

UKRAINIAN CATHOLIC UNIVERSITY

BACHELOR THESIS

**Analysis of regional specifics influence on
interface systems for real estate choosing
in Ukraine**

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*A thesis submitted in fulfillment of the requirements
for the degree of Bachelor of Science*

in the

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APPLIED
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Declaration of Authorship

I, Olena SKIBINSKA, declare that this thesis titled, "Analysis of regional specifics influence on interface systems for real estate choosing in Ukraine" and the work presented in it are my own. I confirm that:

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- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

Signed:

Date:

“Thanks to my solid academic training, today I can write hundreds of words on virtually any topic without possessing a shred of information, which is how I got a good job in journalism.”

Dave Barry

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Faculty of Applied Sciences

Bachelor of Science

Analysis of regional specifics influence on interface systems for real estate choosing in Ukraine

by Olena SKIBINSKA

Abstract

This paper presents a user experience study about how people search for and choose housing in Ukraine. The real estate purchase is one of the responsible choices in most people's lives. Not only it is one of the most significant financial investments most people ever get to make, but it also requires many efforts to become successful in home ownership eventually. What is more, if we observe the statistic in Google Trends, we can assert that the demand for real estate is increasing in Ukraine (*Google Trends Buy apartment search request*). Another thing to mention is that the constant progress of technology helps to simplify the process of choosing a real estate, by enabling online property search and value creation. Despite all of the advances in technology and market growth, the process of the real estate choosing consists of many bottlenecks. The problem of finding a housing remains open within the UX/UI domain in Ukraine. Thus, there is still place for improvement. The findings of this study are dedicated to ease the problems of choosing the housing and make that experience more accessible and convenient.

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List of Abbreviations

HCI	Human-Computer Interaction
UX	User Experience
UI	User Interface
KPI	Key Points Indicators
ROI	Return On Investment
JTBD	Job To Be Done
HMW	How Might We
POV	Point Of View
DDD	Data Driven Design
NPS-measure	Net Promoter Score

Dedicated to my family

Chapter 1

Introduction

The biggest website providing real estate search in Ukraine is LUN (*LUN*). This company collects all ads of the real estate market in one place. The LUN's team conducts a lot of usability testings, which deliver quantitative and qualitative findings for improvement of their interface. Based on such approach of making design decisions, one can state that LUN follows data-driven design. Due to the periodical quantitative assessment LUN's team has recognized the regional diversity in service usage. As the results of the assessment showed, their service has lower position in Lviv real estate market comparing to the position in Kyiv real estate market. That is why this problem has received substantial interest.

Therefore, the objectives of this thesis are divided into two segments: UX investigation and business side of the real estate search.

1.1 UX investigation objectives

The first goal is to explore the actual experience of people searching the housing and reveal most of the problems they would meet during the search. Our approach is based on conducting in-depth interviews with people who have a goal of purchasing a real estate. Hence, we need to observe which stages users follow while searching for real estate. What does convenience mean in terms of choosing housing? Which criteria are essential in this field? By enhancing our understanding of people's behaviour, pains, and gains while looking for housing, we can improve their experience.

Another goal is to test the user experience during interaction with a particular interface and compare two design approaches: data-driven design and emotional design. These two strategies lead to fundamentally different usage experience, thus forming the polarity problem in UX/UI design. The main examples of these two types are Booking(*Booking.com*) and Airbnb(*Airbnb.com*). There are several UX case studies about the investigation of particular problems with the usage of these services, for instance, the case study of Booking(*Booking.com case study 2017*) and the case study of Airbnb(*Airbnb case study 2018*). However, these researches concentrated on only one of the services. By contrast, our study is focused on comparing the design approaches in both Booking and Airbnb services. That is why we conducted usability testing with the aim to evaluate the impression during the interaction with these services. Of particular interest for this study was to investigate the issue of emotional load in the interfaces. The observational findings aim to show the advantages of interaction for both methods in design.

1.2 Objectives of business side of the real estate search

The first goal is to gather, compare and analyse the quantitative data about the real estate market in Kyiv and Lviv to understand the level of real estate market progress in both cities. The following stage is to analyse the data collected from the usability researches by LUN with the purpose to compare the real estate choosing behaviour for both cities. Hence, these findings aim to understand in-depth how people choose housing, considering regional specifics. Another goal is to contribute to the existing website of the LUN by investigating possible solutions to use in their design approach, which can make it easier for people to choose a real estate.

1.3 Structure of the thesis

This work is organised as follows: in Chapter 2 we review related studies on human-computer interaction, user experience and all the methodologies in evaluating the usability of an interface, including usability testing and type of collected data. In Chapter 3 we analyse and compare Lviv and Kyiv real estate markets. Moreover, by conducting in-depth interviews, we describe users' behaviour and how they choose housing. Finally, we compare the real estate choosing behaviour of both cities. In Chapter 4 we explore differences between data-driven and emotional approaches in design. What is more, we determine the evaluation of the user's impression about interaction with particular service. In Chapter 5 we conclude what was done. Based on our conclusion, we suggest several decisions for LUN design in terms of how we can make the searching of housing easier for people.

Chapter 2

Related works

2.1 Human Computer Interaction

There is an encyclopedia of design(*The encyclopedia of human-computer interaction 2nd ed.*), where John M. Carroll explains about Human-computer interaction, by referring in his paper to Myers, 1998. According to *The encyclopedia of human-computer interaction 2nd ed.* Human-computer interaction is scientific area where investigation and practice are intersect. Initially, as a specialty in computer science, it included cognitive science and human factors engineering. Its main focus was interaction between humans and computers. The boundaries of HCI have expanded over the years and today it covers almost all forms of information technology design(*The encyclopedia of human-computer interaction 2nd ed.*).

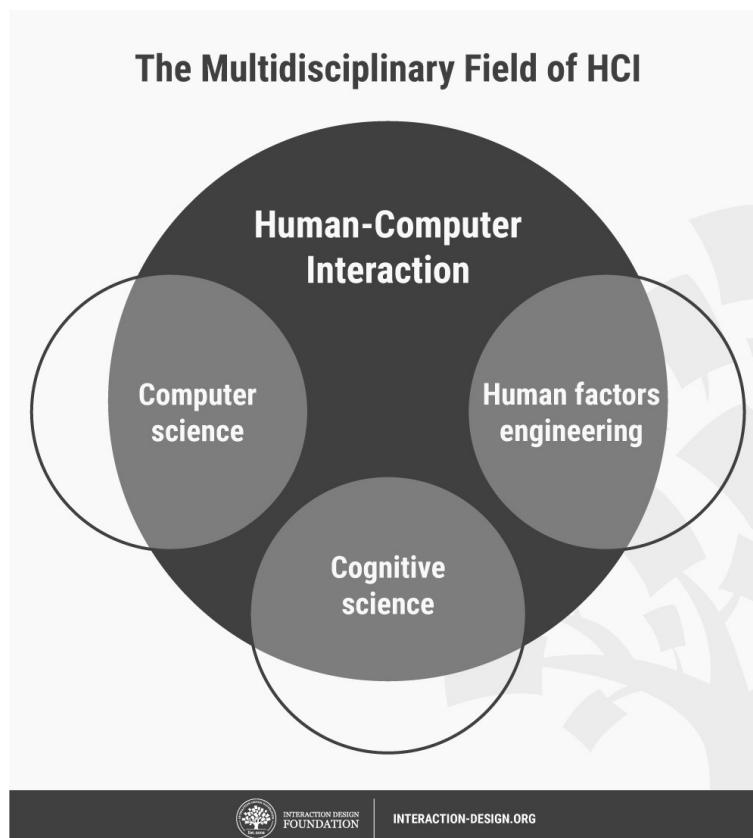


FIGURE 2.1: The Multidisciplinary Field of HCI, *Human-Computer Interaction (HCI)*

The author emphasizes that computer science was a basis for HCI, but when its focus has moved beyond the desktop, HCI started to diversify and eventually broke all boundaries. Moreover, as the central concept of HCI is usability, it managed innovation to ensure that human values and human priorities are advanced, and not reduced through new technology. This core principle created HCI, this is what led HCI off the desktop, and it will continue to move on this domain to new fields of technology-mediated human possibility. All things considered, usability is still an open-ended concept, and can never be diminished to something fixed (*The encyclopedia of human-computer interaction 2nd ed.*).

The particular value and contribution of HCI is its influence on investigation and evolving those new areas of possibility not only in the meaning of technologies or designs but also in enhancing human activity and experience (*The encyclopedia of human-computer interaction 2nd ed.*).

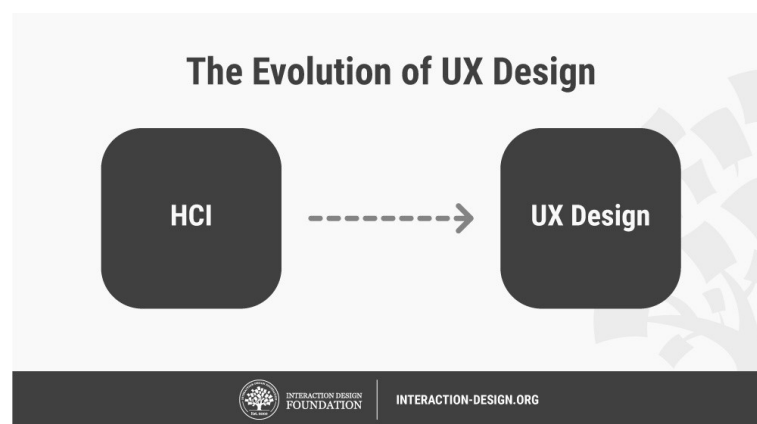


FIGURE 2.2: The Evolution of UX Design, *Human-Computer Interaction (HCI) 2012*

It is considered that User Experience Design came from HCI. However, there are some differences between them. The main one is that HCI specialists focus more on an academic approach, by involving in scientific research and building empirical understandings of users, while UX practitioners are exclusively industry-focused and involved in developing products or services. On the other hand, the practical considerations UX designers use for developing the products have a direct link to the findings of HCI researchers about users' mindsets. What is more, UX designers have many resources to use in practice by leaning on a broader span of topics, which HCI covers. Another essential thing to mention is that the designers must stretch outside industry-dictated constraints with the purpose of finding key insights for achieving the best experience for their users. Hence designers may drive impactful changes in the market and society in case of collaboration (*Human-Computer Interaction (HCI)*).

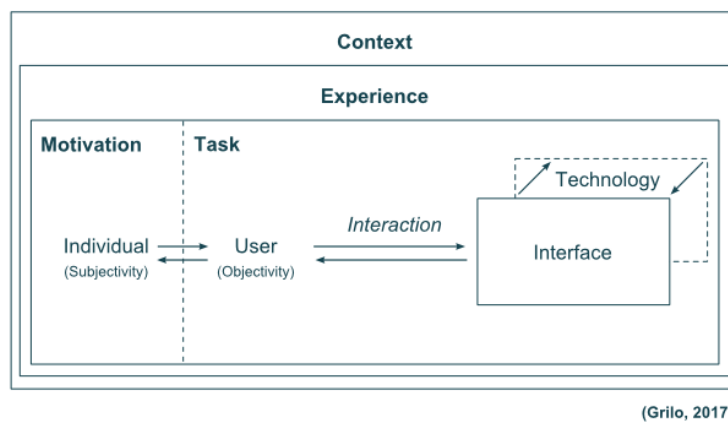
2.2 User Experience

Initially the term 'user experience' was coined by Dr. Donald Norman in the mid-1990s. He was also the first who described the value of the user-centered approach in design – the idea that design decisions should be accepted through the needs and wants of users (*The business of user experience: how good UX directly impacts on company performance 2018*).

UX is not about the inner workings of a product or service. It is about how the product works on the outside, where a person comes into contact with it. All of the products which are used by someone deliver user experience. Hence UX also has broad horizons, as its impact and value spread far behind the bounded context of the Web and even screen-based interactive applications (Garrett, 2010).

As analysis is the primary approach in UX, all design suggestions should be proved by data. That is why researches aimed to ask several questions by designing solutions, where the main is how we can use that analysis to make improvements (Garrett, 2010)?

As André Grilo (Grilo, 2017) suggests in his article, there exists the duality of who interacts with product in a specific context: the same person is an individual, what is the subjective side of interaction and also a user of a product, what is the pragmatic operation on the interface.



(Grilo, 2017)

FIGURE 2.3: The duality of interactions, Grilo, 2017

The author explains that the user experience includes the variables listed above as the result of interaction with the interface and the corresponding understanding by the individual user. These two types of interaction help to understand how easy it is to use the interface for the final user of the product. Consequently, during interactions there are different mental models and kinds of user knowledge, that act as variables, which should be taken into account in the design process of the user interface. Therefore, André Grilo emphasizes on the importance of increasing the knowledge about problems in the user experience through the comprehension of the final user's motivations and explains the bias by the following expression:

$$k(p) = \beta > \alpha$$

$$k(t) = \alpha > \beta$$

There β stands for individuals who know their genuine motivations for using the product, $k(p)$ is a so called "knowledge-of-problem". The variable α stands for those, who know all of the objectivity surrounding the tasks and regulate them to better use of the product, respectively $k(t)$ is a "knowledge-of-task". That expression explains why the statement that "user will learn how to use the certain product while practicing along the time of use" is false. The simulation attempts of final user thinking and behavior do not erase the limitation on behavior alike α -users. To overcome that problem, the author proposes to produce products aiming for increase $k(t)$ in β -users, and this approach is possible only in case of learning from their experience through product evaluation. According to that, designers and developers learn about users and increase their $k(p)$. In conclusion, in creating a product it is

significant to perceive the motivations of individuals that turn them into a user of the product, as well as to bring the user-centered approaches to provide smooth and user-friendly interfaces (Grilo, 2017).

2.2.1 User goals and business goals

As we have mentioned above, User Experience Design involves a scientific approach by doing research in purpose to understand users and developing solutions for users' problems and needs. On the other hand, if we look deeper into the design process of any product, we could see that the actual definition of UX consists of three essential components: user, business and technology (Codes and Codes, 2018). As understanding the business goals is as vital as understanding the user goals, the whole process of user experience research aims to look from several perspectives and find the intersection between user needs, business goals, and technical constraints. In that case, the UX researcher can ensure that knows all of the ramifications of design decisions (Garrett, 2010).

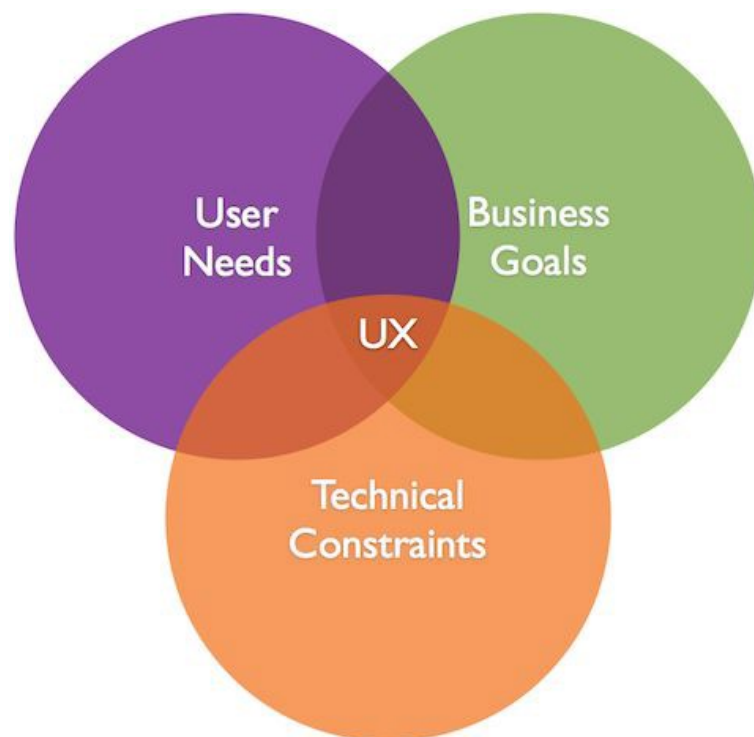


FIGURE 2.4: Three main perspectives in UX, Codes and Codes, 2018

Jesse James Garrett empathises in his book that good UX is good business. While setting out user goals, which aim to provide users with an experience that is cohesive, intuitive and pleasurable, business goals describe company objectives and direction, which mostly focus on making or saving money. As any user experience effort aims to improve efficiency, it is crucial to ensure that the intersection between the user and business goals is taken into consideration during the design process. As a result, the business will provide such experience for its users, where everything works the way it should (Garrett, 2010).

The author also indicates that there are different metrics or KPI's (Key Points Indicators) in the business, which aim to measure the result of UX approach influence. The author explains that one of the conventional ways of measuring the effectiveness

of user experience is conversion rate, where a quality user experience is a crucial factor (Garrett, 2010).

Moreover, all design decisions should be aligned between the user and business goals in aim to get business benefits when users reach their goal. On the other hand, if goals are aligned not in a proper way, then either users get what they want without helping the business – lots of users, no success, or the users do not get what they want – no users, no success. (*User and Business goals*)

In other words, ignoring the business perspective while making decisions, which do not work well for business, leads to the worst case scenario, when business is falling. It would result in zero users, thus zero user experience, and zero usability (*UI/UX Principle 49: Understand Business, User, and Technology Perspectives Up Front 2017*).

There is one particular form of measurement used to assess the business impact of user experience – it is Return on Investment (ROI). In a paper (*The business of user experience: how good UX directly impacts on company performance 2018*), the author presents the evidence of UX researches. He also explains that in the case when all researches provided correctly, it will deliver excellent ROI for the business. What is more, the author asserts that numerous studies have found that "every dollar spent on UX brings in between \$2 and \$100 in return". Moreover, in that paper presents a study, where Forrester revealed that "implementing a focus on customers' experience increases their willingness to pay by 14.4 %, reduces their reluctance to switch brands by 15.8 %, and boosts their likelihood to recommend your product by 16.6 %" (*The business of user experience: how good UX directly impacts on company performance 2018*)

To sum up, a crucial task for UX is to find the balance between the business case and the user's requirements, in purpose to make all design decisions bring maximum benefits for the business as well as the end user. It means that the necessary content needs to be accessible in the most intuitive approaches for users, as well as promote the business in such a way that it is beneficial for the business and simultaneously does not hamper the overall user experience. While focusing on balance approach, all design decisions may help the business to receive the maximum advantages of them. Another critical thing to mention is that while searching the solution for that balance, it is essential to focus on the users' goals first and then align these to the business goals. This approach will assure for business the ability to cover its goals and gain the right output, which will bring effectiveness and benefits. Otherwise, in case of neglecting of the importance of the user-centric approach and focusing only on business profit, it will cause the deprivation of users forever. The example of that case could be the Snapchat redesign fiasco (*The Biggest UX Design Lessons Learnt from Snapchat Redesign Fiasco 2018*), which eventually led to the massive damage to the business (Young, 2019).

2.3 Usability

The usability concept also has a central position in UX, as making things usable is an essential aim of all UX researches. According to Hartson and Pyla, 2012, usability is a central component of guaranteeing a quality user experience. It is about providing the users with the ability to focus on getting things done for work through the technology. In other words, the author explains the usability as designing the technology in the way of being an enlargement for human capabilities in order to accomplish

individual goals and to be as transparent as possible in the process (Hartson and Pyla, 2012).

By Jacob Nielsen's definition usability is a quality attribute which evaluates how easy to interact with user interfaces. Also, this term stands for improvement methods that aim to increase ease-of-use during the design process (*Usability 101: Introduction to Usability*). What is more, the author determines usability through five quality components and describes each by the following question:

- **Learnability:** How easy is it for users to complete basic tasks the first time they interact with the design?
- **Efficiency:** How quickly users perform the tasks after they have learned the design?
- **Memorability:** When users return the use of the design after a long pause, how quickly can they reestablish proficiency?
- **Errors:** How many errors do users make, and how easily can they recover from them?
- **Satisfaction:** How pleasant is it to use the design? (*Usability 101: Introduction to Usability*)

There are several ways to measure usability of the product and, accordingly, improve it.

2.3.1 10 usability heuristics

The first way to eliminate major issues of usability is by using a technique called Heuristic Evaluation. According to Nielsen Norman Groupe (*10 Usability Heuristics for User Interface Design*), heuristic evaluation includes ten principles, which are not specific usability guidelines, but broad rules. These principles are as follows:

1. **Visibility of system status.**

It refers to how informative the state of the system is reported to its users, through corresponding feedback within a reasonable time.

2. **Match between system and the real world.**

The words, phrases, and concept of the system should be presented in a familiar way to the users through natural and logical order. As familiarity is the approach for better user experience, users should always have the ability to understand the meaning without forcing to look up in a search engine. This heuristic should be applied not only to internal content but also to all digital experience, which influences users expectations about the process and their feelings.

3. **User control and freedom.**

As there are situations when the system functions are chosen by mistake, it is essential to place a noticeably marked 'emergency exit' for leaving the unwanted state without additional struggles. The system must also support undo and redo functions. Even when the system does not provide a specific screen and the users cannot see the outcome of action, minimum feedback that the command was accepted is required.

4. Consistency and standards.

The system should not have to force the users to wonder neither the different system objects mean the same thing, or the same objects lead to different outcomes. Following the standard conventions leads to risk-less system functioning.

5. Error prevention.

One of the 10 Heuristics states that it is required to correctly display the errors to the users. However, the careful design which prevents the users from making the errors should be in the first place. There are discussions about whose fault is in making the errors. Although the term 'user error' assumes that the user actions led to problems occurring, it is not correct to blame the user, as the designer is the one responsible for making it too simple for a user to make a mistake. Consequently, the solution is neither to blame users, or force them to try harder, or provide them more comprehensive guiding. The system should be designed in a less error-prone way, as well as present users a verification before they commit to the action.

6. Recognition rather than recall.

The term "recognition" stands for the ability to recognize a piece of information as familiar, while "recall" stands for designating the retrieval of related details from memory. Therefore, the internal content of the system should be visible with the aim of minimizing the user's memory load. Moreover, the system usage instructions should be quickly retrievable whenever appropriate as well.

7. Flexibility and efficiency of use.

The interface of the system should be flexible enough to suit novice as well as expert users. Accordingly, the system should be easy to interact for both inexperienced and experienced users, as well as provides the accelerators for speeding up the usage for the advanced users. The system should allow users to adapt frequent actions.

8. Aesthetic and minimalist design.

This heuristic stands for prioritization of the content. The interfaces should be cleared of unnecessary elements, which do not support the page goals and tasks, as well as the displayed information should not be irrelevant or rarely needed. Every additional piece of information competes with the relevant part and reduces their relative visibility.

9. Help users recognize, diagnose, and recover from errors.

In case of an error, the system should not make users panic. It should help them to recover by suggesting a solution. Hence, the error message should be communicated in understandable language, not in code way, accurately explain the problem and recommend a constructive solution.

10. Help and documentation.

A system with good user experience assumes the interaction with users through the interface without any documentation. On the other hand, it may be necessary to supply help and documentation. In that case, such information should be accessible, and provide particular steps to follow without overstatement.
(10 Usability Heuristics for User Interface Design)

2.3.2 Quantitative and qualitative usability testing

The second and the best way to increase the quality of user experience is usability testing. Although this practical approach assumes the interaction with real users, it may be more expensive in terms of time and cost, it is considered to be the most efficient method aiming to reveal product inconsistencies and improve the usability of a product.

There are two main approaches for conducting usability testing: summative and formative. The difference between them is that the first method focuses more on collecting quantitative results, while the latter tends to collect such information as user thoughts and preferences. On the other hand, well-developed paper prototypes can collect numeric data, as well as user's thoughts and preferences. Therefore, qualitative results can be gathered together with quantitative data. The critical thing to mention is that the more users express their opinion while accomplishing the tasks, the more interruptions occur in their actions. These interruptions will influence the numerical data, such as time of assignment fulfillment.(Lazar, Feng, and Hochheiser, 2017)

According to the information above, the data gathered through usability testing can be divided into two types: qualitative and quantitative. By (Myers, 1998), quantitative data are numeric information, such as data obtained by the performance metrics or opinion ratings. Qualitative data are non-numeric descriptive data, usually reporting inconsistency observed during an interaction.

As Jakob Nielsen(*Usability 101: Introduction to Usability*) points, before conducting a usability testing, it should be determined which UX research method is exactly needed. As the author explains, there are some of the most common types of quantitative research:

- Quantitative Usability Testing (Benchmarking)
- Web Analytics (or App Analytics)
- A/B Testing or Multivariate Testing
- Card Sorting
- Tree Testing
- Surveys or Questionnaires
- Clustering Qualitative Comments
- Desirability Studies
- Eyetracking Testing (*Usability 101: Introduction to Usability*)

While each of the listed above methods requires a different amount of resources and effort, as well as techniques, each of these methods yields valuable quantitative data. (*Usability 101: Introduction to Usability*) Qualitative data gathering and analysis are essential topics in usability testing as well. A more in-depth explanation about methods of working with data collected by the qualitative method can be found in(Baxter, Courage, and Caine, 2015) and (Hartson and Pyla, 2012).

Nielson Norman Group provides (*Quantitative vs. Qualitative Usability Testing*) the summarization about the differences between these two types of research. The author presents the table below to demonstrate these contrasts:

	Qual Research	Quant Research
Questions answered	Why?	How many and how much?
Goals	Both formative and summative: <ul style="list-style-type: none"> • inform design decisions • identify usability issues and find solutions for them 	Mostly summative: <ul style="list-style-type: none"> • evaluate the usability of an existing site • track usability over time • compare site with competitors • compute ROI
When it is used	Anytime: during redesign, or when you have a final working product	When you have a working product (either at the beginning or end of a design cycle)
Outcome	Findings based on the researcher's impressions, interpretations, and prior knowledge	Statistically meaningful results that are likely to be replicated in a different study
Methodology	<ul style="list-style-type: none"> • Few participants • Flexible study conditions that can be adjusted according to the team's needs • Think-aloud protocol 	<ul style="list-style-type: none"> • Many participants • Well-defined, strictly controlled study conditions • Usually no think-aloud

FIGURE 2.5: The differences between the two types of research, *Human-Computer Interaction (HCI) 2012*

Even though quantitative and qualitative data are gathered for different purposes, they are tightly connected. As we mentioned above, even if the focus was on collecting qualitative data during the usability testing, there is still the possibility to collect some quantitative data. For instance, in-depth interviews with open-ended questions can be investigated to find out the occurrences number of a particular word or phrase. (Baxter, Courage, and Caine, 2015)

On the other hand, there is a conflict between gathering quantitative and qualitative data during usability testing. According to (Hartson and Pyla, 2012), while carrying out formative testing, qualitative data collecting should win over quantitative, because the qualitative method focuses more on the cases of the error and approaches to fix them. On the other hand, the summative method is more focused on quantitative performance measures. In case when during usability testing user interrupts a performance by qualitative data, the quantitative data is not usable anymore. Consequently, if there is a threat to corrupt the quantitative results, it is recommended to omit the qualitative data collecting, while gathering quantitative data. However, when both qualitative and quantitative data are still required, various options can be useful. (Lazar, Feng, and Hochheiser, 2017)

All things considered, the usability testing aims to recognize usability problems during interaction with the system, by gathering qualitative and quantitative data, observing different behaviors, and reinforcing user satisfaction.

Chapter 3

Regional influence on real estate choosing

To derive the possible design suggestion for existing real estate searching platform based on regional specifications to existing real estate searching platform, the data LUN provide need to be determined. Further, the user flow, experience and all pains and gains while searching housing should be extracted and described.

3.1 Real estate market in Ukraine

First, we need to comprehend the progress level of the real estate market in Ukraine. We used the Google Trends to explore the search statistics by a specific keywords "buy an apartment" in Ukrainian plus Russian languages within the past five years in Ukraine. The result shows that the demand for real estate in Ukraine is increasing. (*Google Trends Buy apartment search request*)



FIGURE 3.1: Popularity of "buy an apartment" search request (in Ukrainian and Russian languages) over the last 5 years. Numbers stand for search interest relative to the highest point on this line chart, where 100 value means the highest label for the searching term; the 50 value is middle of the popularity, and the score of 0 means there was not enough data for the this term, *Google Trends Buy apartment search request*

The Figure 3.1 represents how the amount of those, who are interested in purchase housing, have been increasing within the past five years all around Ukraine.

Additionally, the Figure 3.2 represents the regional distribution of the exploring keywords. As we can see from the figure, the Kyiv region occupies the first position.

One more resource of available official statistic about the real estate market in Ukraine is Ukrstat data (*Number and area of the buildings put into operation*). They publish statistics of the number and the total area of occupied buildings by the regions every quarter. When there is the last quarter, they publish the total statistic for

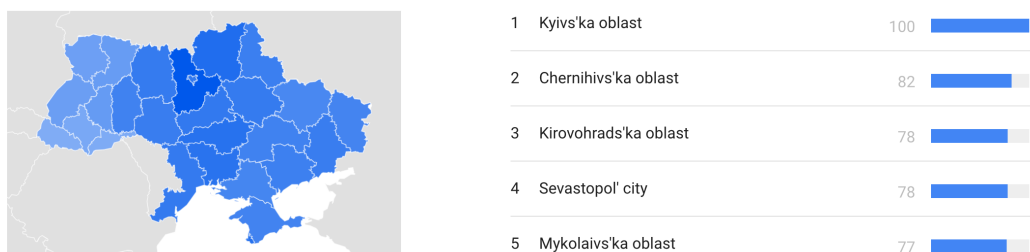


FIGURE 3.2: Interest by subregion. Numbers are calculated on a scale from 0 to 100 as well, where 100 means the area with the highest level as a fraction of total searches in Ukraine, 50 is a location with the middle mark, and 0 value indicates a location where there was not enough data for this term, *Google Trends Buy apartment search request*

the whole year. In our research we explored such Ukrstat data: information about the level of acceptance in operations of housing (new construction) by regional distribution for the year 2018.

Figure 3.3 indicates the data appearance all of the region, while Figure 3.4 visualises the result of the level of acceptance in operations of housing for 2018 (*Number and area of the buildings put into operation*).

Прийняття в експлуатацію житла (нове будівництво) ¹ по регіонах у 2018 році			
	Загальна площа		
	усього, м ²	у % до відповідного періоду попереднього року	у розрахунку на 1000 осіб населення
УКРАЇНА	8689356	94.3	206.4
Вінницька	223899	73.7	143.4
Волинська	371290	120.4	359.0
Дніпропетровська	283525	88.7	88.2
Донецька	40584	106.0	9.7
Житомирська	146281	117.7	119.3
Закарпатська	428736	116.6	341.7
Запорізька	68246	77.0	39.8
Івано-Франківська	404164	77.3	294.4
Київська	1541015	89.6	877.9
Кіровоградська	48028	117.9	50.9
Луганська	15975	109.6	7.4
Львівська	897323	101.0	357.9
Миколаївська	51302	99.1	45.2
Одеська	567842	83.1	239.5
Полтавська	202547	98.5	144.7
Рівненська	319285	88.7	275.7
Сумська	96886	105.7	89.2
Тернопільська	261055	106.8	249.6
Харківська	528854	152.0	198.1
Херсонська	95067	159.8	91.3
Хмельницька	324952	97.0	256.6
Черкаська	131273	98.5	108.5
Чернівецька	287520	153.7	318.6
Чернігівська	97853	82.6	97.4
м.Київ	1255854	75.5	432.8

FIGURE 3.3: Acceptance in operations of housing (new construction) by regional distribution for the year 2018, ¹ without the occupied lands of Ukraine *Number and area of the buildings put into operation*

According to that data, 8 689 356 m² of housing developers have passed all over Ukraine for the past year. The 1 255 854 m² of housing was put into operation in Kyiv for the past year, and even plus 1 541 015 m² in Kyiv region, while there was

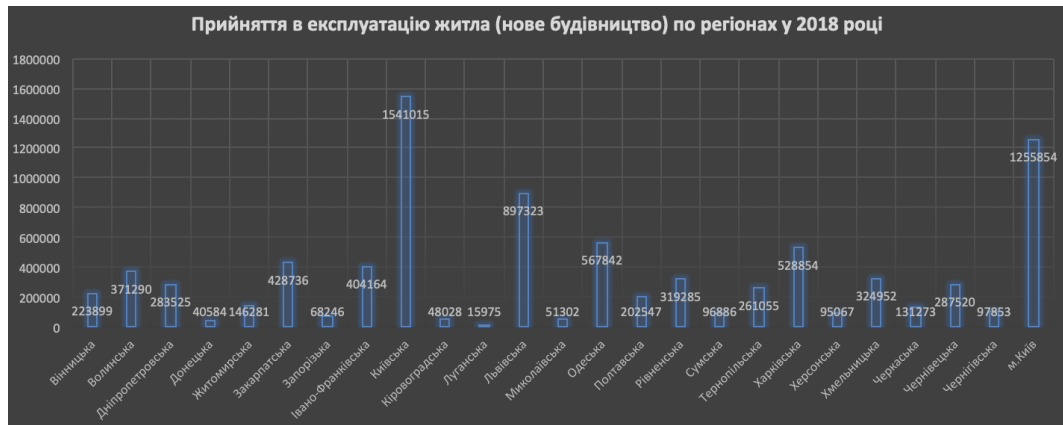


FIGURE 3.4: Visualisation of acceptance in operations of housing (new construction) by regional distribution for the year 2018

897 323 m^2 of housing put into operation in Lviv. As the result shows, Kyiv region is on the first position again. However, the active constructions are underway all around Ukraine.

What is more, we explored preliminary data of Derzhkomstat (*Number and area of the buildings put into operation*) with the purpose to show an index of the amount of m^2 put into operation in dynamics. We observed in-depth the data about the amount of area put into operation during 2013-2018 in Kyiv and Lviv. The Figure 3.5 visualises the dynamics divided into fourth quarters in Lviv, while the Figure 3.6 represents the situation in Kyiv.

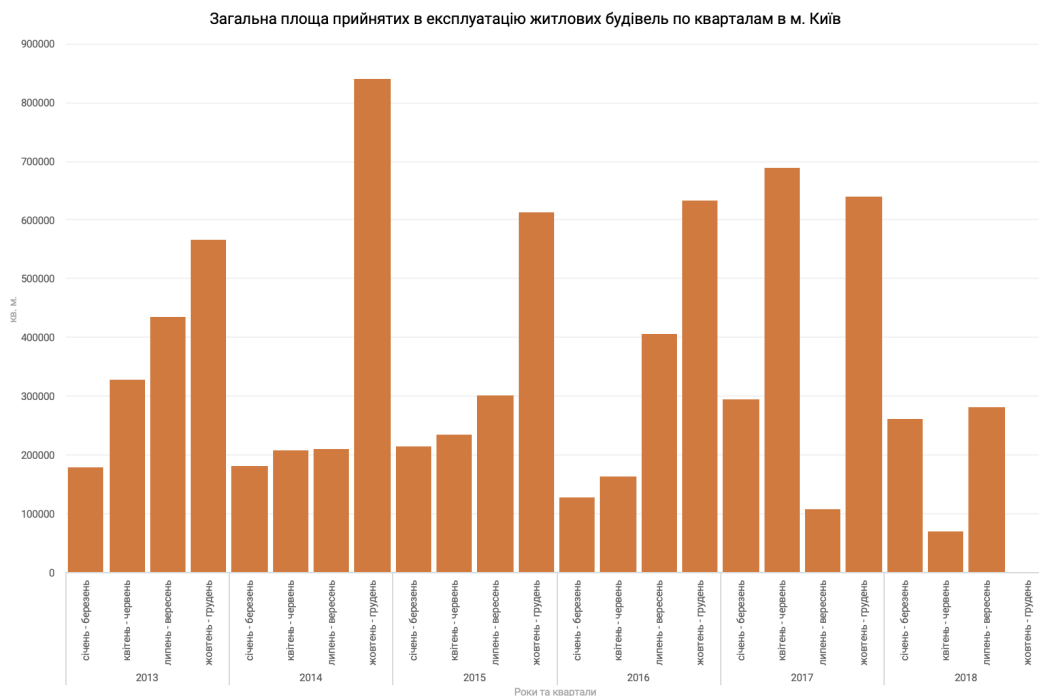


FIGURE 3.5: Visualisation of total area put into operation during 2013-2018 in Kyiv

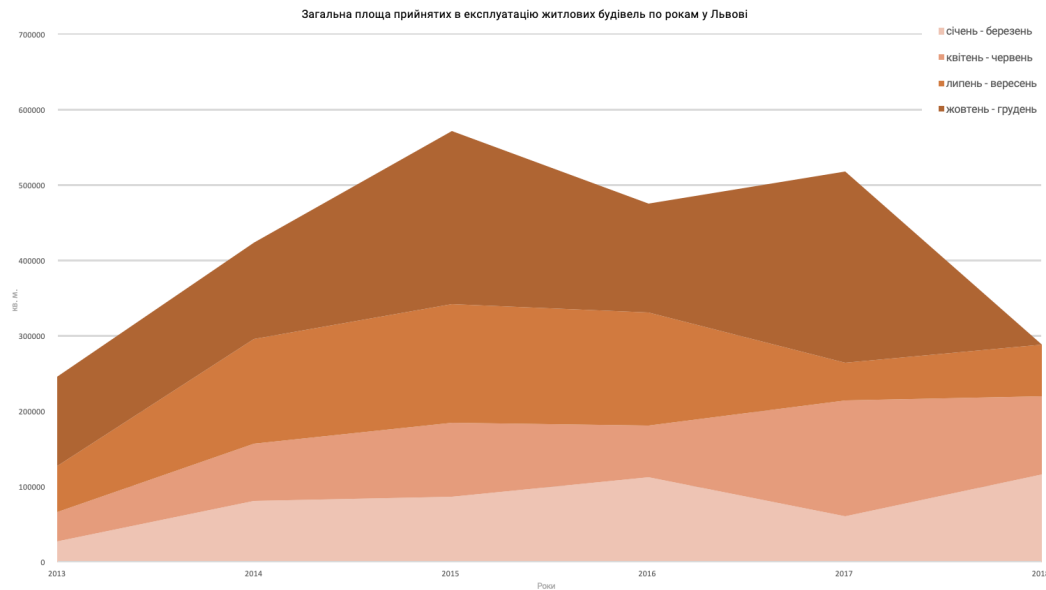


FIGURE 3.6: Visualisation of total area put into operation during 2013-2018 in Lviv

According to the results, the general trends represents that there have been falls and increases in the volume of housing accepted in operation in the whole country since 2013. Moreover, there are some regularities in the charts of for both cities. For instance, in the beginning of the year the lowest level of new housing purchase is observed. The process of taking buildings in operation starts to increase closer to the summer period. Furthermore, the highest amount of m^2 put into operation is in the fourth quarter. This whole process continues every year.

3.2 Collected quantitative data and UX researches by LUN

LUN can be called an aggregator of the real estate ads, as it enables the online searching of all ads about real estate through one website. LUN analyses all of the ads from all possible online and offline resources and groups them with the aim for more efficient real estate choosing. Besides that, all of the real estate on LUN website are displayed on the map with colour encoding (*LUN*).

The main features of the LUN are:

- All type of real estate market ads:**
 The ads include primary market, secondary market, long-term rent and daily rent advertisement.
- All necessary documents**
 Collecting of all necessary documents, and translating into the natural language without legal terms with the purpose to help users independently understand the legality of construction.
- 3D Master plan**
 All buildings are rendered on the big map in 3D to provide the ability to observe all surroundings.

- **Filters**
LUN provides a wide range of filters from the budget to the insulation of the walls for faster real estate search.
- **Usage of the aeroblot-360**
The service provides the flyover the most famous buildings by drones to reduce the necessity of visiting the construction site.
- **Information about real estate developers**
LUN provides the user with all available information about the real estate developers. What is more, the service provides an opportunity to send questions to the developer department and arrange the real estate revision directly from LUN website.
- **3D rendering**
The service implements 3D rendering of apartment planning with the purpose to help users see the future apartment inside and the surrounding online.
- **Statistics**
LUN team regularly conducts various studies in Kyiv and publishes many articles about their investigations. For instance, the study about the determination of the greening level of micro-district of Kyiv (*What parts of Kiev have most of the parks and squares*) or the research about evaluation of the temperature of the outer surface of the walls to determine which types of buildings are less efficient in terms of energy consumption (*What houses lose more heat?*). Moreover, LUN provides valuable statistics and comprehensible visualisations about the real estate market in Lviv. These statistics and actual prices for 140 residential complexes in Lviv are updated monthly.

The Figure 3.11 is useful for understanding how the real estate market in Lviv has been evolving in the cash equivalent, while the Figure 3.12 delivers the information about the average cost range of different types of housing in the Lviv's district and type of housing (*Real estate market statistics in Lviv and regions for March 2019*).

It can be concluded that LUN gathers and checks, systematises and arranges all the necessary real estate information with the purpose to display for users the truth about real estate market without any decorations, unrealistic renders or advertised "5 minutes to the metro". The LUN team informs about any changes in the status of construction, makes photos of the state of the construction monthly and manually checks the price to improve the efficiency and affordability of online housing search and help people to make the right decision (*LUN*).

3.2.1 Analysis of the collected data

LUN validates all design solutions through data collected by providing usability testing. To compare the real estate market in Kyiv and Lviv, first we need to investigate all quantitative data, and usability researches result in Kyiv provided by LUN.

Quantitative data

LUN monthly conducts the quantitative assessment of the real estate market and LUN positions in it. The method of investigation is a panel survey. These researches

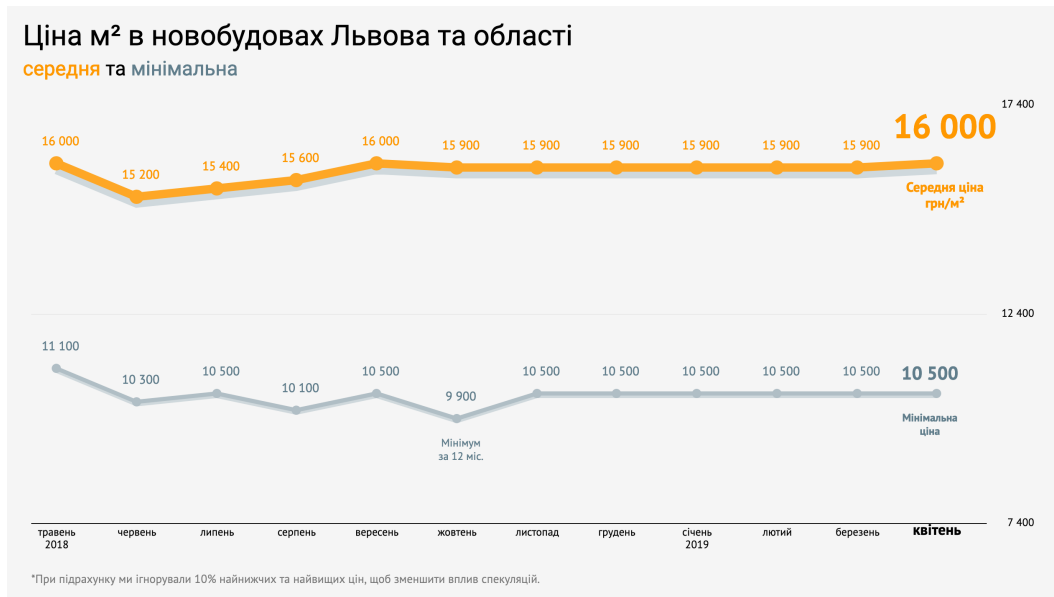


FIGURE 3.7: Average and minimum price of m² in real estate in Lviv, LUN

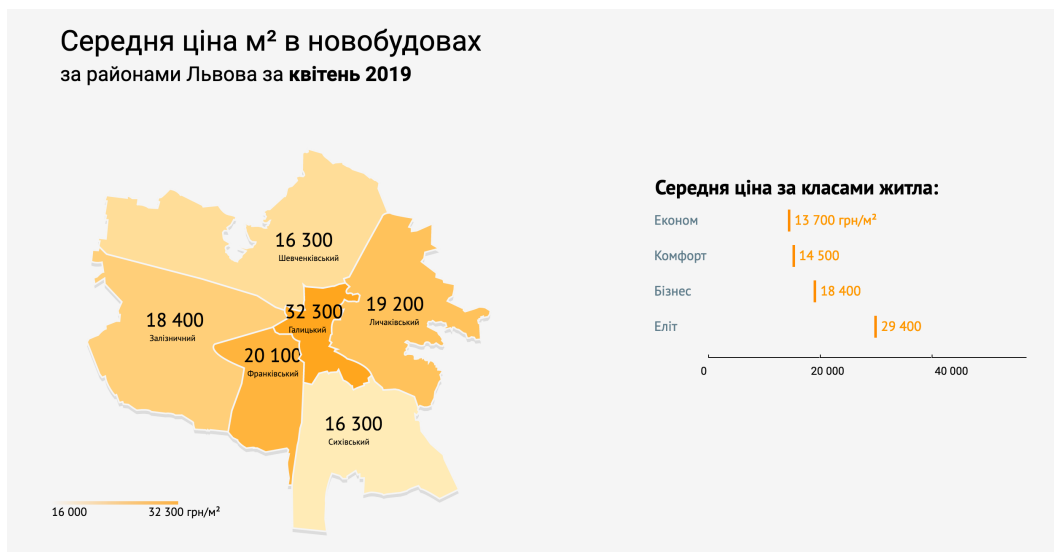


FIGURE 3.8: Average price of m² in real estate in Lviv by district, LUN

are valuable because they show how many people are interested in real estate purchase, and determine which type of real estate is in preference. What is more, there is an opportunity to compare Kyiv and Lviv, as the researchers also include quantitative regional studies about the degree of interest of Kyiv and Lviv citizens in the type of housing selection and purchase.

We investigated one of this quantitative researcher for November 2018 for Kyiv and Lviv. The data is distributed by sex, age, type of interesting real estate(primary or secondary markets) and level of interest of new buildings over the past three months. For our study, it was of interest to explore the correlation between different aspects, especially between age and interest in new buildings, and between age and preferences in the type of real estate. Further, to compare results for Kyiv and Lviv.

The Figure 3.9 represents the interest in new buildings by age range both in Kyiv and Lviv. The Figure 3.10 shows preferences in the type of real estate by age range both in Kyiv and Lviv.

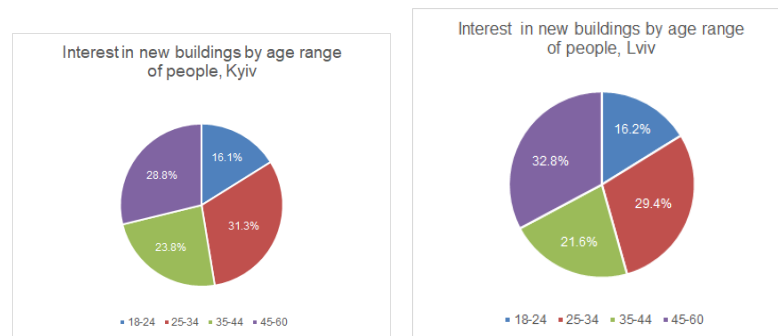


FIGURE 3.9: Visualisation of interest in new buildings by age range both in Kyiv and Lviv

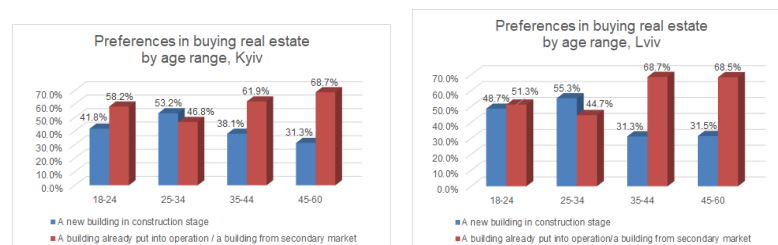


FIGURE 3.10: Visualisation of preferences in the type of real estate by age range both in Kyiv and Lviv

According to the result visualization, the group of 45-60 age (32,8%) and the group of 25-34 age (29,4%) have the highest level of interest in new buildings in Lviv, while on the contrary the peak point in Kyiv is the group of 25-34 age (31,3%) and the group of 45-60 age (28,8%). What is more, the distribution in preferences in the type of real estate by age range is almost similar in both cities. The result for Lviv shows that such groups of age as 35-44(68,7%) and 45-60(68,5%) mostly prefer the real estate put already into operation/secondary market, while the group of age 18-24(48,7% for new buildings) are divided almost into half in preferences, and the group of age 25-34(55,3%) prefers new buildings. On the other hand, the visualization for Kyiv shows almost similar statistics in preferences for the groups of age 45-60(68,7%) and 35-44(61,9%) mostly prefer the real estate put already into operation/secondary market, the group of age 25-34(53,2%) prefers a new buildings, but the group of age 18-24(58,2%) mostly prefers secondary market.

UX researches

Besides collecting the quantitative data, LUN provides additional UX researches with the purpose to create a better experience for those who are looking for housing in Kyiv. They accomplished their researches by several qualitative UX techniques: observation, in-depth interviewing, prototyping based on POV&HWM techniques, and a lot of usability testing.

According to their researches, LUN's team determined the user flow and pain points on every stage. Further, by exploring their users' experience, motivation and fears, investigators found out the main criteria in the process of choosing housing.

What is more, they discover the behaviour patterns of their users and how they match with LUN service.



FIGURE 3.11: User flow for real estate choosing in Kyiv

The main criteria for choosing a housing

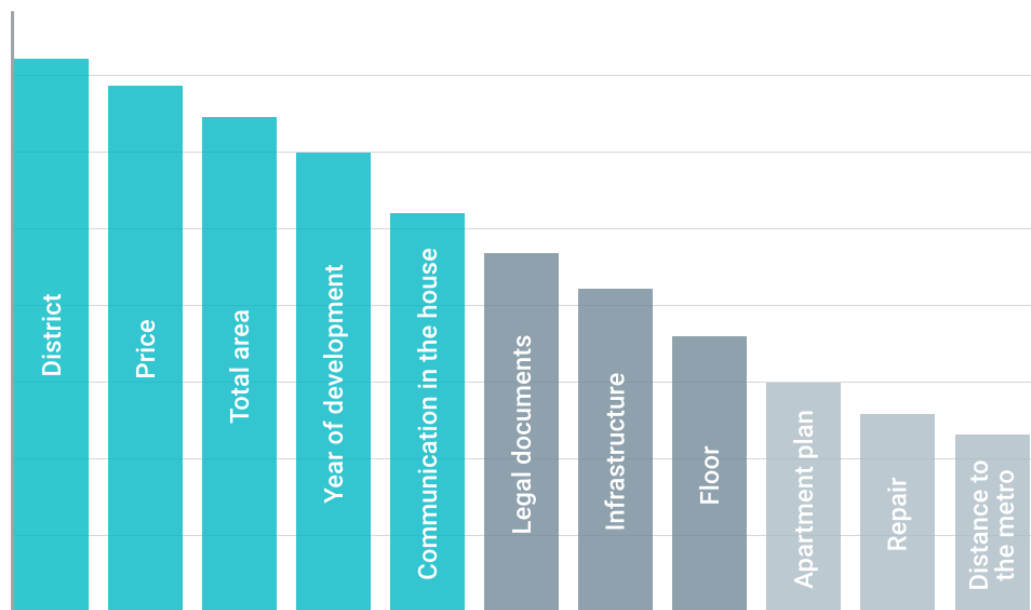


FIGURE 3.12: The main criteria for choosing a housing in Kyiv

To summarise, by conducting and evaluating the usability of their service, LUN better understands their users, have in-depth comprehension about how their users interact with their service and where their service has the problems. Consequently, LUN investigates many types of research with the purpose to improve their interface, make the users experience with their service more efficient, and eventually help people in searching and purchasing a real estate.

3.3 User search behavior study

After having analysed all the quantitative data and UX research provided for Kyiv, we started investigating the situation of the real estate market in Lviv. We wanted to fully understand the current behaviour patterns, needs and problems of those, who are interested in real estate purchase. To accomplish that, we provided an in-depth interview, which is the qualitative research technique.

3.3.1 Methodology

In-depth interviews deliver a broader understanding of customer goals, needs, behaviours and motivations, which can help to make the end-to-end users' experience during interaction with the digital platform more efficient. This method helps to identify opportunities to solve users' problems and pain points (*In-depth interviews*). The in-depth interview involves one-to-one engagement with individual participants. It is a qualitative data collection method where the interviewer asks questions with the purpose to find out more about the respondent experience.

There are several advantages of in-depth interviews:

- Rich data collection
- Simple logistics
- Comprehensive findings
- Deeper insights (*In-Depth Interview 2018*)

The outcome from this research technique is a set of detailed notes to provide context and a deeper understanding of users' experience, the workflow that helps to inform design changes, and insights from real users that provide details to describe the design recommendations.

Considering all the above-mentioned information, we formed the protocol of our investigation, which included the following steps:

1. Creating and publishing an online survey.

The in-depth interview is better to use in conjunction with the previously conducted survey to better understand the context and motivation of the respondents. What is more, this type of methodology helps to find those, who fit our case study and eventually form the audience group. The survey consists of the following introductory questions:

- (a) Would you choose an apartment in the primary market or the secondary market?
- (b) Are there the housing complexes or apartments that you liked?
- (c) Have you visited the sales department or had a meeting with the realtor?
- (d) For how long have you been choosing housing?
- (e) Have you bought a property before?
- (f) Would it be convenient to meet?

2. Setting the audience group.

According to the survey result, we have appointed five in-depth interviews to explore the experience, pain and struggles of the interviewees during real estate searching, and collect qualitative data. As it points in *Why You Only Need to Test with 5 Users*, this amount is large enough to establish a qualitative research. The reason is that already from five user tests one will likely get a significant number of insights. Moreover, testing more than five users may cause resource wasting and compromise the final design quality (*Why You Only Need to Test with 5 Users*).

3. Conducting an intensive in-depth interview.

This type of research provides a possibility to follow-up questions on the respondent's answers, which is not possible by an online survey. We wanted to ask our interviewees about their goals, needs and frustrations in searching and choosing a real estate. Consequently, our aim for conducting these in-depth interviews was to explore the existing experience of our audience group and to determine the following points:

- How they choose a real estate for future living there?
- What criteria they are guided when choosing housing?
- According to which geographic factors they choose housing?

By conducting these in-depth interviews, we follow the technique of cross-questions interview. It stands for four following groups of questions and examples of formulation:

- (a) **Abstractions.** This group stands for ambiguous phrases, which we can determine with the question: What means for you...?
- (b) **Emotions.** This group indicates evaluative adjectives, which we can compare by the question: How do you distinguish ... from not...?
- (c) **Facts.** This group consists of a description of actions, which we can estimate with the question: What did you feel when ...?
- (d) **Details.** This group provides accuracy and nuances, to understand the importance of which we can through the question: Why is it essential for you, that...?

The first two groups represent an emotional component, while the last two – data. That is why, by mixing these sections of questions during the interview, we have an opportunity to dive into the current personal experience and find out a lot.

3.3.2 Analysis and results

First of all, we describe the result of our survey. We had eleven respondents, and the Figure 3.13 shows the result of their responses. According to the visualisation of the result, it is essential to mention that the majority of respondents are interested in a primary market (72,7%), almost all respondents had at least one meeting with a salesman or a broker (90%). Further, 'from 3 to 6 months' option (36,4%) has the highest value in the question about the time of searches, and the minority (36,4%) has the experience in the real estate purchase.

The following step was the analysis of the conducted in-depth interviews. Firstly, we extracted the user flow for real estate choosing in both primary and secondary markets. This method aims to fully understand all stages in the choosing process: from idea to purchase.

Further, we determined all Jobs To Be Done for each stage. According to Clayton M. Christensen's explanation(Christensen et al., 2016), it is essential to focus on what user is trying to reach in a given circumstance. Businesses divide their target audience into fragments by user or product properties. However, the user has another viewpoint on the market: he/she has a particular task, which he/she wants to accomplish – so-called 'job to be done'. The user buys a service, or by other words

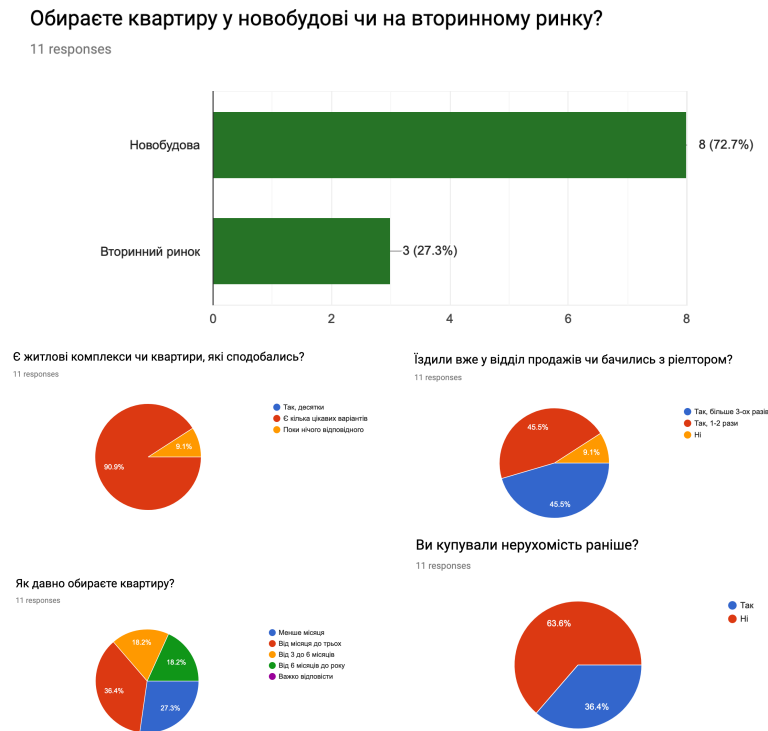


FIGURE 3.13: Statistics of the survey results

hires that service to do the job and make user's life happier. That is why the service needs to solve the user's problem – do the job. (Christensen et al., 2016)

To fully investigate the user experience during real estate choosing, we established pains and gains, which are relevant to each stage. We provide all these steps of analysis and correspondivе results below. What is more, Figures 3.14 and 3.15 represent the stages for primary and secondary markets respectively.

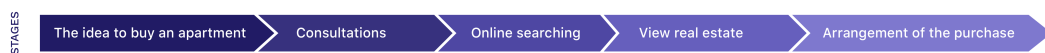


FIGURE 3.14: The user flow for real estate choosing in primary market

The user flow for real estate choosing in primary market, including JTBD, pains and gains for every stage:

1. The idea to buy an apartment

(a) JTBD - WHEN (situation), I WANT TO (motivation), SO I CAN (expected outcome)

- i. WHEN I saw the passport of the object in an interesting district and I liked it I WANT TO google the developer's website SO I CAN find out more about developer and housing
- ii. WHEN I only decided to buy housing I WANT TO know which aspects are essential to pay attention in choosing housing SO I CAN search by myself, without realtors

- iii. WHEN I only decided to buy real estate I WANT TO find the most liquid variant of real estate SO I CAN profitably invest my money and sale or lease in future just in case

(b) PAINS

- i. Unaware of what is essential to pay attention while choosing a real estate
- ii. Unaware of characteristics of the district
- iii. Unaware of how to check the quality of the real estate
- iv. Unaware of how to check the legality of developer
- v. Unaware of where to gather all information

(c) GAINS

- i. Ability to gather knowledge about the important aspects of choosing a real estate

2. Consultations

(a) JTBD - WHEN(situation), I WANT TO(motivation), SO I CAN(expected outcome)

- i. WHEN I only started the searching I WANT TO gather as much as possible useful information about choosing real estate SO I CAN have more knowledge how to filter the variants
- ii. WHEN I only started the searching I WANT TO know which aspects influence the profitability of the housing SO I CAN understand where I will save, and where I will overpay
- iii. WHEN I only started the searching I WANT TO know which aspects influence the quality of the housing SO I CAN better pay attention while walking through housing
- iv. WHEN I only started the searching I WANT TO know which aspects are important to ask sales managers SO I CAN get a clear understanding about offers of developers

(b) GAINS

- i. Understanding the critical aspects to pay attention during searching online and offline
- ii. Understanding how to filter the offers faster
- iii. Understanding how to invest money in the right way
- iv. Ability to decide by myself

3. Online searching

(a) JTBD - WHEN(situation), I WANT TO(motivation), SO I CAN(expected outcome)

- i. WHEN I visit developer's website I WANT TO see user-friendly website SO I CAN then trust this company and continue the searching
- ii. WHEN I visit developer's website I WANT TO see all needed info about real estate SO I CAN quietly make a decision and only then arrange a meeting with sales managers
- iii. WHEN I interested in several developers I WANT TO see developers' rate and real reviews in one place SO I CAN find out the level of trust for the developers

- iv. WHEN I am collecting information about housing I WANT TO see the plan of housing in a convenient digital version first SO I CAN fully understand how the apartment looks like without wasting time on meetings with sales managers
- v. WHEN I am collecting information about housing I WANT TO know all information about its developer SO I CAN be sure about the reliability of the developer
- vi. WHEN I found out the price of the housing I WANT TO know clearly what are included in that price SO I CAN understand what I buy and how much will overpay after the purchase
- vii. WHEN I am collecting information about housing I WANT TO know which documents are important and check available documents of that real estate SO I CAN be sure that everything is legal and I will not lose my money
- viii. WHEN I am collecting information about housing I WANT TO be sure about the legality of development SO I CAN decide on a purchase
- ix. WHEN I am collecting information about housing online I WANT TO find out as more as possible for making decision SO I CAN save my time
- x. WHEN I am choosing an apartment I WANT TO avoid multi-apartment complexes SO I CAN be sure about the surrounding space in future housing
- xi. WHEN I am collecting information about housing I WANT TO know about the development of the surrounding infrastructure SO I CAN filter the offers
- xii. WHEN I am collecting information about housing I WANT TO know about traffic junction SO I CAN understand how long will it take to get to work

(b) PAINS

- i. Availability of information about real estate online
- ii. Inconvenient and unreliable developer's website
- iii. Lack of real estate prices on sites
- iv. Lack of knowledge to make search faster

(c) GAINS

- i. Gather all needed information with the purpose to do not waste time on offline view
- ii. Filtering the offers
- iii. Collect as much information as possible to know what to check during looking at the apartment

4. View real estate

(a) JTBD - WHEN(situation), I WANT TO(motivation), SO I CAN(expected outcome)

- i. WHEN I look at interesting housing with managers I WANT TO have answers on all my questions about that housing SO I CAN see the competence of the manager and have more insights about housing

- ii. WHEN I communicate with a manager I WANT TO hear the truth about housing SO I CAN be sure that the manager does not lie to me and does not follow the aim just to sell
- iii. WHEN manager shows me apartment options I WANT TO know that he/she is not interested in selling that developer who pays more SO I CAN be sure that this manager help me to find such real estate that fits my desires and opportunities
- iv. WHEN I walk through housing I WANT TO have the paper of act of receiving the transfer SO I CAN check if everything is correct and done
- v. WHEN I walk through the housing with the paper of act of receiving the transfer I WANT TO check if everything is correct and done SO I CAN be sure about offerings and the rightness of my decision
- vi. WHEN I walk through housing I WANT TO check my feelings according to m2 of apartment SO I CAN understand the real sizes of apartment
- vii. WHEN I walk through housing I WANT TO check my feelings according to the view of window SO I CAN compare expectation and reality

(b) PAINS

- i. Sales managers want to sell that variant which more profitable for developers
- ii. Incompetent sales manager
- iii. Push from a sales manager in making decision
- iv. Expectations do not match reality
- v. Many aspects need to be double checked
- vi. It takes much time to see all variants
- vii. Poorly developed infrastructure
- viii. The lack of a traffic junction

(c) GAINS

- i. Get own experience
- ii. Find the right housing
- iii. Confidence in the real estate in the context of quality
- iv. Understanding what you invest in

5. Arrangement of the purchase

(a) JTBD - WHEN(situation), I WANT TO(motivation), SO I CAN(expected outcome)

- i. WHEN I am interested in certain housing I WANT TO know everything about the quality of that real estate and all problems with documents SO I CAN avoid risks and get an expert opinion
- ii. WHEN I am interested in certain housing I WANT TO know all additional payments after the purchase SO I CAN avoid stress due to unexpected payments and think twice
- iii. WHEN I am interested in certain housing I WANT TO know the dates of signing documents and getting the keys SO I CAN avoid risk to be deceived

- (b) PAINS
 - i. Many cases of fraudulence with developers
 - ii. Delay with putting into operation
 - iii. Unexpected surcharges
- (c) GAINS
 - i. Confidence in the purchase in the context of legibility
 - ii. Understanding how much you will pay including the supplies after purchase
 - iii. Buy real estate



FIGURE 3.15: The user flow for real estate choosing in secondary market

The user flow for real estate choosing in secondary market, including JTBD, pains and gains for every stage:

1. The idea to buy an apartment
 - (a) JTBD - WHEN(situation), I WANT TO(motivation), SO I CAN(expected outcome)
 - i. WHEN I only decided to buy housing I WANT TO know which aspects are important to pay attention in choosing housing SO I CAN search by myself, without realtors
 - ii. WHEN I only decided to buy real estate I WANT TO find the most liquid variant of real estate SO I CAN profitably invest my money and sale or lease in future just in case
 - iii. WHEN I only decided to buy real estate I WANT TO understand how much money I need to collect SO I CAN afford the purchase
 - (b) PAINS
 - i. Unaware of what is essential to pay attention while choosing a real estate
 - ii. Collecting money
 - iii. High prices on the primary market
 - (c) GAINS
 - i. Ability to gather knowledge about the important aspects of choosing a real estate
 - ii. Understanding the price range in the market
2. Online searching
 - (a) JTBD - WHEN(situation), I WANT TO(motivation), SO I CAN(expected outcome)
 - i. WHEN I found out the price of the housing I WANT TO know clearly what are included in that price SO I CAN understand what I buy and how much will overpay after the purchase

- ii. WHEN I am collecting information about housing I WANT TO know which documents are important and check available documents of that real estate SO I CAN be sure that everything is legal and I will not lose my money
- iii. WHEN I am collecting information about housing online I WANT TO find out as more as possible for making decision SO I CAN save my time
- iv. WHEN I am collecting information about housing I WANT TO know about the development of the surrounding infrastructure SO I CAN filter the offers
- v. WHEN I am collecting information about housing I WANT TO know about traffic junction SO I CAN understand how long will it take to get to work

(b) Pains

- i. Availability of information about real estate online
- ii. Lack of knowledge to make search faster
- iii. All phone numbers are lead to brokers

(c) GAINS

- i. Gather all needed information with the purpose to do not waste time on offline view
- ii. Filtering the offers
- iii. Collect as much information as possible to know what to check during looking at the apartment

3. Communication with broker

(a) JTBD - WHEN(situation), I WANT TO(motivation), SO I CAN(expected outcome)

- i. WHEN I only started the searching I WANT TO gather as much as possible useful information about choosing real estate SO I CAN have more knowledge how to filter the variants
- ii. WHEN I only started the searching I WANT TO know which aspects influence the profitability of the housing SO I CAN understand where I will save, and where I will overpay
- iii. WHEN I only started the searching I WANT TO know which aspects influence the quality of the housing SO I CAN better pay attention while walking through housing
- iv. WHEN I only started the searching I WANT TO know which aspects are important to ask owners SO I CAN get a clear understanding about what I invest in
- v. WHEN I communicate with a broker I WANT TO see that the broker performs its duties and helps in searching SO I CAN find the right real estate as fast as possible

(b) PAINS

- i. Incompetent and indifferent brokers

(c) GAINS

- i. Understanding the critical aspects to pay attention during searching online and offline

- ii. Understanding how to filter the offers faster
- iii. Understanding how to invest money in the right way
- iv. Find the housing

4. View real estate

(a) JTBD - WHEN(situation), I WANT TO(motivation), SO I CAN(expected outcome)

- i. WHEN I am collecting information about housing I WANT TO see the plan of housing SO I CAN fully understand how can I change it
- ii. WHEN I look at interesting housing I WANT TO have answers on all my questions about that housing SO I CAN see the competence of the owner and have more insights about the housing
- iii. WHEN I communicate with the owner I WANT TO hear the truth about housing SO I CAN be sure that the owner does not lie to me and does not follow the aim just to sell
- iv. WHEN I walk through housing I WANT TO check all rooms in apartment SO I CAN understand the sizes and the real state of the apartment

(b) PAINS

- i. Incompetent and nasty owners
- ii. Expectations do not match reality
- iii. The profitability of the real estate
- iv. Stove heating
- v. Many aspects need to be double checked
- vi. It takes much time to see all variants
- vii. Poorly developed infrastructure
- viii. The lack of a traffic junction
- ix. Old communication
- x. Planning old houses, everything is small
- xi. Need to break everything, time to disassemble the old items
- xii. Need to recover a lot

(c) GAINS

- i. Get own experience
- ii. Find the right housing
- iii. Confidence in the real estate in the context of quality
- iv. Understanding what you invest in

5. Arrangement of the purchase

(a) JTBD - WHEN(situation), I WANT TO(motivation), SO I CAN(expected outcome)

- i. WHEN I am interested in certain housing I WANT TO know everything about the quality of that real estate and all problems SO I CAN avoid risks
- ii. WHEN I am interested in certain housing I WANT TO know all additional payments after the purchase SO I CAN avoid stress due to unexpected payments and think twice

- iii. WHEN I am interested in certain housing I WANT TO know about all neighbours SO I CAN understand with whom I will live
 - iv. WHEN I am interested in certain housing I WANT TO know to check all documents SO I CAN avoid risk to be deceived
- (b) PAINS
- i. Suspicious neighbours
 - ii. Unexpected surcharges
- (c) GAINS
- i. Confidence in the purchase in the context of legibility
 - ii. Understanding how much you will pay including the supplies after purchase
 - iii. Buy real estate

Finally, we generated HMW statements, which means 'How Might We' questions. It is a problem solver searching method of reframing the pains to possible solutions (*Define and Frame Your Design Challenge by Creating Your Point Of View and Ask "How Might We"*). Our HMWs are:

- How might we help a user to find honest rating, real reviews and feedbacks about developers with the purpose to help the user understand who he/she can trust?
- How might we help a user to compare developers?
- How might we help a user to understand which criteria should pay attention to while choosing real estate in both primary and secondary markets?
- How might we help a user to choose housing by himself/herself?
- How might we help a user to gather as much as possible information about the real estate of both primary and secondary markets online without communication with sales manager/broker?
- How might we help a user to check the quality of housing online?
- How might we help a user to understand what is included in the cost of real estate to minimise the possible surcharges?
- How might we help a user to check all the appropriate promises from sales manager while looking at housing?

According to our result, we can conclude the following points. Initially, we decided to split primary and secondary experience with the purpose to examine whether there is the difference in essential criteria which influence the housing choosing, as well as extract pains & gains for that stages, which are different. However, as we can see, the flows for primary and secondary markets are nearly equal. What is more, the pains of those who search in primary market are significantly intersected with pains of those who search in the secondary market. The pains and gains of both markets intersect in the process of options' comparison. Furthermore, if we compare the real estate choosing flows of Kyiv and Lviv citizens, we could also observe a little discrepancy in behaviour patterns.

On the other hand, there are still some differences in the experience of Kyiv and Lviv citizens, especially in the first stage of the flow. We observed that there are considerable numbers of pains. The reason is that users have a lack of knowledge about which aspects are essential to pay attention in term of choosing real estate. In the case of the primary market, the common thing to Lviv citizens is to use services of Pronovobudovy (*Pronovobudovy*) company on this stage. Pronovobudovy explains about all important aspects in choosing, helps to deal with all necessary documentations and selects options of real estate. Accordingly, the central pain on this stage is the low level of user's confidence in motives of the offered housing.

On the whole, such aspects as price, reliability of the developer, legality of the documents, quality of a real estate are the primary aspects common to all users. What is more, location, surrounding area and neighborhoods are also important criteria, which influence the real estate choice.

All things considered, we can deliver the possible design suggestion to LUN's interface based on combinations JTBD along with HMWs, which should reduce the users' pains and strengthen their gains. The proposed solutions can be found at the Appendix A.

Chapter 4

Data-driven and emotional approaches

4.1 Emotional and data-driven design

In the 21st century, thousands of new products with fancy designs appear on the market. However, a good-looking interface is not the key to the success of a product. What makes a product successful is focusing the design on what customers think, what matters to them and what would make their user experience as smooth and as pleasant as possible.

One of the ways to build a user-focused product design is to use the data-driven design (DDD). Data-driven design is an approach for the development of the product which is based on analytical explorations and various tests. Such explorations can include analysis of existing users of a product. For example, in the investigation of a website one can start with the assessment of the site's in-page analytics, behaviour flow. Further, one can conduct customer surveys or interviews. Considering the derived results of the studies, one might create user personas and run tests with participants who match these personas the most. The tests, e.g. A/B tests, can be directed at recognising the areas for potential improvement as well as finding the bugs and potential issues (*Data-driven design*).

However, when conducting different usability tests designer should not only concentrate on finding the usability issues and reaching some predefined numerical results. He/she should also care about users' emotional responses while interacting with the product. Such concern should be driven by the fact that the process of decision-making relies strongly on emotional feedback (Demirbilek, 2017). The design approach concerned about provoking the emotional impact on a user while utilising the product is called emotional design. The emotional impact can include such effects as engagement, pleasure and joy of use, fun, aesthetics. (Hartson and Pyla, 2012). The goal of such design approach is to increase the desire to use a product through creating a strong mental attachment between the user and this product (Ho and Siu, 2009).

4.2 User evaluation of service study

After we explored the experience of those who are interested in purchasing real estate, we started to discover the difference in interaction with both data-driven and emotional designs. The most relevant example of these approaches are Booking and Airbnb in accordance. We wanted to fully observe the real user flow in interaction as well as reveal most of the problems users would meet during the usage of the service. The aim of this investigation was the evaluation of users' impression during

and after usage of the service. To accomplish that, we provide controllable usability testing by one-to-one.

4.2.1 Methodology

Accordingly, we formed the protocol of our user testing, which consisted of the following steps:

1. Preparation the user
2. Conducting usability testing
3. Emotional screening

In the first step, users did the exercise: we asked the users to list how many windows in their apartment. After the response, we ask to explain how had the user recalled that he/she had so many windows. It means that the count does not matter, but the stories they described after are significant. This exercise aimed to explain the procedure to the participants and how they should comment on their actions. The users needed to comment on their actions in terms of feelings, not what they are doing right now, but rather what impression do they get from what they see. Following that briefing, the users practised both search and 'think-aloud' (response) procedures for this investigation.

After that briefing, we started up the usability testing. We provide the participants with the next exercise: to go to sea for a short vacation in the summer and find housing for that. By explaining the instruction, the user was asked to perform an on-line housing search on a computer with an Internet connection. During the search, users were asked for think-aloud and explain their responses. We provided an audio recording of their search behaviour as well as noted their searching sequence in steps and complaints during the interaction.

The next step after conducting the usability testing was emotional screening. This stage included several levels. First, we asked the user to describe the service as a person. As people think about the rest of the world as humans, it is a certain comprehensible level of abstraction. This description aimed to execute impressions for further data structuring. Next, we asked the participant to evaluate the service by four parameters, which are displayed in Figure 4.1. After that, we asked the user to choose from three to five descriptors of the tone of voice, which are relevant to the interacted interface. The descriptors were listed as Figure 4.2 shows.

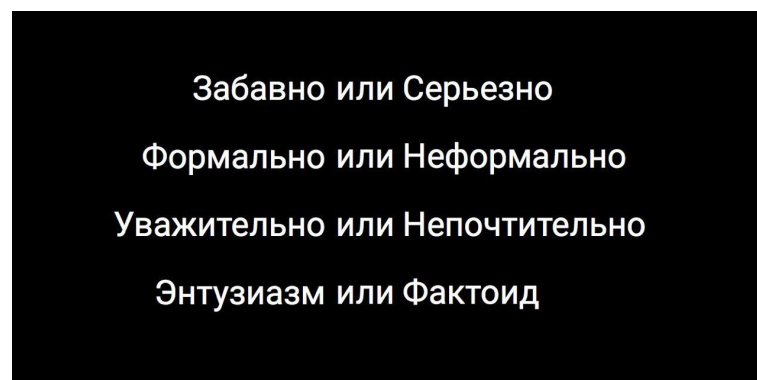


FIGURE 4.1: The list of parameters

Авторитетный	Формальный	Страстный	Детский
Заботливый	Точный	Игривый	Симпатичный
Веселый	Дружелюбный	Профессиональный	Модный
Грубый	Веселый	Провокационный	Надежный
Консервативный	Развлекательный	Ловкий	Неапологетический
Разговорный	Юмористический	Уважение	Приподнятый
Повседневный	Информативный	Романтичный	Остроумный
Сухой	Беспощадный	Саркастический	
Острый	Фактоидный	Серьезный	
Энтузиаст	Ностальгический	Умный	

FIGURE 4.2: The list of descriptors

Eventually, the last step was NPS-measure. We asked the participants to evaluate from zero to ten how likely it is that they will recommend this service to close people and acquaintances, where the value of zero stands for never, and ten – with pleasure. At the end of the study, we asked to explain the reasoning of such estimation.

4.2.2 Analysis and result

The gain of this study was that users had the same task at the entrance and two direct competitors. However, users evaluate the emotional component of their experience in different ways due to their perception of the product and giving it emotional characteristics. We structured the responses into table and the Figures 4.3, 4.4 and 4.5 show the result. According to our result, we could conclude several points.

Користувачі	Сервіс	Етапи та враження	Опис сервісу, в образі людини
1	Booking	Зайшов на бкінг, дивлюся пропозицій на будь-який сезон, вибирає Палермо, вибир	Багато говорить і не по суті, має зв'язки, чоловік, в потьортому костюмчику
2	Booking	Не подобається впливакне віконечко, тому одразу закриває, перевіряє назву сайт	Не асоціюється з людиною, каже що на древньому ресурсі, який давно не :
3	Booking	Починається зразу з вибору готелю, передивляється варіанти, вирішує подивитись	Молодий бізнесмен з сумочкою, кейсом, виглядає діловито, формальне спі
4	Booking	Заходить на свій акаунт, вибирає сицілію, вибирає перші 2 тижні червня бо кажуть	Меленіал 27 років хлопець, держа сучка, вимогливий, ідеальний продажни
5	Booking	Не працює в Криму Booking Вибираю поїздки в Ліворно -> Дивуюсь що дорого -> по'	Дама, з великою кількістю аксесуарів на собі, які всі підходять по стилю. Ду
6	Airbnb	Заходить і що його хариті що відкривається російська версія, і в більшості випадків	Підліток, який ще не сформувався, не може ще добре висловитись, вдягає
7	Airbnb	Спочатку вирішує подивитись пропозиції від сервісу, зразу заохотилось подивитись,	п Людина яка підлаштовується під інших, готує мілану, дуже популярну музика
8	Airbnb	Вибирає Тайбей тайвань, вибирає дати поїздки, вибирає кількість мандрючих, вині	Чоловік, який присмно вітається, це швейцар який доступно розказує що ві
9	Airbnb	Заходить під власним акаунтом, вибирає індонезію, думає де знайти фільтри, виби	Не можу описати
10	Airbnb	Каже що юзабіліті ваше галіміи. Іде в Туреччину, Ідуть в Карачу, вводить дати, каже	Женщина, яка помішана на прибирані, приємна, але прямолінійна, в неї во

FIGURE 4.3: Usability testing result: stages and comments; descriptions of the service as a person

Airbnb is perceived as young people, which follows the trends. However it perceived as immature, service could suggest exciting offers. What is more, users describe their interactions with service in terms of effortless, pleasant and creamy emotions, without excessive elements, only needed information. On the other hand, Airbnb is perceived as an instrument to use if necessary. It does not prompt to go somewhere. Moreover, users noted the advantages of using the map while searching. However, there were problems with interactions and correctness of location determination.

Booking is perceived as a great salesman, who knows where to push for manipulating and making the user spend time exploring the website as long as possible. Moreover, usually users lost themselves, could not find what they want and focus on the needed section of the page, because of the overload of information, useless

Користувачі	Сервіс	Параметри Забавно/Серйозно Формально/Неформально Шанобливо/Нешанобливо Ентузіазм/Фактоїд	Дескриптори
	1 Booking	40/60 10/90 50/50 0/100	сухий, формальний, консервативний, інформативний, повсякденний, серйозний
	2 Booking	60/40 0/100 100/0 не знає	консервативний, безпощадний, дитячий
	3 Booking	0/100 80/20 100/0 60/40	говіркий, формальний, інформаційний, серйозний, надійний
	4 Booking	25/75 40/60 40/60 80/20	веселий, грубий, говіркий, ентузіаст, інформативний, говіркий, дружній, грайливий, провокаційний, спритний, модний, симпатичний, дотепний
	5 Booking	30/70 60/40 50/50 10/90	спритний, симпатичний, інформативний, турботливий, надійний
	6 Airbnb	65/35 50/50 30/70 30/70	говіркий, інформативний, спритний
	7 Airbnb	100/0 60/40 80/20 60/40	дружній, говіркий, інформативний, повага, надійний, піднесений
	8 Airbnb	5/95 35/65 80/20 85/15	повсякденний, дружлюбний, шанобливий, надійний
	9 Airbnb	0/100 100/0 100/0 100/0	дружній, інформативний, професійний, розумний, надійний
	10 Airbnb	30/70 40/60 70/30 20/80	дружній, інформативний, симпатичний, професійний, повсякденний

FIGURE 4.4: Usability testing result: parameters; descriptors

Користувачі	Сервіс	Замір NPS	Причина
1	Booking	4	Airbnb – легший, менш напружений, менше інфа грузить, зручніший. От тут ці фільтри мене збисили: ти вибираеш, а воно наверх, і так кожного разу. І кожна сторінка, ніби міняється. Враження, ніби хаос
2	Booking	8	Функціональний, але потрібно навчитись користуватись, не так уже й просто користуватись. Але точно би порадив користуватись, бо можна знайти бомбезні варіанти
3	Booking	8	Було непогано, але були незрозумілі моменти. Тому ідеального не буває.
4	Booking	8	Напрягає агресивна агітація, можна знайти цікавішу пропозицію на airbnb. Все правдиво, надійно і впринципі ніколи не було лаж з ними.
5	Booking	9	Найзручніший сайт, який не має альтернатив. Але не можна бути впевненим на 100%, що сервіс такий класний
6	Airbnb	8	Деколи дуже великі комісії, але в них є прикольні акції. Плюс, якщо їдеш за кордон – набагато дешевше такий варіант, ніж знімати номер в хостелі. Але глючність сайту – це жсть.
7	Airbnb	9	Все подобається, але можливо десь є ще щось краще. Хоча особисто все влаштує
8	Airbnb	9	Дуже зрозуміло, найшов, що шукав, вся інфа на долоні. Не треба додатково розбиратись і закопуватись, щоб знайти і варіант, який ти хочеш, і всю інформацію про нього.
9	Airbnb	10	Нижчі ціни, ніж на бункінгу. Як на мене бункінг – це старий кит.
10	Airbnb	7	Не на 100% ідеальний, але не викликає огиди. Коли потрібно, я завжди і скористаюсь. Але я б не сказала, що це такий сервіс, на який би мені хотілось повертатись і заходити кожен день. Це швидше інструмент. 10 поставила би тому сервісу, який би тебе спонукав їхати кудись, букати, і там такий крутий дизайн і як рухаються ті кнопки, вау

FIGURE 4.5: Usability testing result: estimation; explanation of the reasoning of estimation

information frequently, and constant aggressive agitation. Booking is perceived as something outdated. Nevertheless, users were assured that the service is reliable and trustworthy. Moreover, users confirmed the functionality of the service. If know how to use and where to search, Booking will react to requests and perform the best with aiming to achieve user goals.

Given the above, the total picture is that the Airbnb is more pleasant in use; Booking is perceived as more functional and reliable service.

Chapter 5

Conclusion

In this study, we explored the experience of Lviv and Kyiv citizens who were interested in a real estate purchase for primary and secondary markets. According to our findings, we described the user behaviour in the form of user flow and also determined the JTBD, pains and gains for relative stages. Further we compared the outcomes of the researches about Lviv and Kyiv citizens to reveal the similarities and differences. What is more, we determined the advantages of both approaches in design – data-driven and emotional – based on users' evaluations and perceptions.

Finally, based on the findings of the analysis, we formed HMW questions. In such way we provided the design solutions for LUN website interface, which could deliver a better experience by strengthening the users' gains and reducing their pains. The proposed solutions can be found at [A](#).

The proposed next steps could be the following. Firstly, it is important to conduct additional usability testings of the derived from this study design solutions with the aim of their improvement into high-fidelity wireframes. Secondly, by providing additional A/B testing of the high-fidelity wireframes, more problems and insights may be revealed. Further, the results of the analysis for Lviv might be extended to bring additional comprehension about interface improvement.

Appendix A

Wireframes

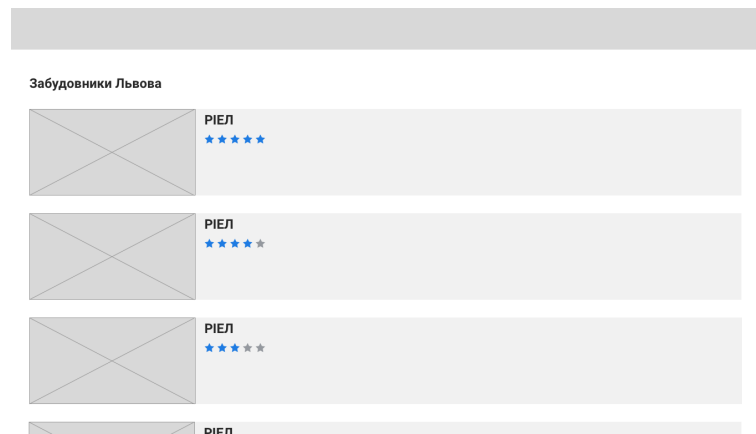


FIGURE A.1: The page of developers and their ratings

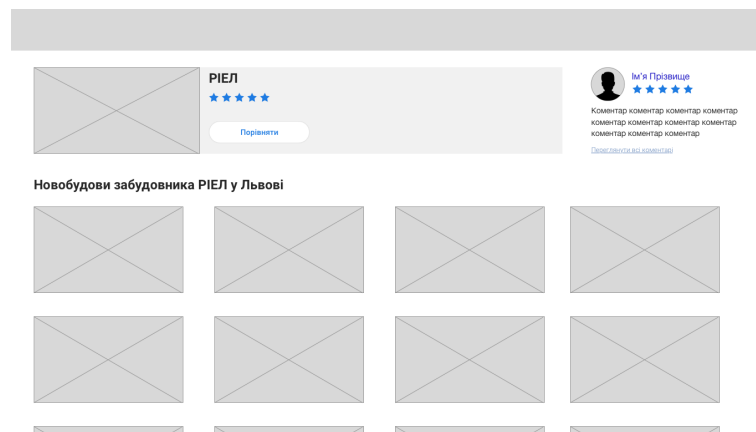


FIGURE A.2: The page of certain developer with rating, comment and button to compare

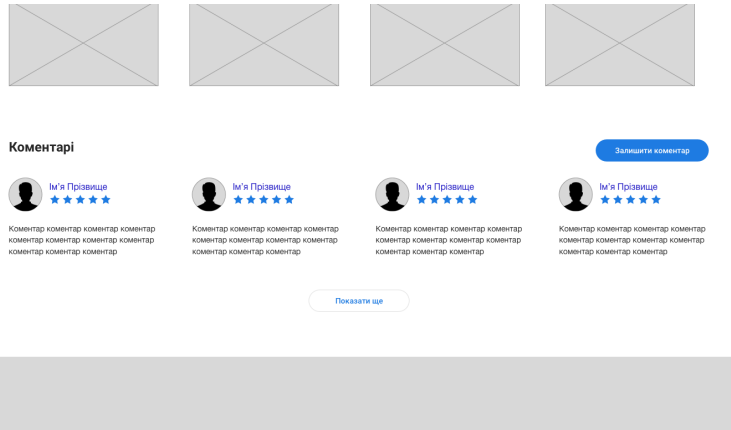


FIGURE A.3: The page of certain developer with all comments and button to leave comment

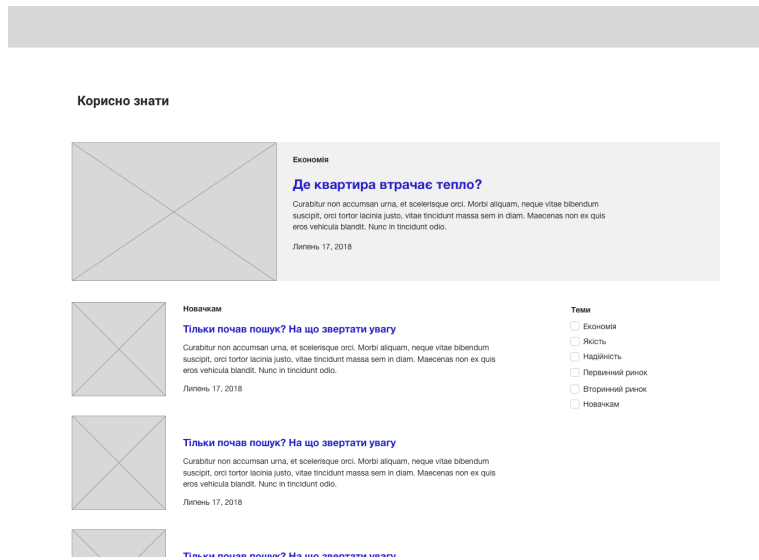


FIGURE A.4: The page of important information

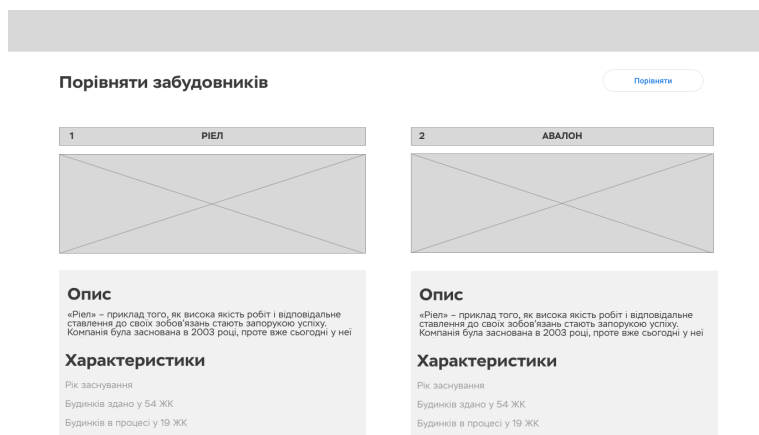


FIGURE A.5: The page of comparing developers

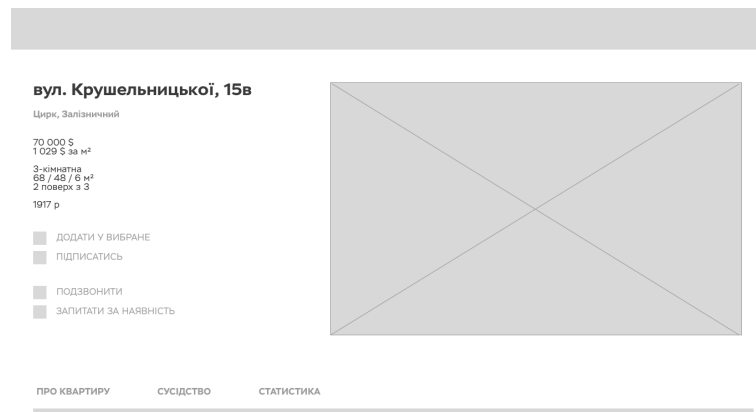


FIGURE A.6: The page of an apartment's details

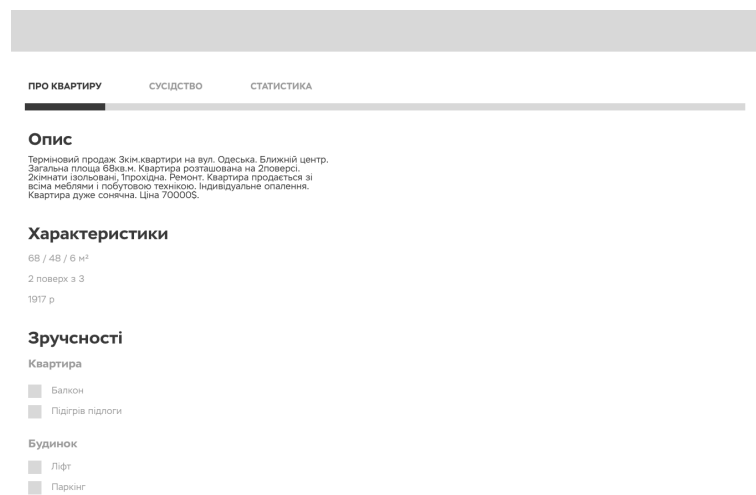


FIGURE A.7: The page of about apartment tab

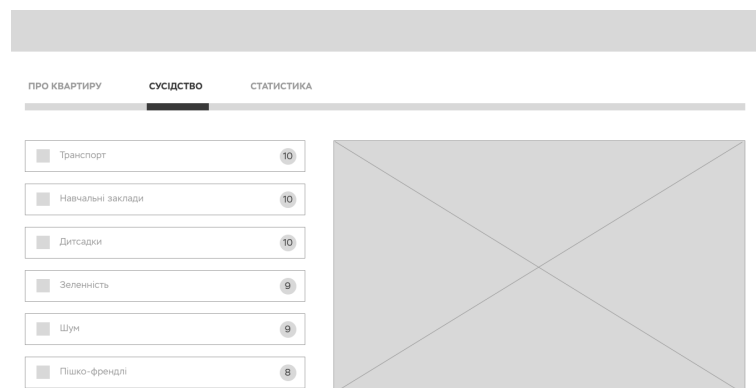


FIGURE A.8: The page of neighbourhood tab

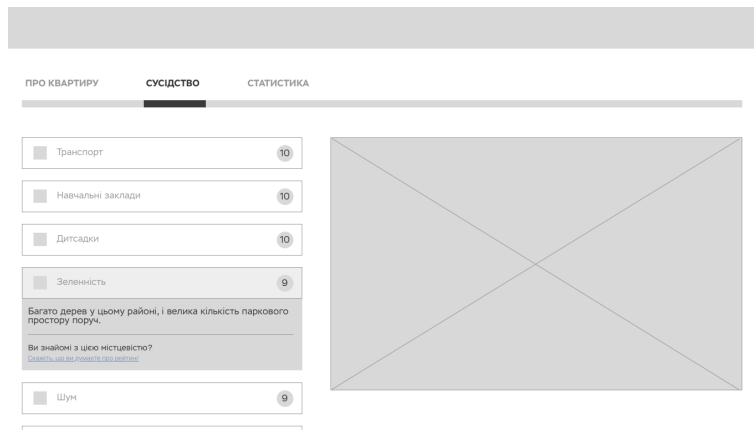


FIGURE A.9: The page of the neighbourhood parameter information

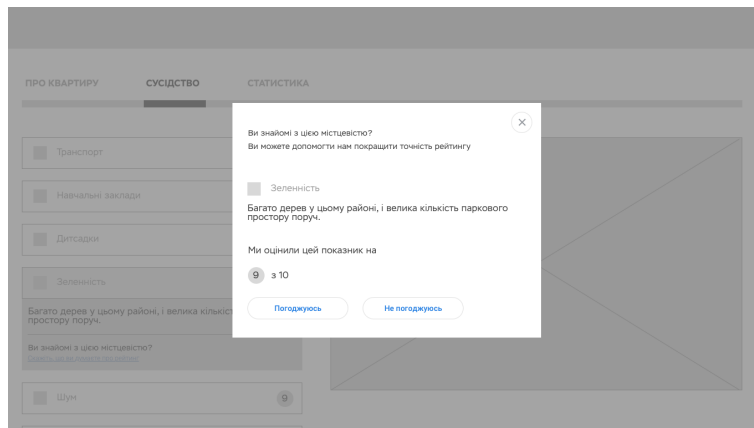


FIGURE A.10: The page of detailed information about the score of a neighbourhood parameter

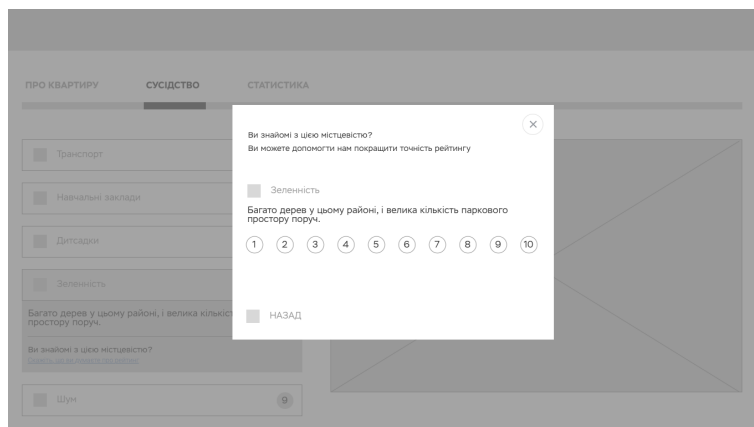


FIGURE A.11: The page of to rate a neighbourhood parameter

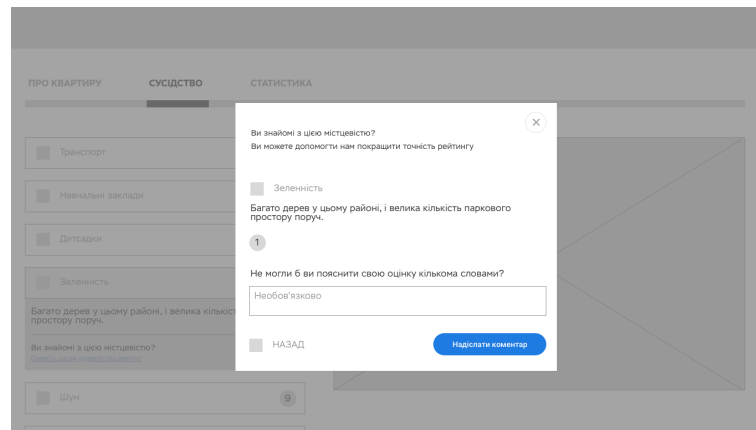


FIGURE A.12: The page of to leave comment of score and send feedback

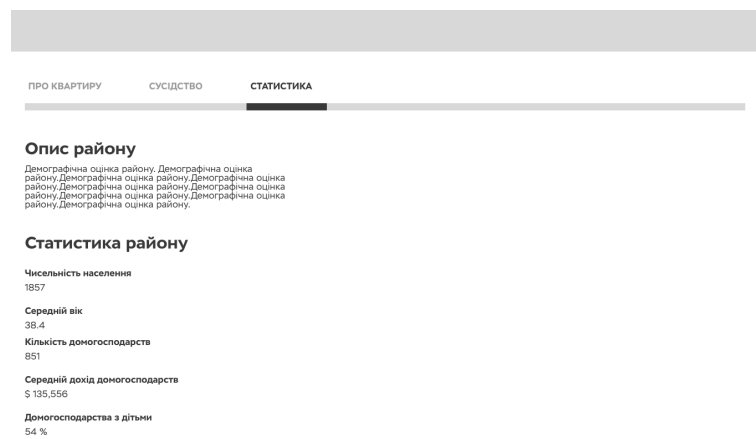


FIGURE A.13: The page of district statistics tab



FIGURE A.14: The page of comparing real estates

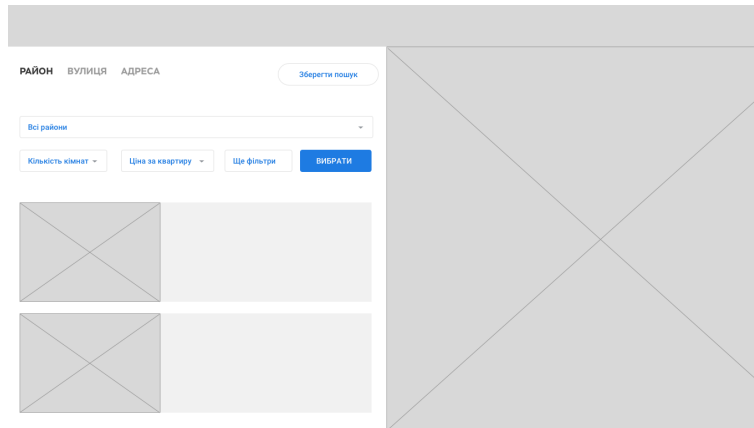


FIGURE A.15: The page of real estate searching with 'save search' button

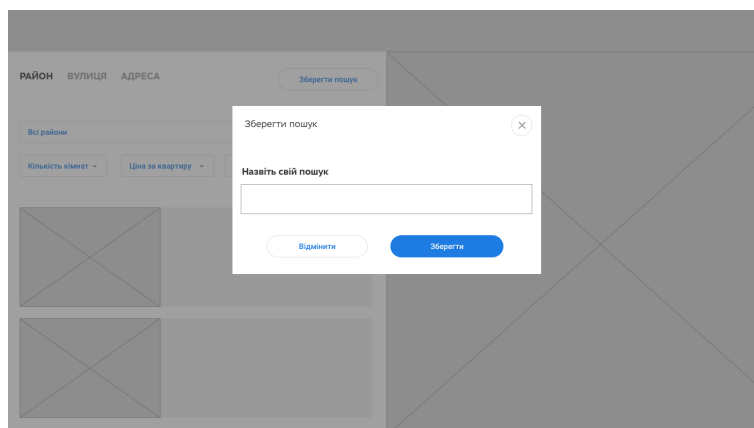


FIGURE A.16: The page of saving search

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