

# A comparative analysis of the functionality and quality of the interface of chosen applications for ordering food

## Analiza porównawcza funkcjonalności i jakości interfejsu wybranych aplikacji do zamawiania jedzenia

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### Abstract

In recent years, growing popularity of food ordering mobile applications was noticeable. The COVID-19 pandemic has only accelerated this trend. In Poland, there are a large number of applications that allows to order meals from restaurants. In this article, three of the most popular ones have been selected - UberEats, Pyszne and Glovo. The aim of the research was to determine their functionality and the quality of their interfaces. The study used the method of experimenting with users who performed the most likely application usage scenarios, during which the time of their execution was measured, and then an survey using the SUS method was conducted. The obtained results allowed to determine that it is impossible to indicate the most effective interface in general. Depending on the task, the times of its execution differed. The results of the SUS survey showed that the UberEats app has the best interface quality.

*Keywords:* interface quality; user research; food ordering apps; SUS method

### Streszczenie

W ostatnich latach można było zauważyć rosnącą popularność mobilnych aplikacji do zamawiania jedzenia. Pandemia wirusa COVID-19 tylko przyspieszyła ten trend. W Polsce istnieje duża liczba aplikacji pozwalających na zamawianie posiłków z restauracji. W niniejszym artykule wybrano trzy najpopularniejsze z nich – UberEats, Pyszne oraz Glovo. Celem badań było określenie ich funkcjonalności i jakości ich interfejsów. W badaniu zastosowano metodę eksperymentu z użytkownikami, którzy wykonywali najbardziej prawdopodobne scenariusze użycia aplikacji, w trakcie których mierzono czas ich wykonania a następnie przeprowadzono ankietę wykorzystującą metodę SUS. Uzyskane wyniki pozwoliły określić, że ogólnie nie można wskazać najbardziej efektywnego interfejsu. W zależności od zadania czasu jego wykonania różniły się. Wyniki ankiety metody SUS wykazały, że najlepszą jakość interfejsu posiada aplikacja UberEats.

*Słowa kluczowe:* jakość interfejsu; badania z udziałem użytkowników; aplikacje do zamawiania jedzenia; metoda SUS

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## 1. Introduction

The rapid development of the computer industry, especially mobile devices, makes many companies expand their activities by making their services available on the Internet [1]. This tendency also affected the catering industry [2]. The developing IT sector made the appearance of online stores allowing online shopping [3]. It is not surprising then those similar activities began to appear in other industries offering the purchase and delivery of goods, including the catering industry [4], of which telephone orders have long been a part. Unlike online stores, where most online stores have their own website or web application for shopping, the most popular online food ordering applications allow to choose to place orders at many restaurants. This is beneficial both for the restaurant, which does not have to have and maintain its own, independent application and provides advertising among users, and for the end customer who can use only one application offering access to many restaurants, and thus allows him a greater choice among prices and the type of food he want to order.

The scope of the research included examining the possibilities of application interfaces for food ordering in the form of a comparison, checking what a given interface enables and examining their efficiency by measuring the times of performed tasks as well as quality through the survey with the SUS (System Usability Scale) method among participants performing the tasks.

Before starting the research, the following hypotheses were made:

- H1. Each of the interfaces of the tested applications allows to select the delivery time, type of receipt of the order, type of payment, and leave a tip for the courier.
- H2. The quality of the food ordering app interfaces varies significantly.
- H3. The quality of interfaces among users does not affect its performance.

In this article, the interfaces of three most popular applications for food ordering in Poland [5] [6]: UberEats, Pyszne and Glovo were compared. Testing the quality of the interface of a those applications was planned in two ways - through an experiment with users (i.e. measuring the time needed to perform specific tasks by

users) and through a survey according to SUS method [7], carried out among users after performing specific tasks. The research carried out in this way and the conclusions drawn on its basis allowed for the selection of the most effective and useful interface of the selected applications.

## 2. Literature overview

The role of the Internet in retail trade is becoming more and more important [1]. Information on the growing popularity of online shopping and importance of customer satisfaction was provided [1]. The work [1] examines existing problems, gathering information about customer satisfaction in selected online stores and provides them with suggestions on how to improve customer satisfaction and maintain their loyalty.

The article [2] reports that in the online food ordering market, many restaurants compete for orders placed by customers through online food ordering platforms. It has been found that the two main factors that guide restaurants are food quality and location. The results of the study [2] found that restaurant decisions regarding food quality are significantly influenced by customer behavior. The same study [2] showed that the location of the restaurant does not have a large impact on the customer due to the delivery that can be carried out by the food ordering platform.

The rapid growth of online customers and, consequently, of online stores was described in the work [3]. A study summarizing critical factors in the operation of online stores was conducted and the relationship between the popularity of the store and the marketing campaign was checked [3].

The rising popularity of mobile applications for food ordering was presented in the article [4]. This popularity is dependent on the customers age groups [4]. The study [4] analyzes also the perception of online food ordering services by customers. Article [5] provides information on the catering market in Poland in 2020 and data on online orders and how the Covid-19 pandemic affected this market. The presented research indicates the growing popularity of online food ordering in Poland and shows that the most popular mobile applications for food ordering are Pyszne, Glovo and UberEats. The same results are presented in the article [6].

The most commonly used standard questionnaire for assessing perceived usability of interfaces is SUS method [7]. Article [7] presents the history of SUS from its inception through recent research and future prospects, and says it is likely that SUS will continue to be a popular measure of perceived usability.

## 3. Chosen applications interfaces

Based on the analysis of the literature [5, 6], three most popular applications for food ordering in Poland were selected for the study: UberEats, Glovo and Pyszne.

### 3.1. UberEats

Figure 1 shows the UberEats mobile application interface. The colors of the interface are in light colors - the

dominant color is white. The first view that the user encounters is the home page, which immediately contains a list of restaurants delivering to the user's current address, which is gained from the phone's shared location. This address can be changed by clicking on it and entering another address from the telephone keypad. At the top of the interface screen, the user can choose whether the order is to be delivered to the address indicated or picked up. When choosing a pickup, below the given or gained current address, instead of the list of restaurants, there is a map with marked restaurants, as shown in Figure 2. The list with restaurants and food categories is then transferred below the above-mentioned map. At the bottom of the interface, the user can switch between four main views - "Home", "Browse", "Orders" and "Account". The "Browse" view, contains product categories for dishes in the form of tiles. After clicking a given tile, the interface shows restaurants that fulfill orders for dishes from the selected category. Above these tiles there is a bar for searching for restaurants or specific dishes. Selecting the "Orders" view shows in the form of a list all orders placed by the user assigned to the account for which the user is logged in. The "Account" view allows to check the details and edit the user account and his functions.

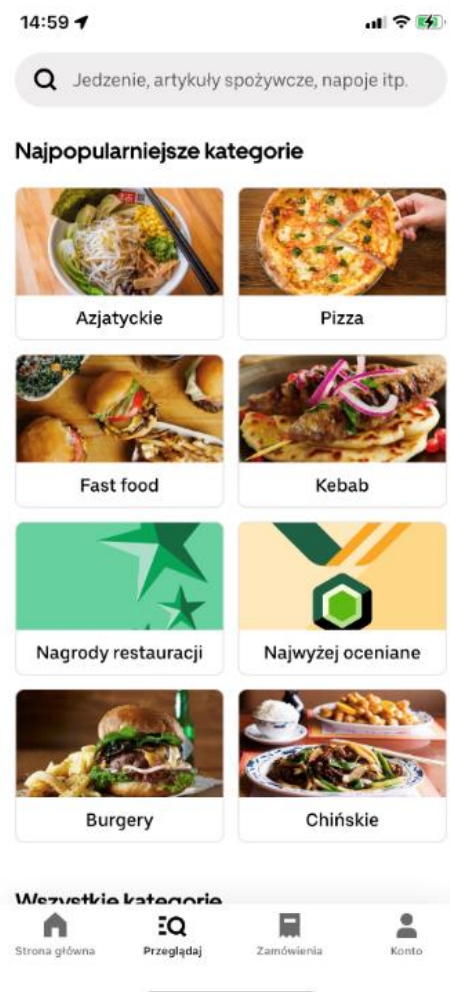


Figure 1: Home page of UberEats mobile application interface.

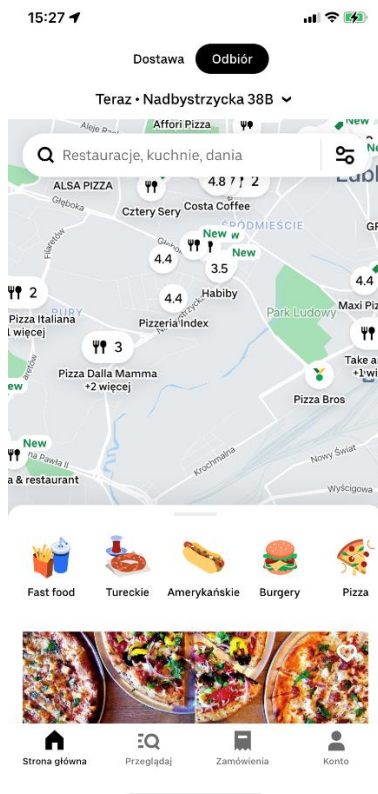


Figure 2: Map with restaurants in UberEats mobile application interface.

### 3.2. Pyszne

Figure 3 shows the interface of the Pyszne mobile application. The interface colors are orange and white. The first view that appears to the user is the list of restaurants available for the current address which is at the top of the interface. After clicking on this address, the user can change it - by default, it is gained from the current mobile device location. Right under the address there are buttons for selecting delivery or picking up the order. At the bottom of the interface, there are three icons that allow user to: filter the displayed restaurants, show the map of the area with the marked restaurants available in the app and search for specific restaurants or dishes.

### 3.3. Glovo

Figure 4 shows the interface of the Glovo mobile app. The colors of the interface are dark. In the first view, after turning on the application, the user sees 8 round tiles that allow to choose one of the services offered by the Glovo service. At the top of the first view, the user can enter the delivery address - by default, it is taken from the current location. This article focuses on the interfaces for food ordering, and after selecting the "Food" tile, the user moves to the interface tested in this work. Figure 5 shows the interface for food ordering in the Glovo app. At the top of the interface is a search box for a restaurant or product. Below there are icons with captions showing product categories, after clicking

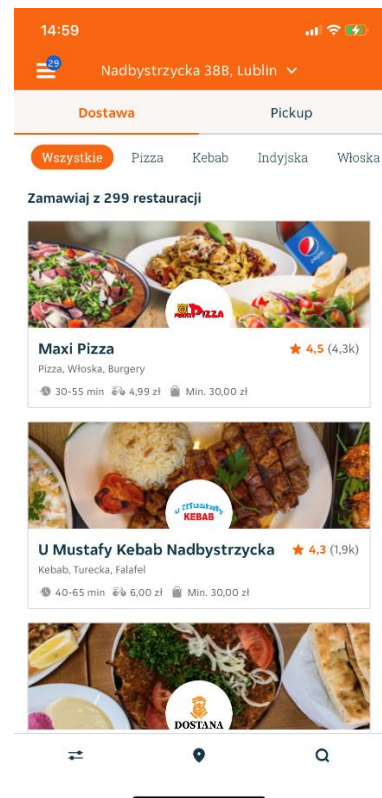


Figure 3: Main page of Pyszne mobile application interface.

which the user is presented with restaurants fulfilling orders that meet the requirements of the selected category. Below is a list of restaurants grouped into different collections - for example, as in Figure 5, the collections - "Best Nearby" and "Sales". In the upper right corner of the interface there is a switch that allows to choose the execution of the order - with delivery or pickup.



Figure 4: Main page of Glovo mobile application interface.

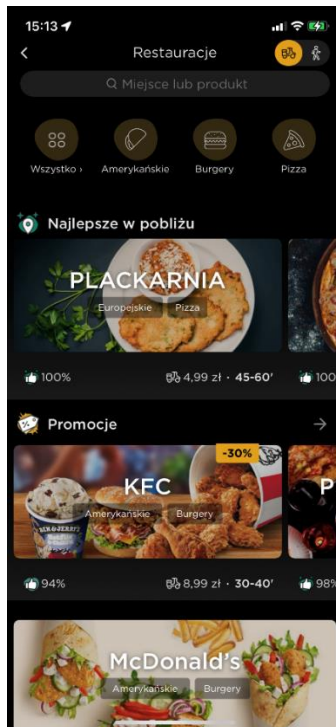


Figure 5: Restaurants list view of Glovo mobile application interface.

### 3.4. Joint overview

Online food ordering services via mobile applications, in addition to the obvious basic functionality, have additional possibilities, extending the main task of the service, enabling users to perform additional activities in relation to the details of the order, restaurant or encouraging the user to further orders through a system of loyalty programs. Testing the possibilities of the interfaces of the above-mentioned services were performed in mobile applications available on the iOS system, available in the AppStore. Table 1 presents the list of functionalities of selected mobile applications for food ordering.

The interface of each application allows user to choose the time of delivery, order pick-up type, online payment by card, payment on delivery, use of discount codes, tracking the supplier in real time, contact to the service staff after placing the order and tracking the status of the order. Each of the applications also allows for mobile payments in the BLIK system, however, in the Pyszne interface it is possible indirectly through the PayU internet payment operator. The Glovo application interface does not allow user to make payments with Apple Pay, unlike Pyszne and UberEats.

The tip for the courier is a phenomenon that can be realized directly upon received of the order, but each of the tested applications allows it to be sent via the Internet service. However, Glovo only allows this before placing the order - then the tip of customer choice is added to the cost of the order.

Other applications allow this after placing the order, allowing the user to decide depending on the time of delivery or whether the courier was pleasant.

Table 1: Summary of the interface capabilities of selected applications

Functionality	Pyszne	Glovo	UberEats
Delivery time selection	YES	YES	YES
Order pick-up type	YES	YES	YES
Card payment	YES	YES	YES
BLIK payment	YES	YES	YES
Apple Pay payment	YES	NO	YES
Cash on delivery	YES	YES	YES
Delivery without entering an address - "pin" on the map	NO	YES	PARTLY
Discount codes	YES	YES	YES
Gratuity to the courier	YES	PARTLY	YES
Loyalty program	YES	NO	PARTLY
Order personalization	YES	NO	YES
Message to the restaurant while ordering	PARTLY	PARTLY	PARTLY
Live provider tracking	YES	YES	YES
Contact the courier after placing the order	NO	YES	NO
Contact to the restaurant after placing the order	PARTLY	NO	YES
Contact for service after placing the order	YES	YES	YES
Order status tracking	YES	YES	YES

The loyalty program is not available in the Glovo interface. UberEats has such a program, however, only in selected restaurants and it cannot be combined with other eateries - the user can get a discount for a certain number of orders. Pyszne has the most developed loyalty program out of the three analyzed applications, also available in selected restaurants, however points obtained from orders from various restaurants sum up and can be exchanged for prizes.

Comparing the application capabilities, an examination was made of how the user can provide additional information regarding the order. Customization of the order is available at Pyszne and UberEats. There is no such functionality in the Glovo interface. It was also

checked whether it was possible to send a general message to the restaurant when placing the order. Pyszne and UberEats allow user to leave additional notes with each ordered meal and at the delivery address. Glovo allows to add information about user allergies. Neither of the interfaces allows general text information to be included in the order.

The contact after placing the order with the courier delivering the meal is only available in the Glovo app.

User can contact the restaurant executing the order directly from the UberEats interface. Pyszne allows to find phone number to restaurant, but not from the view of the order placed. Glovo does not have such capabilities.

#### 4. Research methodology

##### 4.1. Research environment

In order to start the research, it was necessary to prepare an appropriately configured research environment with locally installed applications that would allow the research to be carried out. The device used and the versions of the applications are presented in tables 2 and 3.

##### 4.2. Study group

The study group on which the study will be performed will consist of 24 people aged 20-26 who use mobile devices on a daily basis. Each test person has never used the selected application. The study will not be extended to more than one application on each of the test persons, as the experiences gained from the previous application could distort the test result. As a result, according to the A/B method, there will be 8 people for each tested interface.

##### 4.3. Research scenarios

A research group will be invited to perform the study and collect the results required to compare the performance and quality of interfaces of the selected applications.

Table 2: Research environment parameters

Name	Apple iPhone 11
Height	150.9mm
Width	75.7mm
Thickness	8.3mm
Weight	194g
Display	6.1-inch Multi-Touch LCD on the entire front surface of the device, made in IPS technology
Resolution	1792 x 828 pixels at 326 pixels per inch
Processor	A13 Bionic chip 6-core CPU with 2 performance cores and 4 energy-saving cores
Graphics processor	4-core GPU
RAM	4 GB
Storage	128 GB
Operating system	iOS 15.4.1

Table 3: Versions of the tested applications

App	Version
Pyszne	34.16.1
Glovo	7.38.0
UberEats	6.105.10003

People from the study group will carry out the study individually. In the study, a person from the study group will be asked to perform two tasks with the following content:

Task No. 1. "Please add a "Hawaiian pizza" or a replacement product from any restaurant to the cart."

Task No. 2. "Please find the price and show it to the person conducting the examination:

- A "Big Mac" product from a McDonald's restaurant
- The product "The Wołowino" from the restaurant "MOJO Kitchen & Friends"."

The tasks were arranged so that each restaurant was available in each tested application. Task No. 1 was considered as completed if the cart included a pizza with the ingredient pineapple.

During the execution of the tasks, the time of task completion will be measured by the examiner who will constantly control whether the task has been performed correctly. If the test person reports that the task has been completed and the examiner finds that the task has not been completed, appropriate information will be provided to the test subject and person will be asked to continue the task - the measured time does not stop until the task is completed correctly. After performing the above-mentioned activities, the respondents will be asked to complete a questionnaire which will be performed in the survey used the SUS method.

#### 5. SUS survey

SUS is a quick measurement of the usability of hardware, IT systems, websites and applications by means of a survey. SUS survey consists of 10 questions and a 5-point rating scale (based on the Likert scale) [7]:

1. I think that I would like to use this system frequently.
2. I found the system unnecessarily complex.
3. I thought the system was easy to use.
4. I think that I would need the support of a technical person to be able to use this system.
5. I found the various functions in this system were well integrated.
6. I thought there was too much inconsistency in this system.
7. I would imagine that most people would learn to use this system very quickly.
8. I found the system very cumbersome to use.
9. I felt very confident using the system.
10. I needed to learn a lot of things before I could get going with this system.

For questions 1, 3, 5, 7, 9, the following scores should be assigned [7]: strongly disagree = 0, rather

disagree = 1, have no opinion = 2, tend to agree = 3, and strongly agree = 4.

For questions 2, 4, 6, 8, 10 the score is as follows [7]: strongly disagree = 4, rather disagree = 3, have no opinion = 2, tend to agree = 1, and strongly agree = 0.

The points should be summed up and the obtained value multiplied by 2.5 [7].

**6. Results**

The research was conducted according to the methodology described in chapter 4. The results are presented in Tables 4-6 and Figures 6-8. Tables 4-6 show medians, averages and standard deviations of results. Box plots with a mustache were used to show the obtained results. The exceptions are the results showing the completion rate of the task by the study group presented in Table 7. On the basis of the collected results, the rho-Spearman correlation coefficient was also calculated between the times of the first and second tasks described in chapter 4.3

Table 4: Time of execution of the task No. 1

App	Median [s]	Average time [s]	Standard deviation [s]
Pyszne	23	24	8.95
Glovo	27	41.5	37.18
UberEats	74,5	74	29.61

Table 5: Time of execution of the task No. 2

App	Median [s]	Average time [s]	Standard deviation [s]
Pyszne	62	70	21.55
Glovo	62.5	64	20.40
UberEats	48.5	50	11.68

Table 6: The results of the SUS survey

App	Median [point]	Average [point]	Standard deviation [point]
Pyszne	72.5	67.5	16.35
Glovo	77.5	69.7	18.49
UberEats	86.25	78.125	17.26

The results of the SUS survey, which are presented in Figures 9, 10, 11, and Table 8.

Table 7: Task completion rate by the study group

App	Task No. 1 [%]	Task No. 2 [%]
Pyszne	100	89
Glovo	100	100
UberEats	100	100

Table 8: Rho-Spearman correlation coefficient between the times of the tasks and the results of the SUS survey and it's significance level

Task	rho-Spearman correlation	Significance level
Task No. 1	-0.014	0.951
Task No. 2	-0.317	0.14
Combined task No. 1 and task No. 2	-0.141	0.52

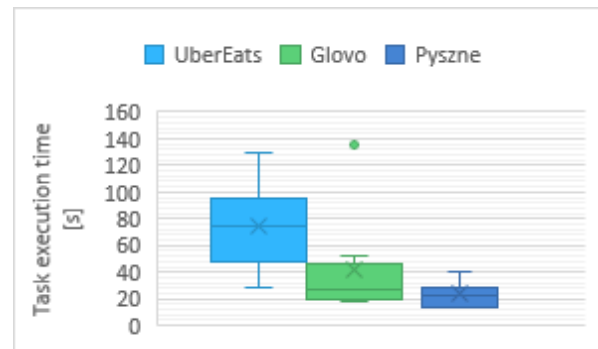


Figure 6: Summary of the research results for task No. 1. The mean values are shown with a X symbol, the horizontal line within the box represents the median, the top and bottom of the box is the 75th (Q3) and 25th (Q1) quartile respectively (interquartile range). The whiskers represent minimum and maximum values (excluding outliers), respectively, and the dots represent outliers.

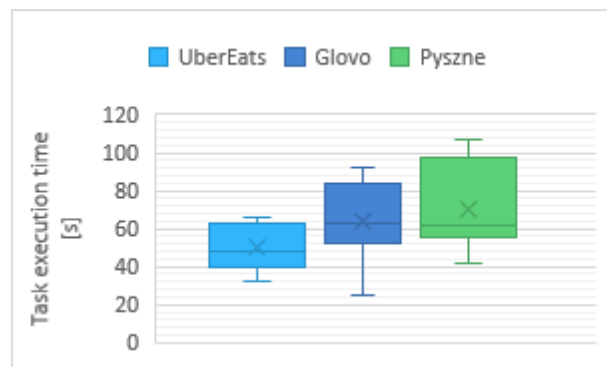


Figure 7: Summary of the research results for task No. 2. The mean values are shown with a X symbol, the horizontal line within the box represents the median, the top and bottom of the box is the 75th (Q3) and 25th (Q1) quartile respectively (interquartile range). The whiskers represent minimum and maximum values (excluding outliers), respectively, and the dots represent outliers.

**7. Research discussion**

In the research conducted with the use of three mobile applications for food ordering, it is not possible to clearly state which application interface is the most efficient. The selected tasks that the people from the study group were asked to do indicated different conclusions. Task No. 1 indicated that the most effective interface for finding one particular dish and adding it to the cart is in the Pyszne application with an average task completion of 24s.

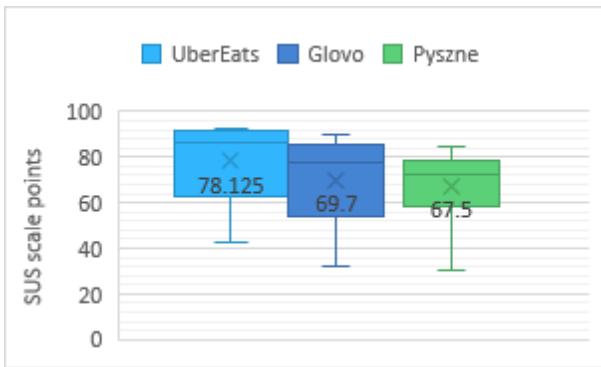


Figure 8: Summary of the results of the survey with the methodology of SUS (System Usability Scale). The mean values are shown with a X symbol, the horizontal line within the box represents the median, the top and bottom of the box is the 75th (Q3) and 25th (Q1) quartile respectively (interquartile range). The whiskers represent minimum and maximum values (excluding outliers), respectively, and the dots represent outliers.

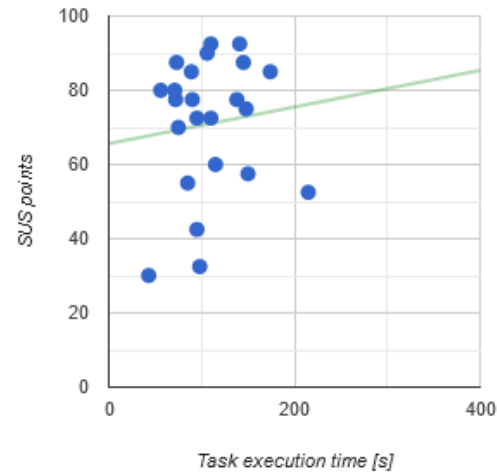


Figure 11: Rho-Spearman correlation coefficient between the combined execution times of task No. 1 and No. 2 and the results of the SUS survey.

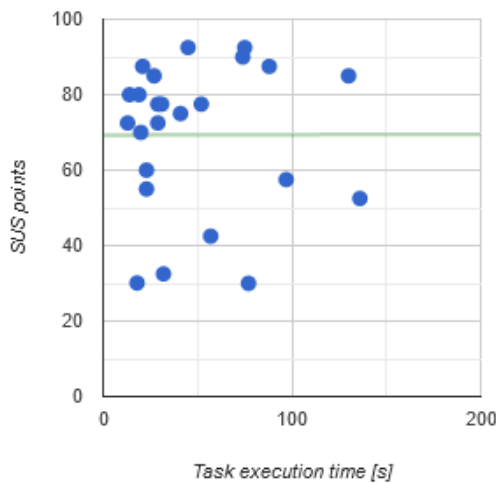


Figure 9: Rho-Spearman correlation coefficient between the execution times of task No. 1 and the results of the SUS survey.

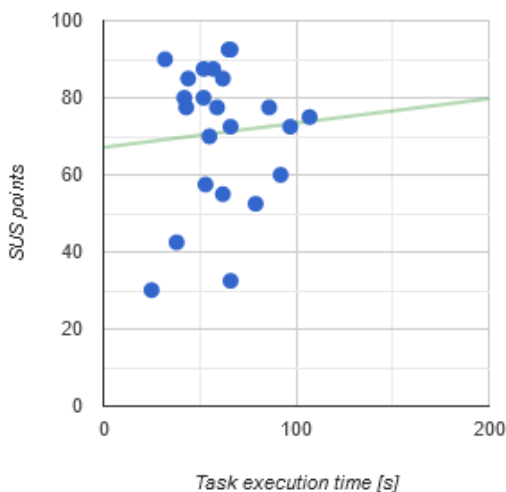


Figure 10: Rho-Spearman correlation coefficient between the execution times of task No. 2 and the results of the SUS survey.

The least effective interface in this task was the UberEats application interface with an average task completion time of 74 seconds, which is almost three times the value obtained for the Pyszne application interface. The times obtained in the Task No. 2 pointed to something completely different. In this task, the most effective interface turned out to be UberEats with the lowest average and median time needed to complete the task. Both Glovo and Pyszne had similar median times. Based on these studies, it can be concluded that the dependence of the effectiveness of the mobile application interface for food ordering is closely related to the type of action we want to achieve. Finding a specific meal from any restaurant is the most time-effective in Pyszne. However, if the user's goal is to find a specific dish from a specific restaurant, the most effective interface is the one in the UberEats application. During the research, the only repeated error in the implementation of tasks was searching for dishes or restaurants in the place where user should enter the address, in the interface of the Pyszne application, which is at the top of the interface. The place for searching for dishes or restaurants is located at the bottom of this interface and therefore it can be concluded that it is hardly visible.

The quality of the interfaces was tested using SUS surveys and it can be concluded from their results that the UberEats application interface is the interface of the highest quality for the user, while the interface of the Pyszne application has the lowest quality. The results of the SUS survey are similar for the Pyszne and Glovo interfaces, and the UberEats interface positively stands out from them. Based on the collected results, the hypothesis - "H2. The quality of the food ordering app interfaces varies significantly" can be rejected.

An important aspect of testing the quality of interfaces is also the degree of completion of the assigned tasks. Task No. 1 was completed by all people in each application. Tasks No. 2 could not be completed by one person working on the Pyszne UI, and the second task

completion rate for this app is approximately 89%. In the case the user did not complete the task in the Pyszne interface, he could not find a place to search for a dish and restaurant. Instead, he tried to enter values in the space intended for the delivery address.

Based on the analysis of the interface capabilities performed in chapter 3.4. it can be concluded that the posed hypothesis - "H1. Each of the interfaces of the tested applications allows to select the delivery time, type of receipt of the order, type of payment, and leave a tip for the courier " is confirmed.

In order to check the H3 hypothesis, correlation tests were performed using the rho-Pearson method. The obtained results, which are presented in Table 8 and in Figures 9, 10, and 11, show no correlation between the SUS survey results and the time of completing tasks for task No. 1 (correlation result equal to -0.014), but weak correlation for combined task times (correlation result equal to -0.317) and for task No. 2 (correlation result equal to -0.141). Based on these results, this hypothesis H3 is partially confirmed.

## 8. Conclusions

The adopted methodology, combining SUS and research with users, allowed to assess the quality of interfaces of the three most popular mobile applications for ordering food. As a result of research, it has been proven that the quality of food ordering application interfaces is not significantly different, as is their functionality.

The correlation hypothesis "H3 The quality of interfaces among users does not affect its performance" requires further research.

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