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Decision-making in the field of improving digital services based on customer experience (UX): The impact of using artificial intelligence technology

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Abstract

By conducting UX research, you can reduce user churn in digital services, identify areas of growth, and offer solutions to improve the user experience and retention. The main benefit of UX research is to understand the needs and expectations of users. UX research helps you analyse user's behavior, preferences and problems of users, as well as determine which features and capabilities of the application are important. The introduction of artificial intelligence (AI) has sparked a discussion about how to improve the design processes associated with UX design, leading to the emergence of the concepts of 'artificial design intelligence (ADI)' and 'intelligent design'.

In this article, the author's approach to conducting UX/UI research using AI technology is developed. The current customer path of the banking section in the bank's mobile application is compiled and modelled. In-depth interviews were conducted with 20 respondents, in which respondents compared screen forms with and without the use of AI technology. UI/UX studies are described based on the in-depth interviews conducted, followed by a justification of the need to implement AI technology to personalise the user path in a mobile application.

In addition, the results of the UI/UX study confirmed the hypothesis that the introduction of a personalised user experience using AI technology (photorealistic images of cars) in the bank's mobile application will lead to improved customer satisfaction and increased engagement, which in turn will increase the bank's profitability and competitiveness.

The proposed recommendations will optimise the user experience in the mobile application and improve the NPS and MAU metrics by a factor of 2, according to the experts.

Keywords: UX/UI research, mobile application, consumer preferences, digital technologies.

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基于UI/UX研究的数字服务改进决策：人工智能技术的影响

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简介

进行UX研究可以减少数字服务用户的流失，发现增长点，并提出改善用户体验和提高用户留存率的解决方案。 UX研究的主要优势在于了解用户的需求和期望。 UX研究可以分析用户的行为、偏好和问题，并确定哪些功能和应用程序的特性是重要的。 人工智能（AI）的引入引发了关于如何改进与用户体验（UX）设计相关的设计流程的讨论，并催生了人工智能设计（ADI）和智能设计（Intelligent Design）等概念。

本文开发了一种使用AI技术进行UX/UI研究的独特方法；构建并模拟了银行移动应用程序中银行部分的当前客户旅程；进行了20位受访者的深度访谈，在访谈中他们比较了使用和未使用AI技术的界面设计；基于深度访谈进行了UI/UX研究，并论证了在移动应用中引入AI技术以实现用户路径个性化的必要性。

此外，UI/UX研究的结果证实了以下假设：在银行移动应用中使用AI技术（如照片级真实感的汽车图片）实现个性化用户体验将提高客户满意度和参与度，从而提升银行的盈利能力和竞争力。

提出的建议将优化移动应用中的用户体验，并据专家评估，提高NPS（净推荐值）和MAU（月活跃用户数）指标，提升幅度可达两倍。

关键词： 移动应用，客户体验，消费者偏好，数字技术。

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Introduction

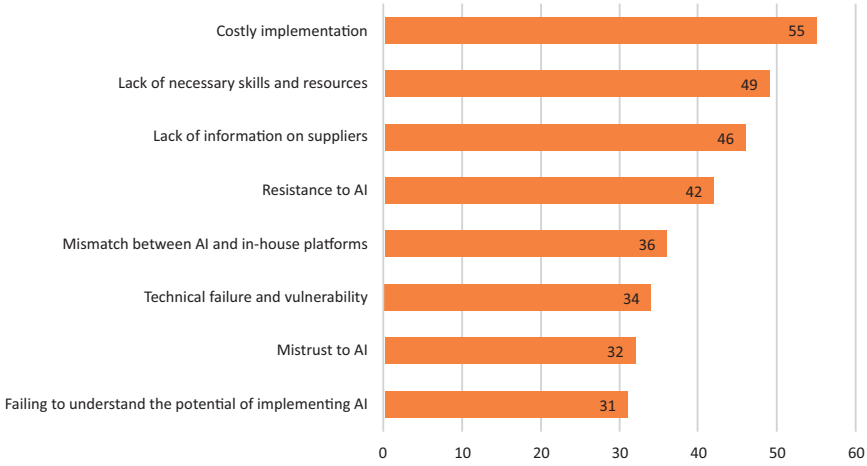
In recent years, Russian companies have been actively implementing the latest technologies and developing their own digital solutions to ensure the convenience and comfort of their customers. The level of digitalisation of Russian companies continues to grow, making financial services more accessible and innovative. Artificial intelligence as an innovative solution is in demand in various industries. More and more companies are deciding to implement this technology in their business processes: from facial and voice recognition to determining customer behaviour [Lew, Schumacher, 2020].

According to the Bank of Russia[1], вleading companies in the Russian market have adapted artificial intelligence mechanisms to their needs, created teams of development experts, designed data processing and gained experience in using advanced processing technologies in their processes.

According to the results of the VTsIOM survey[2], 55% of respondents said they were not using artificial intelligence because of the high initial investment. Some 49% of respondents cited the lack of necessary skills and a development team among staff as a barrier to implementing AI technology. Of those surveyed, 34% cited a technical failure and vulnerability of the technology as a barrier to implementing AI.

Respondents are likely to be concerned that the new technology could lead to data leakage, subsequent breaches of privacy rights and a loss of trust among users.

Fig. 1. Barriers to adoption of AI technology

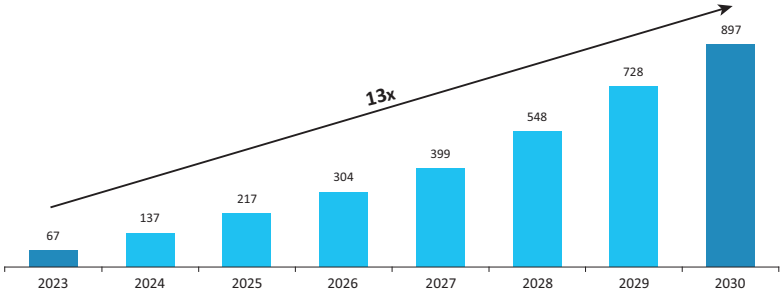


Source: Prospects and problems of using artificial intelligence technologies in the regions of the Russian Federation. tse64fmdsetwhhpd6e57a3wjtsud6mdx.pdf (csr.ru).

[1] Application of artificial intelligence in the financial market. Report for public consultations. Bank of Russia, 2023. https://cbr.ru/Content/Document/File/156061/Consultation_Paper_03112023.pdf.

[2] Artificial intelligence: A blessing or a threat? https://wciom.ru/analytical-reviews/analiticheskii-obzor/iskusstvennyi-intellekt-blago-ili-ugroza.

Fig. 2. Artificial intelligence market growth



Source: Application of artificial intelligence in the financial market. Bank of Russia, 2023. https://cbr.ru/Content/Document/File/156061/Consultation_Paper_03112023.pdf.

Therefore, an IT department or project team with experts in the field of artificial intelligence is needed to implement and support AI technology.

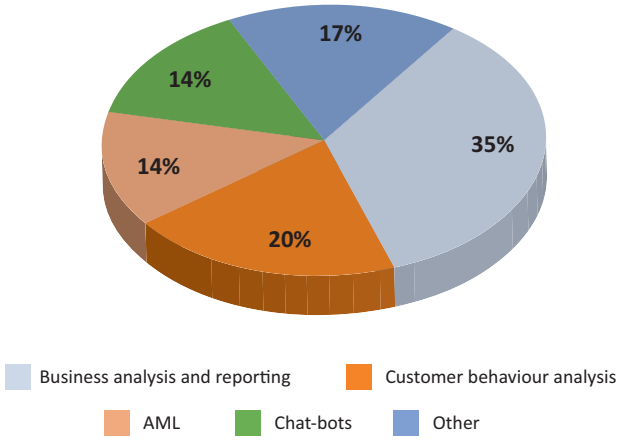
According to the results of the All-Russian Public Opinion Research Centre, 48% of respondents are interested in artificial intelligence as a new technology, and 31% are neutral. The study showed that the majority of Russians have a positive interest in the use of AI technology.

Based on the research conducted[3] it can be concluded that the global market for IT solutions using AI technology will grow 13-fold between 2023 and 2030 – from $67 billion to $897 billion (Figure 2).

Artificial intelligence and machine learning[4] technologies are actively used by Russian companies to collect data and analyse customer information. Figure 3 shows the main applications of artificial intelligence.

Approximately 35% of Russian banks perform business analysis and report generation – with the help of AI technology, banks can quickly process large amounts of data and build financial forecasts[5]. User behaviour analysis accounts for 20% – artificial intelligence enables us to identify human emotions using advanced facial and voice recognition technologies. With AI-powered mobile apps, transactions can be faster and more secure, and banks and financial institutions can recognise human behaviour and offer personalised services through the app[6].

Fig. 3. Areas of application of AI technology in Russian companies



Source: Prospects and problems of use... tse64fmdsetwhhpd6e57a3wjtsud6mdx.pdf (csr.ru).

AI-enabled products are becoming more customer-centric as the number of users loyal to the technology grows. In the future, AI products will continue to evolve due to their deep understanding of human behaviour. Given the constant development of the technology itself, it is almost certain that most banks will implement it to remain competitive and provide better customer service. The combination of AI technology and UX design offers great opportunities in the future [Stige et al., 2023].

The purpose of this article is to consider how AI technologies can be implemented in the process of developing a digital service, and to assess the impact of implementing AI technology in UX design on an organisation's effectiveness.

1. Literature review

When developing a digital service, designers need to conduct user experience (UX) research that meets the requirements and expectations of the end user [Chen et al., 2018]. Conducting UX research helps to reduce user churn and identify growth points that can lead to an influx of users, as well as offer solutions to improve the experience and retain users. For example, to determine which elements of the application design and functionality evoke emotions and provide a positive user experience, and which, on the contrary, require changes.

The main benefit of UI research is to understand the needs and expectations of users. Research allows you to analyse user behaviour, preferences and problems, as well as determine which features and capabilities of the application are important. For example, what emotions does AI technology evoke in a mobile application [Wiberg,

[3] Artificial intelligence: benefit or threat? https://wciom.ru/analytical-reviews/analiticheskii-obzor/iskusstvennyi-intellekt-blago-ili-ugroza.
[4] The application of artificial intelligence in the financial market... https://cbr.ru/Content/Document/File/156061/Consultation_Paper_03112023.pdf.
[5] Id.
[6] Id.

Stolterman Bergqvist, 2023]. As a result, such research helps you to improve the user experience.

In addition, it should be noted that UI research provides an emotional interaction between the user and the application. By analysing users' emotions and reactions, it is possible to create an interface and content that can evoke positive emotions and increase user engagement, leading to an improved user experience [Li et al., 2024].

An important benefit is the increase in usability, as the main goal of UI research is to create a user-friendly and intuitive interface in a mobile application. Thanks to research, it is possible to identify difficulties that affect the conversion of sales through a mobile application. Therefore, research also allows you to identify the reasons why users may not complete a purchase or skip important steps, and to optimise the elements that affect conversion and sales in a mobile application.

There are numerous examples in the literature where poorly understood customer experience has led to end users abandoning a service due to technostress, fatigue and misuse [Hart, Sutcliffe, 2019; Nisafani et al., 2020]. End users of digital solutions have high demands on applications or services, and the success of digital technologies is often linked to how well developers manage to understand user requirements and translate them into appropriate solutions in terms of functionality and aesthetics [Silva-Rodríguez et al., 2021]. The work [Oulasvirta et al., 2020] shows that creating user-friendly and innovative solutions requires user-centred design with qualities such as creativity, problem solving, reflection and empathy.

In [Verganti et al., 2020], design is defined as a part of the innovation process aimed at making decisions in the area of generating new ideas and solving user problems. The authors define design as a process consisting of a set of stages, methods, tools or collaborative practices, and as a design object that describes new solutions for creating a product, service or process.

In recent years, the UX design process has become a subject of special study in the research literature. For example, the authors of [Verhulsdonck et al., 2021] define UX design as 'the process of supporting user behaviour by providing usability, usefulness and desirability through interactions with a product'. An important part of UX design is to follow a predefined and established process, the key elements of which are piloting, testing and refining [Tokkonen, Saariluoma, 2013].

Currently, one of the most commonly used UX design methods for digital solutions is the so-called user-centred design, i.e. a design that places the user of the product at the centre of the design [Pandian, Suleri, 2020].

With this design method, each phase of the process can be linked to different UX activities, which allows for more detailed information about how such a process changes with the introduction of artificial intelligence [Park et al., 2013]. The authors of the study [Preece et al., 2015] define user-centred design as a design process that involves identifying user needs and requirements, generating ideas, and evaluating them to meet those needs and requirements. A key element of user-centred design is that it is iterative, as steps can be repeated if the result does not meet the user's needs after each iteration. The user-centred design process promotes dynamic interactions between the user and the designer, allowing UX designers to conceptualise, communicate and evaluate their design before creating the final version [Pandian, Suleri, 2020].

However, the design process still takes a lot of time and requires relevant experience and resources. The task of designers becomes increasingly complex as they are required to simultaneously understand what needs to be created (problem setting) and develop an appropriate solution (problem solving) [Yang, 2017]. To understand the task at hand, developers need to gather information about how the solution they are developing is being used by analysing data from the users who interact with the system. However, in many cases this data is missing, which further complicates the task.

The recent introduction of artificial intelligence (AI) has sparked a debate about how to improve the design processes associated with UX design by providing designers with tools that enable them to create higher quality digital services in less time and at lower cost [Oh et al., 2018].

In recent years, the number of practical applications and research in AI for UX has grown rapidly. Using datasets containing, for example, user data or graphical interface elements, AI applications can automate design tasks and facilitate the creation of adaptive interfaces that evolve dynamically according to user requirements [Johnston et al., 2019]. Thus, AI-enabled UX is fundamentally changing the process of digital service development.

The introduction of artificial intelligence has already led to fundamental changes in the UX design process, so it is important to understand how such technologies can be developed and integrated into the design process. In a recent literature review, [Abbas et al., 2022] presented a description of the challenges UX designers face when implementing machine learning (ML) in the design process. In their conclusions, the authors propose several tools, algorithms and techniques that can be used to overcome the emerging challenges. In essence, the study [Abbas et al., 2022] represents another approach that aims to identify the main challenges faced by UX designers. However, their work pays less attention to how AI can be used at different stages of the UX design process.

Other studies have mixed opinions on the use of AI, with some studies citing negative aspects of its use. For example, [Gaffney, 2017] notes potential negative and unintended consequences, and also argues that the use of AI in the UX design process is a potential risk factor associated with a lack of control and autonomy, inconsistency in UX design, decreased productivity, and increased stress and frustration among designers due to fear of losing their jobs [Gaffney, 2017].

[Koch, 2017] emphasise that it is important to view UX design as a holistic process, and that for AI to be a useful tool in the UX design process, both technical capabilities

and human needs need to be understood throughout the design process.

The authors of the review [Enholm et al., 2021] consider various definitions of AI and argue that 'there is general agreement that artificial intelligence means endowing a computer with human-like capabilities, meaning that computers are capable of performing tasks that would normally require human intelligence'. Therefore, AI can provide the ability to fine-tune and analyse the use of digital solutions, as well as assist designers in the creative process [Oh et al., 2018].

As the use of artificial intelligence for design purposes has expanded, so have the concepts used to describe this phenomenon. One such concept is artificial design intelligence (ADI): it refers to AI that has developed design knowledge by using ML to predict design trends and generate designs [Li, 2020]. Another example is computational creativity, an area of AI in which systems exhibit behaviours that would be considered creative in humans [Feldman, 2017].

Another area is the interaction of AI with artistic design – the concept of intelligent design. This area includes, among others, AI-assisted automated design, intelligent artificial design system, AI-assisted user experience design for products, and AI-assisted product management [Li, 2020].

However, research into the use of AI in the design process remains fragmented.

Based on the review, the author hypothesises that the implementation of AI technology in a mobile application will personalise the user experience, increase customer satisfaction and their level of engagement, which will ultimately increase the company's profitability and competitiveness in the market.

2. Methodology for studying the impact of AI technology on user experience

In order to conduct this study, the following research questions were formulated:

- How can the implementation of AI technology help at different stages of the development of a mobile banking application redesign?
- Can the implementation of AI technology improve the personalisation of the user experience?
- Can the implementation of AI technology improve customer satisfaction and engagement, thereby impacting the bank's profitability and competitiveness?

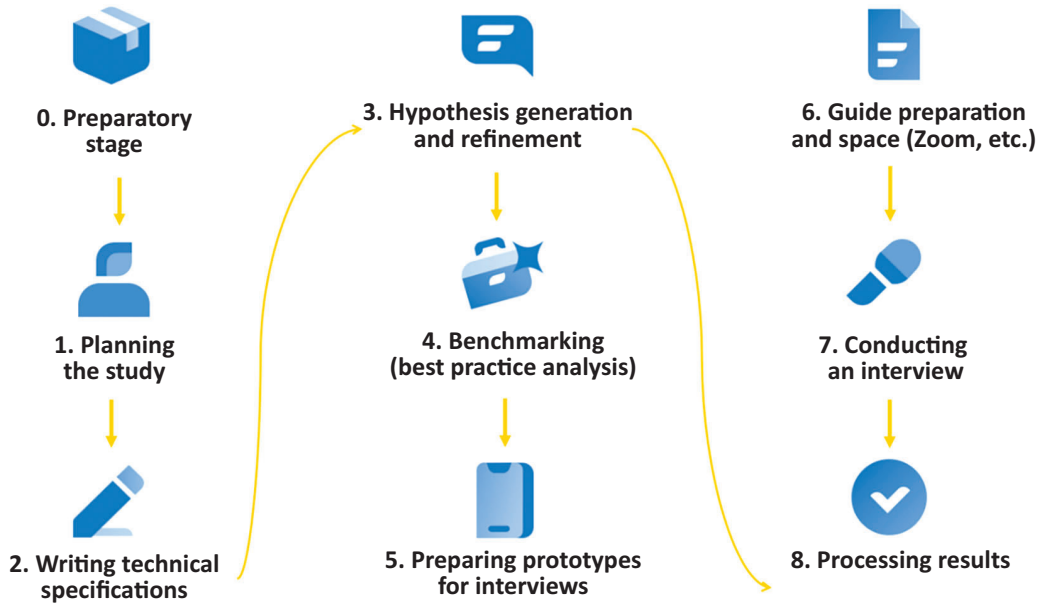
A research methodology was developed to answer the questions posed:

- developed our own approach to conducting UX/UI research;
- captured and modelled the current banking customer journey in the bank's mobile application;
- conducted in-depth interviews with 20 respondents comparing screens with and without the use of AI technology;
- described the UI/UX research based on the in-depth interviews conducted, with subsequent justification of the need to implement AI technology to personalise the user journey in the mobile application.

In the first stage, a methodology for conducting UI research was developed, consisting of nine steps, as shown in Fig. 4.

Preparatory stage: a Customer Journey Map (CJM) was created and modelled in the context of banking scenarios in a mobile application based on the BPMN notation. The advantage of this notation is that it allows to identify

Fig. 4. Stages of UI research



Источник: разработано автором.

growth points in the context of the business and technical aspects of the mobile application. The business side is the user path, the interfaces that the user sees in the mobile application when going through a particular scenario. The technical side includes a description of the microservices of the mobile application.

Planning the study: The research objectives and key participants were defined, key questions for in-depth interviews were formulated based on the previously studied user journey, and a research plan was agreed.

At the technical specification stage. All the requirements were formulated in the form of a research project passport. Then, based on a theoretical review of the literature, hypotheses were defined and refined based on the analysis of the first phase of the study.

The fourth stage involved *benchmarking* (analysis of best practice). Competitors in the market or practices of other successful applications in the industry were analysed to identify strengths and possible areas for improvement. This stage is not mandatory – it allows you to compare the application with competitors, identify similar functionality or radical differences, and gather additional information to create a set of questions for further interviews.

In *preparing prototypes for interviews,* prototypes were created from design layouts to be shown to respondents during interviews.

Preparing the guide and room for conducting the interviews: At this stage, instructions were written describing the scenarios and questions needed to conduct interviews with respondents. A guide is a set of instructions containing a list of questions designed to obtain information from respondents in order to confirm or refute a hypothesis. A group of respondents was also identified at this stage.

The seventh step is *to conduct interviews*. According to the developed scenario, 20 qualitative studies were conducted – in-depth interviews lasting 90 minutes with all answers and emotions recorded.

The final stage is *to process the findings*. All interview recordings were transcribed to create a list of problems and ideas. This allowed us to quantitatively and qualitatively analyse the list of hypotheses and draw conclusions.

3. Research results

3.1 Conducting UI research in a bank's mobile application

The ecosystem in the banking industry, as a trend of digital transformation of business, allows companies to improve the wide range of banking and non-financial services provided to customers. Therefore, we will consider conducting UX/UI research on the 'Auto' section of a mobile banking application.

To determine the current level of the UX concept of the bank's 'Auto' section, as part of the UX/UI research, a customer journey (CJM) was compiled for the scenario of adding a car to the bank's mobile application (Fig. 5).

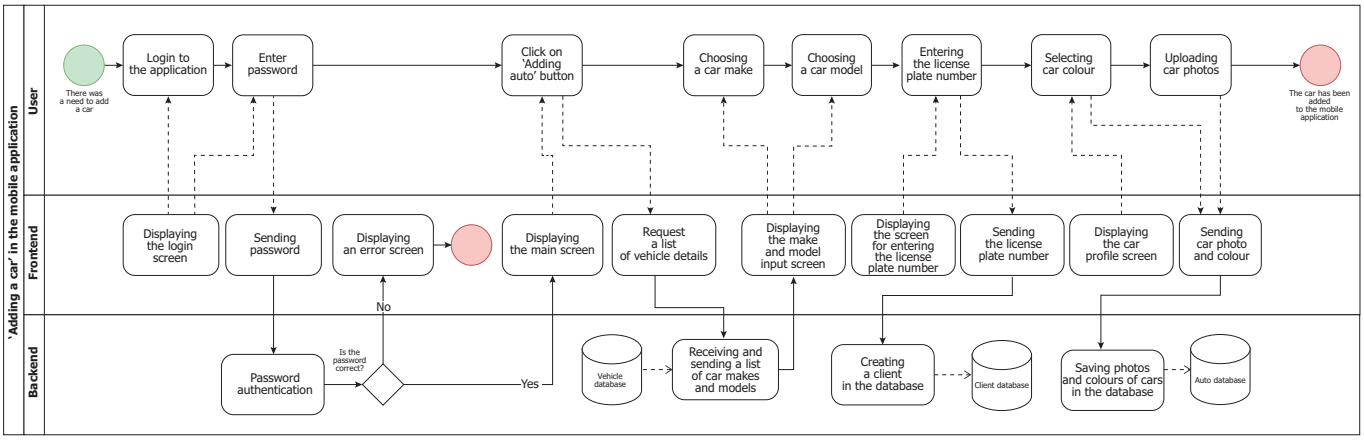
Let's look at the simulated CJM of the current 'Adding auto' scenario in the mobile application. The user starts his journey from the authorisation zone in the mobile application. After receiving the debit card from the bank, he has to enter the pre-set password. If the user is not a bank customer, he will not be able to access the authorised area of the mobile application. This means that the Bank's products and the full functionality of the entire mobile application will not be available to him. If the password is entered correctly, the user will be taken to the main screen of the mobile application.

The main screen of the mobile application contains the bank's main products: banners, account, support chat, profile, stories (news feed), etc.

The main screen serves as an entry point for various scenarios: paying for housing and municipal services, searching for tickets, viewing an invoice, making a payment, including adding a customer's car.

Next the Client must click on the 'Adding auto' button. The customer is taken to the 'Adding auto' scenario. The customer must select the make of their car from the drop down list of models or enter it in the search bar to search.

Fig. 5. User path 'Adding auto' in the mobile application



The search is done by reference to the bank's database. The database is updated and supplemented by integrations with car suppliers or other car services.

Next, the customer must select the car model from the drop-down list of models or enter it in the search bar, as in the previous step. The next step is to specify the year of manufacture of the car and then enter the country registration number.

Further on in the interface, it is possible to edit and change the information: choose the colour, the shape of the discs, upload photos.

After saving the necessary data, the customer completes the process of adding a vehicle in the mobile application. The application will display a notification of successful addition.

A tool like CJM allowed us to gain a deeper understanding of the customer experience and identify potential bottlenecks for further improvement, to create an optimised path for the bank's loyal motorist customers, increasing their satisfaction and improving their experience.

The current 'Adding auto' scenario has several shortcomings in its interface in terms of UX requirements, as shown in Table 1.

Table 1
Disadvantages of the current 'Adding Cars' scenario

Interface weakness	Description
Large amount of input data on different screens of the mobile application	The user is forced to enter a lot of data about the car: make, model, year, colour. Information overload can be tedious. If the user has several cars, he has to repeat the current process for each one
Loss of context in the script	The current process of adding a car consists of multiple screens or transitions, which can cause the user to lose context
Lack of automation in the script	The current path is not optimised for the user. There is no integration with the ability to automatically fill in fields and search for a car without specifying more information
Low level of personalisation	The user has to assemble an image of his car – the image does not reflect reality. The user is not very interested in returning to this section when entering the application

Source: compiled by the author.

This confirmed the need to improve the user journey in the mobile application.

A UI study was then designed to answer the research question and confirm or refute the hypothesis.

Then the technical task was defined. Let's consider the technical task of the UI research using the example of a specific section 'Auto' of the banking application, described in Table 2.

Table 2
Terms of reference for conducting UX/UI research

Block	Description
Product name	The 'Auto' section of the bank's mobile application
Target audience	1. Customers using the Bank's car products: car loan CMTPL or CASCO. 2. Active customers of the 'Car' department 3. Users who own a car but do not use the 'Auto' section
Business value	Increase % retention of current MAU. Current MAU is 150 thousand customers, which is 1/3 of the active customer base of 6 million customers.
Deadline	2 months
Research objectives	1. Identify barriers and new motivations for using the 'Auto' section 2. Identify key patterns of using the 'Auto' section 3. Conduct concept testing of the 'Auto' section, determine user perception of current design concept 4. Determine attitudes towards AI technology, impact on personalisation of the user path within the framework of auto images
Key questions for interviews in the 'Auto' section	1. How does the user understand the overall meaning of the section? Is it valuable to them and why? 2. What functions of the section are obvious to the user? 3. Which features are less clear, but can be figured out with leading questions? 4. Which features are unclear? 5. Which features does the customer consider valuable? Why? 6. What do users feel is missing from the current interface? Why? 7. Which scenarios/functions/elements of the interface do users consider unnecessary? Why? 8. How does the user understand the importance of adding a car? Do they consider it valuable and why? 9. Does the user use the current section? If so, how often? For what purpose? If not, why? 10. What in the interface is critical to the user? If yes, what is it and why?
Questions about AI technology	1. We will now look at two prototypes of the scenario for adding a car: a) the first screen has a basic image of the car b) The second has an image of the car created using artificial intelligence (AI) 2. What do you think of the first prototype? What emotions did it arouse in you? Do you like the car? 3. What do you think of the second prototype? Are you put off by the fact that the car is generated by AI? Do you like your car now? 4. Which of the two prototypes do you like better and why? If neither, why? 5. What do you think about the use of AI technology in the banking sections of the mobile application?

Source: compiled by the author.

Next, in order to conduct in-depth interviews within the framework of the analysis of the current customer journey of the bank's mobile application using the example of the 'Auto' section, hypotheses were formulated for the current section of the banking application, which are presented in Table 3.

Hypothesis 1. Providing a more attractive and intuitive interface in the car section of the mobile application will attract new users to the car segment and increase the retention of existing users.

Hypothesis 2. The introduction of AI technology to generate car images will personalise the user experience of the 'Auto' section, and new car images as a gamification tool will increase the loyalty (NPS) of customers who have not used the section or have been inactive.

Benchmarking (analysis of best practices) was carried out to refine the questions and design prototypes for future demonstration in interviews. Let's consider a competitive analysis of the current product ('Auto' section) on the market (Table 3). The best practices on the market, according to the experts, were defined as Yandex.Zapravki and Auto.ru mobile applications.

Table 3
Competitive analysis of the 'Auto' section of the mobile application

Functionality	Yandex. Zapravki mobile application	Auto.ru mobile application	The 'Auto' section of the bank's mobile application
Ability to add a car	Yes	Yes	Yes
Onboarding when adding a car for the first time	No	No	No
Ability to choose the colour of the car when adding a car	Yes	Yes	Yes
Ability to track the status of a car	No	No	Yes
Ability to buy/sell a car	No	Yes	Yes
Ability to upload a picture of the car	Yes	Yes	Yes
Availability of gamification in the application	No	No	No
Ability to buy CMTPL	No	Yes	Yes
Ability to rate the car	No	Yes	Yes
Display the car	User's photo	Photorealistic cars	Standard car pictures
Ability to see fines for the car	No	No	No
Availability of support chat	Yes	Yes	Yes

Source: compiled by the author.

Based on the competitive analysis, a growth point was identified – displaying a car to the user. There are no solutions on the market that show a photo of a realistic car to the user as a tool to keep their attention in the application. It is the implementation of AI technology that will allow the personalisation of the user experience.

Next, two prototypes were created with the help of the design and development team. The first prototype contains a basic image of a car from the bank's directory, the second – an image of the user's car created using artificial intelligence (AI). The main difference in the second prototype is a photo-realistic image of the user's car.

After the prototypes were developed, a guide for conducting interviews was prepared. The guide with a list of questions for conducting an in-depth interview is shown in Table 4.

Table 4
In-depth interview guide

Interview stage	Description
Introduction (2 minutes)	Introducing the moderator Discussing the ground rules Video recording Confirming confidentiality of responses Communicating the general purpose of the interview
Getting to know (10 minutes)	How old are you and where do you live? Who do you live with? Where do you study/work? What is a typical weekday like? Do you drive – why, where, for how long? What do you do after work? How do you spend your weekends? What do you like to do? What don't you like to do, what do you want to get rid of? What do you watch/listen to/read? Which subjects?
Driving (5 minutes)	Please tell us your story, how did you get your licence? Why did you decide to get it?
About auto (20 minutes)	Please tell us how you acquired your current car? How did you choose it? How did you buy it? How often do you use your car? For what purpose? Where is it usually parked? What does its maintenance involve? Do you consult anyone about maintenance? In what situations do you contact the mechanics? How do you choose a garage/car wash/service? Are there any apps or websites that help with car maintenance (do you use automatic car washes or online petrol stations)?
Attitude to auto (5 minutes)	How would you continue the sentence 'My car is...'?
Discussion of prototypes (30 minutes)	List of questions from the technical task Showing prototypes
Conclusion (2 minutes)	Is there anything you would like to add? Additional questions from the team Giving thanks and closing the interview

Source: compiled by the author.

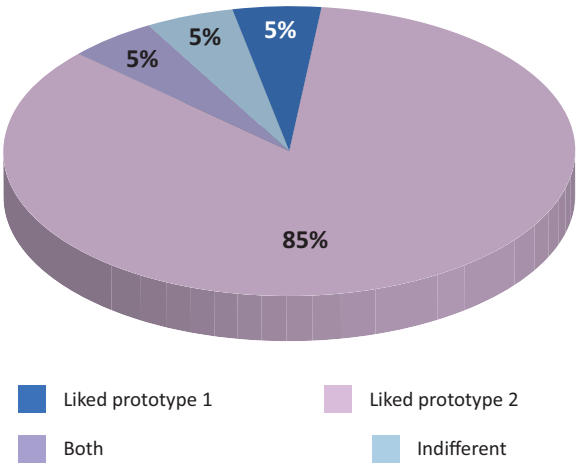
Subsequently, 20 in-depth interviews were conducted with respondents according to the developed scenario. Emotions and responses were recorded in the interview template. The transcript of the recordings to form a list of problems and ideas, as well as the quantitative and qualitative analysis are presented in the next section.

3.2. Justifying the impact of AI technology in improving the user experience of a banking application

The transition from purely financial activities to a single ecosystem encompassing all areas of users' lives has affected the UX/UI quality of new areas of mobile applications in the fintech industry.

The results of the 20 in-depth interviews showed that 85% of respondents preferred the app interface that used AI technology (Fig. 6). Of the respondents, 5% of each group said they liked both screens. Therefore, the AI-based interface increases interest and is more attractive to users.

Fig. 6. Respondents' attitudes towards UX/UI prototypes



Source: compiled by the author.

During the interview, the respondents' reaction to the interface screen where AI technology was used was also noted. Attitudes towards the AI technology are shown in Figure 7. When the interface was demonstrated, 65% of respondents had a positive reaction, noting that the new screen significantly increased their interest in visiting compared to the previous one. In addition, 20% of respondents noted that the user scenario has become visually more comfortable. It should be emphasised that users are not immersed in the technical features of AI technology, and ignorance of the technology itself can lead to a misunderstanding of how the operation of algorithms and information processing provides a personalised result for the user experience.

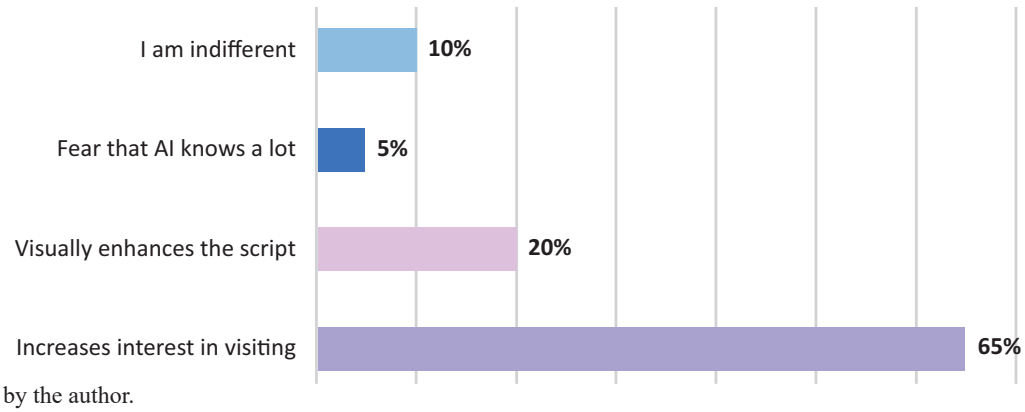
Let's summarise the results of the study using the example of the 'Auto' section in the bank's mobile application, based on the processing of the recordings of in-depth interviews with respondents (Table 5). The problems and drivers were considered in the context of the interface without the use of AI technology.

Table 5
Survey results of the current 'Auto' section of the mobile bank

Block	Description
Problems	Lack of knowledge about the availability and capabilities of the 'Auto' section
	Customers notice constant errors when adding a car in the mobile application
	The car when added does not correspond to the actual image of the customer's car
	The section is difficult to find or its nature is unclear
	Customers are not in the habit of visiting the section due to a lack of clear need
	Most customers know the name but do not remember what is in the section
Drivers	Everything online
	Customers have no contradictions when using car products (fines, insurance)
	Saving time (registering insurance, viewing repair offers, etc.)
	One place to track the condition of the car
	Separate reminder about the purchase/ discount/car service station

Source: compiled by the author.

Fig. 7. Fig. 7. Respondents' attitudes towards AI technology



Source: compiled by the author.

Based on the in-depth interviews conducted, the following conclusions can be drawn about the shortcomings of the 'Auto' section (without the use of AI technology) in the bank's mobile application:

- the current visual design of the section and its functionality do not inspire a desire to visit the service on a regular basis, but customers are positive about the idea of a service for the car segment;
- users do not understand the current capabilities of the 'Auto' section, but during interviews, users noted that a significant opportunity for them is to pay fines, check the cost of a car and view their expenses;
- customers react neutrally to the image of the car as it is not very close to their model, confirming low customer loyalty and lack of motivation to visit the 'Auto' service;
- most of the design elements are misunderstood. For example, the 'shield' icon means that there is insurance, but users do not intuitively grasp this meaning, and the element is not highlighted with an information note with a description.

Based on the results of the UI research, general recommendations were made for the further redesign of the 'Auto' section as one of the areas of a single ecosystem to improve the user experience in the bank's mobile application.

1. It is necessary to develop an entry point for the 'Auto' section on the main screen of the mobile application with high user recognition.

2. To develop a new design concept for the 'Auto' section with developed user scenarios based on the analysis and best practices in the market, as the current user path is very long and requires a lot of data entry.

3. To work out the maximum photorealistic image of the customer's car to increase the level of personalisation of the service. To generate a large number of car makes and models, it is necessary to use artificial intelligence. UX/UI research has shown that an image created using AI technology generates a high level of interest on the screen. In addition, AI generation will allow you to create: an online image for each user with a high level of automatic detail; automatic colours of a specific HEX value (code in the palette); when creating an image, manage the background, which will save time for editing artefacts by the design team in the future. For example, high-quality training of the model using detailed queries (object background, shadows, lighting, position, size) helps you generate an object with maximum detail.

4. To create a section with the ability to enter data about the car (mileage, consumables and when they need to be replaced). This will allow you to collect more data about the customer and send personalised notifications, e.g. about the need to replace parts/oil.

5. To develop the synchronisation of the mobile application using the REST API of government services with data (e.g. from the State Traffic Safety Inspectorate) in order to minimise their input by the client.

The existing IT infrastructure of the banking industry will allow, subject to the allocation of the necessary technical resources, the redesign of the mobile application through the introduction of AI technology to improve the user experience.

Thus, the results of the UI study confirmed the hypothesis that the introduction of a personalised user experience using AI technology (photorealistic images of cars) in the bank's mobile application will lead to increased customer satisfaction and engagement, which will ultimately increase the bank's profitability and competitiveness.

The proposed recommendations will optimise the user experience in the mobile application, improving the NPS and MAU metrics by a factor of two, according to the experts.

3.3. The efficiency of implementing AI technology in UI research processes

The analysis of the cost-effectiveness of introducing AI technology into the UI research processes during the redesign of the 'Auto' section of the mobile application is based on changes in key metrics:

- Increasing customer loyalty (users are more interested in using a product with an intuitive user interface);
- Increasing the number of unique users;
- Increasing sales of auto banking services and conversion to targeted actions through the 'Auto' section of the mobile application.

The economic viability of the car section will be achieved by improving the user experience through the redesign of the mobile application, which will ensure higher user satisfaction and increased sales of banking car products.

Based on actual data prior to the development of a new IT solution and a specialised analytical BI platform for product analysis provided by the bank, calculations were made for the indicators shown in Table 6.

Table 6
List of indicators to evaluate the effectiveness of an IT project

Indicator	Formula
NPS (consumer loyalty index)	NPS = % promoter – % critics (1)
MAU	Unique users per month
Conversion to target action (transition to 'Auto' section)	$Conversion = \frac{X_1}{X} * 100\%$, (2) where X_1 – the number of users who actually clicked through from the 'CMTPL' banner to detailed product cards, X – Total number of users who visited the 'Auto' section
Empty screens	Number of errors/zero-screens in user scenarios

Source: compiled by the author.

The Net Promoter Score (NPS) for the car section was calculated based on surveys and feedback from bank users. Before the redesign of the mobile app section, this figure was 35%. After the redesign of the car section, 400 customers responded to the bank's survey and the following ratio was obtained:

– promoters who rated it 9-10 – 276 people (69%);
– neutrals who rated it 7-8 – 82 people (20.5%);
– critics who rated it 0-6 – 42 people (10.5%).

Let's calculate the Net Promoter Score (NPS) using formula (1) from Table 6:

NPS = 69% promoters – 10.5% critics = 58.5%.

The value of the unique users indicator for the month before the redesign of the 'Auto' section of the mobile application MAU on the IOS and Android platforms was 150,000 users. After redesigning the mobile application by uploading data from the BI platform, the value of the MAU indicator increased 2 times and was 320,000 users.

The conversion rate of the transition to the 'Auto' section for the purpose of connecting car products was calculated using formula (2) from Table 6. Prior to the implementation of the project to improve the user experience of the 'Auto' section, the total number of users who visited this section was 1,250,000 and only 112,000 users went to the detailed view of the product cards. Accordingly, the conversion in the old design was no more than 8.96%. After the redesign, the BI platform was unloaded by the number of visits to sections and transitions to internal scenarios.

Let's calculate the conversion using formula (2) from Table 6:

$$Conversion = \frac{299\,010}{1\,350\,089} * 100\% = 22.15\%.$$

The effectiveness of the user experience is also affected by the presence of blank screens (empty pages or zero screens) in the mobile application within the 'Auto' section. Blank screens can create negative impressions for users, leading to misunderstandings and disappointment, which in turn can lead to lost users and reduced conversion. Before the redesign project, the total number of blank screens was 520, after – 147 (measured using the bank's product analysis and reports from the BI system), i.e. after improving the user experience, the number of blank screens was reduced by a factor of 3.

The results of the calculation of the changes in the banking metrics are presented in Table 7 before and after the redesign of the 'Auto' section of the mobile application.

After completing a mobile app redesign project for the bank's car division, the improved user experience and personalisation tools had a positive impact on the project's key metrics.

The increase in the NPS metric indicates an increase in user satisfaction and loyalty following the AI-powered redesign of the 'Auto' section of the mobile app. In addition, the increase in the MAU metric indicates a more active use of the app and the acquisition of new users. Such positive changes confirm that the AI-powered redesign was successful and contributed to the improvement of key project metrics.

The first major change was the growth of the monthly active audience (MAU) from 150,000 to 320,000 users, which means that the content has become useful and personalised for each user. The ability to track information about their own car in a mobile application attracts users.

The increase in the Net Promoter Score (NPS) from 35 to 58.5% is another indicator of the success of implementing AI in the design process. The increase in user satisfaction indicates that the new design and functionality of the 'Auto' section using AI has a positive impact on customer emotions. This positive response allows the bank to attract a new target group interested in the convenience and functionality of the application.

Conversion rates to the target action (transition to the 'CMTPL' product via the 'Auto' section) of 8.96 to 22.15% indicate the quality of the bank's personalised offers. An effectively designed user path encourages key actions, providing an opportunity to increase sales of the bank's car products.

It should be noted that the reduction in the number of blank screens from 520 to 147 plays an equally important role in improving the user experience. The absence of errors

Table 7
Changing metrics while improving the user experience

Metric name	Value before redesign (design without AI)	Value after redesign (AI-powered design)
MAU (number of users)	150 000	320 000
NPS (%)	35	58.5
Conversion to target action (transition to detailed banking product cards via the Notification Centre) (%)	8.96	22.15
Blank screens (number of errors/zero screens) (units)	520	147

Source: compiled by the author.

and a well-thought-out customer path with a minimisation of negative scenarios (blank screens) help to prevent negative impressions for users and ensure a comfortable interaction with the application.

So, the redesign of the bank's mobile application using AI within the 'Auto' functionality has really improved the user experience and improved the key performance metrics of the mobile application.

Conclusions

For example, the work shows an algorithm for developing and using AI technology to generate a personalised image of a car with a prediction of its colour to be displayed to the customer at the time of searching and adding their car to the section of the mobile application.

An evaluation of the effectiveness of the development of the redesign of the 'Auto' section for the bank was also carried out. The calculation of the economic efficiency of the project was based on changes in indicators such as NPS, MAU, conversion to target actions and display of zero screens. The data was obtained by surveying users after the development of the project and using an analytical BI platform. The results of the ROI assessment allow us to be sure of the feasibility of the decision to redesign the 'Auto' section.

As a result of the analysis carried out on the IT solution, improvements were identified in the key profitability indicators of the 'Auto' section of the mobile application.

When redesigning a mobile application and developing new functionality, banking organisations should consider the following recommendations:

To understand user needs and preferences. Companies should conduct UX/UI research, design user journeys, formulate potential challenges in scenarios and test them with in-depth interviews. Feedback can be used to assess the complexity and priority of features to be added to the mobile app.

To design layouts based on the results of UX/UI research within the minimum viable product. An intuitive interface helps increase customer loyalty and satisfaction.

To use AI technology to personalise the user experience. AI technology not only allows you to analyse user data and create personalised recommendations and products, but also to analyse user behaviour to improve the user experience.

To use AI to predict user behaviour, anticipate their needs and make appropriate recommendations. Developing effective predictive models and analytical algorithms will significantly improve user satisfaction.

To implement AI to recognise speech, images or other types of data. For example, generating icons or graphic images will reduce the cost of graphic designers. It is necessary to highlight the information that artificial intelligence has been used for functionality – this will significantly increase the interest and frequency of use of the mobile application.

The UI study confirmed that the implementation of AI technology in the bank's mobile application will personalise the user experience, increase customer satisfaction and engagement, and ultimately increase the bank's profitability and competitiveness in the market.

In addition, the results of the UI research will be used to suggest effective ways of using AI technology to improve the quality of the user journey.

The integration of AI technology into the bank's mobile application has great potential to increase customer satisfaction and enhance the bank's competitiveness. The scaling of AI technology will allow personalisation of the customer approach in all areas of the bank's mobile application. This is not only an important factor in improving functionality and attractiveness for users, but also serves as a competitive advantage in the banking industry.

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