

An Hai Ta

**USER-CENTERED DESIGN OF A  
PERSONAL FINANCE APPLICATION:  
LOCALIZATION FOR YOUNG MILLENNIALS IN  
VIETNAM**

Computing and Electrical  
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## ABSTRACT

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Finance technology, or abbreviated as fintech, has emerged as an industry ever since people understood that technology can be radically utilized to provide value to the general public in the finance sector. Since then, many initiatives have been taken to improve financial services to users, via ways such as budgeting, investing or cryptocurrency.

Although the fintech industry has come a long way, it still has a particular problem when it comes to younger user segment, typically under 25 years old, known as millennials. The reason may come from the stigma that youngsters have against banking and finance being complex. This bachelor's thesis studies how improved user experience of a fintech mobile application named Blinky, can increase its appeal to this demographic. It does so in mainly two ways, namely user-centered design and product localization. With the user-centered design approach, the thesis explores the definition of user experience, the making of good usability in an application and the principles of user-centered design. When turning to localization, the thesis explains localization and culture. This lay the foundation for applying cross-cultural design to the research process.

The research approach can be described as iterative cycles of weekly interviews and user tests. Some number of suitable participants each week provide quantitative and qualitative feedback for improvements by the end of the cycle. After the research is conducted, there are insightful findings deducted from the data. Several differences are shown in the way Vietnamese testers behave, in contrast to the home market, Finland. They can be interpreted from the culture theories. Aside from that, the quantitative data from the user tests give a direction to improve the current version of Blinky.

The goal is to help millennials in Vietnam find an effective application to assist them in their personal finance. They could better manage the flow of money between friends that occurred during social activities. Furthermore, with Blinky, they could keep an intuitive log of their saving goals to help them achieve these targets.

Keywords: User experience, User-centered design, Human-centered design, Finance, Finance technology, Mobile application, Millennials, Localization

The originality of this thesis has been checked using the Turnitin OriginalityCheck service.

## **PREFACE**

This document template conforms to the Guide to Writing a Thesis in Technical Fields at Tampere University (2019).

I would like to thank my thesis supervisor Kaisa Väänänen for her valuable feedback. I would like to also thank my employers and colleagues in Bankify for providing me a great working environment and experience, and especially for the opportunity to make this thesis.

Tampere, 14<sup>th</sup> May 2019

An Hai Ta

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## LIST OF SYMBOLS AND ABBREVIATIONS

Fintech	Finance technology
ISO	International Standard of Organization
UCD	User-Centered Design
HCD	Human-Centered Design
UX	User experience
TAU	Tampere University
URL	Uniform Resource Locator

# 1. INTRODUCTION

Personal finance is well-known to be a difficult subject, especially for the younger generation. It is usually not included in the curriculum of academic schools. Even in higher education, only certain bachelor's degrees in business would include such course. Therefore, many have viewed finance as a tough and boring area, despite its ubiquitous presence in everyone's everyday lives.

"Finance" is the management of a supply of money (Cambridge Dictionary, 2019; Cambridge Dictionary, 2019; Cambridge Dictionary, 2019; Cambridge Dictionary, 2019; Cambridge Dictionary, 2019). By definition, it revolves around everyone, ranging from a bank giving transnational corporate loans down to a young child buying himself a watermelon-flavored popsicle. Since finance is plays such a fundamental role in people's lives, it is important for everyone to understand that it is not only reserved for bankers.

As technology development continues to rise, so does the digitalization of the finance sector. This gave birth to a new industry known as Finance Technology, or commonly abbreviated as Fintech. It is characterized as the new applications, processes, products, or business models in the financial services industry, composed of one or more complementary financial services and provided as an end-to-end process via the Internet (Kagan, 2019). Numerous companies have emerged that now became internationally recognized, for example Visa, Paypal, etc. In one way or the other, such organizations have radically improved the way money is managed. People no longer have to queue at banks for hours on end to perform financial actions.

Millennials, known as individuals who were born in 1980s, 1990s, or early 2000s (Cambridge Dictionary, 2019), are a very distinct generation. They are the first generation who grew up with the internet. Due to an innate understanding of how to use technologies, millennials can quickly familiarize themselves with Fintech. According to KPMG, 67% of millennials prefer digital banks for the convenience, real-time access and lower banking fees (Dodini et al., 2016). This shows the opportunity in the market segment for the personal finance applications.

This thesis work is based on an application development project, in which ***the main focus is about the localization of the application called Blinky, to the millennials in Vietnam***. The case company is Bankify<sup>1</sup>, a Finnish Fintech company.

Vietnam is a major market opportunity for Fintech, as it is projected to reach \$8 billion by 2020, almost doubling just from \$4.4 billion in 2017 (Sieburg et al., 2018). On the other hand, the millennials make up for about 30% of the Vietnam's population, with rapid access to new technologies. Realizing such potential, the case company decides to localize its mobile application. The goal is to tailor the user experience according to the behavior of Vietnamese millennials.

The execution is based on the human-centered design process, which will be explained in the next chapter, alongside other terminologies. Then, Chapter 3 describes the research methods carried out to achieve results. In Chapter 4, the case company's product will be demonstrated for better understanding of the evaluation analysis conducted in Chapter 5. In the 6<sup>th</sup> Chapter, results of the research are revealed. Finally, comes the discussion regarding the overall topic and planning for future work.

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<sup>1</sup> [www.bankify.io](http://www.bankify.io)



## 2. THEORETICAL BACKGROUND

This chapter is dedicated to explaining the theories on which the research process is based on, or should be based on. It starts with clarifying the human-centered approach, the product localization and how it is applied to the research work.

### 2.1 Human-Centered Design Approach

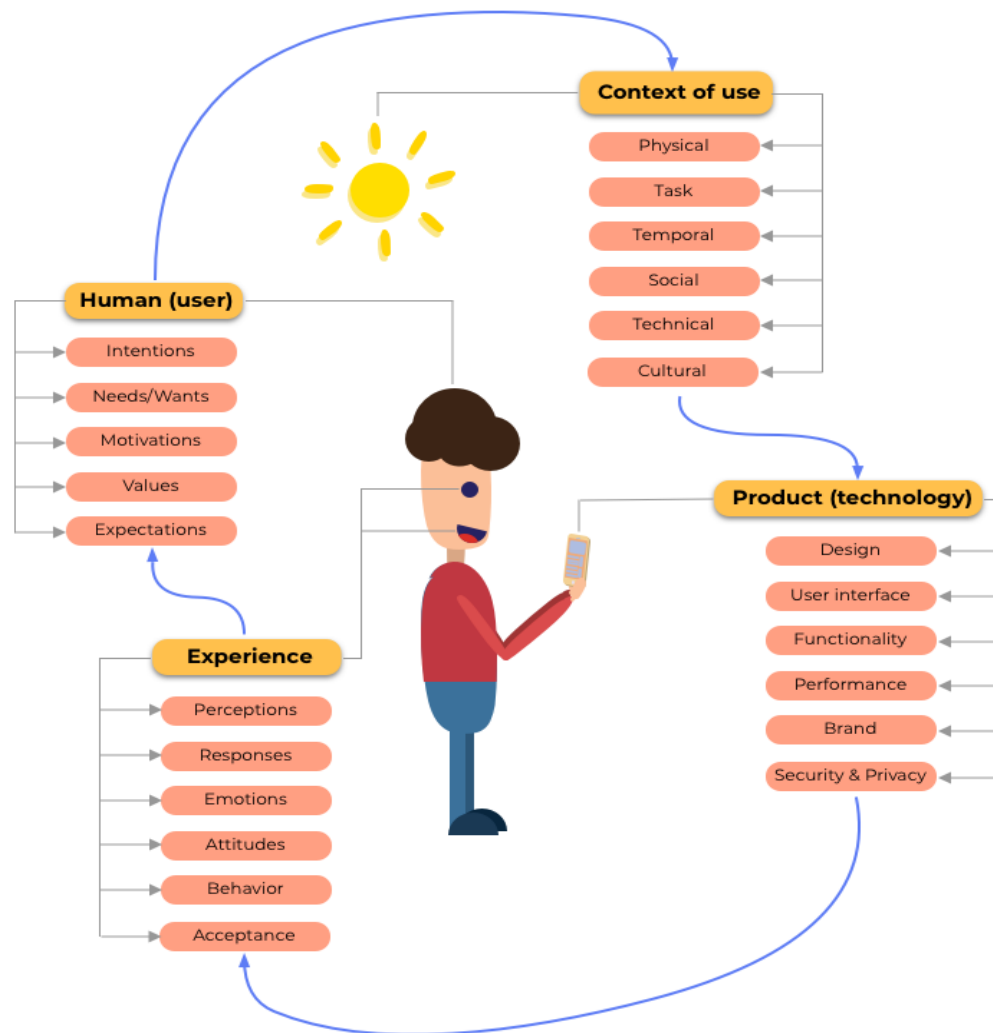
The method chosen by the case company to develop its mobile application is user-centered design. Therefore, to understand better the topic, it is important to clearly state some definitions relating to user-centered design (UCD), otherwise known as human-centered design (HCD) (ISO 9241-210, 2010). The essence of this method is putting the user at the core of the development process, thereby emphasizing the User experience (UX) and the Usability of the application. In order to evaluate the aforementioned characteristics, there must be ways to gather data, which will also be explained in this section.

The case company's primary product is a mobile application, which targets the millennials demographic. As mentioned above, this age group consists of digital natives, thereby having a high expectation on digital products/services. As a result, UX, Usability and HCD need to be adopted into the development phase to ensure the satisfaction of the demand.

#### 2.1.1 Definition of User Experience (UX)

In defining the term User Experience (UX), many attempts have been made. Several definitions will be listed to express the variety of approach in this field. One of the earliest definitions comes from the Nielsen Norman Group, who had given UX a broad interpretation. "*UX encompasses all aspects of the end-user's interaction with the company, its services, and its products*" (Norman et al., 1998). Meanwhile, for The International Standard Organization (ISO) 9241-210, UX is about "*a person's perceptions and responses that result from the use or anticipated use of a product, system or service*" (ISO). Another more descriptive version from Hassenzahl and Tractinsky characterizes UX as "*[...] a consequence of a user's internal state (predispositions, expectations, needs, motivation, mood, etc.), the characteristics of the designed system (e.g. complexity, purpose, usability, functionality, etc.) and the context (or the environment) within which the interaction occurs (e.g. organizational/social setting, meaningfulness of the activity, voluntariness of use, etc.)*" (Hassenzahl et al., 2006).

Deriving from the above definitions, it can be seen that User Experience (UX) is created in the interaction between human and technology, within several different contexts. The relationship is described in the *Figure 1*.



*Figure 1. The interaction between human and product through interface (Roto, 2007, p1 – p4)*

As human beings approach a product or service, they usually have clear *intentions*, *needs*, *motivations*, *expectations* and *values* to extract from it. All these factors ought to be considered when the product design phase begins. In general, there are *needs* or *goals* in using a product such as entertainment, safety, efficiency or communication. However, the challenging part is the diversity in people, such as age, gender, culture, physical and psychological attributes. For example, a deaf person would not be a good fit to use phone calls, but rather video calls since they respond to sign language and visual cues. According to Nielsen, there are three dimensions on which users differ that would result to the disparity in experience, namely *the knowledge about domain*, *the*

*expertise of user of the system, and the depth of the users' computer experience* (Nielsen, 1993). When the user is knowledgeable about the domain of the product, an expert in the product's system, or experienced with computer devices, the learning curve is much faster. Thus, the effort to familiarize oneself with the product reduces, allowing the user to enjoy it more easily. This is clearly illustrated by the demographic of smartphone usage. To exemplify, teenagers use phones much more often than elderly people. They are also able to reap more benefits from such devices compared to the latter group. Another important differential cause is culture. This can be the distinct way people perceive meaning from visuals or behaviors. For example, although many languages read text scriptures from left to right, Arabic or Urdu do the opposite direction. Acknowledging this cultural difference is fundamental when designing interfaces for them.

A product or service is shaped by its *design, user interface, functionality, performance, brand, privacy and security*. Firstly, the design is decided with the user's goals and preferences in mind. This means that the same object can have different designs to suit a wide array of demands. For example, in the automobile industries, there are cars that are designed to be more family friendly, placing emphasis on seat space and luggage; whereas some are more expensive, paying attention on style and luxury. Next, it is the product's user interface that facilitates interaction to create the user experience. A user interface (UI) is defined as "*any system, either physical or software based, that allows a user to connect with a given technology*" (Techopedia). When the user controls the product, it gives feedback about the functionality. From the feedback, the user can measure the performance of the product or service. The relationship between the UI, functionality and performance constructs the usability of a product or service, which will be more thoroughly discussed in the next section. Another aspect of a product or service is its brand, which publicly distinguished itself from other products or services so as to ease communication and marketing (Rouse, 2016). To exemplify, Apple's smartphones are branded as iPhone, and cost significantly more than other similar devices. Finally, privacy and security also have major impact on user experience. When a person chooses a computer, for example, they will want to know that it can sufficiently safeguard their personal information.

When the interaction occurs between the product and the user, it prompts an experience for the user. One of the most important elements that is often discussed in product design is *emotional response*. Since the user's incentive to consume a product is usually associated with positive emotions, product designers often aim to evoke pleasantness. Aesthetics, for example, is about creating visually pleasant products. Therefore, fashionable clothes by brand designers or sleek devices from Apple cost tremendously more than

the average similar products. Next, a good product impacts a person's *attitude* constructively. Many mobile applications, for example, aim to help users to foster a positive mindset like Thought Diary, Happify or MindShift (Scott, 2018). By the same token, a product can influence their *behavior* as well. To illustrate, fitness trackers such as Fitbit Charge or Xiaomi Band help users analyze their health while they exercise, resulting in a more efficient workout (Conelly, 2019).

Another important aspect of user experience is the environment in which the interaction takes place. It could be via *physical, temporal, technical, social, cultural* or *task-specific context*, though it is more often a mixture of these. *Physical context* is meant by the tangible aspects such as lighting, temperature, clothing, humidity, noise, space and safety factors. For example, smartphones are designed to operate best in room temperature, not in extreme cold weather. In such a scenario, the user would feel cold in the fingers if using a smartphone. Similarly, its battery also drains faster in low temperature. The next context to consider is the *technical*, referring to the infrastructure, compatible devices and software. This could be understood as the availability of network. Numerous applications or software on smartphones require Internet access to work, so a lack of such connection would hinder their performance. Another context is *social*, meaning to the people around the user, the people who are connected on the Internet, the public use and shared use. A telling example to highlight the significance of social context would be the social media application Facebook. The more Facebook friends the user has, the more engaged one is to the application. Similarly, *cultural context* refers to the product's adaptation to the locale's customs and behaviors. Finally, *task context* involves the tasks user does simultaneously or related to the mentioned product. When designing footwear, for example, the task context is placed at the center of consideration. Brands such as Nike and Adidas focus on sports shoes, whereas, Vans manufactures skateboard sneakers.

### **2.1.2 Nielsen's Usability Heuristics**

In the process of user-centered design, it is vital that one understands the *characteristics of good usability*, often presented as Usability Heuristics. There are ten Usability Heuristics that underline good design, which are based on Nielsen's Heuristics (Nielsen, 1994). The term "heuristics" was given because their purpose is to outline board rules of thumbs, not to be treated as specific guidance to best-guaranteed designs. Therefore, knowing these fundamentals allows researchers to build a strong foundation for the product development, as well as prevents them from reinventing the wheel.

The first usability heuristic concerns *the visibility of system status*. The interface should always be visually responsive to let the users know what is happening, through an acceptable period of feedback time. Without such reply, users cannot be sure if the system works correctly, or they are. For example, when a functional smartphone user taps on his phone to open an application, there must be an immediate switch to a new screen view. Otherwise, his assumption would be that either the phone is malfunctioning, or he has mis-clicked. (Nielsen, 1994)

Second, *the system's match with the real world* is considered. This characteristic appeals to the natural and logical appearance of information from the system. The product or service should have familiar language, words, phrases and concepts to the user, instead of system-oriented terms. For instance, when a user signs up for an account with a lengthy password, rather than displaying "*length-error*" as in programming, the system should display "*The password is too long, please try a new one*". (Nielsen, 1994)

The third principle concerns *user control and freedom*. As commonly known, humans are prone to err. In situations where users accidentally select a system function, they need the possibility to undo or redo without significant extra work. A good example of such aspect in a system would be an application in which there is a *Back* button for every screen or *Cancel* button for any action. (Nielsen, 1994)

Fourth, comes the importance of *consistency and standards*. Consistent typography, color palette, layout patterns and so on provide a better user experience. This way, users will not be confused by meanings expressed from different words, situations or actions. Similarly, interface standards should be adhered to, thus ensuring users understand individual interface elements. For example, in any online shopping site, users have internalized that the "*Shopping cart*" symbol is where they check out (Nielsen, 1994). However, when a winter sports shopping site replace it with a "*Shopping sled*", 50% of users failed to understand the concept (Nielsen, 1999).

*Error prevention* is another important heuristic. In other words, a thoughtful characteristic of good design is its ability to prevent error from even occurring. There are several ways to help user avoid such slips, such as helpful constraints or suggestions (Laubheimer, 2015). Including constraints could be exemplified in cases where dates need to be picked. By graying out the dates in the past, users cannot select a flight departure from two days ago. Similarly, offering suggestions proves to be powerful when users search for a product, an article or a video. (Nielsen, 1994)

Sixth, a good system makes use of *recognition rather than recall*. Recognition is user's ability to recognize familiar information or objects, while recall demands a user to retrieve

details from memory (Budi, 2014). The reason why recognition is preferable can be illustrated with the example of meeting an acquaintance on the street. It is easy to tell if the person has been met before but recalling his/her name would be significantly harder. Good interfaces reduce users' effort to remember, such as how search engines display their search history to remind them the recent activities. (Nielsen, 1994)

The next desirable characteristic is *flexibility and efficiency of use*. As there are different levels of skills and familiarity of users regarding a product, it should provide flexibility and efficiency in the way it operates. Adobe Photoshop, a graphic and photo editor software, for example, provides different techniques to edit an image. If the users want to enhance a picture, they can either apply "Camera Raw filter" or use "Adjustments". Furthermore, for experienced Photoshop users, the software provides many shortcut buttons, making it faster to use the program. (Nielsen, 1994)

Eighth, *aesthetics and minimalist design* play a vital role in good usability. Since humans are attracted by novelty and aesthetics, products that possess these features tend to gain user's attention. Therefore, they should strive to adopt sleek design that resonates with user's taste. On the other hand, such aesthetics should not come at the expense of unnecessary details. This could lead to irrelevant information, competing against relevant material, thereby diminishing the overall appearance. (Nielsen, 1994)

Ninth, *error recovery* is essential to help user return to normal functions of the product. This characteristic is often sufficiently addressed as long as error messages are clearly expressed, indicative of the problem and constructive toward a solution. (Nielsen, 1994)

Finally, *documentation* is necessary for more complex systems. While it is preferable that systems are usable without documentation, it is worthwhile to have help. Such information should be easily found, concrete and focused on the user's task. For example, all Adobe software have a massive documentation available online to assist users with its complicated programs like Photoshop or Illustrator. (Nielsen, 1994)

### **2.1.3 Definition and Principles of Human-centered Design (HCD)**

According to the International Standard of Organization (ISO) 9241-210, Human-Centered Design (HCD) is "*an approach to interactive systems development that aims to make systems usable and useful by focusing on the users, their needs and requirements, and by applying human factors/ergonomics, and usability knowledge and techniques*" (ISO 9241-210, 2010). Although User-Centered Design (UCD) is an acceptable equivalent, it is recommended to use HCD. UCD focuses on the users first and foremost, while

HCD indicates that not just the users are important, but all stakeholders involved in the process, such as designers, marketers.

There are six principles of human-centered design. They establish a good set of rules of thumbs to produce a quality human-centered product. By following these principles, companies can benefit vastly in the long run.

First, ***designers' work should base closely on explicit understanding of users, tasks and environments***. Early in the process, they should identify all the relevant user and stakeholder groups. In other words, the people who will use the products, systems or service; and the people who might be affected by the use of such. Tasks and environments involve the contexts of use, which are already analyzed in section 2.1.1.

Next, ***users are actively engaged in the design and development of the products***. As the product revolves around the end-users, they need to be in close interaction throughout the course to give feedback, suggestions and criticisms to designers. These valuable inputs allow designers to gain deeper understanding of their behavior and thought process. In reality, this can be done by recruiting a representative group of users of the suitable demographic.

Third, ***the design is driven and refined by a user-centered evaluation***. After receiving feedback from users, it is crucial to apply the precious source of information appropriately. It minimizes the risk of failure to meet the users' needs. It also reduces the likelihood of addressing the wrong problems. Additionally, it can reveal hidden requirements that initially were not specified. Furthermore, the feedback is useful as well during the operation of the product for diagnosing long-term issues. Then, the product can be refined for future design.

The fourth principle emphasizes ***that the process should be iterative***. The involvement of users and gathering of their feedback should occur in various phases. It allows for improvements to be built on top of the previous sample. This entails an emphasis on the early stage, in which the iterative changes made can be more cost-effective. Then, the iteration is done on the preliminary designs and prototypes.

Fifth, ***the design ought to focus on the whole user experience***. As defined above, this includes all the interactions that occur with the company, its products and services. They should be continuously polished for better user experience. By the same token, the ten heuristics of good usability should be addressed throughout the process. This increases user's retention due to further satisfaction, thus benefiting the company tremendously.

Finally, ***human-centered design requires multidisciplinary skills and perspectives.*** This stresses the importance of diversity in a human-centered design team, regarding extended knowledge in professionals such as user studies, user interface design, marketing and technology. The additional advantage is the creativity and ideation arising from teamwork. Such collaboration helps the team to tackle unique challenges in the field of human-centered design.

## **2.2 Product Localization**

This section explores the prerequisite knowledge to successfully localize a product. It begins with defining the terms *localization* and *culture*. As these are described, the next step is to study the cultural differences between the original market where the case company operates, Finland, and Vietnam. The characteristic distinctions shall be examined based on a popular metric, known as Hofstede's cultural dimensions.

### **2.2.1 Definition of Localization**

Localization refers to the adaptation of a product or service to a specific location or market (Ishida & K. Miller, 2015). Aside from the language translation, the localization process may also consist of the modification of content to suit the tastes and habits of consumption of other markets, the graphical and design adaptation, or the conversion to local requirements and regulations. In an organizational context, localization means adapting and transcreating content of the products and services to the local language and culture to be responsive to customers there (Ferreira, 2017). A stark example of localization of a mobile application is Airbnb<sup>2</sup>, a platform where locals can host travelers in their own home, available in 65,000 cities across 191 countries. In any of the thousands of cities that have Airbnb accommodation listings, the app also offers "Experience". These are packages that allow travelers to participate in cultural activities and have a deeper understanding of their travel destination. Furthermore, Airbnb offers customer service in local language and local payment options. This adds to the ease of using the application for users as well.

### **2.2.2 Culture**

To properly localize a product or service, organizations ought to consider first and foremost the culture of the targeted locale. However, the term "*culture*" has had several variations in meaning throughout history. The first definition was given by pioneer English

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<sup>2</sup> Airbnb.com



anthropologist Edward Tylor in his book *Primitive Culture*. According to him, culture is “that complex whole which includes knowledge, belief, art, law, morals, custom, and any other capabilities and habits acquired by man as a member of society” (Tylor, 1871). Hofstede gave a more recent definition of culture as “[...] the collective programming of the human mind that distinguishes the members of one human group from those of another. Culture, in this sense, is a system of collective held values” (Hofstede, 1980). While Tylor’s definition illustrates the intricacy of culture, Hofstede’s expands it to multiple societies. In reality, culture can be vastly different from one society to another, thereby making the localization a challenging process. Nonetheless, Hofstede’s model of cultural dimensions offers a way to analyze different cultures (Hofstede, 2019).

### 2.2.3 Hofstede’s Cultural Dimensions

One of the most widely used metric to measure the degree of difference between cultures is Hofstede’s 6-dimension model of national culture. The six dimensions are Power distance, Individualism, Masculinity, Uncertainty avoidance, Long-term orientation and Indulgence. To assess the difference between countries along each dimension, Hofstede uses a scale from 0 to 100. In the Hofstede Insights website, the creator has constructed a tool to compare countries along these dimensions. This provides tremendous clarity when investigating the cultural characteristics of Vietnam (Hofstede, 2019). Understanding Vietnam’s dimensions explains how they can be different from the case company’s home market Finland.

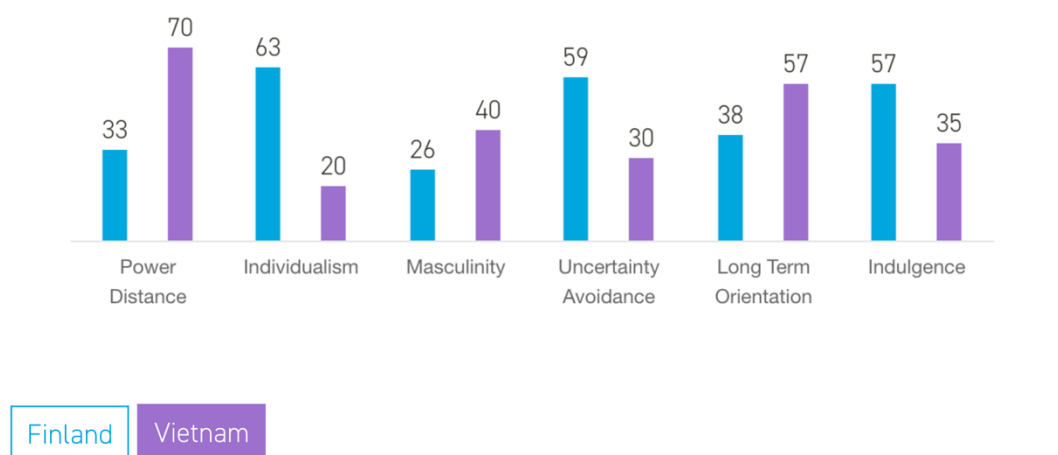


Figure 2. Country comparison of Hofstede's cultural dimensions between Finland and Vietnam (Hofstede, 2019)

First, the *power distance* dimension explains the degree to which the less powerful members of institutions and organizations within a country expect and accept the unequal distribution of power (Hofstede, 2019). Along this dimension, Finland scores a low of 33, demonstrating its hierarchical flatness and decentralization of power. The relationship between employee and employer manifests in direct communication. Meanwhile, Vietnam is situated on the higher end of the rating (score of 70). This means that organizational hierarchy and centralization are prominent. Leadership is not to be challenged. As a result, Vietnamese people incline toward the role of subordinates when a suitable figure of authority is present.

Second, the *individualism* dimension addresses the magnitude of interdependence a society maintain among its citizens. While an Individualist society promotes its members to only care about themselves and their direct family, a Collectivist society emphasizes the importance of groups. As commonly seen in Confucianist countries, Vietnam is collectivistic, further proven by a low score of 20. Such a country heavily advocates loyalty toward family and communities (Nguyen, 2016). This echoes in Vietnamese's priority of one's reputation, as they do not want to bring shame to their family and lineage. Therefore, people only act when aligned with the groups' values (Hays, 2008). This can be vastly different from Finland, whose Individualism score is 63. In an individualistic country, each member focuses more on their own well-being and values.

The third dimension is *masculinity*, on which the other polar refers to Femininity. If a country ranks high as a masculine nation, it endorses competition, achievement and meritocracy. In the case of Finland and Vietnam, both countries' scores reside on the Feminine side, with a respective score of 26 and 40. In the Global Competitiveness Report by World Economic Forum, Vietnam ranks 77<sup>th</sup> out of 140 countries in 2018 in terms of competitiveness (World Economic Forum, 2018). This means the people are oriented toward caring for others and improving life quality. Instead of fixating on winning, the members of feminine societies strive for mutual agreement. They are more likely to compromise for the common benefits.

Next, the dimension of *uncertainty avoidance* is considered. This dimension describes the extent to which a country is comfortable with ambiguous situations. Finland scores 59, showing its conservatism, resistance to uncertainties but high regard for precision and punctuality. On the other hand, Vietnam's score is half of Finland's, revealing its positive attitude towards changes and innovation. When a society is low on uncertainty avoidance, its members are open to new ideas. Ever since the Vietnam war ended in 1975, the country witnessed an explosive economic growth, with its GDP skyrocketing from less than \$100 in 1989 to \$2300 in 2017 (World Bank, 2018). This is largely due to

its free-trade policy and massive reform in many frontiers. In more recent years, Vietnam has proactively embraced the fourth industrial revolution, placing heavy emphasis on technology innovation (Vu & Nguyen, 2017).

In the fifth dimension, Hofstede discusses *long term orientation*. This refers to a country's attitude towards its linkage to the past and challenges of the present and futures. A normative country, whose score occupies the lower half of the dimension like Finland (39), tends to follow traditions and norms. It also treats future changes with cynicism. However, Vietnam is seen as a pragmatic country, scoring a high of 57. This further explains its propensity for changes and innovation, as the score indicates Vietnam's ability to adapt. In the context of technology, the pragmatism is illustrated by the country's openness to rapid innovation. In the span of 15 years from 2000, Vietnam grew to 14000 IT businesses (Marvin, 2015). In terms of foreign co-operations, the Vietnamese government welcomes investments and collaboration. For example, it partnered with the Finnish government to launch the Innovation Partnership Programme in 2014 (Innovation Partnership Programme, 2018).

The final dimension, *indulgence*, portrays the extent to which people control desires and impulses. Finland achieved a relatively high score of 57, expressing its proclivity towards indulgence. On the other hand, Vietnam's score is a low of 35, downplaying the importance leisure time. In such a restrained society, people tend to work more. According to the data in Global Database's Vietnam, in 2017, the average work hour was 45 per week (General Statistics Office, 2017). Meanwhile, in Finland, workers averaged 38 hours a week for full-time work, 15% lower than those in Vietnam (Tarkoma, 2017). Furthermore, it indicates that the social norm pressured its members into thinking that indulging themselves is unjustified. As Buddhism remains the most prevalent religion in Vietnam, people follow its practice of self-control and overcoming desires.

### **2.3 Applying Cross-cultural Design to Research Process**

A large portion of Chapter 2 is dedicated to study the cultural differences and thinking model of Vietnamese people. With such information, researchers can adjust their usual approach toward conducting research accordingly. This entails concrete changes that are implemented in the research process for this thesis.

One of the notable distinctions in the Vietnamese thinking model is the *power distance*. As mentioned previously, people have a strong regard for hierarchy. In the context of an interview, this means they tend to be highly receptive toward the interviewer, since they are more inclined to assume authority in the one who asks questions. In other words,

they try to say the right things and please the interviewer. This may cause misleading information, as the honest feedback of the interviewee is what is most valued during the session. Consequently, it is crucial to communicate to Vietnamese interviewee the importance of complete transparency, even when the feedback might be deemed negative.

Secondly, *individualism* ranks predictably low in Vietnamese society. People often put community and group benefits ahead of their own. Researchers should take this into consideration when performing group interviews. It is likely that the majority of the interviewees will follow collective assumptions and disregard their own personal taste. In such scenarios, it is advisable to prepare the content of the questions. Otherwise, the result can be compromised with one-sided opinions.

### 3. RESEARCH METHODS AND PROCESS

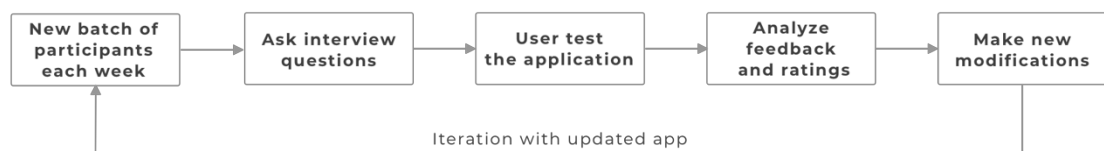
This chapter explains how the research is conducted. It first draws an overall picture of the process, then details the research methods used in the process. It also presents the metric that was used to evaluate the feedback over the period of time the research was conducted.

#### 3.1 Overall Research Process

Since the scope of the project was research in Vietnam for millennials, the chosen testers needed to fulfil the basic background criteria. They were all students of both genders. Their age ranged from 16 to 25. Testers were expected to have basic knowledge of mobile application.

To build a reliable product, it is paramount that reliable information is gathered. For example, what the users find important, their motivation behind the task or the context of use, are all relevant as building blocks toward a successful product. Such information is a powerful force that influences the user experience.

During this research process, a lean testing method was implemented to gather data. It incorporates two standard research methods, interviewing and user testing. This combination was due to the time, location and resource constraints of the research period. The process was conducted in-person in Vietnam for eight weeks. In the case company Bankify, I worked as an UX researcher who participated in the process. It was decided that a leaner process should be adopted, illustrated by *Figure 3*. With each tester, the interviewer would combine simultaneously both methods to get more quantity of interviews and user tests. It would then be evaluated at the end of each week. The useful comments would be implemented in the next round of testing, in which the same procedure would be repeated.



*Figure 3. The “lean” research process conducted by the case company*

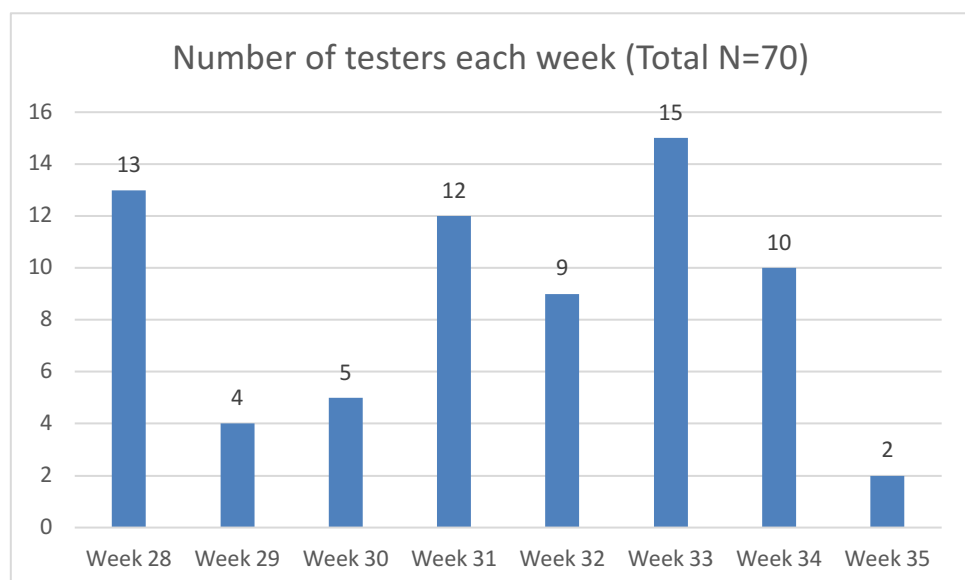
As a result, 70 testers were interviewed and tested individually. The default language was in Vietnamese. All the interviews were guaranteed anonymity so that users feel free to critique the application.

The interview fell into the category of a structured interview. This means that the questions had already been preplanned. Interviewer proceeded throughout the interview in the order that had been specified in the question form. As the sample group was quite large (N=70), the structured format was selected to reduce possibility for variety. This helped narrowing down the influx of data. Subsequently, the analysis of data can be performed with more ease and fewer variables. As the case company's application had already been soft launched, the focus was to emphasize on producing comparable results.

The outline of the interview questionnaire can be found in APPENDIX A. In a nutshell, it consisted of questions related to background information, user's current usage of mobile applications, followed by evaluating the company's application by testing it.

### 3.2 Participants' Profile

In total, 70 interviews/user tests were carried out, each with a new tester. In the 70 sessions, the first 7 were both interviewed and user tested, while the rest was only user tested. The specific number in each week is shown as a chart in *Figure 4*.



*Figure 4. Number of testers each week (Total N=70)*

Their age ranged from 16 to 26 years, with the average of 18.7, and a standard deviation of 1.58. Almost all of them were students, studying either in high schools or universities, with the exception of one working adult of age 25.

All of the participants were new users to the application. This was important since the goal was to receive unfiltered feedback. In other words, the testers should not have seen the functionalities beforehand so as to prepare for answers, but rather give immediate thoughts upon seeing them.

### **3.3 Interview**

The interview is structured, meaning that there are a set number of questions to be asked (Rogers et al., 2011). The first four questions are related to interviewee's background. The first one is about the person's age. The purpose of this is to make sure that the interviewee belongs to the correct demographic, which is a young student in the age range of 17 to 25. In the next three questions, the interviewer proceeds to ask about mobile related usage. This includes the user's phone operating system, the top most used mobile applications in general and finance applications in specific. These questions help build a better user persona.

The interview questions are presented in Appendix A. They revolve around testers' routines in everyday life. The aim is to paint a better picture of the user's life, and to see if there are any potential pain points to address. Furthermore, they directly ask financial activities in the interviewee's everyday life. The interviewer attempts to see if there are any dissatisfactions with the person's way of handling money between friends, or while saving up money for something.

It should be noted that the two latter questions were only asked to the first 7 interviewees. Since they are open-ended questions, it would be time-consuming to repeatedly include them in all the sessions. It would be sufficient to get such a sample size. Otherwise, the first four questions which can be answered shortly are included in all 70 interviews.

### **3.4 User Testing**

The second method used for quantitative data is user testing (Rogers et al., 2011). After the background questions presented in Appendix B are asked, the tester is then given access to the application for testing the two main functionalities: *Goal Saving* and *Cost Split*. To start using the functionalities, the user is given a scenario to contextualize where and when the application is used. For *Cost Split*, the user imagines themselves going out with their friends, together doing activities that cost a certain amount. The user then

uses the application to split costs and get the money back from others. For Goal Saving, the user is given a target that is personal to themselves. The next task is to create the goal inside the application and log savings.

While testing, the user is always asked to “think out loud”. This means that they are encouraged to say whatever that comes to their mind during interaction with the application. The interviewer then writes down these thoughts for further analysis later.

When the user tests were conducted, it was required that a score metric was created. The purpose was to measure the changes that would come throughout the week, as the application was modified immediately according to the feedback received. *Table 1* is the template with which the users rank the application on various aspects, on the scale from 1 to 5 on a weekly basis.

Category	Week	Week	Week	Week	Week	Week	Week	Week
Design & Visuals								
Language understandability								
Usability								
Cost Split functionality								
Goal Saving functionality								
Fun								
Usefulness								
Interest								
Recommendability								
<b>Total average</b>								

*Table 1. Weekly user test scores template*

In Table 1, there are nine aspects that were measured. They are formed from the informed opinions of the author and the product development team. The goal was to evaluate the user experience quality and the localization quality of the application on a quantitative level. The first row indicates the amount of user tests conducted within the week. The first aspect is *Designs and visuals*, referring to the aesthetics and looks of the application. Second, the *Language understandability* is considered, seeing how well the translation is done, not only semantically but culturally. Afterwards, the tester critiques the application’s *Usability*. This involves criteria from the usability heuristics in Chapter 2. The next two scores regard the testers’ evaluation of each of the functionalities. This serves as a more specific insight to usability, not just of the application in general but



each functionality individually. Then comes the *Fun* element, one of the core values the case company holds. Sixth, the *Usefulness* of the application is evaluated. This suggests how applicable it is to the tester's everyday life. The two final ratings, *Interest* and *Recommendability*, express tester's willingness to download the application or recommend it to their friends. These nine scores have equal weight, which are then calculated into a *Total average* as a mean of comparing amongst other weekly scores. It is computed by adding all the scores together and then dividing the result by the number of metrics measured in the week.

## 4. DEVELOPMENT OF CASE COMPANY APPLICATION: BLINKY

In this chapter, the application is explained in detail. It starts with the vision that brought the application to life, then its core functionalities which are being developed in this thesis.

### 4.1 Product Vision

Bankify<sup>3</sup>'s slogan was "Make finance fun". The company was convinced that the reason why millennials pay little attention to the finance section was due to its dullness and complexity. Therefore, to attract this segment, the company wanted its product to embody its slogan. To do so, the product was developed based on the human-centered design process.

### 4.2 User's Goals and Tasks

The application Blinky had two main functionalities, Cost Split and Goal Saving.

#### 4.2.1 Cost Split

The concept of cost-splitting arose from a real-life problem that the company's founders encountered during their dinner together with friends back in 2015. As they finished their meal, they had trouble trying to split the costs between themselves. A calculator was too complicated, while pen and paper also seemed inconvenient. Realizing the lack of an effective tool for this particular problem, the founders came up with the idea for an application that would solve the math in an easy and fun manner.

Similarly, the user's goals of using the application is to get back the money that was owed to him/her by others, who participated in an event that was paid in advance by the user. To do so, the user will conduct a series of steps in the suitable context. During an event, the user will be the one paying in advance for all the related costs. He/she then uses the application to record all expenses and those who participated in each expense. Afterwards, the user can base on the calculation to request the money back from the participants.

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<sup>3</sup> Bankify.io

## 4.2.2 Goal Saving

As young adults, one of the big hurdles they ought to overcome is learning how to save money. At this age, they begin to lead an independent life. This newly found freedom can easily cause irresponsible purchases, especially in the era of consumerism. Though new items bring short-term gratifications, it is problematic in the long run. Despite knowing that they should save up for more long-term goals, young adults find it hard to stick with the savings. As a result, the case company wanted to create a tool to make such endeavor easier and more fun.

The user's goal in this case is to reach the saving goal with the assistance of the application. Throughout the user's journey of saving for the goal, he/she will log in each time the user sets aside money for the goal. In this case, the application functions as a digital diary of sort, that tastefully displays the user's saving logs. Additionally, the application allows the user to send donation request to others to help raise money for the goal.

## 4.3 Functionalities in Detail

It should be noted that the screens used as figures are from the updated version after the localization research process was conducted. The purpose was to bring overall clarity regarding the functionalities of the application. Furthermore, due to technical complications, it was difficult to fully recover the old version that was before the research.

### 4.3.1 Cost Split

This sub-section describes in detail the user interfaces of the *Cost Split* functionality using screenshots from the application.

*Figure 6* shows the home screen of the *Cost Split* functionality. It is referred to in the application as *Activities*. The main element in the screen is the image of a magnet attracting a coin. This signifies that users can get their money back using the application. The *Navigation bar* in the bottom consists of five icons. The left most icon is for *Activity*, which is the current state of the application. The next icon is for *Goal* functionality, which will be further elaborated in the next section. The only blue icon in the middle of the *Navigation bar* is the *Add* button. Depending on the state of the application, tapping the *Add* button either adds a new *Activity* or new *Goal*. The *Notification* icon is represented by a bell. The right most icon is dedicated for the *Profile* section.

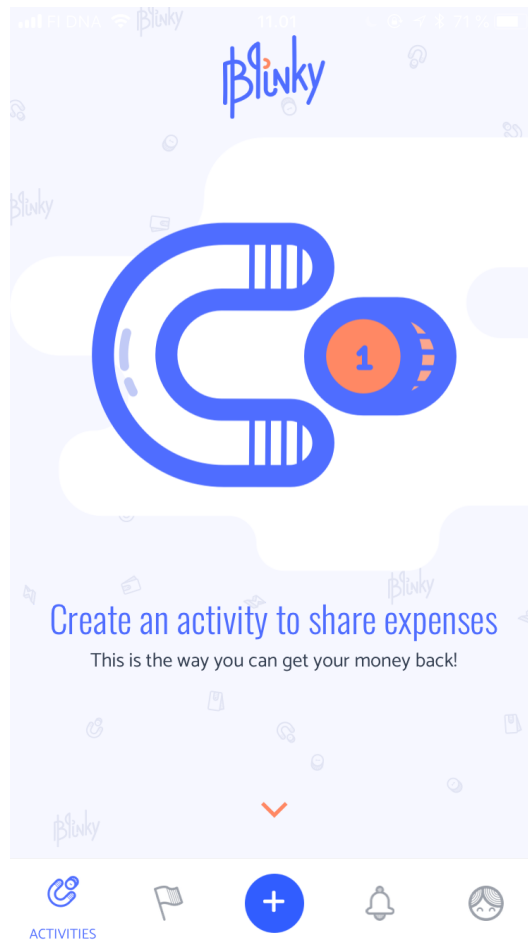


Figure 5. Home screen of the Activities (Empty state)

When clicking the *Add* button in the *Activities* state, the *Create activity flow* will be initiated. There are three major steps to go through in this process, *creating a group*, *adding expenses* and *requesting money*.

Firstly, the user will add all the members that participate in the *Activity*. The input field on top serves two purposes. The first is to search for the name of the participant from the imported contact list *Your contacts*. The second is to write the name of a participant that is not available in the user's contact list. The name will then appear in the *Quick add* section, from which the user is able to add to the group. This step is shown in *Figure 7*.

Notably, the avatar of the members is by default their profile picture. However, if they do not have one, the app will generate a facial expression emoji in to substitute. This creates a more playful feel to the overall experience.

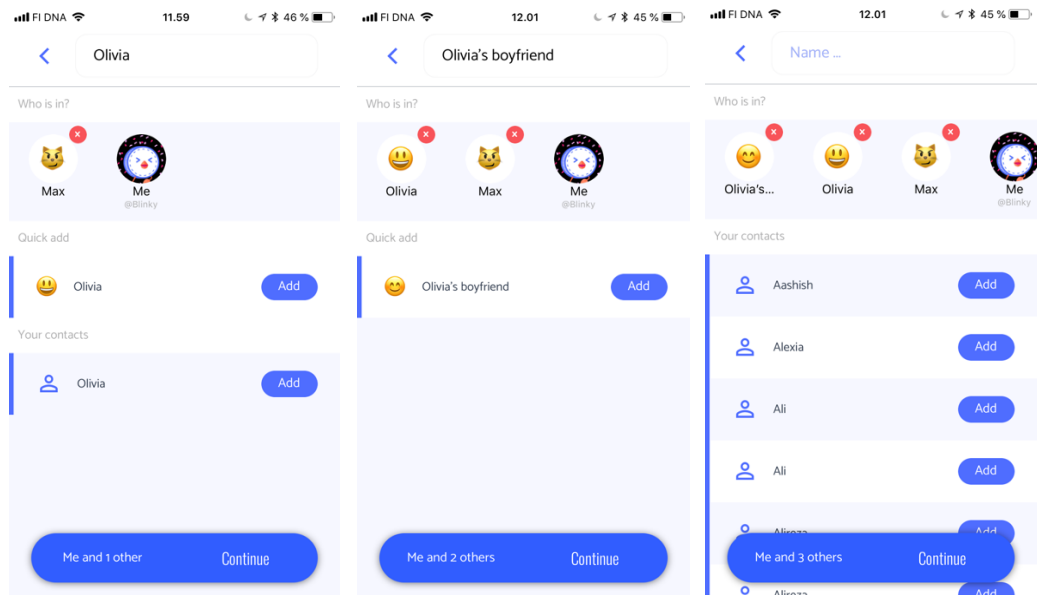


Figure 6. Creating a group for the Activity

After all the participants are added into the current *Activity*, the next step is to add in the expenses. There are two ways for the user to add them in, either manually or by scanning the receipt. Manually, the user can input the *Expense's* name and *price* in the upper input fields (Figure 8 left). Then by tapping the orange plus button, he/she adds the expense. A quicker way is by tapping the *Scan the receipt* button below the *Expense* input field, should the user have a receipt with them. The left screen in Figure 9 illustrates how a receipt is scanned, via taking a photo in such manner. After all the expenses are added, the user then can choose which members of the group need to share which expenses. This is performed by tapping on their names under the designated expenses (Figure 8 right).

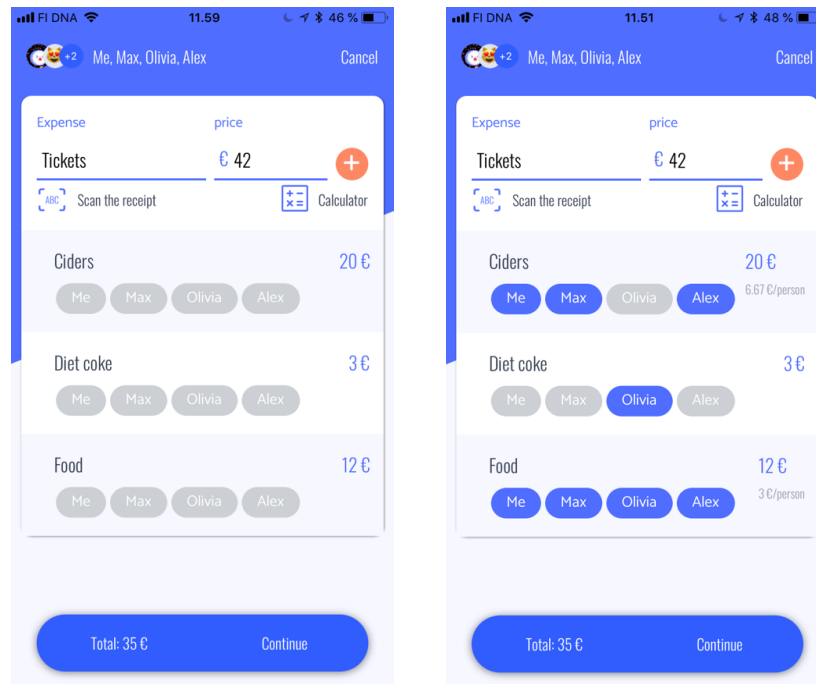


Figure 7. Adding expenses manually (left) and selecting participants (right)

Beneath the input field for *price*, there is a *Calculator* available that could help the user further if there is any need to calculate the value of the expense's price. The interface of the *calculator* is shown in the right screen in Figure 9.

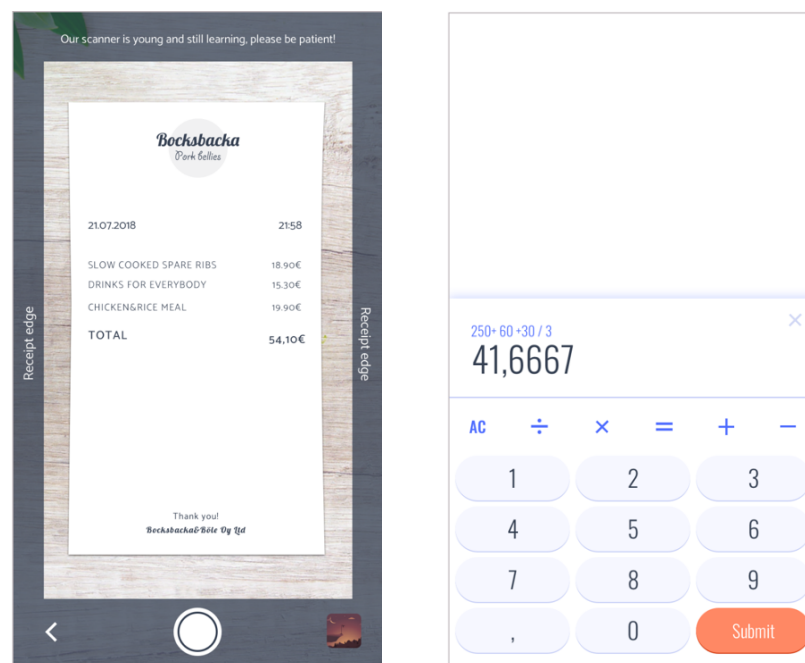


Figure 8. Adding expenses by Scanning receipt (left) and Calculator (right)

Finally, after the members and expenses are added, the *Activity* is created. *Figure 10* shows how the *Activity Main* screen looks like. The main component in the middle of the screen contains an image placeholder, where users can upload a suitable photo for the *Activity*. Furthermore, under it is the name of the *Activity* and its *Total cost*, along with several profile pictures and relevant information. The second component encloses the two buttons *Send Payment Link* and *Edit* that together shape into a blue pill. The *Edit* button sends user back to the screen where he/she can modify the members and expenses. Meanwhile, *Send Payment Link* creates a link with which the user can send to the participants (*Figure 10*). The last component in the main screen consists of *Pending payments* and *Payment responses*, telling user which participants still owes money or have already paid.

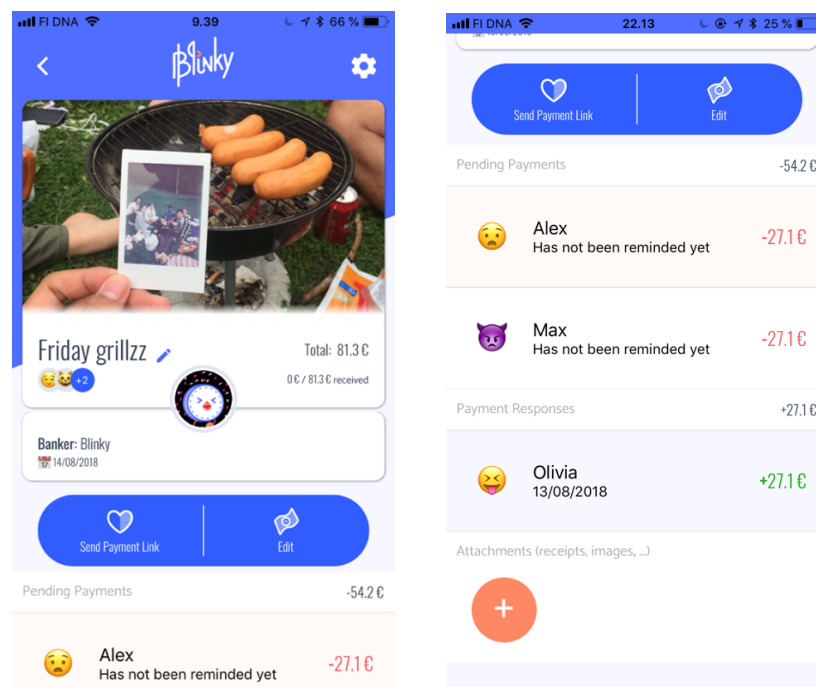


Figure 9. Activity Main screen

When the user taps the *Send Payment Link* button, he/she will be given a link, as illustrated in the left screen in *Figure 9*. At the same time, the user can use quick access to popular messaging platforms by tapping their representative icons below the link. This opens the selected application with which they can find the participant's chat to post the link (right screen in *Figure 11*). The participant can click on this link to see the payment information regarding the *Activity* and then pays the user.

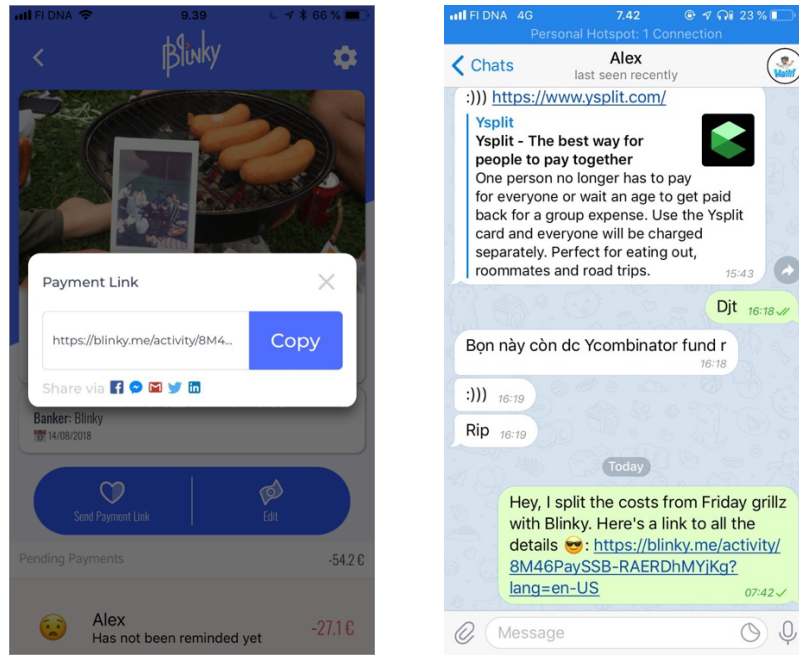


Figure 10. Sending the payment link to a participant

Once the participant taps on the link, he/she opens the Blinky web application. In this page, the participant sees the relevant information regarding the *Activity*. Then, he/she selects who they are in order to see the specifics of their own participation. Afterwards, the participant can make small adjustments to the payment, such as adding tip, selecting payment method and leaving a message. The process is demonstrated in *Figure 12*.

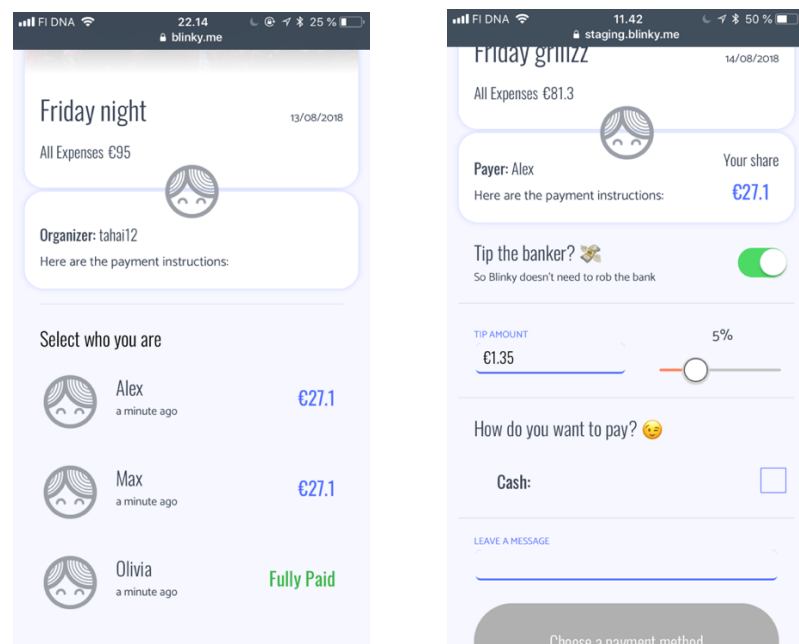


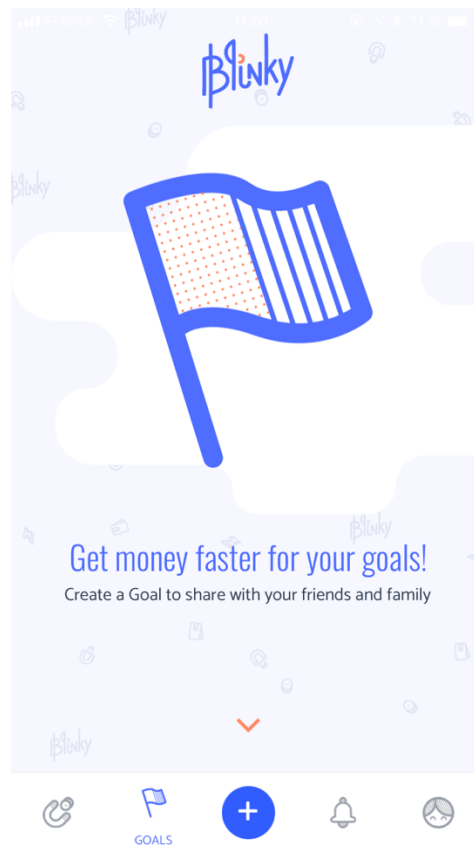
Figure 11. The process of a participant paying the user



### 4.3.2 Goal Saving

This section describes in detail the user interfaces of the *Goal Saving* functionality using screenshots from the application.

Similar to *Figure 6* as home screen for *Activities*, *Figure 13* presents the home screen for *Goals*. The main image of the screen is a flag, which represents the finish line of a metaphorical race that is a goal saving. The elements in the navigation bar at the bottom of the screen remain as described in the previous section.



*Figure 12. Home screen of the Goal (Empty states)*

Once the users tap the *Add* button in the *Goals* state, the *Create activity flow* will be initiated. They are then led through a series of four steps to add relevant information that constitutes a *Goal*. After a goal is created, users are able to log in their savings amount to track and also request donations from others.

First, to create a *Goal*, four types of information are needed, which are illustrated in *Figure 14*. The process starts with the name of the *Goal* and a representative optional photo. Then, the user is asked to put in the desired amount. The third question regards the date of which the amount is to be saved. Finally, the user needs to decide the frequency of saving to commit. This could be either daily, weekly or monthly.

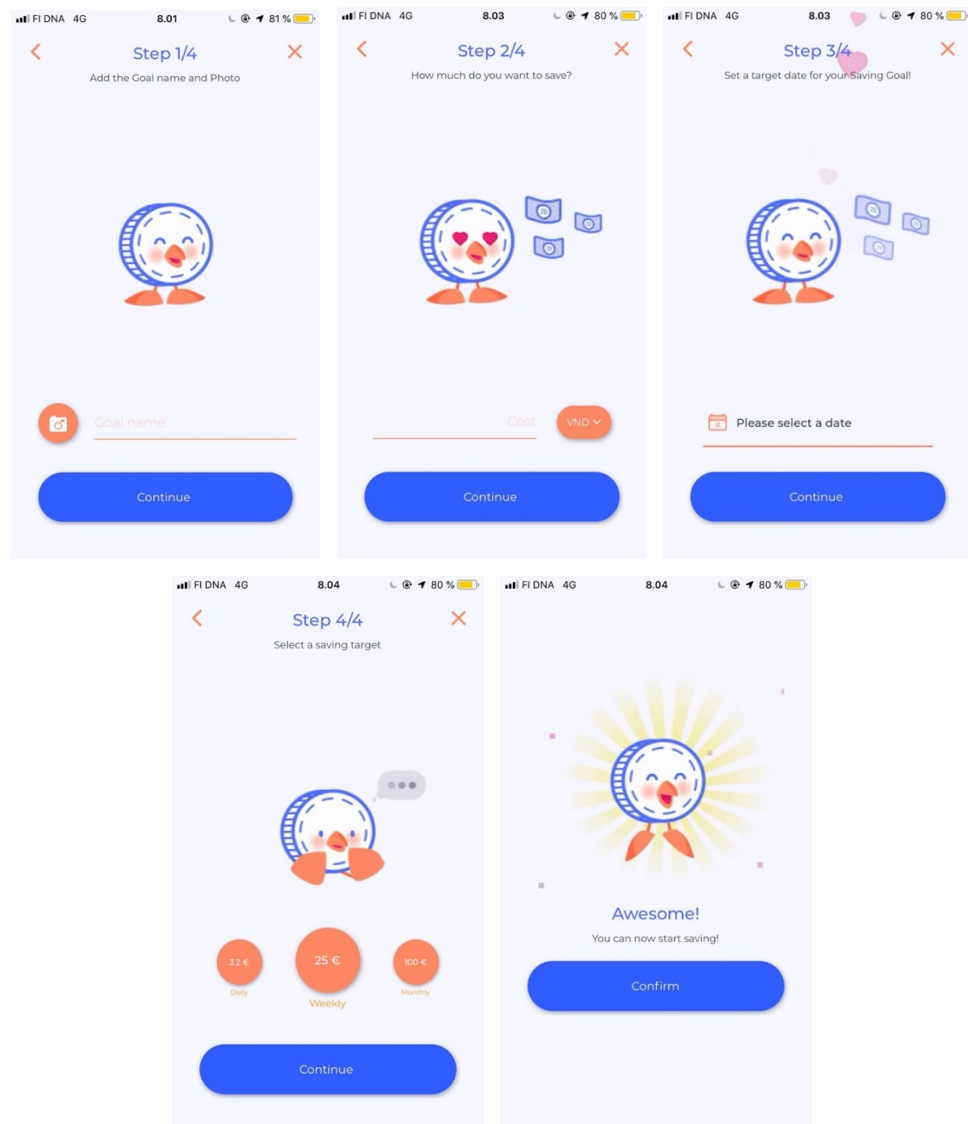


Figure 13. The steps to Goal creation

Figure 15 comes as a result of the Goal creation process. Its layout is designed similar to the Activity main screen. There is also an image at the center of the screen, followed by the name of the Goal and its *finished date*. The card below includes three figures, respectively the *weekly goal*, *own savings* and *savings left*. The *weekly goal* indicates the amount of money the user needs to save each week in order to meet the goal on the due date. Notably, this number is recalculated after each time a saving is deposited. It can also be *daily goal* or *monthly goal*, depending on which frequency the user chose in the previous steps. *Own savings* indicates the amount of money have been saved by the user. *Savings left* is the number of times the user still needs to make a saving. In the case of Figure 15, for example, the user has 209 more weeks to go until he/she reached the Goal. Next, identical to the Activity main screen, is the blue pill-shaped field that contains the *Send a donation request* and *Make a deposit* button. In similar ways to *Send*

payment link in Activity, Send a donation request also generates a link for the user to send to people who he/she thinks are most likely to support. As seen from the right screen of Figure 15, the ones who make the donation will be shown on the timeline. Whereas if the user makes a saving by him/herself, the screen in Figure 16 appears.

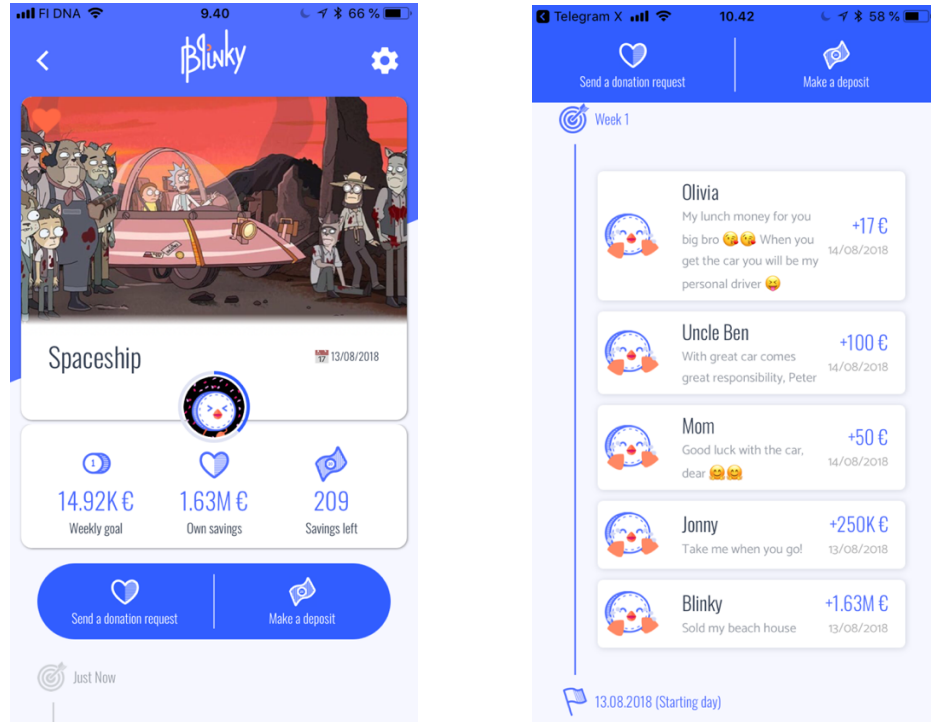


Figure 14. Goal main screen

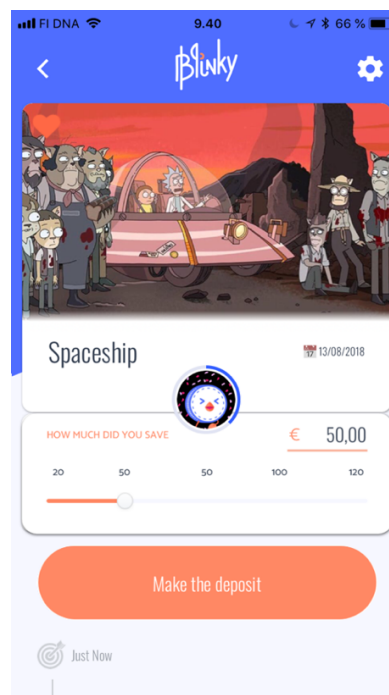


Figure 15. Make a deposit

## 5. FINDINGS OF INTERVIEWS AND USER TESTS

In this chapter, the findings from the interviews are analysed. Next, the results of the user test scores are presented.

### 5.1 Findings from Interviews

After the first seven interviews and immediate feedback from the user tests, some insights were made. Unfortunately, the interviews were not recorded, but instead paraphrased. Nonetheless, they still provided valuable information for the future work.

First, it confirmed *that the need to get money back from peers are still of high demand*. 5 out of 7 interviewees stated that they need a better tool for reminding friends to pay back the money they owed. This corresponds to Vietnamese people's non-confrontational nature, which may stem from the *collectivism* mindset. The updates of the application should, therefore, aim to perfect the *payment reminder* function so as to minimize the discomfort of the action.

Second, this demographic strongly believes that *presenting saving goals in a better way will help with getting the money assistance*. To clarify, young people agree that if parents or relatives see the effort they put in to save for a car, for example, the odds of receiving donations from them will increase significantly. This may indicate that visual and design quality should be improved to capitalize this aspect.

Third, *a significant number of testers asked if there were any more functionalities inside the application*, other than the two they tested. Meanwhile in Finland, the home market, the case company has raised the question of whether to separate the application into two separate applications with only one functionality each. The purpose was to simplify the application, due to mounting feedback by testers in Finland that it was slightly too complex to follow. This reveals an interesting difference between the two markets. This is backed up by popular examples in Asia such as Alipay<sup>4</sup> in China, or Momo<sup>5</sup> in Vietnam that house over 30 functionalities in their application. This suggests that in this region, people may prefer an application with an ecosystem of functionalities, instead of a single-purpose application.

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<sup>4</sup> Intl.alipay.com

<sup>5</sup> Momo.vn

Fourth, it was found that there is a high degree of cynicism towards fintech applications. The interviewers expressed their concerns over security and transparency when it came to cashless payment. This agrees with the current state of digital payment in the entire country (Nguyen, 2019). According to the interviewers, however, this doubt would diminish if the application is backed by trusted financial institutions.

Fifth, there was a noticeable difference between the Northern and Southern of Vietnam. The interviewers in Hanoi, which resides in the north, showed a lower overall interest and recommendability in the application. In a research conducted by The Nielsen Company in Vietnam, it was shown that the capital Hanoi has contrasting consumer behavior compared to Ho Chi Minh city in the south (Cross, Ryan, & Mai, 2009). People in Ho Chi Minh are characterized as “living in the moment”, while the Hanoians are frugal. They are twice as likely to try a new product and service in comparison to people in Hanoi. A deeper analysis showed that one significant reason is that Hanoians are heavily influenced by others’ opinions. This could explain why they are more hesitated to buy or use something new. This could be linked to Nielsen’s *indulgence*, *collectivism* and *uncertainty avoidance* dimensions. In a nutshell, this is useful knowledge to determine the marketing strategy of the case company when penetrating Vietnamese market.

## 5.2 Score Results from User Testing

*Figure 17* summarizes the average scores given on the scale from 1 to 5 by users every week from week 28 to week 35. Each average score is calculated by dividing the sum of scores given by testers by the number of testers that rated. The number of testers each week can be seen from *Figure 4* in *Section 3.2*. It should be noted that in the first week, the ratings of *Cost Split functionality*, *Goal Saving functionality* and *Recommendability* were not asked.

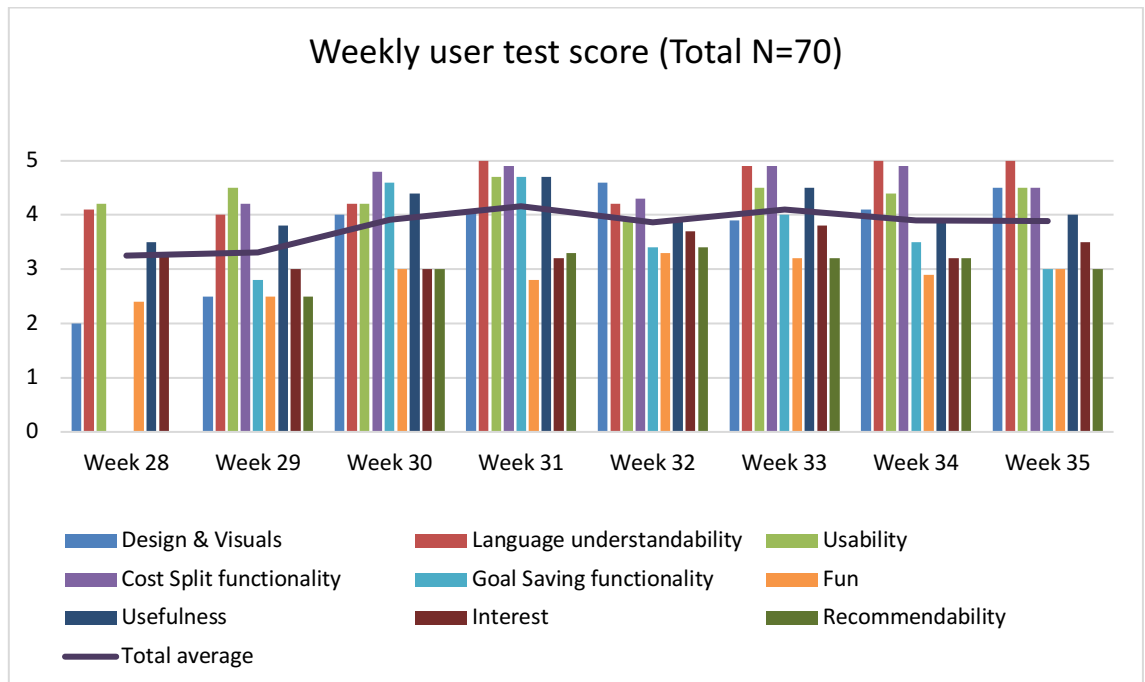


Figure 16. Weekly user test scores

The *Design & Visuals* score witnessed a two-fold increase throughout the period. This could be seen from the comparisons between the screens before and after the research. *Figure 18* demonstrates the changes that may be responsible for such boost.

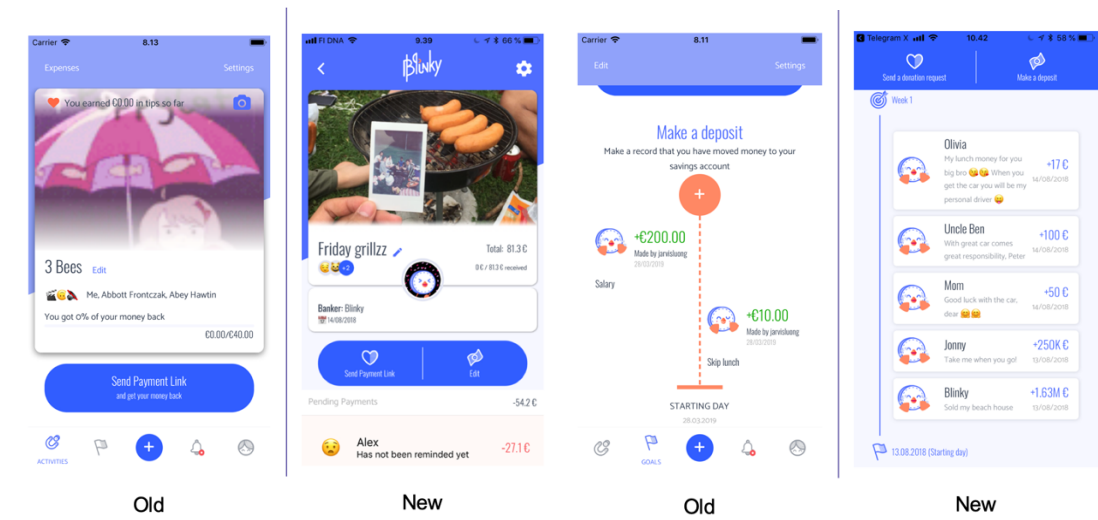


Figure 17. Comparisons between the design before and after the research

*Language understandability* started with an already high point of 4.1, and rose to a maximum toward the end, despite some minor fluctuation. This shows that the localization of the language was improved well.

Upon rating the application's *Usability*, the testers gave a high score in general, ranging from 3.9 to 4.7. After the first week, it was decided that each functionality should have separate rating, so that the interviewer can measure which one was more favoured. Consequently, the scores showed a distinct interest toward the *Cost Split functionality*, as it reached .1 less than the best score on three different occasions. Meanwhile, *Goal Saving functionality* started with a moderate 2.8. It then scored well in the subsequent two weeks, achieving 4.6 and 4.7, but significantly decreased to a 3 in the final week.

The next criteria is *Fun*. Initially, the score was 2.4, which was below average. During the entire period, it only witnessed a slight increase to 3, with some minor fluctuations, as it peaked at 3.3 on week 33 and then fell. As the deviation is minor, it may just be due to personal preference, since judging what is *fun* could be quite subjective.

*Usefulness* demonstrates the most fluctuations throughout the testing period. It began with a 3.5, rose to 4.7 in week 31, but decreased to 4 toward the end. This could stem from the fact that the application could not move real money inside it, but the increased fidelity in the design may have indicated otherwise. As a result, the testers might feel that the application could be more useful if the payment gateway was implemented.

Similarly, the testers' *Interest* also fluctuated, but the final score was 3.5, which is .2 higher than in the first week.

The *Recommendability* is the final rating, which was also added in only after week 28. In week 29, it started with a 2.5, then after some fluctuations, increased to 3 in week 35.

After all the metric's average scores were calculated, the *Total average* could be computed. It showed a marketed increase from 3.25 to 3.89. In week 31 and week 33, the score even rose above 4.

## **6. CONCLUSION**

This chapter summarizes the whole thesis. It then reflects on the current limitations of the methodologies. Finally, there will be ideas for the future work in improving localization for the case company's application in Vietnam.

### **6.1 Thesis Summary**

The main goal of the thesis is to study the behavior of millennials in Vietnam to adapt the personal finance application so that it addresses their needs. . The user-centered design process was applied, along with the study of product localization in Chapter 2. The third chapter introduced the data gathering methods, which were structured interview and user testing. The interviews helped collect information regarding the user behavior, while the user tests revealed how the targeted users evaluate the current product. Then in Chapter 4, case company's application was demonstrated in detail of the two functionalities, namely Cost Split and Goal Saving. In Chapter 5, the results of the research were presented.

With the data collected from the interviews and user tests, interesting findings were discovered. Not only are there multiple cultural differences between Finland, the home market, and Vietnam, but also between regions in the country itself. Furthermore, the result indicates that there is clearly a viable market in Vietnam. The product also showed a remarkable growth in quality by the end of the research progress.

### **6.2 Research Reflection and Limitation**

Hofstede's cultural dimensions framework provided correlations to the findings, but not strongly. There were only several interpretations that seem legitimate, although the connection needs to be further supported by empirical evidence.

An inadequacy in experience and preparation led to inconsistent data collecting methodologies and substandard results. The structured interviews should have been recorded for better analysis. As a result, there might be information loss and potentially biased findings. Meanwhile, the user tests had added in more metrics later on in the process. Furthermore, the number of user testers each week varied tremendously, ranging from 2 to 15 testers. These factors could decrease the quality of the average score.



Regarding the application, there was a significant functional limitation that might have hindered the user testing. Even though the application deals with money related issues, the application itself does not have payment gateways. In other words, money cannot flow through the application. To pay back money that someone owes from an *Activity*, one still needs to go to their online banking application or a payment application. It is similar when one wants to donate for another's *Saving Goal*. This drawback increases the steps user testers have to take to finish the journey. It is also sometimes confusing to the testers when they try to use this functionality.

Although the *fun* aspect was a key value proposition of the case company, the application has not yet succeeded in doing so. This was shown by the score collected from user testing. This may have to do with the nature of finance technology application, as money is a serious subject in people's lives.

### **6.3 Conclusion and Future Work**

From this thesis, it can be concluded that there is a need for an application that assists young people in Vietnam in activities that include joint payments and saving for goals. Throughout the research period, the application Blinky witnessed significant improvement, which can be observed from the quantitative data.

In terms of research methodologies, the subsequent studies must recognize the practical shortcomings and learn from them. It is crucial that the interview questions are constructed thoughtfully and empirically. Interviews and user tests should be recorded in order to collect qualitative data.

Currently, the design serves all the basic functionalities, except for allowing actual money transactions inside the application. It is important to develop such capabilities for the users. The next step is to seek partnership with a reputable bank in Vietnam to acquire trust. Once that is accomplished, the application should be tested again to gather more evidence.

Another important work is improving the user experience relating to the *fun* aspect of the application. This needs to be further researched by human-centered design approach and cross-cultural design. Thematic interviews are recommended to discover ways to develop the application that reside with user psychology.

## 7. BIBLIOGRAPHY

- Aamodt, M. (2018). *Why Scandinavian modern design is so popular*. Retrieved from Aamodt Plumb: <https://aamodtplumb.com/why-scandinavian-modern-design-is-so-popular/>
- Aykin, N. (2016). Usability and Internationalization of Information Technology. *CRC press. Cambridge Dictionary*. (2019). Retrieved from <https://dictionary.cambridge.org/dictionary/english/finance>
- Cambridge Dictionary*. (2019). Retrieved from <https://dictionary.cambridge.org/vi/dictionary/english/millennial>
- Conelly, C. (2019). *How to make wearables more effective for fitness clients*. Retrieved from Team Exos: <https://www.teamexos.com/idea-list/how-to-make-wearables-more-effective-for-fitness-clients/>
- Cross, A., Ryan, V., & Mai, T. T. (2009). *Hochiminh versus Hanoi: Differences between consumers of two regions*. Retrieved from [https://www.nielsen.com/content/dam/corporate/t3/vietnam/reports/Nielsen%20Vietnam\\_%20HCMC%20v%20HanoiRegionalConsumerDifferences\\_June%202009-VIETNAMESE%20Copyright\(NXPowerLite\).pdf](https://www.nielsen.com/content/dam/corporate/t3/vietnam/reports/Nielsen%20Vietnam_%20HCMC%20v%20HanoiRegionalConsumerDifferences_June%202009-VIETNAMESE%20Copyright(NXPowerLite).pdf)
- Dodini, S., Lopez-Fernandini, A., Merry, E., & Thomas, L. (2016). *Consumers' Use of Mobile Financial Services*. Retrieved from Federal Reserve: [https://www.federalreserve.gov/consumerscommunities/mobile\\_finance.htm](https://www.federalreserve.gov/consumerscommunities/mobile_finance.htm)
- Eypórsdóttir, K. S. (2011). *The Story Of Scandinavian Design: Combining Function and Aesthetics*. Retrieved from Smashing Magazine: <https://www.smashingmagazine.com/2011/06/the-story-of-scandinavian-design-combining-function-and-aesthetics/>
- Ferreira, A. (2017). *Universal UX Design: Building multicultural User Experience*.
- General Statistics Office. (2017). *Vietnam Average Working Hour Per Week*. Retrieved from CEIC data: <https://www.ceicdata.com/en/vietnam/average-working-hour-per-week/average-working-hour-per-week>
- Hassenzahl, M., & Tractinsky, N. (2006). User experience - a reaserch agenda. *Behavior & information technology*, 91-97.
- Hays, J. (2008). *SOCIETY IN VIETNAM: CONFUCIANISM, HISTORY, SOCIAL STRUCTURES AND COMMUNISM*. Retrieved from Facts and Details: [http://factsanddetails.com/southeast-asia/Vietnam/sub5\\_9c/entry-3404.html](http://factsanddetails.com/southeast-asia/Vietnam/sub5_9c/entry-3404.html)
- Hofstede, G. (1980). *Culture and Organizations*. International Studies of Management & Organization.
- Hofstede, G. (2019). *Hofstede Insight*. Retrieved from Country comparison: <https://www.hofstede-insights.com/country-comparison/finland,vietnam/>
- Hofstede, G. (2019). *Hofstede Insights*. Retrieved from Country comparison: <https://www.hofstede-insights.com/country-comparison/finland,vietnam/>
- Hofstede, G. (2019). *The 6-D model of national culture*. Retrieved from Geert Hofstede: <https://geerthofstede.com/culture-geert-hofstede-gert-jan-hofstede/6d-model-of-national-culture/>
- Innovation Partnership Programme. (2018). Portfolio.
- Ishida, R., & K. Miller, S. (2015). *Localization vs. Internationalization*. Retrieved from W3C: <https://www.w3.org/International/questions/qa-i18n>
- ISO 9241-210. (2010). *Ergonomics of human system interaction - part 210: Human-centred design for interactive systems*. International Organization for Standardization.

- Kagan, J. (2019). *Fintech*. Retrieved from Investopedia: <https://www.investopedia.com/terms/f/fintech.asp>
- Karina, R. (2018). *Characteristics of an Oriental Design Style*. Retrieved from Hunker: <https://www.hunker.com/13411188/characteristics-of-an-oriental-design-style>
- Marvin, R. (2015). *Vietnam's Tech Boom: A Look Inside Southeast Asia's Silicon Valley*. Retrieved from PCmag: <https://www.pcmag.com/article/337436/vietnams-tech-boom-a-look-inside-southeast-asias-silicon>
- Murphie, A., & Potts, J. (2003). *Culture and Technology*.
- Nguyen, D. (2019). *Businesses have long wait to cash in on cashless Vietnam*. Retrieved from Vnexpress: <https://e.vnexpress.net/news/business/data-speaks/businesses-have-long-wait-to-cash-in-on-cashless-vietnam-3868565.html>
- Nielsen, J. (1994). *10 Usability Heuristics for User Interface Design*. Retrieved from Nielsen Norman Group: <https://www.nngroup.com/articles/ten-usability-heuristics/>
- Norman, D., & Nielsen, J. (1998). *The Definition of User Experience (UX)*. Retrieved from Nielsen Norman Group: <https://www.nngroup.com/articles/definition-user-experience/>
- Rogers, Y., Sharp, H., & Preece, J. (2011). *Interaction Design - Beyond Human-Computer Interaction*. Wiley.
- Roto, V. (2007). User Experience from Product Creation Perspective . pp. 1-4.
- Scott, E. (2018). *Positive Thinking Apps Apps That Can Change Your Outlook* . Retrieved from Verywell mind: <https://www.verywellmind.com/positive-thinking-apps-4171906>
- Sieburg, M., & Tran, T. (2018). *Unlocking Vietnam's Fintech growth potential*. Retrieved from Solidiance: <https://solidiance.com/insights/others/white-papers/unlocking-vietnams-fintech-growth-potential>
- Tarkoma, J. (2017). *Labour force survey*. Retrieved from Statistics Finland: [https://www.stat.fi/til/tyti/2017/13/tyti\\_2017\\_13\\_2018-04-12\\_kat\\_003\\_en.html](https://www.stat.fi/til/tyti/2017/13/tyti_2017_13_2018-04-12_kat_003_en.html)
- Tylor, E. (1871). *Primitive Culture*.
- Vu, T.-M., & Nguyen, V. N. (2017). The Fourth Industrial Revolution: A Vietnamese Discourse. *Quality Management Journal*.
- World Bank. (2018). *Public data*. Retrieved from Google: [https://www.google.com.vn/publicdata/explore?ds=d5bncppjof8f9\\_&met\\_y=ny\\_gdp\\_pcap\\_cd&hl=en&dl=en#!ctype=l&strail=false&bcs=d&nselm=h&met\\_y=ny\\_gdp\\_pcap\\_cd&scale\\_y=lin&ind\\_y=false&rdim=region&idim=country:VNM&ifdim=region&tdim=true&tstart=-309837600000&tend=](https://www.google.com.vn/publicdata/explore?ds=d5bncppjof8f9_&met_y=ny_gdp_pcap_cd&hl=en&dl=en#!ctype=l&strail=false&bcs=d&nselm=h&met_y=ny_gdp_pcap_cd&scale_y=lin&ind_y=false&rdim=region&idim=country:VNM&ifdim=region&tdim=true&tstart=-309837600000&tend=)
- World Economic Forum. (2018). *Vietnam Competitiveness Rank*. Retrieved from Trading Economics: <https://tradingeconomics.com/vietnam/competitiveness-rank>

## APPENDIX A: INTERVIEW QUESTIONS

1. Background information: Email, age
2. Phone's operating system: Android/iOS
3. Top 5 most used mobile application
4. Current testers' finance applications
5. Describe your day-to-day life
6. Have you had problems with events that require money?
  - What kind of problems?
  - Have you thought of solutions?

## APPENDIX B: USER TEST QUESTIONS

1. Background information: Email, age
2. Phone's operating system: Android/iOS
3. Top 5 most used mobile application
4. Current testers' finance applications
5. Describe the user's day-to-day life (*not included in template*)
6. Does the user have trouble when it comes to money? (*not included in template*)
  - When splitting bills with friends
  - When saving up for something
7. Application's usefulness of the Cost Split and Reminder functionality (rating from 1-5)
8. Application's usefulness of the Goal Saving functionality (rating from 1-5)
9. Problems encountered while using Cost Split functionality
10. Problems encountered while using Goal Saving functionality
11. Application's fun aspect (rating 1-5)
12. Application's design (rating 1-5)
13. Application's language understandability (rating 1-5)
14. Application's usability (rating 1-5)
15. Application's overall usefulness (rating 1-5)
16. Tester's interest of the application (rating 1-5)
17. Tester's likeliness to recommend the application to a friend (rating 1-5)
18. Biggest problem while using the application:
  - Application is complicated
  - Application is buggy
  - Inappropriate language
  - Application does not have expected functionalities

- Issues with design
- None

19. Tester's favourite element of the application