Creating personas from online discussion logs

Case study: Bitcoin users

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Presented: VT 2015
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Sammanfattning

"Personas" är användbara redskap som används för att öka kvaliteten vid design av användargränssnitt, och de kan skapas utifrån flera olika typer av användarstudier. Emellertid kan det vara förenat med svårigheter för designers att nå ut till relevanta användargrupper. Det är också tidsödande och resurskrävande att förbereda intervjuer och observationer med användare för att få fram den precisa informationen som behövs från insamlade data. Dessutom kan det vara svårt för användare att erinra sig viktig information om de inte ombeds föra dagbok.

Denna uppsats syftar till att föreslå en alternativ typ av användarstudie genom att ta reda på om diskussions-forum på Internet kan erbjuda den information som är nödvändig för att konstruera Personas. En ny metod bestående av ett antal procedurella steg för att analysera innehållet i diskussions-forum presenteras och implementeras på användargrupperna kring Bitcoin-teknologin och dess användning.

Resultatet visar att loggar från online diskussioner utgör en rik informationskälla som väl lämpar sig för att konstruera Personas. Slutligen presenteras en segmentering av användarna kring Bitcoin i fem stycken väl utvecklade Personas.

Abstract

Personas are useful design tools that are used for improving the quality of the design and they can be created with the help of various user research methods. However, it is hard for designers to reach out the relevant group of users. Also, it is time and effort consuming to set the interviews & observations with the users and pull the precise information from the gathered data.

Moreover, users can recall a limited amount of their memories when they are asked unless they are keeping a diary. This study aims to suggest an alternative user research method by figuring out if the online discussions are capable of supplying the necessary information which will be the basis for the Persona. As a result, a set of procedural steps are designed for analyzing the online discussion content and it is implemented to a case where the community is trying to develop the Bitcoin technology and its usage.

It appeared that discussion logs are such a rich source of information which covers the necessary input for Personas. Finally, Bitcoin users are segmented and five vivid Personas are created.

Index

1. Introduction

Some studies and theories demonstrate that using some design and research methods for understanding and considering users carefully throughout the design process improves the quality of the end product. Persona is one of the effective design tools for tailoring the service according to user's motivation, behavior patterns, goals and needs. It is used as a communication tool and it builds empathy with the user. But there is no cookbook for creating Persona and Personas are created based on research as well as taking designer's observations and imagination into account.

The research method which brings the necessary information for the Persona creation process can be time consuming. Also, finding the right participants from all over the world might not be possible. So, the research process should be alternated regarding the sources of the project such as time or the possibility to access to users. In fact, social media platform would supply some useful information about the users; but there is no systematic attempt to show that social media content can cover all the necessary information that is needed to create a Persona.

This study aims to explore to what extent social media content would satisfy the required information for creating a Persona. Therefore, the function of the Persona is questioned and what type of information needs to be collected is defined. Then the qualitative content analysis method is used and some discussion logs are analyzed.

Bitcoin used as a case. Bitcoin is an open source project and the community shape the technology with the help of the online discussions. Moreover, discussions take place on a social media platform namely Reddit and it enables researchers to access all the previous comments of a user.

2. Background

2.1. User centered system development

Industrial designer Victor Papanek defines design as a conscious and intuitive effort to impose meaningful order (Cooper, Reimann & Cronin, 2007). Similarly, the software creation process is an intentional activity and it is far beyond creating a random collection of features (Norman, 2004). So, good designers reject the features that do not fit and accept the ones that do in order to serve a clean and coherent service.

Such a thoughtful attitude requires empathetic focus: planning and executing according to users' needs, motivations and contexts (Norman, 2004). In this context, 'empathetic' means the ability to relate ourselves with the users. Empathy removes the illusion that users are acting, thinking, feeling in the same way that we do. In this context, 'focus' expresses the concept that functions should be defined according to the requirements of the users rather than arbitrary ideas of the team.

One of the approaches to define requirements of a system is to apply requirement engineering (Scneidewind, Horold, Mayas, Kromker, Falke & Pucklitsch, 2012). Requirement engineering takes results from platform, tasks, context of use. The users are taken into account regarding their roles in the organization and a role is defined through a specified task or a group of closely related tasks

(Scneidewind, Horold, Mayas, Kromker, Falke & Pucklitsch, 2012). However roles aren't useful enough when it comes to understanding the needs and behaviors of the users (Hudson, 2013; Scneidewind, Horold, Mayas, Kromker, Falke & Pucklitsch, 2012). Because roles tell us what kind of tasks that user needs to accomplish but they don't describe when and how these tasks are performed (Hudson, 2013). Also user roles are not vividly modeled: it is hard to imagine what users' motivation and context of use is (Scneidewind, Horold, Mayas, Kromker, Falke & Pucklitsch, 2012).

Another attempt to define requirements is to ask users what type of functions do they need or desire (Cooper, Reimann & Cronin, 2007). But the answer might not reveal all of the improvement possibilities. Because users' thinking process does not cover all of the potential situations: most of the users tend to focus on low-level tasks or workarounds to product flows when they are asked such a question (Cooper, Reimann & Cronin, 2007).

In addition to defining the requirements, it is important to design an engaging and enjoyable experience. Carrying a task shouldn't demand users to think in the same way that the designer does; since it would require too much effort from users to fit in the designer's mental model and such a rigid structure would prevent users from operating efficiently (Cooper, Reimann & Cronin, 2007). In addition to efficiency aspect of usability, a bad design can retain users to achieve their goals and decrease the quality of the effectiveness (Cooper, Reimann & Cronin, 2007). For example taking wrong design decisions can cause users to make big mistakes: users can trigger dangerous commands if these commands are presented on the wrong place.

When all of the potential users are taken into account, logic can tell designers that implementing all of the possible functions to the product would satisfy everyone's needs (Cooper, Reimann & Cronin, 2007). However, trying to fulfill everyone's need is more likely to end up with satisfying no one's need; since each feature creates cognitive load and it makes it harder to navigate in the system (Cooper, Reimann & Cronin, 2007). In addition, every user group has got different perception that needs to be considered when it comes to create a visual design and interaction flow. Therefore it is important to choose the right individuals to design for.

Personas are created to address the issues mentioned above. Persona is a model which represents a group of users. It is mainly created based upon the information that is collected from various field studies (Cooper, Reimann & Cronin, 2007). Besides, it involves some fictional elements that makes it more lively (Cooper, Reimann & Cronin, 2007; Norman, 2004; Nielsen, 2013).

2.2. Bitcoin

Bitcoin is an open source software project which enables its users to make online payments without consensus of a third party. Different services and concepts emerges around the technology such as online exchange providers, centralized wallets, hardware wallets etc. Wallets store the Bitcoin by holding the information and there are many types of wallets regarding the security features. Exchange services are the online Bitcoin providers which let users to buy coins without meeting with a peer who wants to sell coins.

Bitcoin users develop the products and the technology all together. Discussions are mainly carried online and this study take the ones from a social media platform namely Reddit.

2.3 Problem statement and Aim

Current methods of creating personas requires a diligent effort and they are time, money, attention consuming. The researchers need to find the right users; the researchers need to ask right questions to users or be thoughtful about the things that they observe; the researchers adjust the data that they gather from the interviews & observations; the researchers need to analyse the data and gain understanding. However, it can be difficult to access a global user population to make interviews, surveys or observations. Also, the data could be more precise from the beginning of the study. Moreover users are not capable of recalling all the memories and thoughts that they have. Therefore, there is a need to find more suitable methods. The aim of this thesis is to explore if the information that is collected from online discussion forums can be a useful resource for creating Personas which will be used in a user centered system development process.

3. Theory

3.1. Persona theory and its advantages

Personas provide us a careful way of thinking and communicating about how we can understand goals, motivations, behavior patterns of the users: here is a clear and structured benefit list of the Persona. In the literature we find different concepts relating to the advantages of using Personas as communication tools in the process of adapting the user interface to the needs of the users.

The first concept is that of the *Elastic User* by Cooper (2007). Personas help to standardize the language among members of the team such as designers, programmers and marketers (Cooper, Reimann & Cronin, 2007). Because the user term is elastic: meaning of the 'user' can be stretched to fit to the opinions and presuppositions of whoever is talking (Cooper, Reimann & Cronin, 2007). So Personas acts like a communication unit which brings clarity about what a team member means when he uses the word 'user'.

The consultant Norman (2004) emphasized that *Empathy* is another central concept. It is important for Personas to feel like a real person in order to allow the designer to ask questions such as "how would George interact with it?" (Norman, 2004). Because the notion of knowing a person makes it easier to call to lifelong experience and to imagine what it would be like in that person's situation (Norman, 2004). So, Personas can be used in order to build empathy and to gain understanding of the individuals (Norman, 2004; Hudson, 2013).

We can summarize another set of related concepts by *Defining requirements*. Desires, needs, motivations and contexts may vary and the best way to successfully deal with variety of users is to design specific set of features for specific type of users (Cooper, Reimann & Cronin, 2007). Personas pack the necessary information for specific group of users (Cooper, Reimann & Cronin, 2007). So designers can define what needs to be implemented for satisfying the needs of a specific group of users (Cooper, Reimann & Cronin, 2007; Scneidewind, Horold, Mayas, Kromker, Falke & Pucklitsch, 2012).

Personas help the team to discover user requirements. But it can also help to determine which requirements are mandatory and which are optional in order to figure out if the right problems are being solved (Cooper, Reimann & Cronin, 2007; Scneidewind, Horold, Mayas, Kromker, Falke &

Pucklitsch, 2012; Miaskiewicz & Kozar, 2011). Because of that we need *Requirement prioritization* (Edge cases). Location description of a stop point can be given as an example: occasional user, commuter and the tourist would need the name of the stop point primarily; but the tourist and occasional user might need an extra information in order to be supported by the design.

Another useful aspect of personas is *Audiences prioritization*. Personas can help teams to create segmentation and enable them to focus on the most important audience (Miaskiewicz & Kozar, 2011; Nielsen, 2013; Scneidewind, Horold, Mayas, Kromker, Falke & Pucklitsch, 2012). Moreover, some persona creation approaches include the information about how big a share of the market the individual person takes up, how much market influence the persona has, as well as a description of a typical day or week in life of the user (Nielsen, 2013).

One of the most important is *Prevention of Self-referential design*. In some situations, designers take themselves as a reference point and project their own goals, motivations, skills onto the design process (Cooper, Reimann & Cronin, 2007). However this approach lead them to make mistakes; since their goals, motivations, skills mismatch with the user (Cooper, Reimann & Cronin, 2007). In addition to reflection of their subjective understanding, they evaluate the easiness of the design according to their own mental model which is different from a person who had never used their design before (Cooper, Reimann & Cronin, 2007). Personas help the team to realize how the users/customers are different from themselves (Cooper, Reimann & Cronin, 2007; Miaskiewicz & Kozar, 2011).

A unique characteristics of persona as a method is its ability to *Challenge assumptions*. Personas challenge the organizational assumptions about the users/customers and they help to eliminate the wrong ones (Miaskiewicz & Kozar, 2011). Because some of the established assumptions are prejudgemental; since they are derived from stereotypes (Cooper, Reimann & Cronin, 2007; Miaskiewicz & Kozar, 2011). However personas with a good research foundation enable us to look at the users from different angles.

For example, in some cases it is a common mistake to make a generalization according to gender, demographics, age etc. and disregard other dynamics that affect the motivation and behavior of the user (Cooper, Reimann & Cronin, 2007). Another example can be the assumptions that are made according to the user roles. Requirement engineering defines the requirements according to the roles and these roles are simple units without the motivation and the behavior information of the user. All these situations where the organization lacks the information to reason properly, lead to wrong conclusions. So personas bring fresh information and see if the earlier thoughts are coherent.

Personas can also help to *Keep focus on the audience*. There are some situations that distract designers from considering the users at the first place. Because specific limitation and opportunities of the technology can lead the team to shape the product according to the solutions at hand themselves (Cooper, Reimann & Cronin, 2007; Miaskiewicz & Kozar, 2011). Besides designers may have some sophisticated ideas which sound desirable to other team members (Cooper, Reimann & Cronin, 2007). However personas help the team to keep the focus on behaviors, and goals appropriate for the individuals rather than limitations, opportunities and fancy ideas themselves (Cooper, Reimann & Cronin, 2007; Miaskiewicz & Kozar, 2011).

Finally but not least important, the persona method enable us to *Measure effectiveness of design choices*. Personas enable designers to measure the effectiveness of their design (Cooper, Reimann &

Cronin, 2007). Design choices can be tested on the persona by picturing the steps as if they are taken by the persona (Cooper, Reimann & Cronin, 2007). So the persona is a rapid reality check tool for evaluating the ideas from a formative process perspective.

3.2 . Activity theory

We tend to put things into categories mainly because we find them similar to each other: a car is more similar to another car rather than being similar to a tree. However, a number of theorists recently argues that similarity is a term which helps us to explain of our categorization and it is not the best explanation how our conceptual categories function (Hahn & Ramscar, 2001). So, this study aims to create theory-based conceptual representations which explains why we divided users into groups regarding their motivations rather than their gender, educational level, age etc.

Traditional task based product design approach brings inadequate results (Cooper, Reimann & Cronin, 2007). Because it lacks the habit of asking the question why is a user performing an action or operation (Cooper, Reimann & Cronin, 2007). Understanding the reason why users want to accomplish a task would reveal their expectations and aspirations which can in turn help designers to define the functions are truly relevant to their design (Cooper, Reimann & Cronin, 2007).

Activity theory offers a set of concepts that describes activity in relation to motivation. It is a clarifying descriptive tool rather than a predictive theory. Activity theory provides a concept namely object-orientedness and a three-layer model of the activity.

Object-orientedness suggests that all human activities are directed toward their objects (Kaptelinin, 2014). Objects have their "objective" meanings and the subject reveals the objective meaning of it by determining its relationship with other beings in the world (Kaptelinin, 2014). Finally, the motive is the object that the subject primarily needs to reach and it plays a significant role in the human activity (Kaptelinin, 2014).

Human activity can be analyzed and it can be represented within a three level of hierarchy: activity, action and operation. Activities are directed to objects and activity aims to fulfill the motivation (Carroll, 2003; Kaptelinin, 2014). Actions are the conscious processes directed to goals and they are created in order fulfill the motivation indirectly (Carroll, 2003; Kaptelinin, 2014). Actions come into being through a series of operations that are "triggered" by conditions (Carroll, 2003). Operations are usually routine processes that are carried subconsciously (Carroll, 2003; Kaptelinin, 2014).
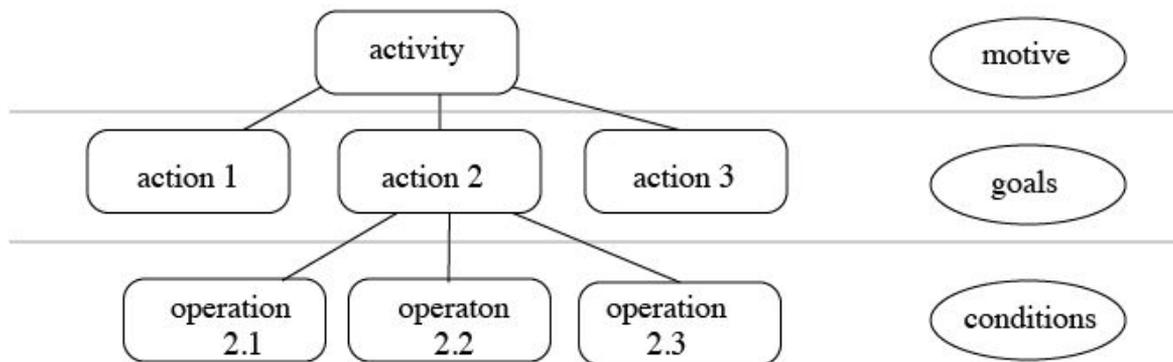
Figure 1: Hierarchy of activity, action, operation

Three level of hierarchy represents human activities and in reality there is a more complex relationship between the goals and the motives (Carroll, 2003). Animals are usually directed by motives straightly while a person would direct his efforts to accomplish actions which would help him to accomplish his motives indirectly (Carroll, 2003; Kaptelinin, 2014). For example a hungry person would be going into a restaurant and reading a menu instead of grabbing the first eatable thing in front of the restaurant.

The tasks that users carry, remain on the operational level. So, it would require from users to carry different set of tasks regarding the goal in their hand. Moreover, users would switch his goal according to their motivation. So, motivation is a gateway of a path that goes to the tasks. Therefore this study organizes users' goals and tasks by dividing users into groups according to their motivations.

To sum up, personas aim to describe the motivation of the users as well as picturing their needs, goals and patterns of behavior. Furthermore, activity theory brings us a different perspective where we can see the relationship between tasks, goals and motivations more clearly. So, motivation emerged as a heavily leading and inspiring concept while analyzing the social media content and creating the personas.

3.3. Content Analysis

Content analysis is a text analysis method that is applied to draw conclusion based on a systematic reasoning (Marsh & White, 2006; Elo & Kyngäs, 2008). The researcher uses analytical constructs, or rules of inference in order to gain understanding and to bring answers to the research question (Marsh & White, 2006; Elo & Kyngäs, 2008). However it is a flexible method and there is no established and comprehensive guide of the data analysis procedure (Pfeil & Zaphiris, 2010; Elo & Kyngäs, 2008). Therefore it is applied very differently across different studies.

Sorting the data into codes is the fundamental part of the content analysis; yet this process takes place in various ways. Literature refers to two main content analysis approaches: qualitative and quantitative. Each of them has got their own strengths and weaknesses in terms of validity and each of them brings different type of advantages.

The aim of the qualitative content analysis is to describe the 'big picture' regarding the studied subject while displaying the conceptual depth of it with the help of a thoughtful arrangement of detailed observations (Marsh & White, 2006). Qualitative content analysis focuses on the meaning and the relationship within the data rather than yielding a testable hypotheses (Pfeil & Zaphiris, 2010) It finds nuances and patterns of the discourse with respect to context which is rich with meaning (Pfeil & Zaphiris, 2010) Therefore qualitative content analysis organizes information under themes without a special regard for frequencies of words (Kracauer, 1952).

Quantitative content analysis is generally perceived as an objective and systematic analysis of the content (Kracauer, 1952). It is capable of testing hypothesis with quantified measurements and it mainly focuses on the statistical analysis of the data (Pfeil & Zaphiris, 2010). It generally focuses on the content straightly regardless the content of use; since a significant amount of energy is devoted to the counting procedure (Elo & Kyngäs, 2008).

One of the arguments against the qualitative analysis is the possibility of interpreting the content in different ways (Kracauer, 1952; Pfeil & Zaphiris, 2010). On the other hand, unlike the qualitative content analysis, the quantitative content analysis is considered as a reliable and objective analysis of the text due to its capability to measure (Kracauer, 1952). However, the coding phase where researcher defines the keywords, themes, categories etc. might be subject to a bias (Kracauer, 1952). Also quantitative content analysis process is not sensitive to the meaning of the words or to the context (Kracauer, 1952; Pfeil & Zaphiris, 2010).

Whether it is quantitative or qualitative, the content analysis is far beyond a simplistic description of data or a word counting game (Elo & Kyngäs, 2008). Moreover, the lack of objective truth doesn't mean lawlessness: qualitative research is not a discipline that brings arbitrary speculations (Kracauer, 1952). The quality of the results is dependent on the skills of the researcher and the method is as easy or as difficult as the researcher determines it to be (Elo & Kyngäs, 2008).

Another division of approach is made with respect to the two data driven categorization methods: inductive category development and deductive category application. These approaches have got similar preparation phases. But either inductive or deductive approach is more appropriate depending on the research question of the study.

Deductive category application takes place when the researcher has got a former knowledge about the subject (Elo & Kyngäs, 2008). He imposes a framework of concepts and keywords to the text (Pfeil & Zaphiris, 2010). Besides, inductive category development is a framework constructing process (Pfeil & Zaphiris, 2010). Researcher keeps the research question in hand and s/he takes an exploratory attitude towards the data (Marsh & White, 2006).

On one hand, there is no ready made set of rules for analysing the data qualitatively. On the other hand, every qualitative content analysis application holds a key feature which is classifying the text

into much smaller content categories. There are three main steps that frequently appear in different sources that explain the qualitative content analysis: sampling, coding and unit of analysis.

In order to define the scope of the segments for coding, the raw data needs to be broken into smaller pieces and units of analysis is the basis for reporting these chunks (Marsh & White, 2006; Pfeil & Zaphiris, 2010; Elo & Kyngäs, 2008). So, the researcher decides upon the unit of analysis in order to define what is the fundamental element that will bring a code. Unit of analysis is chosen strategically regarding the goal of the research (Marsh & White, 2006; Elo & Kyngäs, 2008). Secondarily, the size of the sampling defines what will be regarded as a unit.

The sentence unit is considered as a detailed units of analysis. Investigating each sentence leads to a high coding reliability; since it is syntactically defined and fixed (Pfeil & Zaphiris, 2010). However, in some cases it might be hard to judge where a sentence ends and another one starts when it comes to computer mediated communication (Pfeil & Zaphiris, 2010). In addition, the sentence unit might be time consuming regarding how big the data is: it leads to a high number of units that needs to be coded (Pfeil & Zaphiris, 2010). Lastly, the judgement about what type of meaning that a sentence carries might not be obvious: the contextual information that is included under the combination of several sentences might be lost (Pfeil & Zaphiris, 2010).

In some special cases where text is taken from online discussion boards, message unit can be a fixed unit of analysis as well. It is easy to define the message unit and it reduces the time to code as a bigger unit compared to sentence (Pfeil & Zaphiris, 2010). On the other hand, some messages might cover more than one topic and contain different patterns of communication. So nuances and important aspects of the message might be missed by coding the whole message into one code (Pfeil & Zaphiris, 2010).

The meaning unit is an another commonly used unit of analysis. It is lodged in meaning regardless if it is situated in a sentence, word or a message (Pfeil & Zaphiris, 2010). So, coding takes place per meaning and this approach makes the level of the detail adjustable. However, judgement about the meaning can be subjective and it can lower the reliability of the results (Pfeil & Zaphiris, 2010). Therefore the researcher constructs detailed rules in order to improve the objectivity.

As it is mentioned above, another important step of the content analysis is to define the content that will be analyzed. Sampling is made by choosing the relevant text regarding the purpose of the research (Marsh & White, 2006). The size of the sample is important; since the qualitative content analysis is an iterative process which takes lots of effort (Marsh & White, 2006). Multiple interpretations may occur and the researcher needs to work carefully in order to avoid misunderstandings (Marsh & White, 2006). Besides, sample is selected before initiating coding and all the objects that is included in the sample is not necessarily analysed in cases that they are not useful (Marsh & White, 2006).

Open coding procedure is the part where actually the qualitative content analysis begins. It requires tagging the key phrases and segments that is related to the research question as the researcher reads the text in order to note the important and unexpected ones (Marsh & White, 2006). Moreover, he sees the similarities between expression of the same concepts, diversity of ideas, alternative perspectives, and oppositional writings (Marsh & White, 2006). This construction of understanding is iterative and it requires re-reading the content (Marsh & White, 2006; Pfeil & Zaphiris, 2010).

The researcher records his findings in memos in order to keep track of the emerging concepts and how these concepts are related to each other. Two types of memos can be kept: concept memos and theory memos (Marsh & White, 2006). Concept memos focus on discovering concepts and interpretation of the concepts (Marsh & White, 2006). Besides, theory memos is used for picturing the relationship in between concepts and researcher gradually integrates the concepts in it (Marsh & White, 2006). The collection and organization of all these notes display the key findings of the study.

4. Method

4.1. Methodological considerations

We decided to use the content analysis method in order to interpret the social media content. Content analysis method is mentioned in various sources and these sources show us that there are so many different aspects and implementations of it. So, content analysis is a highly flexible method: it takes shape regarding the research question and the sources of the study such as time, type of the content, preliminary study etc.

This study demands such a flexible approach. There are two main reasons why we need to tailor the analysis method for analysing the content. First of all, every social media platform has got its own unique graphical user interface. Secondly, the persona is a concept which is created with the help of a particular type of information. So, pulling a special kind of information from a special source is required and the researcher needs to take a slightly different path compared to other studies with different goals.

The qualitative research method is preferred over the quantitative one. The quantitative content analysis requires a broad understanding about the topic in hand before starting the analysing process in order to create the proper codes that will be counted. However, this study starts without any preliminary information and it aims to be the first step to discover the main pillars of the topic from the users' perspective. As a result, an exploratory strategy is adopted and qualitative content analysis is chosen as a method.

4.2. Aim and research questions

Can information that is collected from online discussion forums be a useful resource for creating Personas to be used in a user centered system development process?

The goal of the study is to analyse the social media content in order to create a persona. In addition to the main research question, we need to create precise sub questions which will help us to reach out our goal. Because these sub questions will be fundamental tools that are used during the content analysis in order to define our sampling, identification of the unit of analysis and the information that we are coding, some leading questions are created.

The guiding questions are tailored according to the needs of the persona creation process. Persona is a model which pictures the needs, motivations, behavior patterns, frustration of a special group of users.

So, the questions are set to reveal this particular information that will enable us to construct the persona.

Persona reminds designers that the product will be used by real people. It aims to create a vivid image of the user even though it is a description of a fictional character that is created with the output of the user research. Therefore first group of questions are aiming to get inspiration for creating a lively persona.

Is there any personal information about the user?

- Where is the user located?

- What kind of hobbies does the user have?

Persona is also used for tailoring the product according to the special requirements of the user. So, second group of questions are the strategical ones which will bring information about what are the motives, behavior patterns, needs and problems of the users.

- What are the motivations of the user for using Bitcoin?

- What does the user do with his Bitcoins?

- What does the user need?

- What are the things that the user is complaining about?

- Does the user believes in Bitcoin's future?

- What type of storage does the user prefer?

- Which platform / tools does the user use in order to buy and sell Bitcoin?

- How frequently does the user spend his Bitcoins?

4.3. Application of content analysis

4.3.1. Selection of data sources and sampling

Sampling is a conscious act and it is done with respect to the research question. The level of the relevancy and the capacity of answering the research question define the parts of the content which will be sampled. In this study, the text is narrowed down by taking two main steps.

First step is to find a strategical thread which holds enough number of users who are sharing their opinions. This study considers different motivations as an indicator of different group of users. So, selected thread is a Reddit text post which asks users what are their motivations to use Bitcoin.

Under the chosen thread, twenty users were actively discussing their motivations. The second step is to access all previous comments /posts of these users that take place in the discussion under the selected

thread and pick the relevant comments/ tasks. Relevant comments/ tasks are defined regarding their capacity to answer any of the research questions that are defined at the beginning of the study.

All comments/ posts of the selected users are read while keeping the questions in mind. The ones which potentially answer the research questions are chosen and they are copied & pasted to a document. Sampling stage was not judgemental apart from assessing the relevancy of the content regarding the research question.

4.3.2. Procedure for selecting the units of analysis

Meaning is chosen as a unit of code in this study: each meaning that gives a relevant clue that lightens the research question will be coded. Meaning unit is found more efficient and effective compared to the sentence and thread units. Sentence unit is hard to handle when the size of the sample is taken into account. Moreover it lacks the meaning that derives from the combination of sentences. Thread unit would be a bigger unit; but it puts aside some important information: one thread has got the capacity to include more than one code which fulfills different aspects of the research question.

The coding process needs to be repeatable and objective. However meaning unit is not fixed and it brings the question about how an unit will be defined. So a guideline created and repeated for each thread.

Read post and make a research about the terms that is not familiar to you

Read the post, ask the research question, define the words that answers the research question and mark them green,

Read the post again with the research question in mind and decide if the green lines are appropriate unit for coding

* If the green lines are appropriate move to the other thread

* If you decide to change what is marked as a meaning unit, read the post again with the research question in mind and decide if the edited green lines are appropriate meaning unit for coding

In case where reading post doesn't remove the doubt about selecting the meaning unit more than 3 times, ignore the comment / post

4.3.3. Analysis procedure

Now, lets discuss the coding. Being able to explore new insights is essential; since the goal of the study is to discover the necessary information for the persona creation rather than testing if the users' statements are consistent with our insights. The inductive approach gives the opportunity to explore new ideas, communication patterns, a piece of information during the sample evaluation process. So Inductive approach is chosen rather than the deductive one.

The content analysis helps us to reach out to our goal: we aim to answer some questions that will bring the necessary information for creating a set of personas. Therefore our openness to any kind of

information is limited even though we attempt to carry an exploratory study. This study requires a structure that provides us a focus to a certain degree while we are revealing the unknown that is hidden in the content.

The structure is created based on the research questions. Whenever a meaning of unit was a subject to the analysis process, the research questions are asked and codes are created accordingly to these questions. Moreover, codes are organized while they were being created.

Codes are inserted to a table after they had been created. The rows keep the shortened versions of questions. Each column represents a user that actively participates to the discussion under the chosen text post.

A repeatable procedure is developed for coding similar to defining the unit of analysis procedure:

Read one unit of meaning at a time and ask the research question

Check if there is a relevant code on the table that summarizes the unit of meaning

Create a relevant code that summarizes the unit of meaning if there is not a relevant code on the table

Read the unit of meaning with the research question in mind again and decide if the code is appropriate for summarizing the unit

* If the code is appropriate move to the other thread

* If you decide to change the code that summarizes unit of meaning, read the unit again with the research question in mind and create another code

4.4. Creation of the Personas

Activity theory is revisited and it is suggested that it is useful to group users regarding their motivations rather than grouping them in relation to other type of personal information such as gender, educational background, age etc. while creating the Personas. Also the different persona creation methods are reviewed and it appeared that the imagination can be used as a foundation of Personas in addition to the information gathered from the user research. Lastly the exploration of other studies demonstrates that there is no specific Persona creation guideline: Persona creation procedures may vary.

In this study, users were grouped with respect to their motivation, and then information about other key variables such as needs are attached and made the characteristics of groups more distinct, in addition Personas became more lively by being added narrative content which are results of imagination. All in all, the given steps are inspired by other Persona creation approaches and these steps are tailored regarding the size and the quality of the information that we gathered from the social media.

The first step of creating Persona is the organisation of the 'motivation' codes that are recorded under the motivation row. Similar motivation codes are selected and they are chunked regarding their similarity. First round of chunking resulted in more than ten groups. Therefore similar groups are

chunked again and second round of chunking similar codes resulted in five final groups. These five groups of motivation codes are given a title regarding the similarity that they share: 'idealist', 'investor', 'anonymous', 'trader', 'remitter'.

Second step of creating Persona is to assign 'need', 'usage', 'problem and frustration' codes to the relevant motivation themes. Once the themes are created by chunking the motivation codes, these themes are being enriched with the input that is captured about the needs of the users as well as how they use the Bitcoin. After getting familiar with the sample and the codes, one could easily attach the relevant need, usage, problem & frustration codes with the relevant motivation themes. For example long term investor is more concerned with different security codes compared to intellectual user who use the Bitcoin for the sake of Bitcoin which makes him enjoy its complexity.

Third and the last step of creating Persona is to make Personas more realistic and lively. After motivation codes are grouped and more information is being attached to these initial themes, the narrative aspect of the Personas is created. the code usage during creating a narration is to support the creativity and the narration is inspired by the codes namely background, location, hobbies/interests, the belief in the future of the Bitcoin. The Personas are improved by adding the narrative content which brought the advantages of having fictional characters that resembles real people.

5.   Results and analysis

5.1. General results

Let us first consider segmentation of the users into group according to motivation. Note that one individual might belong to more than one segment: for example an *idealist* can also belong to *long term investor* group at the same time. However user's choice upon the exchange service and the storage method would differ according to his motivation.

One group that could be clearly identified was the *Long term investors*. They invest big amount of money into Bitcoin; since they believe that it will bring profit in the long run. They prefer cold storage methods or hardware wallets and they don't spend their coins on the daily basis.

Another prominent group was the *Intellectuals / Idealists*. This group interested in the impact of the Bitcoin such as decentralizing power, fighting with inflation, trustless consensus etc. Also some of them simply find the Bitcoin usage like an intellectual game. They spend Bitcoin for the sake of Bitcoin in order to make Bitcoin promote its daily usage. So they keep a small amount of Bitcoin in their local wallets which wouldn't be a problem if they would be hacked.

We could also separate out *the Traders*, they buy Bitcoin when it is low and sell Bitcoin when it is high. They receive tailored information from specialized apps and quickness is their major concern in addition to alertness.

A different set of motivations gave us *the Remittance Group*. This group use bitcoin mainly because it removes borders between countries when it comes to money transaction. The most common usage cases were people who moves from one country to another (e.g. moving from Australia to Sweden for 6 months) , people who do business with other companies which is located in other countries, people who wants to do donation to unbanked people and people who wants to buy products from online

merchants which doesn't accept their credit cards (e.g. there are some merchants in America do not accept credit cards that are not taken from American banks while they accept sending products to other countries).

Finally there were *the Anonymous*. This group use Bitcoin in order to hide their identity from anyone else. They might be just sensitive about leaving information traces behind them as well as willing to break the laws by gambling or buying drugs. They don't use exchange services; since it requires them to reveal their identity via 'Know Your Customer' procedure.

5.2. Persona descriptions

5.3.1. The Idealist

The keyword for this Persona is *convenience.*

John is a forty seven years old Software engineer in the video game industry and his employer is a big tech company which is located in U.S.A. He is interested in gaming as well as topics such as space, technology, chess and future. He lives by himself; but he enjoys gatherings where him and his old friends carry deep discussions about the theoretical books that they read.

John is enthusiastic about Bitcoin and he strongly believes that its future will be bright. According to him, Bitcoin is far beyond the bulky banking system and it is an open source platform which brings some utilities that no one could envision before. First of all Bitcoin provides security and privacy: he doesn't need to provide his credit card information to any company. Secondly, he likes the idea to send money instantaneously to any person on the planet without taking any permission from a trusted third party. Also it creates a unique opportunity for unbanked people to access modern payment methods as well as reducing the transaction fee that is taken during the credit card payments. Moreover, Bitcoin decentralizes power in addition to decentralizing money: governments would not be capable of causing inflation; since the amount of Bitcoin is limited in supply.

John considers himself as a passionate member of the Bitcoin community and he is fully dedicated to support the Bitcoin. So, he makes his spending with Bitcoin as much as he can. However, there aren't adequate number of merchants around who accepts Bitcoin as a payment method. Also BTMs are accessible only in some special locations.

Time to time using Bitcoin becomes something frustrating for him; because he faced with some problems while he was trying to make the purchase. He wishes it to take shorter time and less effort than using the credit card. Some wallets, especially centralized ones may take a lengthy time during the transaction. Also he came into some situations where the waitress didn't know the Bitcoin purchase procedure very well and handled the payment process clumsily and that day his phone battery was almost over. Moreover, once he had two tabs open in his browser and he sent coins to the wrong Bitcoin address. Bitcoin usage should be covering all these daily case scenarios.

John believes that Bitcoin should be adopted by more and more people in order to be established. He is looking forward for a killer app which will bring an indispensable feature that is provided by the possibilities the technology creates. But more than this, he expects from services and products to make the Bitcoin usage easier: he strongly believes that user-friendliness is the key factor for reaching out more people. However, there isn't any common design pattern for products and services. Also, the

features of wallet services change quickly and this requires even better designers to step onto the stage. So, he appreciates the services and products which serve a high quality experience both to the beginner and expert users.

John thinks that Bitcoin is got stronger and some people exaggerate the security issues of the Bitcoin usage. He thinks that the centralized wallets are slippery and they don't give the full control over his wallet addresses. So he simply uses two storage methods: a hardware wallet and a local wallet with seeds.

After all John wants to see the Bitcoin to grow mature. All his efforts to store and spend Bitcoin is to support the community. He is looking forward for the future where he can see that his dreams come true. He treasures any service or product that makes people to embrace and use Bitcoin easily and quickly.

5.3.2. The Investor

The keyword for this Persona is *security.*

Charlie is a thirty six years old management consultant who lives in Canada. He has been married for seven years and he bought Bitcoin with some part of their savings. Him and his wife agrees that Bitcoin needs to be regulated wisely in terms of laws before taking a part in everyone's life; but he is bothered by the fact that his wife has got some prejudices against Bitcoin.

For now, Bitcoin is just an investment opportunity for Charlie. He believes in Bitcoin's future; but he thinks that there will be some changes needed before it is being used by everyone. He is looking for regulations to be established; so he would not need to follow the discussions about the tax.

He hopes to take advantage of being one of the early adopters; but still he is not willing to invest more than he can dare to lose. He sees Bitcoin as a risky investment; since it is hard to estimate external factors which would cause Bitcoin disappear from the stage. Second main reason why he sees Bitcoin as a risky investment is the high possibility of being hacked. He reads about some Bitcoin users' bad experiences on forums and can't stop thinking that he could be one of these victims.

He thinks that cold storage is the best way to protect himself from people who would attempt to steal their Bitcoins. He considered about buying a hardware wallet such as Trezor; but he read that software updates had created some temporary issues and he thought that the paper wallet would be easier and cheaper. He divided his investment into five paper wallets just to make sure that he would not lose them all at the same time.

5.3.3. The Anonymous

The keyword for this Persona is *privacy.*

Michael is twenty nine year old musician who lives in a big city in U.S.A. He is an open minded person who is interested in meeting with new people and embracing new ideas. Moreover, it's been years that he is constantly questioning the human nature, society and the power relations. He thinks that the governments suppress their citizens in addition to exploiting the citizens for achieving some destructive goals.

Michael believes that Bitcoin gives his freedom back which makes him more alive. Because it opens up the possibility to break some rules without leaving any trace. Moreover, Bitcoin protects his privacy. He doesn't need to share his credit card information with some companies who would spy on him.

He prefers services and products that doesn't require him to share his identity. However, each day Michael finds it harder and harder to engage with Bitcoin. Because governments started to regulate Bitcoin usage and he is afraid that very soon Bitcoin won't mean freedom anymore.

Lately he encountered an article which is arguing that the peer to peer trade applications might become forbidden by law in U.S.A. If this happens, it would be so hard for him to buy Bitcoin; because he doesn't want to use online exchange services which requires him to reveal his identity because of the 'Know Your Customer' regulation. He wants to make sure that no one else saves his identity along with an associated wallet.

5.3.4. The Trader

The keyword for this Persona is *quickness*.

Ruben is a forty three years old businessman from Netherlands who imports electronic equipments from Malaysia. He likes reading news about economy and finance. In addition he follows stock markets.

He realized that Bitcoin is a great opportunity to raise money. Ruben buys Bitcoin when its value is low and sells it when its value is high. Moreover he earns some money by trading peer to peer as well. Trading peer to peer is cheaper, faster and it is quite profitable, especially when he meets with tourists who would like to buy the local currency with Bitcoin.

On one hand he likes trading peer to peer, on the other hand it is hard to find the right person who holds enough Bitcoin or willing to buy as much as he sells. Also selling Bitcoin peer to peer without meeting in person is risky. Some users, who pay online, receive their Bitcoin but they withdraw the payment they attempt to make.

So Ruben uses online Bitcoin exchange services as well, particularly for buying and selling big amount of Bitcoin.

It is important for Ruben to choose the right Bitcoin exchange service. Firstly quickness is important; because he buys and sells in a short period of time. Secondly, exchange service needs to be viable. Once he did a larger trade at an online exchange service which was stuck at 60% and the waiting time felt like eternity. Thirdly some exchange services suggests slightly better offer: the value of a currency varying by over 1% across services.

Ruben wants to take the most profitable decisions. He uses a special application to receive information about the price of the Bitcoin. Still he wants different price widgets to be developed. Moreover he wishes a bot that will let him set it to buy/sell a certain percentage of his balance. Lastly he thinks that he needs an application which would let him to check all his bitcoin balances including the cold stored ones.

5.3.5. The Remitter

The keyword for this Persona is *spendability*.

William works as a freelance graphic designer and he likes travelling a lot. He moved from Australia to Philippines nine months ago. Thanks to his friend who introduced him Bitcoin, he doesn't need to waste money while he is transacting money in between his Australian bank account and the local bank account.

The more he got to know Bitcoin, the more he started to realize how much money the banks take per transaction both with credit card and in between two bank accounts that are located in different countries. So he uses Bitcoin whenever possible. However, there aren't enough merchants which accepts Bitcoin: it would be great at least if the supermarkets would accept it. Also he would like to know how much using Bitcoin costs and how much he saves by using Bitcoin.

Another thing which makes it harder for him to integrate Bitcoin usage to his daily life is its volatility. It is hard for him to look for the right moment to purchase something. He would definitely prefer a steady fashion rather than speculative bubbles. He thinks that transparent exchange with volume-weighted average price (VWAP) would be helpful.

Lastly it is easy to be hacked and totally relying on Bitcoin makes him feel insecure. He thinks that some services can help users to protect their accounts. For example service can impose limits on how much can be transferred daily. Also both phone and computer would need to be compromised.

6.   Discussion

6.1. Feasibility of the method

We found that social media is a rich information source for creating Persona. Interpretation of the data showed us that users share their needs, motivations and frustrations in the social media platform. So, when the right approach is chosen, it is possible to gather appropriate data, to analyze it and to organize the information that is pulled from the data for creating fulfilling Personas.

Analyzing discussion logs for finding the adequate information about users in order to create Persona, has got some benefits compared to other Persona creation methods. Firstly, twenty users, who are representative for the community, are found quickly and easily from all over the world with various backgrounds. Secondly, if these users would be asked to speak their minds, they would be able to recall a limited amount of memories and thoughts. In contrast, discussion logs were kept naturally by users and these logs were representing the precise information that we were looking for.

One question might come to mind when reading the Personas that are created as a result of this study: why some Personas are longer and more detailed in comparison to other ones? The users are grouped regarding their motivations and the number of the users with ideals were more than the other users such as the ones who want to stay anonymous. Consequently, we reached more information about what idealist users think and how they use Bitcoin.

Social media provides a quick access to the users' opinions from all over the world, but it also brings a big amount of information that is waiting to be filtered. Some specific information about the users was

needed in order to create the Personas; but the sampling of the right information took so much effort as the social media information space was too big. An interviewer could ask direct questions and get the answers which brings precise information that is required to create the Persona in a case where another research method was chosen. Moreover, in this particular study, there was a chance to access to a topic where Bitcoin users were discussing their motivations and it simplified the process of filtering the right information. If there was no discussion in which users discuss their motivations to use Bitcoin, it would be extremely effortful to scan random Bitcoin users to see if they had shared their motivations on the social media platform. All in all, sampling process requires a diligent effort and it can be even more effortful in cases where there is no discussion that address the motivation of the users.

This study suggests some procedural steps to gather information. However these steps are not enough to reproduce the same results every time that the study is being conducted. The results are partly dependant on the understanding and the creativity of the researcher. Combining qualitative research methods with some other quantitative research methods could be helpful to derive more objective results.

The Bitcoin users who share their ideas on the forums might not exhibit representative personality traits and Bitcoin usage habits that are more common amongst average users. For example one could argue that the users on forum might be more willing to take risks, prone to have some addictions, more open to new experiences etc. compared to rest of the Bitcoin users who are preferring to share their ideas with peers that they know well. Therefore it is open to further discussion if the Bitcoin users, who participate online discussions, represent the average user and cover all types of users.

All in all, Persona creation regarding the discussion logs is partly subjective and sampling the content takes a significant amount of effort; yet it is realizable and it is advantageous in many ways. Online discussions enable designers to access to the user's mind quickly and easily, while Persona help designers to organize the information that they gathered from these discussions. Designers can benefit from the procedure that is explained in this study during the product development process that they are involved in.

We found that discussion logs are such a precious source for reading the user's mind; since they provide easily reachable and detailed information. Moreover, organizing information that is taken from online discussions and creating a Persona, makes this information more beneficial for the product development. Online discussions are capable of covering user's needs, behavior patterns, motivations which are the basis for the Personas. Also, it is possible to create a systematic framework to define what type of data will be analyzed and how the selected data will be analyzed.

We also pictured what type of benefits does Persona bring. Some concepts emerged as a result of this attempt: elastic user, empathy, defining requirements, requirement prioritization (edge cases), audience prioritization, prevention of self-referential design, challenge assumptions, keep focus on the audience, measure effectiveness of design choices. All these concepts can be considered as a measure of the quality of the Personas and discussion logs were capable enough to create Personas which bring the benefits mentioned above.

6.1.1. Ethics

According to McKee and Porter's model, before gathering data from social media platforms, researchers should question publicity of the content, topic sensitivity, degree of interaction and subject vulnerability (Fossheim, 2015). The discussion about Bitcoin is an intellectual conversation whereas some other forum discussions reveal vulnerabilities such as suppressed emotions and personal issues that are not known by others: topic sensitivity is low in this research in comparison to topics which reveals personal information. Moreover, the study didn't require from me to interact with the subjects directly, so the degree of interaction is low. Even though the codes taken from the subject's posts are included in the thesis, codes are not noted down with the words of subjects. So, the words that subjects choose to use is not shared in the thesis in order to protect their anonymity. Also user names are kept anonymous. As a result subject vulnerability is being respected and subjects are put in less vulnerable position with the help of anonymity.

The study is evaluated regarding the topic sensitivity, degree of interaction, subject vulnerability in the earlier paragraph and these three factors are clearly described by the McKee and Porter's model. However the fourth factor, the publicity of the content, is more complex compared to other factors and what is considered as publicly available is open to further discussion (Fossheim, 2015). Publicity could be assessed by four factors: persistence, replicability, invisible audiences, searchability of the content (Fossheim, 2015). Persistence term suggests us to examine if postings on the Internet are automatically registered and stored. Replicability is the ability to duplicate the content freely. Invisible audience means if the content is publicly available and everyone have got permission to the view the post. Lastly searchability considers if content is accessible by conducting a search (Fossheim, 2015). When this study is reviewed by taking all these four factors into account, replicability remains as an issue. Because sharing information publicly doesn't mean that anyone can take the content and claim to have all the rights regarding the usage of the content.

One another source gives the social media research ethics guidelines and this study aligns with their criteria. The study categorizes the research studies and this work falls under the "Observational Research" category. It is suggested that if the social media website is public, information is identifiable but not private, and if there is no need to interact with the person who posted it online, and then it is presumably align with the rules from the ethical perspective (Moreno, Goniu, Moreno & Diekama, 2013). The source also gives the Youtube as an example: publicly posted and available content accessible to any Internet user and information is not considered as private, as a result consent is not required to conduct an observational study of general YouTube videos (Moreno, Goniu, Moreno & Diekama, 2013).

6.2. Future studies

Personas that are created in this study is the first draft which will become mature by being fed with new information over time. First of all, our Personas needs to be validated. There are many different ways to validate Personas; but the reasoning behind the chosen method needs to be rationale. Therefore the validation process requires a careful and thoughtful research similar to the Persona creation research. Secondly, differences between personas can be sharpened: for example, all cross border Bitcoin transactions grouped under group remittance; yet the the idealist and a person who lives out of their country shares the same goal: spending it. Personas can be developed in a way that we can

clearly see what type of information or interaction flow differences in between two groups even though their goal is the same.

7.   Conclusion

All in all, this study shows that the information that is collected from online discussion forums can be a useful resource for the Personas. Online discussions have got both the depth and the breadth which enable researcher to access to user's thoughts upon different topics, special scenarios, various desires. This treasure can be unlocked with the help of a systematic investigation and the output can be represented as a Persona.

8.   References

Cooper, A., Reimann, R., Cronin, D. (2007). *About face 3: the essentials of interaction design*. Retrieved from http://www.ub.uu.se

Nielsen, L., (2013). *Personas - user focused design.* doi: 10.1007/978-1-4471-4084-

Miaskiewicz, T., Kozar, K. A. (2011). *Personas and usercentered design: How can personas benefit product design processes?.* Design Studies, 32(5), 417-430. doi: 10.1016/j.destud.2011.03.003

Hudson, W. (2013). *User stories don't help users: Introducing persona stories.* Interactions, 20(6), 50-53. doi: 10.1145/2517668

Schneidewind, L., Hörold, S., Mayas, C., Krömker, H., Falke, S., Pucklitsch, T. (2012). *How personas support requirements engineering.* Paper presented at 2012 First International Workshop on Usability and Accessibility Focused Requirements Engineering (UsARE), Zurich. doi: 10.1109/UsARE.2012.6226786

Pfeil, U., Zaphiris, P. (2010). *Applying qualitative content analysis to study online support communities.* Universal Access in the Information Society, 9(1), 1-16. doi: 10.1007/s10209-009-0154-3

Kracauer, S. (1952). *The challenge of qualitative content analysis.* Acta Informatica Medica, 22(2), 123-127. doi: 10.1086/266427

Marsh, E. E., White, M. D. (2006). *Content analysis: A flexible methodology.* Library Trends, 55(1), 22-45. doi: 10.1353/lib.2006.0053

Elo, S., Kyngäs, H. (2008). *The qualitative content analysis process.* Journal of Advanced Nursing, 62(1), 107-115. doi: 10.1111/j.13652648.2007.04569.x

Carroll, J. M. (2003). *Interactive Technologies : HCI Models, Theories, and Frameworks: Toward a Multidisciplinary Science.* Retrieved from http://www.ub.uu.se

Norman, D. (2004). *ADHOC PERSONAS and Empathetic Focus.* Retrieved from http://www.jnd.org/dn.mss/adhoc_personas_em.html

Kaptelinin, V. (2014). *Activity Theory*. Retrieved from https://www.interactiondesign.org/encyclopedia/activity_theory.html

Wikipedia: The free encyclopedia. (2015). *Bitcoin*. Retrieved from: https://en.wikipedia.org/w/index.php?title=Bitcoin&oldid=663597247

Hahn, U., & Ramscar, M. (2012). *Similarity and categorization.* doi: 10.1093/acprof:oso/9780198506287

Turner, A. M., Reeder, B., Ramey, J. (2013). *Scenarios, personas and user stories: Usercentered evidence based design representations of communicable disease investigations.* Biomedical Informatics, 46(4), 575-584. doi: 10.1016/j.jbi.2013.04.006

Kolski, C., Idoughi, D., Seffah, A. (2012). *Adding user experience into the interactive service design loop: A persona-based approach.* Behaviour & Information Technology, 31(3), 287-303. doi: 10.1080/0144929X.2011.563799

Jianming, D., Kelkar, K., Braun, K. (2007). Getting the most out of personas for product usability enhancements. *Usability and Internationalization. HCI and Culture.* doi: 10.1007/978-3-540-73287-7_36

Vincent, C. J., Blandford, A. (2014). *The challenges of delivering validated personas for medical equipment design.* Applied Ergonomics, 45(4), 1097-1105. doi: 10.1016/j.apergo.2014.01.010

Fossheim, H. (2015). *Internet research ethics.* doi: 10.17585/noasp.3.1

Moreno, M. A., Goniu, N., Moreno, P. S., Diekema, D. (2013). *Ethics of social media research: Common concerns and practical considerations.* Cyberpsychology, Behavior and Social Networking, 16(9), 708-713. doi: 10.1089/cyber.2012.0334

9.   Appendix

Background codes:

Participant 1	-
Participant 2	married, have a fulfilling salary
Participant 3	36 years old, have two kids, engineer, co-founder of a start-up, hold all his savings as bitcoin
Participant 4	his employer is a big tech company, software engineer in the video game industry
Participant 5	-
Participant 6	22 years old developer
Participant 7	hold all of his savings as bitcoin
Participant 8	married, religious
Participant 9	-
Participant 10	musician, wants to develop a mobile wallet
Participant 11	-
Participant 12	-
Participant 13	Licensed American pilot and holding a few btc now
Participant 14	-
Participant 15	-
Participant 16	-
Participant 17	-
Participant 18	-
Participant 19	he is paid in Bitcoin, he put put all his savings in bitcoin
Participant 20	-

Motivation codes:

Participant 1	more anonymous than a credit card, secure (can't be overcharged), secure (credit card number can't be stolen)
Participant 2	freedom (censorship resistance), Investment
Participant 3	merchant discount (3% off when using Gyft), elimination of trusted third parties, innovative, decentralized , open source, freedom (third party)
Participant 4	refuse to give credit card information, long term investment, I can send money to any person on the planet instantaneously, without permission from or the requirement of a bank or other trusted third party
Participant 5	it was crafted to save people from the economies that collapse
Participant 6	investment (trading), convenient (QR code > credit card info)
Participant 7	freedom (third party), secure (credit card number can't be stolen), convenient (QR code > credit card info), investment
Participant 8	historical unreliability of fiat, makes remittance cheaper
Participant 9	investment , shared ideals, decentralize power amongst people , (fight with inflation, reduced wages, bailouts due to financial thievery etc.)
Participant 10	open source, decentralization (brings fairness), a better societal framework
Participant 11	take back the power of money creation from the people who were abusing it, public-centered finance, more private, more secure (compared to credit card: security of my identity from hackers), easier to Use, more sustainable monetary policy, global, consensus-backed not coercion-backed, expansive application possibilities for future infrastructure, monitor common funds
Participant 12	it's fun, it makes him save money (collector), against inflation
Participant 13	online its easier, in person its mostly ideological, investment, trade
Participant 14	liberty, investment, privacy
Participant 15	-
Participant 16	privacy, investment, freedom (third party), secure online shopping (no need for credit card info), easy to use online shopping
Participant 17	order food at http://www.thuisbezorgd.nl/en/ and save €1, when exchange Euros for Malaysian ringgits, earn 5% on average instead of paying €7 plus 1%, get over rejected credit cards in various countries, sending money from the Netherlands to Malaysia: making on average 4.7% profit , dislike credit cards (the percentage

	that the merchant has to pay, seduce people, upwards pressure of prices that they cause), trustless system to manage value and deeds (Cross border money transfers)
Participant 18	use bitcoin with a local payment processor, instead of opening a local bank account and loading a prepaid phone abroad is easier and cheaper than with fiat, Cross border money transfers is expensive, Needs to visit bank to exchange Euro exchange rate at the time of the transaction instead of just the current exchange rate, serve unbanked people, growing distrust in fiat
Participant 19	No Borders, No Discrimination, Privacy & Security, Free Trade, No Debt Bondage Or Inflation Tax, No Theft To Fund State Terrorism, anonymous bitcoin poker sites, Paying rent, staff, load and bills with bitcoin in Philippines, gives new perspectives and stimulating discussions, take the monetary system's control from government's hands
Participant 20	-

Codes that reflect how user uses the Bitcoin:

Participant 1	shop
Participant 2	store, ChangeTip
Participant 3	store, use gyft & its app, shop, ChangeTip
Participant 4	spend, store, ChangeTip
Participant 5	-
Participant 6	shop, store
Participant 7	get paid, shop, store
Participant 8	remittance as a donation, send
Participant 9	store, ChangeTip
Participant 10	spend
Participant 11	spend
Participant 12	spend, store
Participant 13	store (Bitcoin paranoid), spend, trade, buy when it's low sell when it's high
Participant 14	store, spend
Participant 15	-
Participant 16	store, spend
Participant 17	store, spend, send
Participant 18	store, spend, send
Participant 19	store , spend, use bitcoin debit card
Participant 20	-

Need Codes:

Participant 1	-
Participant 2	reverse fraudulent transactions, merchant discounts, usability advantage over other payment methods, infrastructure to make spending easier
Participant 3	BTM machines, AirBnB, services to improve the layout when viewing in a mobile browser, uBTC term
Participant 4	security, two factor authentication, ideal bitcoin debit card that convert bitcoin to USD at the time of purchase at the best conversion rate at that time
Participant 5	easy to use, Security
Participant 6	more merchants to accept bitcoin
Participant 7	transactions generating fees increases over time , the average fee amount increases or the value of bitcoin (and associated fees) increases
Participant 8	known by others
Participant 9	infrastructure to make spending easier, legislative change to redefine bitcoin, visit another country and withdraw into a local currency
Participant 10	bitcoin debit card, digital ownership security, crappy qr code mode, If circle came out with atm kiosks all over U.S, common transacting language for tourists, third world is transacting for remittance, press on the qr code + pop up wallet, massive tipping wallet app, mass adoption, bitcoin foundation to be decentralized
Participant 11	people to be educated, broader use of bitcoin, requires a certain amount of faith, convenience, iOS app that has the local feature, anonymizing features, user friendliness, sleek and sophisticated way to move and hold money
Participant 12	easy to use
Participant 13	see the percentage of recently mined coins that haven't moved, a bot that will let to set it to buy/sell a certain percentage of my balance at multiple percentages of the current price on all the different crypto pairs, moral improvements, good places to earn BTC, pawn shops to accept bitcoin
Participant 14	security
Participant 15	being regulated by laws
Participant 16	measures of privacy need to be integrated, mobile app that is integrated into a remote full-node client to bring your computer's GUI, bitcoin to be integrated in business (travel, food), new programmers to join peer review, tourist locations to

	accept bitcoin, need to make very simple tools for folks to secure their values, Let the protocol and supporting ecosystem get stronger before encouraging mass adoption, The UI could definitely use improvement, Copy & Paste, protocol and supporting ecosystem, get stronger before encouraging mass adoption, Bands need to throw-up a QR code somewhere
Participant 17	checking bitcoin balance in the cold storage, Bitcoin Balance app, create the awareness that paying with credit cards costs money, price widgets, merchant discounts
Participant 18	security, average person to understand Bitcoin easily, easy to use, connecting the Bitaccount number to the SWIFT network, wallet that uses the bluetooth technology, Merchants to drive Bitcoin adoption, The wallets would have to implement multisig to be compatible with each other, Transparent exchange VWAP that removes volatility, Standardize HDM across wallets (seeds), Wallet compatibility -so a 2-of-n multisig transaction can be signed with any combination of two HDM wallets, Standardized wallet configuration: each wallet implementation should consist of a pair of wallets: one multisig and one singlesig, Standardization of wallets to make everyone to use same safe setup, Increased price stability will increase the utility of Bitcoin, Imposing limits on how much can be transferred daily, Both your phone and PC would need to be compromised to steal all your bitcoin at once, Supermarkets to except bitcoin
Participant 19	Honda and Yamaha motorcycle shops in Melbourne to accept bitcoin, Torrent to set up bitcoin tipping
Participant 20	tax from bitcoin needs to be regulated, subscribe from Netflix with bitcoin, 2FA

Location Codes:

Participant 1	-
Participant 2	Canada
Participant 3	USA
Participant 4	USA
Participant 5	Australia
Participant 6	-
Participant 7	Asia
Participant 8	-
Participant 9	Australia
Participant 10	USA
Participant 11	USA
Participant 12	USA
Participant 13	USA
Participant 14	-
Participant 15	-
Participant 16	USA
Participant 17	Netherlands
Participant 18	Philippines
Participant 19	Philippines
Participant 20	USA

Hobby/Interest Codes:

Participant 1	gaming
Participant 2	-
Participant 3	space, entrepreneurship, technology, parenting, future, starcraft, chess
Participant 4	gaming, UtopiaFOX
Participant 5	economy
Participant 6	exercise, gaming
Participant 7	-
Participant 8	history
Participant 9	-
Participant 10	music
Participant 11	gambling
Participant 12	futurology
Participant 13	propertarian anarchist principles, atheism, finance , askscience, space, scuba diving, drones
Participant 14	-
Participant 15	gaming, homebrewing, history, movies, chess, art
Participant 16	-
Participant 17	-
Participant 18	-
Participant 19	gambling, anarcho-capitalism, sports betting
Participant 20	gaming, philosophy, art, space, exercise, health, science

Codes that reflect if users believe in Bitcoin's future or not:

Participant 1	YES
Participant 2	YES
Participant 3	YES
Participant 4	YES
Participant 5	YES
Participant 6	YES
Participant 7	YES
Participant 8	-
Participant 9	YES
Participant 10	YES
Participant 11	YES
Participant 12	-
Participant 13	-
Participant 14	-
Participant 15	NO
Participant 16	YES
Participant 17	YES
Participant 18	YES
Participant 19	YES
Participant 20	NO

Codes that reflect problems & frustrations:

Participant 1	possibility for being hacked
Participant 2	not being able to use daily, low transaction capability
Participant 3	blockchain.info has gone downhill, phishing websites
Participant 4	Bitcoin is simply too easy to steal: either by force, corruption, or hacking; The volatility is pretty difficult to stomach and the volatility really reduces it's potential value to individual consumers, high risk investment because bitcoin could still fail for a number of reasons, Merchants who "accept" bitcoin but in reality they convert it to fiat immediately, miners who have bills to pay. We often hear that bitcoin is a deflationary currency but it is not currently, Early adopters who got thousands of bitcoins for next to nothing sell all of the time, what if the debit card is lost or stolen, lack of interest, declining price, extreme volatility
Participant 5	finding a good designer is hard, designing wallet is hard - wallet's feature sets and use cases are changing monthly, mitm attacks when using tor, why Bitcoin should be obligated to fix the mistakes and misuse of currencies around the world
Participant 6	-
Participant 7	users who decrease their personal supply of bitcoin (converting it into goods and services) without replenishing, low transaction capability of the network, services being over-regulated, super-risky market
Participant 8	-
Participant 9	not being able to use daily, potential bubble (because of the people who have more coins than they need)
Participant 10	bitcoin price movements
Participant 11	merchant service fees are outrageous (exchange), Coinbase / Circle wallets can take long time during transaction / instant buy, third party sites are vastly more insecure compared to local wallets, 2fa and sms 2fa and all these needlessly complicated things when you can have a simple local wallet, Multisig is overrated, others projecting their own losses onto the bitcoin society at large, Bitcoin bank defeats the purpose (circle, coinbase)
Participant 12	hard to use
Participant 13	many of the paypal scammers when you sell, had two tabs open and post went to wrong tab, phishing websites, exchange visitors' currency near airport, Sometimes the exchanges don't process the withdraw for a few min, Places with bitpay have employees that barely know how bitpay works & the employees forget about the tablet, Bitcoin user comes in the battery is dead, low quality of the BTM service,

	did a larger trade at defcon & it was stuck at 60% and it seemed like an eternity, BTM fees are high as 5%
Participant 14	possibility for being hacked, possibility to lose anonymity, blockchain.info is also less private and less secure
Participant 15	Bitcoin is specifically promoted for its supposed ability to undermine laws and regulations, convoluted, risky, scam-ridden, community members who think drugs or child porn can't be suppressed, bitcoin as a speculative investment vehicles
Participant 16	Coinbase is pretty slow, it is seen as a high percentage of its population involved in criminality, banks (like Coinbase) are under gambling associated with bitcoin, criminality associated with bitcoin, lack of peer review for the code, scam posts, insufficient security, implementing anything in Africa is tremendously challenging, had to wait for the change to confirm before making next purchase, poor user experiences aren't good for Bitcoin, illegal in the US to buy or sell bitcoins from someone directly, doing a code patch on the bitcoin core protocol is a nightmare
Participant 17	many of the paypal scammers when you sell, I myself find it hard to spend bitcoin as only a very few of my suppliers accept it, can't reverse transaction, merchants don't share their savings with the consumer
Participant 18	Bitcoin makes engaging like walking through a minefield, blockchain spamming applications significantly increase the bandwidth and disk space required to run a node will inevitably decrease the number of volunteers that run a node, speculative bubbles, an error in the protocol or a bug in its implementation diminishes trust and can cause their value to plummet, volatility of bitcoin
Participant 19	privacy deficiencies of bitcoin, tipping with Coinbase, privacy and security attempts are being considered as something bad, bitcoin regulations
Participant 20	person that likes bitcoin is actively hostile to good design, The price rising and lowering value of a currency varying by over 1% across different exchanges, blockchain don't solve the BGP at all and still require huge amounts of trust, Bitcoin has huge flaws in it's economic system, has huge horrible flaws in it's technology, no one actually spends bitcoin, bitcoin is centralized by inventors of it, Bitcoin is literally the most obscure -less than 750,000 people on earth use it, development has gone to be beyond closed door by a few people run bitcoin, is there any part of bitcoin that is likable except saying "someone told me if I bought it the price might go up", if someone will gain someone will lose, giant market caps are wildly unstable, bitcoin is mostly used for illegal stuff, inflation necessary to get people to actually do things with their money, if coinbase ever goes down that alone will take out like 90% of the entire bitcoin economy, zero confirmation transactions are insecure, bitcoin protects fraud, hot storage that is fed by cold storage (for the sake of security) requires to calculate daily if you plan to never move them again, someone can pay someone bitcoin to buy you things with stolen credit cards

Codes of storage preference:

Participant 1	electrum wallet
Participant 2	-
Participant 3	Mycelium, electrum, breadwallet, the entropy, Trezor
Participant 4	Trezor, de-centralized wallet, paper wallet with BIP38
Participant 5	-
Participant 6	-
Participant 7	paper wallet
Participant 8	-
Participant 9	-
Participant 10	-
Participant 11	HD wallets, Breadwallet on iOS, Electrum (cold storage for savings, hot wallet for spending), paper wallet
Participant 12	-
Participant 13	local wallet
Participant 14	Trezor
Participant 15	-
Participant 16	paper wallet, BreadWallet
Participant 17	Mycelium
Participant 18	Breadwallet, mycelium, multisig wallets
Participant 19	Bitcoinauthenticator
Participant 20	-

Codes that show how users are buying & selling Bitcoin:

Participant 1	-
Participant 2	-
Participant 3	Coinbase, Circle (credit card)
Participant 4	Coinbase
Participant 5	-
Participant 6	-
Participant 7	Coinbase
Participant 8	-
Participant 9	Coin Loft, Circle (credit card)
Participant 10	-
Participant 11	Circle (instant buy), Coinbase
Participant 12	Buttercoin, Purse.io, Local bitcoins
Participant 13	Circle, Coinbase, Myceluim, BTM, trade
Participant 14	-
Participant 15	-
Participant 16	Coinbase
Participant 17	Kraken, Bitonic, trade
Participant 18	-
Participant 19	-
Participant 20	-

Codes of usage frequency:

Participant 1	AS MUCH AS POSSIBLE
Participant 2	NEVER
Participant 3	AS MUCH AS POSSIBLE
Participant 4	AS MUCH AS POSSIBLE
Participant 5	-
Participant 6	AS MUCH AS POSSIBLE
Participant 7	AS MUCH AS POSSIBLE
Participant 8	-
Participant 9	NEVER
Participant 10	-
Participant 11	AS MUCH AS POSSIBLE
Participant 12	AS MUCH AS POSSIBLE
Participant 13	AS MUCH AS POSSIBLE
Participant 14	AS MUCH AS POSSIBLE
Participant 15	-
Participant 16	AS MUCH AS POSSIBLE
Participant 17	AS MUCH AS POSSIBLE
Participant 18	AS MUCH AS POSSIBLE
Participant 19	AS MUCH AS POSSIBLE
Participant 20	-

Codes that reflects the value of the Bitcoin:

Participant 1	-
Participant 2	utility
Participant 3	distributed trustless consensus, permissionless innovation
Participant 4	-
Participant 5	-
Participant 6	-
Participant 7	-
Participant 8	-
Participant 9	-
Participant 10	-
Participant 11	-
Participant 12	-
Participant 13	-
Participant 14	liberty
Participant 15	-
Participant 16	value is simply stored, backed by sheer utility (get btc from miners immediately)
Participant 17	potential of trustless value transfer
Participant 18	trust
Participant 19	utility and scarcity
Participant 20	-