to improve the website UX?
- How the gaps in UX can be seen in the analytics data?

2   Literature review

2.1   Introduction

In order to carry out a research, it is important first to analyze the theoretical concepts which are relatable to the topic of User Experience.

The first part of the literature takes a reader through the concept of Customer Experience and the frameworks for mapping it out. Then, the Design Thinking concept is explained as Design Thinking goal is to understand the feelings and expectations of customer and is related to the Customer Experience and UX.

The second part of the literature review is dedicated to the in-depth look into the UX itself, its definition and what a good UX is like.

As this thesis is focused on the website UX, the final part of the thesis is dedicated to the Web Design and Digital Measurement tools and frameworks. The reader will learn about the components of a good Web Design and how Digital Measurement on the websites is performed.

2.2   Customer Experience

Understanding customer experience is critically important for businesses of today. Nowadays, as the technologies keep developing at a fast pace, customers get to interact with a company in more and more ways through different channels, making customer experience more social. Businesses need to plan thoroughly how companies represent themselves at every point it interacts with the potential customer.

It is challenging to define Customer Experience in one way. Abbott (1955) and Alderson (1957) have were claiming that something what people really desire are not products but satisfying experiences.(Abbott 1955, p. 40) One of the modern ways to look at the Customer Experience was introduced by Zarantonello (2015), who proposes that every service exchange in any form can be called as Customer Experience.

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Knowing what Customer Experience of a brand looks like gives a valuable insight on what are the main areas of focus in the User Experience improvement process. For this reason, designers often draw a customer journey map, which helps to understand the steps of how a customer becomes aware of the brand and interacts with it later on.

2.2.1   Customer journey map

Harvard Business Review defines customer journey as the process of people moving from the point of having a need in something to purchasing a service/product and being loyal to the brand after that. (HBR, 2010)

Through the fast development of multi-channel digital services and information sources, these days anyone can get practically any information about anything on the internet, including information about products and services he or she is interested in. That led to turning the customer journey from a linear and straightforward process into a complicated one. For a business to understand it, the customer journey mapping is used. Customer journey maps show through which stages of a buying process customers go and what are the touchpoints with the brand at each these of the stages.

Customer journey map consists of three main stages which are pre-purchase, purchase and post-purchase stages. (Tsiotsou & Wirtz, 2015)
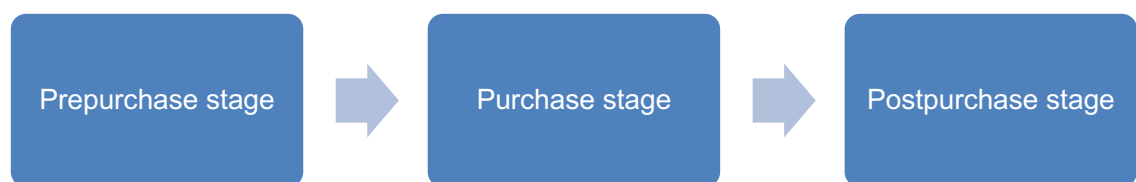

Figure 1.   Customer Journey stages

2.2.1.1   Pre-purchase stage

The pre-purchase stage includes all interactions with the company before the purchase itself happens. From the customer side, at the pre-purchase stage, a potential customer goes through such stages as need recognition, research, and consideration. At this

stage, a potential customer realizes the need for a product or service, does research on how his need can be satisfied and learns about what can be offered in the market and what are alternatives.

2.2.1.2   Purchase stage

During the purchase stage the direct interactions with the companies are happening. A potential customer learns about product and what the offer could be like and then makes a decision whether to proceed with a purchase or not. (Tsiotsou & Wirtz, 2015).

2.2.1.3   Post-purchase stage

Post-purchase stage includes interactions with the brand after the purchase has been made. From the customer side, he goes though the stages of using the product, brand loyalty development and optionally engaging with customer service. At this point, product/service quality becomes the most important as the interaction with the brand itself is not usually happening at this stage unless there's a need in using customer support services. (Tsiotsou & Wirtz, 2015).

2.2.1.4   Touchpoints within the customer journey

During the customer journey process, a potential customer engages with the company on several levels and different stages. Lemon and Verhoef (2015) defines four main types of touchpoints: brand-owned, social, partner-owned and customer-owned.

Brand-owned touchpoints are the ones that brands have control over. These can be advertisements, a website, and marketing campaigns. (Lemon and Verhoef 2015, p.76)

Partner-owned touchpoints are sub-controlled by third-parties. Brands still have sub-control over these touchpoints by request, but central control over them goes to marketing agencies and other service providers. (Lemon and Verhoef 2015, p.77)

Customer-owned points are the ones which brands have no control over as customers go through them themselves by thinking about the suitability of brand offering or choosing the payment or delivery method. These touchpoints are quite common at the beginning

of the customer journey at the pre-purchase stage when the need is being defined, and possible solutions are being researched. (Lemon and Verhoef 2015, p.78)

Social/external touchpoints aren't directly owned by brand, but brands' customer experience for other customers plays a critical role here. Social touchpoints include communicating with other brand customers, getting feedback from trusted peers and reading reviews on product/service. (Lemon and Verhoef 2015, p.78)

However, knowing touchpoints alone is not enough in order to provide a good User Experience. It is important to "connect" with the customers and to understand their expectations first. One of the ways to do that is to apply Design Thinking methods.

2.3   Design Thinking

Design Thinking is a compelling way of thinking, that can help to find a solution to many challenges. It is used a lot by companies and web designers as a way to understand the customers and their expectations, which later on would help to improve the UX.

One of the first adopters of Design Thinking approach was an American psychologist Herbert Simon, who described the concept of Design Thinking in his article "The Sciences of the Artificial" (1969). He claims that Design Thinking can help to solve complex problems extraordinarily.

Another view on design thinking was introduced by Tom Brown, the founder of IDEO and the author of the book "Design Thinking", known by the public as "the father for Design Thinking". He defined Design Thinking as a discipline that uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity. (Brown, 2008) In this section, the author will describe Design Thinking from his perspective.

2.3.1 Design Thinking Principles

In the book "Design Thinking for Strategic Innovation" Mootee described 10 main principles of Design Thinking, which define the idea of Design Thinking and how it differs from another traditional way of thinking. (Mootee, 2013)

Design Thinking is Human Centric. One of the main ideas behind User Thinking is that it is always concentrated on the users' needs. It can be achieved by thorough studying users, their behavior and needs. (Mootee, 2013)

Design Thinking is comfortable with change. It is disruptive and provocative by default as it approaches challenges differently and promotes outside-of-box thinking. (Mootee, 2013)

Design Thinking is Human Centric. One of the main ideas behind User Thinking is that it is always concentrated on the users' needs. It can be achieved by thorough studying users, their behavior and needs. (Mootee, 2013)

Design Thinking integrates foresight. Foresight allows to understand mystery of the future and try working with unknown. (Mootee, 2013)

Design Thinking is a dynamic constructive process. It shouldn't and cannot be stopped. It's an ongoing process of definition, redefinition and learning from the new experience. (Mootee, 2013)

Design Thinking promotes empathy. It put users to the center of the entire process and encourages them to communicate with users for a better understanding of their needs. (Mootee, 2013)

Design Thinking reduces risks. It allows taking into consideration all the factors that can affect the success of the product. (Mootee, 2013)

Design Thinking can create meaning. It can't tolerate tools which limit the possibility to communicate. Maps, models, and sketches, however, help to build the purpose, which can be achieved through conversations and multiple iterations. (Mootee, 2013)

Design Thinking can bring enterprise creativity to the next level. It creates an environment where trying out new things and embracing questioning is encouraged. (Mootee, 2013)

Design Thinking is the New "Competitive logic of business strategy." It's the most suitable for Porter's theory of competitive strategy. (Mootee, 2013)

2.3.2   Design Thinking process

Tim Brown suggests looking at the Design Thinking process more like at the system of spaces rather than a defined list of stages. The interactions within these spaces can seem quite confusing to those encountering it for the very first time but after it while it starts to make sense. These spaces can be separated into Inspiration, Ideation, and Implementation. (Brown, 2008)
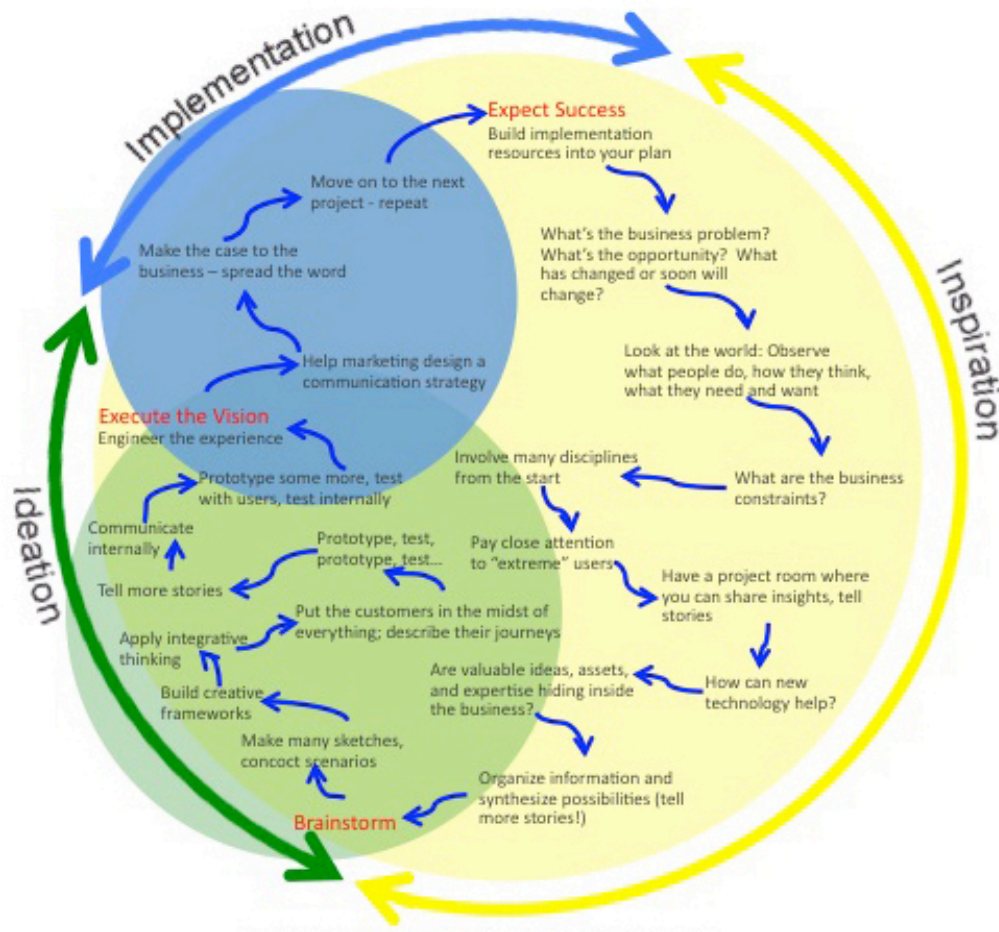
Figure 2.   Spaces of Design Thinking by Tim Brown (2008)

2.3.2.1   Inspiration

In the Inspiration phase, much attention is paid to collaborations. Different teams with different background and experiences work together on finding appropriate constraints for the project. At this phase, it is essential to think more broadly than just about your primary market. (Brown, 2008)

2.3.2.2   Ideation

The Ideation phase is the time when brainstorming takes place. Based on the findings from the inspiration phase, the design team creates as many sketches and usage scenarios as possible, keeping in mind users, their behavior and needs. Then, out of those many sketches, the most working ones are chosen, which now enter the

prototyping/testing process. This process includes testing within the team and potential users of a product/service, and only after that the project moves to the implementation phase. (Brown, 2008)

2.3.2.3   Implementation

The implementation phase revolves around creating a marketing strategy and applying it, to spread the news about new product/service. (Brown, 2008)

2.4   User Experience Design

2.4.1   Definition of User Experience Design

With the development of digital services and increasing internet connection covering the world, it has never been this easy to find needed information about a product. Online users expect better and better digital experience as using the internet became a part of the daily routine for millions of people. Knowing why visitors check a particular website or service can significantly improve visitors' experience with the service. That can be done by using UX design techniques in website design. (Paunovic, 2017)

Shedroff (2006) defines user experience as the overall experience, in general, or specifics, a user, customer, or audience member has with a product, service, or event. From the user side, user experience doesn't form immediately. As a person first encounters some product, he or she informs the first impression of it. However, as a product becomes more familiar over the usage time, the actual and objective opinion about product forms.

2.4.2   UX Process Lifecycle

According to Hartson and Pyla (2012), UX Process lifecycle consists of four main activities, which are applicable for any design, no matter whether it's a hardware design or web-design. These activities are Analyse, Design, Implement and Evaluate or analysis, design, implementation, and evaluation.

A considerable part of the process lifecycle is an evaluation, which is shown in the Figure 3. Every activity within the process lifecycle is being evaluated, such as testing, inspecting and analyzing before pushing it into production.
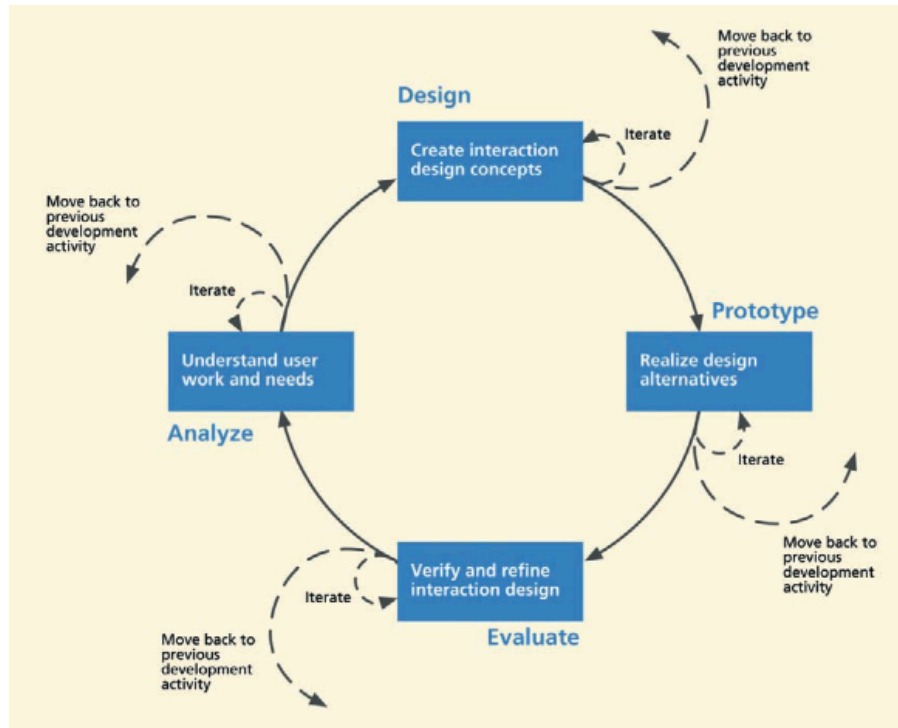
Figure 3.   Evaluation in the UX Process lifecycle according to Hartson and Pyla (2012)

2.4.2.1   Analyze

The analyze stage is all about understanding users and their needs. Two general activities at this stage include contextual inquiry and contextual analysis.

During the contextual inquiry process, customers undergo through the detailed study, to determine their behavior, triggers and behavior patterns. Contextual inquiry is usually made through user interviews and user observations. (Hartson and Pyla, 2012)

Contextual analysis is the process of analyzing information obtained through the contextual inquiry process to find out the work context for a product. (Hartson and Pyla, 2012)

2.4.2.2 Design

After the data from the contextual analysis is processed, the design stage starts. Some of the activities at this stage include design ideation and sketching and design as well as design production.

During the design ideation and sketching, based on the interviews and user observations, the mental models and design storyboards are being presented, which translate user behavior into a list of places, where the current design is lacking and how it can be improved for a better experience with the product. (Hartson and Pyla, 2012)

Design production applies all above mentioned models and boards into real prototypes and physical mockups of a design of a product. (Hartson and Pyla, 2012)

2.4.2.3 Prototype

At the prototyping stage, the main focus is set on creating different design alternatives.

While designers work on different design ideas, they produce a lot of different prototypes, which can be created for different purposes and with a different level fidelity. Some of the examples of such prototypes can be paper models (low-fidelity) or visual, high-precision prototypes (high-fidelity). (Hartson and Pyla, 2012)

2.4.2.4 Evaluate

Evaluation stage is concentrated on verifying and refining the interaction design, developed from prototypes. Before pushing the design into production, the product designers need to be checked once again to make sure that all the requirements are included in the design and all user needs are met. In order to refine the design, rapid evaluation and fully rigorous methods can be applied. (Hartson and Pyla, 2012)

Rapid evaluation methods are mostly to use for finding qualitative data in situations, when the UX problems, which are cost-effective to fix, can be found. This kind of information can be obtained through designs walkthroughs. Rapid evaluation methods are usually less formal and with fewer implementation rules. (Hartson and Pyla, 2012)

Fully rigorous methods allow checking whether the UX targets have been achieved and whether UX design goes in line with the business objectives. It's usually done by the project team, working on that UX design project. (Hartson and Pyla, 2012)

2.4.3   User Experience Components

A good user experience consists of several components, which are all taken into consideration when working on the UX design. The components are Brand, Friction and Flow, Predictability, Consistency, and Viability. On the picture below you can see, that these components can be ordered from the least important - Brand to the most important one – Viability. (Davis, 2017)
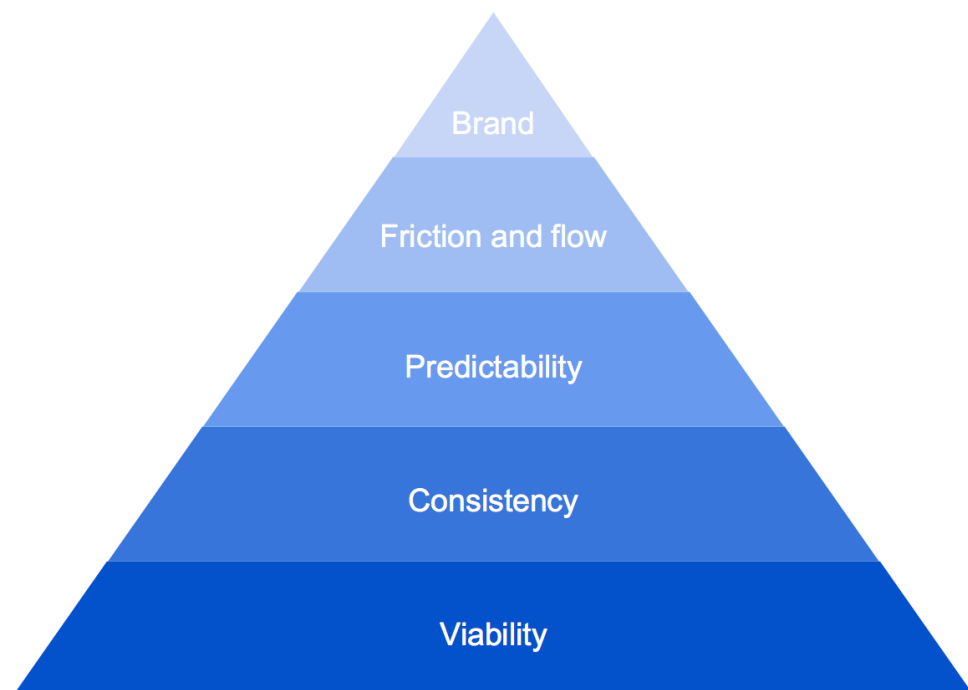
Figure 4.   Five components of the User Experience.

2.4.3.1   Viability

Every product/service with a good UX should have enough viability for comfortable use by users. For example, if a website has a "contact us" form but doesn't have mandatory fields such as request explanation, users might put this information into other fields. This means that the UX wasn't thought through when designing the website and it lacks viability. (Davis, 2017)

2.4.3.2   Consistency

Consistency is another critical component of good UX. That means that the product or service shouldn't have any "surprises" for users and done the same way throughout. In website UX, it means that the same button shouldn't have several different users on different pages of the website or the layout of web pages should be the same throughout the whole website. (Davis, 2017)

2.4.3.3   Predictability

Predictability components determine how self-explanatory design is from the UX point of view. For example, the website might have a complicated sign-up system, which might be hard to understand for those doing it for the very first time. It is essential to make all processes clear and easy to understand. (Davis, 2017)

2.4.3.4   Friction and Flow

Good UX also needs to be structured so that it would facilitate the flow or create friction. Flow makes processes go smoother and simpler. For example, in website development, an example of flow could be showing local information on the website according to the region. As for friction, the example could be making a call for more details instead of filling up a contact form. (Davis, 2017)

2.4.3.5   Brand

Proper branding is the most crucial component of good UX. Users will have better UX when brands act more "alive" than just a company name. Businesses should continuously work on improving brand awareness and improving loyalty to the brand. In website development it could mean, for example, making personal suggestions for each user based on his profile and past actions. (Davis, 2017)

2.4.3.6   User Experience Research Methods

There are many User Experience Research methods available, which are done in different ways and bring different results. It is essential to choose the right techniques for the research which will help to achieve the research goal.

It is helpful to view these methods in a three-dimensional framework: Altitudinal vs. Behavioural, Qualitative vs. Quotative and Context of Use. (Rohrer, 2014)
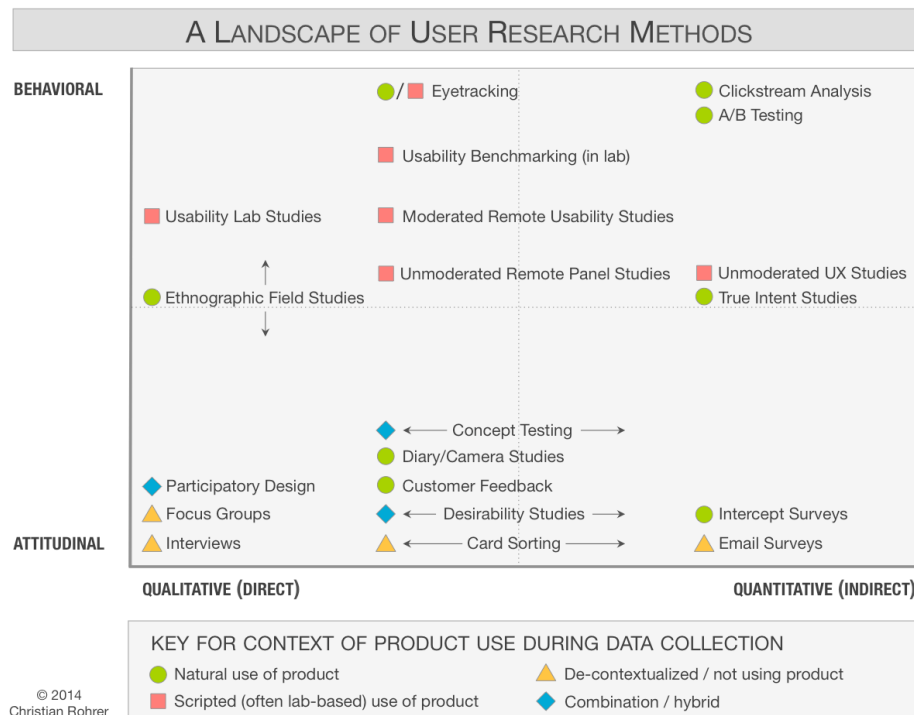
Figure 5.   A Landscape of User Experience Research Methods (Rohrer, 2014)

2.4.3.7   Attitudinal vs. Behavioural

Attitudinal methods are concentrated on learning about people's thinking process and reasoning. This information is essential for designers as the design can be adapted to the process of users' thinking.

For example, these methods include card sorting, which helps to understand better users' mental model, surveys, which help to measure and categorize attitudes and focus groups, which help to understand user's opinions about a brand or product concept.

Behavioral methods, however, are focused on learning about the way users interact with the product or, in this case, the website. Some of the examples for such methods is A/B testing, which helps to understand, how small changes in the design of product affect

users' behavior and eye tracking which helps to understand the way users visually interact with the interface. (Rohrer, 2014)

2.4.3.8 The Qualitative vs. Quantitative

The difference between qualitative and quantitative methods is more noticeable here. Qualitative methods are built to collect information about behaviors and attitudes by observing their behavior directly. The example of such a process could be an open-ended survey question. Quantitative methods, in the meantime, are indirect and fetch the data, which will be analyzed later on through measurement or calculations. This can be, for example, data gotten through the analytics tool, which is represented by different numbers, which will be further studied by the analytics professionals. (Rohrer, 2014)

2.4.3.9 The Context of Product Use

This dimension depends on whether the service or product design is being researched. It can be separated into natural or near-natural use, scripted use, not using the product, hybrid of uses. (Rohrer, 2014)

2.4.3.10 Natural use

When it comes to the natural use of the product studies, it allows seeing how the product would be used in real life. This kind of research is usually as little scripted as possible. (Rohrer, 2014)

2.4.3.11 Scripted use

Scripted use is used in the research when there's a need to research specific parts of the usage process. In this case, the use cases are scripted in advance with the degree of varying depending on each situation, and the participants of the study should follow these cases. (Rohrer, 2014)

2.4.3.12 Hybrid use

This kind of studying combines several uses in one study. For example, participants of the study could be involved in the redesign process in order to understand how the needs

of the users can be met better. Another example could be the application of concept-testing methods, where the concept of a product or service that could improve the UX will be proposed to the focus group with the goal to understand whether it will attract any interest. (Rohrer, 2014)

As websites are an important part of the overall customer experience, keeping UX in mind is critical when working on the website design in order to provide visitors with the most relevant information in the least complicated way. For this reason, these two processes should go hand in hand when developing the website.

2.5   Web Design

With the Internet connection coverage growing around the world and becoming one of the main distribution channels nowadays, the number of websites is growing at a fast pace too. According to Domain Name Stat (Domainnamestat.com, 2019), there are more than 318 million domains registered on the Internet. Most of these domains represent a webpage, which has its purpose, structure, and design. In such a fast-growing industry, good web design is becoming a crucial factor, which determines how many visitors will stay on the website and how many later on will turn into customers.

Jennifer Kyrnin defines Web Design as:

> "The planning and creation of websites. This includes many separate skills that all fall under the umbrella of web design. Some examples of these skills are information architecture, user interface, site structure, navigation, layout, colors, fonts, and overall imagery." (Kyrnin, 2018)

Just like in Product Design, User Experience plays a critical part in the Web Design. No design will help to turn website visitors into customers if UX of the website if it is entirely different from the visitor's expectations. There are several principles of UX in Web Design that make websites easy to understand and navigate.

2.5.1   Components of web design

Web Design doesn't only mean how a website looks like. It covers the overall look & feel of the website. Web Design can be separated into three components: Aesthetic Design, Information Design, and Interface Design. (Ta'eed, 2008)
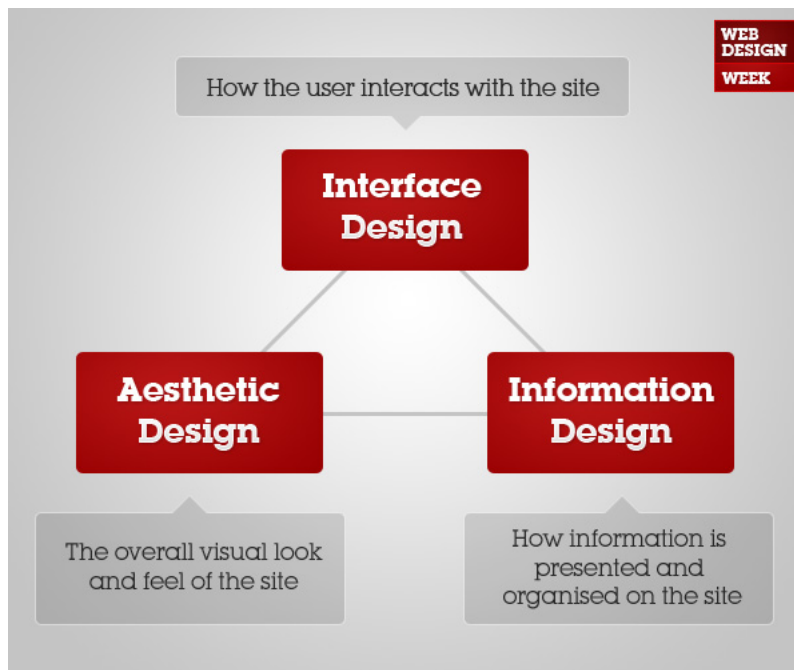
Figure 6.   Components of Web Design

2.5.1.1   Aesthetic Design

Aesthetic Design covers that part of web design, that ensures that the website is appropriately designed. Different websites are built for different purposes and transfer different messages. It is essential that web designers don't go for every web design trend and apply them on their website right away but rather think more how it reflects on brand's message and whether it improves its delivery to the website visitors. (Ta'eed, 2008)

2.5.1.2   Information Design

Information Design is all about the right structure of the text on a website. When visitors come to a website, the main reason why they come is to find the information they need. Information Design techniques include the use of graphical content, headings and sub-headings for the possibility of skimming through the text. (Ta'eed, 2008)

2.5.1.3   Interface Design

Interface Design covers the part of Web Design that includes arrangement of elements of the website and how a user interacts with them. A good website interface is the one, which is initiative, practical and easy to navigate. It is important for web designers to remember that every element on the website should have its reason to be there. (Ta'eed, 2008)

2.5.2   UX in Web Design

Just like in Product Design, User Experience plays a critical part in the Web Design. No design will help to turn website visitors into customers if UX of the website if it is entirely different from the visitor's expectations. There are several principles of UX in Web Design that make websites easy to understand and navigate. (Ta'eed, 2008)

2.5.2.1   Landing Page

Most of the times, the first page which users see on a website is the main page. The right organization of this page is critical to keep visitors on the website as the first impression will be built based on the main page content. It is advised that the main page should be able to capture the attention of visitors. It can be achieved by implementing good, minimalistic design with the relevant content blocks, such as videos or animations. (UX Planet, 2018)

2.5.2.2   Rethink the Content

Quite often, web designers try to squeeze as much content on a page as possible. This is not the right strategy. Having a lot of heavy text can negatively affect the UX as most of the time visitors skim through the text rather than read it thoroughly. In this case, quality goes over quantity. Texts should be created with precise sentences, separated with appropriate headers, and the use of graphical content makes it easier to comprehend the main idea. (UX Planet, 2018)

2.5.2.3   Live Chat

Nowadays, users don't want to wait. Same applies to customer service: people want to know an answer to their questions here and now. Having a possibility to contact a customer service representative is, practically speaking, essential for a website, which strives for the excellent User Experience. It can be used for reaching out to the company by potential customers, price inquiries, job opportunities or even customer feedback. (UX Planet, 2018)

2.5.2.4   Micro Animations

Micro-animations are usually small animations around the website, which make interaction with web pages smoother and eye-pleasing and, hence, help to improve UX on the website. (UX Planet, 2018)

2.5.2.5   Sweet Spot Between Uniformity and Variation

Choosing the right, UX-friendly layout for the website is one of the big pains for web designers. If a website has more than 1 page, it is important to define several layouts, which will be distributed throughout the website. Too many different layouts, however, can affect website and UX on the pages negatively. (Pines, 2018)

After the website is built and its design is finished, another big question which arises is how the success of the website and UX efficiency can be measured. Nowadays, the industry of digital measurement is developing at a fast pace, which can provide a lot relevant website performance data.

2.6   Digital Measurement

Why measure? This is a common question asked in the beginning of the road to the brand's digital development. Ultimately, digital measuring is an essential process that allows noticing the gaps which prevent businesses from reaching their goals. The Web Analytics Association (WAA) defines it as:

"The process of measurement, analyzing and usage of the digital data for better understanding and improving web usage."

As website development industry doesn't stop growing, marketing strategies and websites also require constant optimization. First impression matters so when website visitors notice that the site is poorly done technically or content-wise, the chance of potential customers turning into actual customers decreases significantly. This is when digital measurement comes into play. By analyzing the behavior of customers on the website, it becomes possible to see what exact reasons why visitors might be not proceeding to the purchase stage. It could be page loading speed, too long text or website design fault. All of those is the most important and useful data, which can be used for the UX improvement.

2.6.1 Digital Measurement Tools

All digital measurement tools can be separated into two main types: offsite tools and onsite tools

Offsite tools measure a company's impact on the internet environment outside of the website. For example, they can estimate the number of brand's mentions in socials or measure the size of potential audiences.

Onsite tools work the other way around by concentrating on the website visitors' behavior within the business's website. The data which they measure shows how visitors navigate through the site, how much time they spent on it, what pages they visit the most and a lot of other data which helps to understand how well a website performs. Google Analytics is the most common onsite tool for measuring website traffic, so the author will concentrate on it in this thesis.

2.6.1.1 Google Analytics

Google Analytics is a free statistics software, created by Google. One of the main benefits of Google Analytics is it allows to track the customer journey from the moment a visitor enters the website to the product/service purchase moment. The main three areas of Google Analytics tracking are Acquisition (where did the visitor come from), Behaviour (how the visitor interacts with the website) and Conversion (the goal reaching

moment). Knowing the data from these three areas gives endless opportunities for the UX improvement. (MonsterInsights, 2019)

2.7   Metrics choice and measurement

While it is important to use web analytics data for UX, it is also critically important to choose the right metrics out of a wide assortment. The ex-google designer Kerry Rodden suggested two frameworks, which would help to choose the right metrics to track.

2.7.1   The HEART framework

There are many different metrics available nowadays for tracking. But what they actually measure? The HEART framework, created by Google, helps to understand what kind of user behavior different metrics measure. The main idea behind the HEART framework is the fact that most of the UX metrics which are usually being tracked fall into 5 big categories: happiness, engagement, adoption, retention and task success. (Rodden, Hutchinson and Fu, 2010)

Category	Category description
Happiness	The measurement of happiness is usually done through surveys, which can tell about user satisfaction with a product/service and the ease of product/service use. (Rodden, Hutchinson and Fu, 2010)
Engagement	Engagement category shows how much the users are involved into a product/service. Metrics which fall under this category usually show frequency, intensity, or depth of interaction with a product/service. In the case of website analytics, such metrics can be the visit frequency, visit duration or the number of pages viewed per visit. (Rodden, Hutchinson and Fu, 2010)
Adoption	Adoption metrics show how many new users has the product/service acquired over the period of time. For websites, one of such metrics can be the number of new visitors over the period of time. (Rodden, Hutchinson and Fu, 2010)
Retention	Retention-related metrics show how much users are willing to visit the product/service again. In the web analytics, one of such metrics can be a user retention rate over a period of time. (Rodden, Hutchinson and Fu, 2010)
Task Success	Task success metrics measure how much it takes a user to finish a certain task. Web analytics metrics of this kind can be the conversion rate over a period of time, or how long it took to reach a certain page or to fill a sign-up form. (Rodden, Hutchinson and Fu, 2010)

Figure 7.   The HEART framework

It's not necessary and even not advised to track metrics from all five categories. Rodden suggests that the choice of the metrics should be based on the goal of the project. For example, a small startup might be concentrated on brand awareness and user acquisition, so they would want to track the number of new website visitors and the sources they come from. For the bigger companies, however, it might be relevant to track new visitors but rather how deeply the visitors go into the website and how well they visitors convert in potential customers. (Rodden, Hutchinson and Fu, 2010)

2.7.2   Goals – Signals - Metrics framework

After metrics categories are defined, it is time to move on to the actual choice of metrics. In order to define them, it is important to look at the UX improvement project through through levels: goals, signals, and metrics. (Rodden, Hutchinson and Fu, 2010)

2.7.3   Goals

At this point, it is important to figure out what are the final goals which need to be achieved. Should it be the improved content on the website? Or maybe layout change? It is important to define smaller goals as it would bring the most accurate results and, hence, would help to choose the metrics are actually needed for the project. (Rodden, Hutchinson and Fu, 2010)

2.7.4   Signal

After the goals are chosen, it is time to move to the next stage, where certain points of action or, so-called, signals need to be identified. Later in the UX improvement project, these failed or succeeded signals will be used to make changes in the website on a global scale. (Rodden, Hutchinson and Fu, 2010)

For example, if the goal of the project is to improve the conversion on the product description page, the signal for it could be a filled demo request, which will succeed if the form is submitted or fail if a visitor exists the page without submitting it. If that can be seen that visitors spend a considerable amount of time on the page but avoid demo

requests, then it could give a room for UX improvement of that page. (Rodden, Hutchinson and Fu, 2010)

2.7.5 Metrics

After signals are defined, it is possible to choose the most relevant to the project UX KPIs, which can be chosen by applying the HEART framework. (Rodden, Hutchinson and Fu, 2010)

3 Research Methodology

One can define research as a scientific and systematic search for pertinent information on a specific topic. In the business context, the aim of the research is to understand and establish the truth about certain phenomena by using scientific methods (Kothari 2008). There are three main types of research: quantitative, qualitative and mixed.

Quantitative research can be described as an approach for testing objective theories by examining the relationship among variables. These variables, in turn, can be measured, typically on instruments, so that numbered data can be analyzed using statistical procedures. (Creswell, 2014) Quantitative research usually revolves around a hypothesis analyzed and the final result of the search is either its confirmation or disconfirmation. Some of the methods of quantitative research include surveys, observation, and experimentation.

Baxter and Jack (2008, p.544) defined qualitative research as:

> "An approach to research that facilitates the exploration of a phenomenon within its context using a variety of data sources. This ensures that the issue is not explored through one lens, but rather a variety of lenses which allows for multiple facets of the phenomenon to be revealed and understood."

Qualitative research is appropriate when the primary purpose is to explore, describe or explain. (Leavy 2017: Chapter 1). This kind of research can include focus groups, interviews and case studies.

In comparison with quantitative and qualitative research, mixed research is a relatively new research methodology and it includes in itself parts of both quantitative and

qualitative methods. Creswell and Clark (2007, p. 5) define mixed research as a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative approaches in many phases in the research process. Studies, which are done by carrying out mixed method research usually combine both quantitative and qualitative data.

	Quantitative	Qualitative	Mixed Methods
Philosophical Assumptions	• Postpositive knowledge claims	• Constructivist, advocacy or participatory knowledge claims	• Pragmatic knowledge claims
Strategies of Enquiry	• Experimental designs • Non-experimental designs e.g. surveys	• Narratives • Phenomenology • Ethnographies • Grounded Theory • Case Studies	• Sequential • Concurrent • Transformative
Specific Research Methods	• Predetermined • Closed, instrument based questions • Performance, attitude, observational and census data • Statistical analysis	• Emerging methods • Open questions • Interview, observation, document, audiovisual data • Text and image analysis	• Both predetermined and emerging methods • Both open and closed questions • Multiple forms of data drawing on all possibilities • Statistical and text analysis
Motivations for selection	• Test a theory or explanation • Identify factors that influence an outcome • Understand the best predictors of an outcome	• Understand a concept or phenomenon due to insufficient or new research • Identify unknown variables	• Generalise findings to a population whilst developing a detailed explanation of the concept or phenomenon

Figure 8.   Three types or research

3.1   Research Plan

3.1.1   Interview

Interviews are one of the qualitative research methodic to obtain data. It can be defined as conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program or situation. (Boyce, C. & Neale, P.,2006) One of the benefits of using interviews for the research is the possibility to get

more detailed information about the research question. Also, during the interview, the interviewee can get a chance to clarify certain moments right away, which is hard to do when using other methods. However, it can be difficult to arrange an interview time which would be suitable for both parties.

The objects of this interview are web designers who are involved in the UX and their experience with using analytics data for UX improvement. The goal of the study is to understand the view of designers on the relation between UX and analytics data and how it's utilized. The interview will consist of three sections: general questions, UX perception, and UX improvement through analytics data.

The first section is the general questions section, which allows getting the basic knowledge about the company interviewee works at, e.g. what industry it operates, what is the target audience of the company and what is the role of the website in the company's operations.

The second section is concentrated on how the website UX viewed by the designers, how important it is in web design and what UX methods are used for UX mapping.

The third section of the interview is dedicated to the relationship between website UX and analytics data. The questions will help to gain an understanding of how the analytics data is used by web designers for UX improvement and what metrics they pay the most attention to.

3.1.2   Case study

In order to give a more in-depth answer to the research question, a case study will be performed. A case study is another method of qualitative research, which can be defined as:

> "Intensive study about a person, a group of people or a unit, which is aimed to generalize over several units". (Gustafsson J., 2017)

The case study for this thesis will be performed in a descriptive manner, which means that certain events will be analyzed after some period of time has passed. In this case, the google analytics data for the period of one year will be analyzed.

For the case study, the author chose the website of the Finnish B2B financial software company, which provides financial software for financial institutions around the world. (Further on, Company X). The company's website is the main source of information about the company and its software, hence, a good website UX is critical for the company. The goal of the study is to showcase how the UX of the company website can be improved based on the metrics analysis as well to give suggestions for improvement where needed. The case study will be done with the Google Analytics tool, and with the help of reporting functionality.

3.2   Limitations of the study

Throughout the study, the author encountered several limitations.

The lack of time didn't let to implement more extensive research. Tight schedule of the research led to getting a smaller sample size, which can make it difficult to make a general conclusion on the perception of analytics data by web designers.

In order to get the research done in a shorter time, the author used a so-called "convenience sample". When the convenience sample is used, the easiest to reach population members are chosen for the research. (Kotler & Armstrong 2012: 116) While this sample allows finishing the research earlier, the disadvantage of using a convenience sample is selection bias, which can affect the objectivity of the research.

The format of the research is another limitation the author encountered. Since the research is done for the bachelor thesis, it was not possible to perform a wide, in-depth research.

4   Research Results

4.1   Case study

4.1.1   Company X website role in the business

The website of the Company X plays a critical role in the company operations, as it plays both marketing, informational and internal documentation storage role. From the marketing side, all the company advertisements lead to the main pages or its separate pages with the ultimate goal to collet leads. From the informational point of view, the website includes several descriptions of the company's products and their functionality. From the internal storage side, company clients use this website as a way to access the Help Desk, which includes all software documentation. With this many different use cases, it is essential for this website to be UX optimized.

4.2   Why to perform a case study

The goal is this case study is to show how web analytics data can give insights on user behavior and how the UX gaps can be found.

4.3   Analysis process

For this case study, the author followed the HEART framework and chose to analyze several metrics from four out of five metrics groups: Engagement, Adoption, Retention and Task Success. The happiness part of the framework is skipped due to the fact that it is a qualitative method and isn't related to web analytics.

As a base for analysis, the company's data from Google Analytics from 16th of April 2018 to 16th of April 2019 was taken. The reasoning behind choosing this period is because several changes in the website have been done during that period of time, which reflected on the analytics data too.

The metrics which were analyzed are shown in the diagram below:

Figure 9.   Metrics which were analyzed in the study

4.4   Website Engagement

To measure how much website visitors are engaged with the website, the author chose to analyze the number of visits to the website vs visits length and number of pages viewed vs bounce rate.
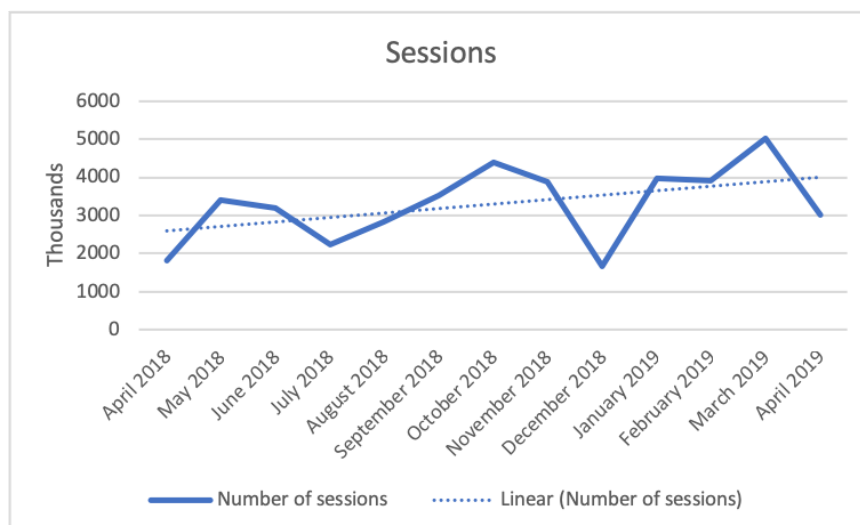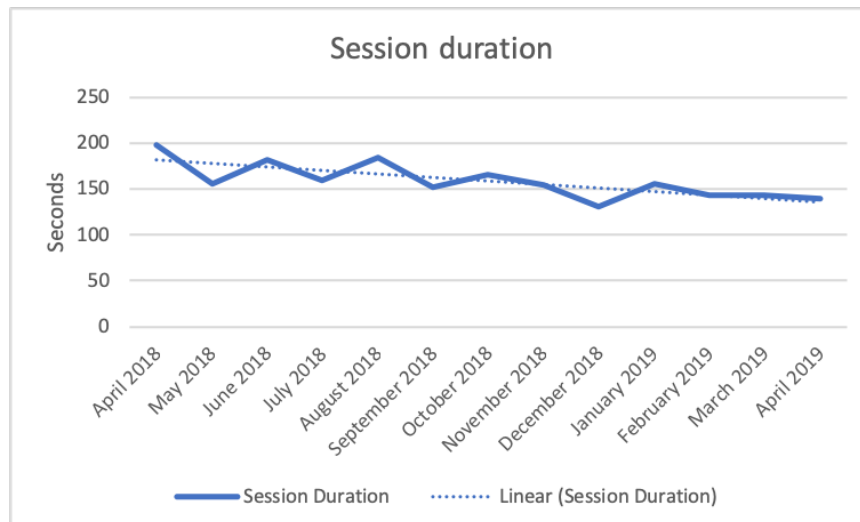

Figure 10. Website sessions

Figure 11. Session duration

The graphs above showcase the numbers of sessions and the average session duration by month.

When it comes to sessions, they were steadily growing throughout the year. There were periods when the traffic would drop e.g. summer holidays in July or Christmas holidays in December but those are a traditional pattern which can be seen every year. Pretty rapid growth has been noticed in March 2019 when the website became advertised more heavily but also more to the target audience, hence, the number of sessions has increased too.

The most surprising turned out to be the average session duration throughout the year. The diagram below shows a gradual decrease in the amount of time which users spent on the Company X website. If in April 2018 visitors would in average spend around 200 seconds on the website, in April 2019 visitors spent only around 150 seconds on the website, which is an almost one-minute difference.

This kind of opposite relationship could mean that even though the audience is growing, it is getting harder and harder to get visitors interested in the website content, which, of course, reflects on the overall website User Experience. Thankfully, there are two ways it could be fixed.

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The first way is to run the content analysis. With every year one of the growing expectations from website visitors is a clear, visual content which allows finding the necessary information faster. Company X could try to cut on the long text usage and add more visuals like images and videos where it's possible. Another way to keep visitors on the website to check the layout of the website as the current website layout hasn't been changed in over 3 years. Nowadays, websites need to have a clean, not overloaded with tabs or CTA's layout, which is easy to navigate.

4.5   Website adoption

In order to understand how "UX friendly" the Company X website is to the new visitors, a comparison between the number of pages per session for new visitors and returning visitors have been made.
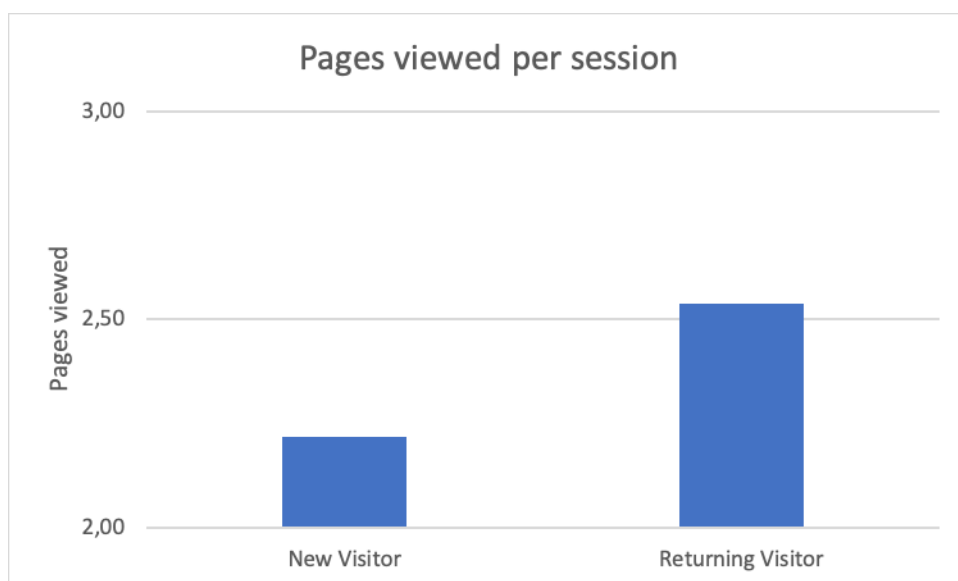

Figure 12. Pages viewed per session by new visitors and returning visitors.

As it can be seen on the diagram above, both new and returning visitors go in average 2-3 pages deep. From the performance point of view, the Company X website is doing good as it falls under the benchmark numbers for these metrics, which is from 1.8 to 5 pages viewed per session.

From the website UX point of view, the diagram shows that the website is adopted similarly well by both new and returning visitors, which is a sign that the website is done well structure wise, so visitors don't need to travel from page to page in order to find needed information.

4.6   Website Retention

Website Retention is important to know in order to understand how much visitors continue using the website after visiting it once.

Unfortunately, Google Analytics cannot show the retention rate, so some calculations have been needed. Retention rate is easy to find by dividing the number of returning visitors by the number of total website visitors. In the case of Company X, the retention rate is 15%.

User Type	Users
New Visitor	22585
Returning Visitor	4134
Total:	26719
Retention rate:	15%

Figure 13. Website Retention rate

One of the suggestions for Company X would be to take a closer look at this metric. From the website UX point of view, a lower retention rate can be observed when the needs of the website visitors are not met. One of the reasons why that could be happening because the website doesn't contain enough information visitors are looking. This problem can be solved by taking a closer look at the target audience and customer journey map for the better understanding of what kind of information visitors might be looking for at the moment when they end up on the website.

5 Task Success

One of the main functions of the Company X website is to collect leads, so that is the main task which has to be done by website visitors. So, knowing how well the website converts is critical. In order to figure it out, the number of conversions throughout the period are compared to the conversion rate.
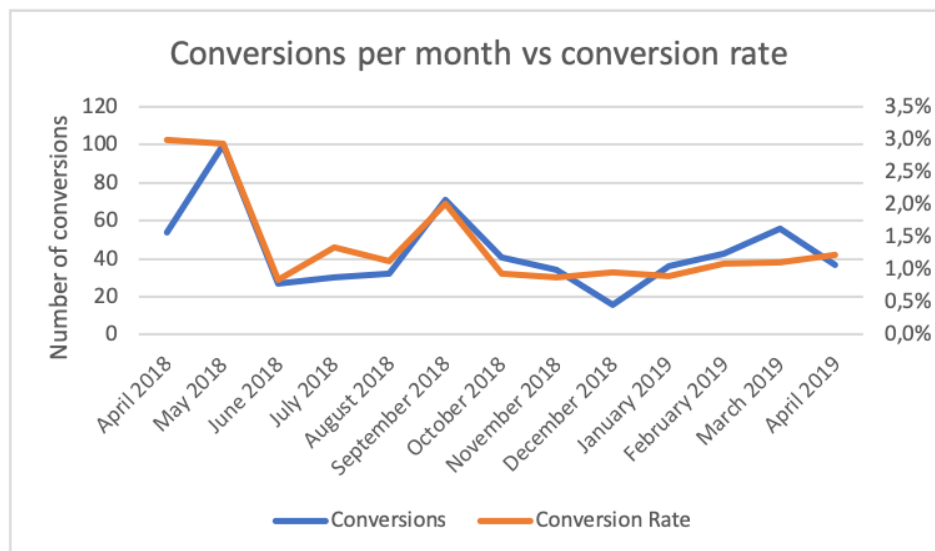
Figure 14. Conversions per month vs conversion rate

As can be seen from the diagram, both metrics have fluctuated a lot during the analyzed period of time. In May 2018 the number of conversions has reached its peak of 100 and never came back to the same level. Same goes for the conversion rate, which reached its maximum of 3% in May 2018 and then kept staying in the range of around 0.8 – 2.3%. This is a very important finding as such drops in conversions mean a definite issue with the website design from the website UX point of view.

As it is known that during the year a lot of changes in the design of the pages have been made, most probably it causes such a noticeable drop in conversions and conversion rate. Company X should make an audit of the website in order to figure out what exact changes in the design caused the conversion drop and make necessary adjustments to increase conversions again.

5.1   Conclusion

As the result of the analysis, it can be seen that there are some areas, where the Company X website UX could have been improved. Especially it concerns the content, which needs to go more on the visual side and web pages design, which needs to be analyzed again in order to bring the conversion rate to the level of April-May 2018.

Overall, Google Analytics succeeded in showing current gaps in the Company X website UX and proved to be useful for the website UX improvement process.

5.2   Interviews

There were two interviews conducted in order to understand how web analytics and UX are connected with each other in the eyes of those involved in web design.

5.3   Interview with a Chief Business Development Officer

The first interview has been carried out with Chief Business Development Officer (further – interviewee) in the Finnish B2B company, which offers a brokerage platform designed for brokering any kind of financial services. As it happens often in the smaller companies, one employee can play several roles, so in the case of this company, Chief Business Development Officer also plays the role of a designer for the website, and she is responsible for its performance. There were 13 questions in total asked, which help to understand how the process of UX improvement in the company is implemented and how UX efficiency is measured. The questions list can be found in the Appendix 1 section.

5.3.1   General knowledge about the company

The first set of questions was related to the company itself for the purpose of understanding its target audience and the role of website in business operations. The target audience of the company is a consumer or a SME looking to finding a suitable

financial service. For example, loan, mortgage, savings account, credit card, insurance, and so forth. The main role of the company's website is to target B2B partners (financial organizations, marketing agencies, media companies) to get more information about the company and lead collection. The company also has end-client facing websites, where the client actually fills in for example the loan application, which is highly crucial for the business as all the services are fully web-based.

5.4 Perception of UX and its challenges

The second set of questions was more related to the theoretical part of UX. The purpose of those questions was to understand how interviewee views the importance of UX in website design and what are the challenges of the website UX nowadays.

The interviewee shared that for her, User Experience plays a crucial part when it comes to websites as without good User Experience the customer/partner might not even understand what the company or the service could do for them and it never leads into sales.

For the interviewee, the most important features of a UX optimized website is that it's easy to use, it's straightforward and understandable for the target client. It's also important that it works across all devices. After these factors are in order, also it should be neat for the target client to use.

When it comes to website UX challenges, in her opinion, usually the ones building the websites are the experts in that industry and forget that the user of the website might not be, so reaching a certain level of simplicity is an issue. Also, from the technical side, how to make the site work fast but also scale to all devices and work flawlessly is another challenge.

5.4.1 Website UX improvement with web analytics data

The third set of questions was dedicated to the role of web analytics data in the company website improvement process and what metrics the interviewee usually measures.

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When it comes to using web analytics tools, the interviewee visits google analytics every day for metrics check as well as other tools provided by different marketing partners, plus database & database searches as well as their internally built analytics tool.

For the interviewee, the main goal of improving of company's website UX is to improve conversions, so the main type of metrics she tracks are the ones related to conversion improvement. She can easily see from the analytics how small changes are affecting the client behavior on the website.

Despite finding web analytics to be a good way to spot the website UX imperfections, there are still limitations of its use. In the interviewee's opinion, web analytics data does not tell explicitly about how the target client feels and experiences the website/service.

5.4.2   Conclusion

Overall, the interview gave a clear picture of how the importance of User Experience is viewed in smaller companies. It also helped to see that web analytics data takes a firm place in the company's website design process and it is a helpful source of understanding visitor's behavior despite its limit in understanding how visitors feel and experience the website. However, such data can be obtained by using another UX research methods – website satisfaction surveys.

5.5   Interview with the UX Designer / Developer

The second interview was carries out with the UX Designer / Developer from another Finnish B2B company working on presentation software. The same set of 13 questions has been asked to the interviewee.

5.5.1   General knowledge about the company

The company offers a presentation platform / app targeted at business and sales use. The company also provides presentation creation services using the platform. One of the main company website roles from is to help potential customers to reach out to the

company (through chat or contact requests), and for the company itself to find potential leads that can be contacted (e.g. through company IP address). Company's social marketing campaigns also often link to custom landing pages the website, helping to evaluate different marketing strategies. It's also a source of information about the app.

5.6   Perception of UX and its challenges

For the interviewee personally, website User Experience is quite a vast area and can start with how easy it is to even find the website. Essentially, it's a user's experiences, thoughts, feelings and response from doing or trying to do something, start to end. It's in most websites, apps and services' best interest to make sure that the user needs that overlap with the website or business goals have as good a user experience as possible, to increase retention and willingness to pay.

He also shared that different kinds of visitors will have a different view on an UX-optimized website. For example, intuitiveness and discoverability are very important for new users while for "seasoned power users", a steep learning curve may be okay if it results in high productivity. In either case, clarity and consistency, making things easy to recognize, is very important. Of course, the most important is that the user is satisfied and got something out of it, even if it's not exactly the need or goal that they had in mind.

When it comes to UX research methods used in the company, usually for improved features they rely on at least brainstorming, stakeholder discussions, prototyping and concept or usability testing. For the bigger picture they have a roadmap that's informed by our strategic goals and user feedback.

The interviewer also agreed that there are challenges existing in the website UX these days. One of them is that good UX takes time. He believes that a data-driven design methodology is very powerful and can create great results, but to get to reliable results you also need a great amount of data. As such smaller websites and services may be better off with focused user tests and expert reviews. Knowing when to pick one methodology over another can be tricky, not to mention that the experience and skills needed can be quite different.

5.6.1   Website UX improvement with web analytics data

In the case of interviewee's company, web analytics data analysis is still in the beginning of its development. Until recently, the analytics data was used in its limited form: which pages are visited how much, what types of devices are used, where are they from etc. However, the company recently improved their web analytics to provide more information. Some of the web analytics tools which are used in his company are Google Analytics and Leadfeeder. They're also currently testing such tools as Albacross and Freshmarketer.

For the interviewee, when it comes to improving UX then the most important thing is understanding where the users struggle. For this reason, he prefers to track retention and/or satisfaction can let measure how well you are doing on the whole compared to the past.

UX improvement has also affected the website design decisions in the past. One of the examples the interviewee shared was realizing that very few people scroll down on some pages have influenced what he put on the website higher up. Check device resolution and browsers also have let him drop support in the app for some small and outdated devices to the benefit of the majority.

Just like the first interviewee, this interviewee agreed that there are limitations of using the web analytics. It can be difficult, both knowing what to track, how to track it and what to do about it. Many of the standard tools, such as GA, don't even provide the detail you need by default. When it comes to dynamic one-page apps and websites you need even more custom code, as the pages aren't static.

5.6.2   Conclusion

Overall, the interviewer gave a lot of insights on the position of UX in his company. He also made an interesting point that different kinds of visitors will have a different definition of an UX-optimized website.

6   Discussion and Conclusion

The purpose of this research was to understand the importance of the optimized User Experience on the website and how it can be improved with the help of web analytics data.

The research began by taking a look at the literature review on the web design, digital measurement and user experience. After analysing several books, articles and journals on the topic, the author noticed that there's one common goal in all cases: to make the user, visiting a website, stay and get interested in the business's product/service. Therefore, web design and UX are closely related in a way that a good web design result in a good UX

Based on the interviews carries out, the author can conclude that nowadays companies care about website UX and are familiar with its concept. As the company website often used as a place for getting potential customers, businesses realise nowadays, when almost every company has a website, it can be possible to stand out with a flawless website UX.

The research results also indicate web analytics data can be a valid, useful source of information for the website UX improvement. It can be used for seeing how visitors interact with the website, which pages are the most interesting for them and which ones need further improvement. However, there are still limitations on web analytics data usage. While there are several kinds of metrics which track visitor's all visitor's behaviour from the page a visitor entered to the page which from it exited the website, analytics data can't show where and why visitors struggle as this kind of data can be only obtained by conducting a survey or interviewing a visitor.

There are many different web analytics tools in the market, but the overall data analysis is still in the development stage. It is hard for the industry to keep up with the websites, which use more and more complicated technologies.

To summarise, improving User Experience is an important part to take into consideration when working on the website design and one of the ways to do that it to use web analytics data for tracking visitor's behaviour.

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Interview questions, 13 questions:

General knowledge about the company

- Could you introduce yourself? What is your role in the company?
- What is your company offering? What is the target audience for the company?
- What role your company's website is playing in the user acquisition process?

Perception of UX and its challenges

- How would you personally define User Experience and its importance in web design?
- What for you are the features of the UX optimised website?
- What UX methods are you usually following?
- What, in your opinion, are the biggest challenges of website UX nowadays?
- Have you ever done the UX research on your website?

Website UX improvement with web analytics data

- Have you ever used or using web analytics data for the website UX improvement?
- How often do you check your web analytics data? What tool(s) are you using?
- When it comes to website UX improvement, what metrics are the most important to track in your opinion? (or what metrics are you tracking for website UX improvement?)
- Do you have an example how web analytics helped you to improve website UX? Could you give one?
- In your opinion, what are the challenges or limitations of using web analytics for website UX improvement?

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