Mobile Application for Gas Prices and Locations Inquiry in Manaus Amazonas

Bruno Pereira Gonçalves;Bruno Lopes Rios;Keneson Liniker Farias de Abreu;Jean Mark Lobo de Oliveira;David Barbosa de Alencar

Abstract

The original features the prototype of an application that allows drivers to locate and compare fuel prices in the city of Manaus. Regarding the applied methodology approaches, this research is quantitative, field, survey and applied. It uses data and statistics from national surveys with population indices. It also brings data from an online questionnaire to measure drivers' opinions and information about the context of Manaus in relation to the stations. After analysis, it is noted that the application that helps drivers is not only necessary in a city with more and more vehicles as well accepted by potential users.

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Abstract

The original features the prototype of an application that allows drivers to locate and compare fuel prices in the city of Manaus. Regarding the applied methodology approaches, this research is quantitative, field, survey and applied. It uses data and statistics from national surveys with population indices. It also brings data from an online questionnaire to measure drivers' opinions and information about the context of Manaus in relation to the stations. After analysis, it is noted that the application that helps drivers is not only necessary in a city with more and more vehicles as well accepted by potential users.

Keywords: Gas stations; Prototype; Mobile app;

1. Introduction

The Amazon vehicle fleet grows every year, especially in the capital, Manaus. The state has 62 municipalities in an approximate area of 1,559,146,876 km², with an estimated population of 4,144,597 inhabitants, of which 2.18 million in Manaus alone (IBGE, 2019). In possession of this population there is a fleet of 883,083 vehicles, of which 718,205 circulate in the capital of Amazonas (IBGE, 2018).

Vehicles circulating in Manaus grew 6.7% in two years, from 668 thousand in January 2015 to 713 thousand in March 2017. A total of 45 thousand new vehicles started to run on the city streets during this period. The data are from the Amazonas State Performance Indicators (Idea), released by the State Government in the first quarter of 2017. Manaus closes 2016 with almost 300 gas stations in operation. The number, according to the Fuel Union (Sindicam), is considered exorbitant and beyond what is necessary for the capital. According to the National Agency of Petroleum, Natural Gas and Biofuel (ANP), many drivers try to search for the lowest price that suits you.

According to statistics, with this increase, the number of stations tends to multiply and, consequently, the price of gasoline will always be fluctuating from one establishment to another. Many consumers have no idea where they will be supplying because they do not know where the price is most affordable, as they only come across values when they arrive. Because of this, the customer supplies the vehicle without knowing that later there may be a station that covers cheaper by the product.

However, the technological advance with smartphones may be a way out of the question. In recent years, there has been an increase in the number of mobile devices. According to the 30th annual survey of the Applied Information Technology Center of the Getulio Vargas Foundation School of Business Administration of São Paulo (FGV-EAESP) of 2019, there are 230 million smart phones in use in Brazil. Adding notebooks and tablets are 324 million handheld devices as of May 2019, ie 1.6 handheld device per inhabitant.

As a result, the smart phone application development market expands. Due to the large number of smartphone users and the growing number of vehicles, an app market is created for this audience that needs to be served.

In this work, a prototype for mobile devices will be created to help consumers research and compare the prices of the cheapest gas stations. The prototype will collect data from the app's users, such as model and make of vehicles. Later, the data can be sold to parts dealers in the region to let them know which car models are prevalent in the capital.

2. Methods

The research adopted in this work, regarding the approach, is classified as quantitative, based on data and statistics of national surveys with population, vehicle and mobile phone usage, accessed through the site. It also brings quantitative data from its own research to measure the opinions of drivers and information about the context of Manaus in relation to the stations. The collection of material in this survey was performed through an online questionnaire.

Regarding the procedures employed, this is a case study research, as it involved obtaining data through consultation with sources other than websites and articles, that is, the drivers who responded to the form in order to know which their opinion about the prototype developed in this work. Still within the procedures, it can be said that it is also a quantitative survey, as it used a questionnaire to conduct a survey of a specific audience, a census of drivers, in which the information gathered was in turn grouped into graphs that allowed an analysis. statistics on the subject.

As for nature, research is applied as it seeks to solve a specific problem. In this case, the problem is the

difficulty that drivers find to find places to supply with cheaper prices, the practical issue that precisely the application wants to solve. In this sense, the research is classified as descriptive objectives, because it seeks to describe a fact of a certain reality, in this case, the problems that drivers from Manaus have to locate nearby and affordable values.

The application will have two versions, one for the owners of the posts and one for customers. It will be updated by the owner of the establishment to maintain the integrity of the amount charged, as users will not be able to constantly monitor fuel price increases at the pumps. The geographic area contemplated will be Manaus, as it concentrates the largest amount of vehicles, besides the time and financial limitations of those involved to consider other municipalities besides the capital.

3. Materials

A prototype has been developed to work on the Android operating system (Google OS for smartphones) using the Android Studio development environment (V 3.4.1) to make the application for that system. The IDE (Integrated Development Environment) is where the application was created and the programming language used was Java (JDK 13.0.1). The Mysql Server manager (V 8.0.18) was used as a tool to edit and query the database.

The public consultation form was made using Google's own Google Forms tool for creating forms. The questionnaire was shared via link or via a QR Code.

4. Results

4.1. Application Health

The application created was developed to present a simple and intuitive interface, for easy access for drivers of all ages. It works as follows:
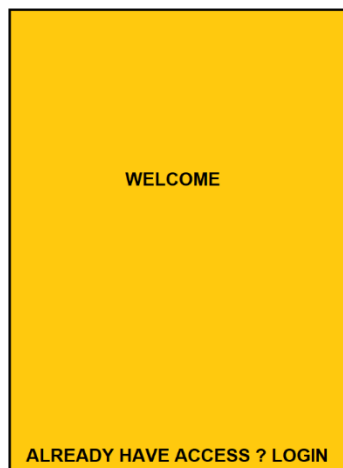

Figure 1 - First Login Screen
Source: Reproduction

When the user clicks where they already have access, they will be directed to a small blank window under the login screen.
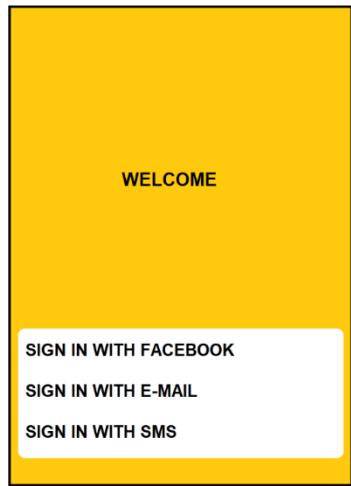
Figure 2 - Second Login Screen

Source: Reproduction

In this screen the user will be presented with three ways to login:

Through Facebook;

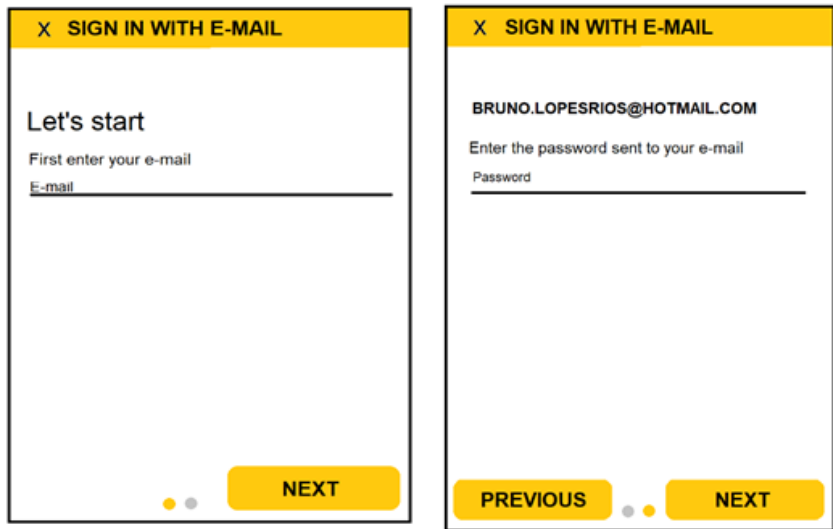Through the email;

Via SMS (mobile number).

Figure 3 - Email Login Screen

Source: Reproduction

By entering the email and clicking the forward button, the application will verify that the email is registered. If not, a password will be sent to the email address entered, as shown in figure 3.
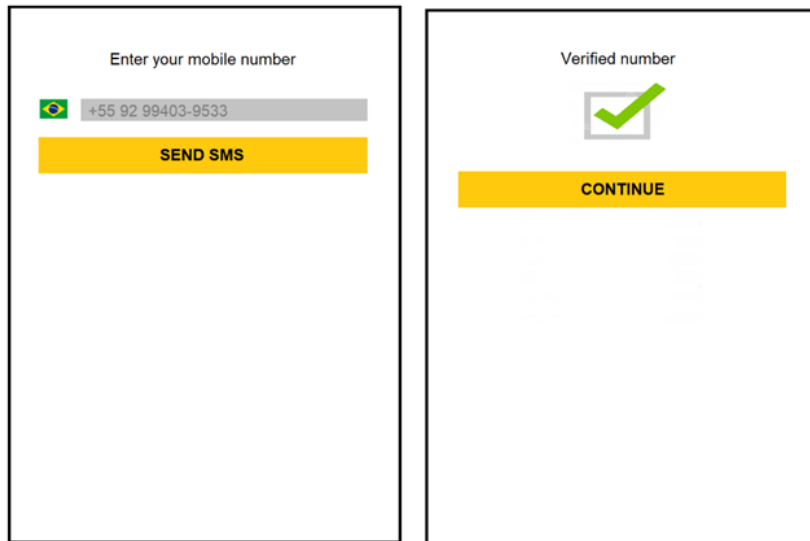
Figure 4 - SMS Login Screen

Source: Reproduction

In this screen, the user will enter his mobile number, through which the application will send an access code to it, automatically identify and will be logged in.
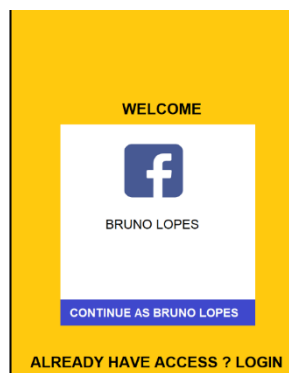
Figure 5 - Login screen via Facebook

Source: Reproduction

In this screen, the user logs in via Facebook, where the application will open the social network on the smartphone in the account that is in use. This will be automatically linked to the post app.
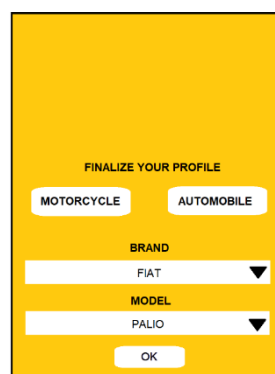

Figure 6 - Registration Screen

Source: Reproduction

The registration screen will be displayed at the first login of the user. The following information will be registered:
• Name;
• Type of vehicle (motorcycle or car);
• Brand (the driver will only need to select one of the brands presented, which will already be pre-registered);
• Model (the driver will only select one of the models, which will be pre-registered);
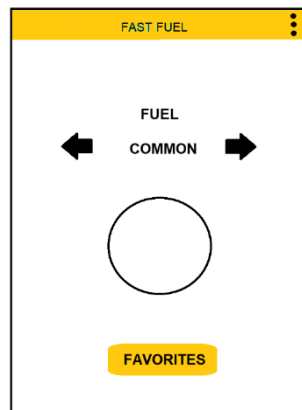• Ok - finalizes the registration.

Figure 7 - Application Home Screen
Source: Reproduction

This is the app's home screen where:
• In the arrows the driver chooses the type of fuel (ordinary gasoline, additive, ethanol, diesel and etc.)
• The circle represents the app icon, which is still in the process of elaboration, and the same will be the search button that will show the nearest posts of the user;
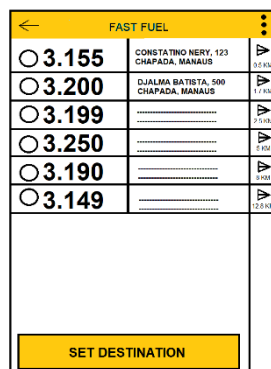• Favorites is the button that will bring the properties listed as main by the user.

Figure 8 - Search Screen
Source: Reproduction

This screen appears after selecting the fuel and clicking the search button. In it are all the nearest stations of the driver, showing address, distance and fuel value. Just the user presses the desired station, a window

of the station will open containing the information of fuels sold along with address.

With the yellow button the driver will be able to set a route and the app will show the best-priced stations on the route.
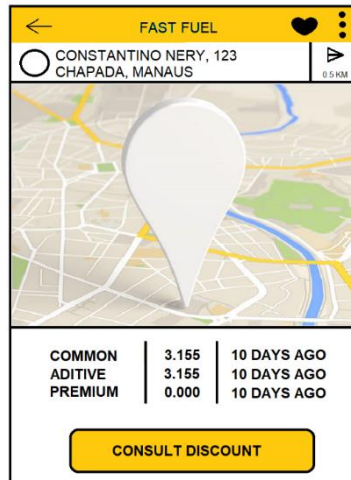

Figure 9 - Screen displaying the selected post in the search screen

Source: Reproduction

This screen shows about the rank and available fuel prices. In the images (MAPS) will be shown the location of the post on the map, and clicking on it, the app will open the map application on the user's mobile phone, playing the location of the post and tracing the route from where the driver is to the establishment. The button "consult discount" will only be visible if the post offers discount when filling with this application. In the top menu there is a heart, which allows you to save the post as a favorite.
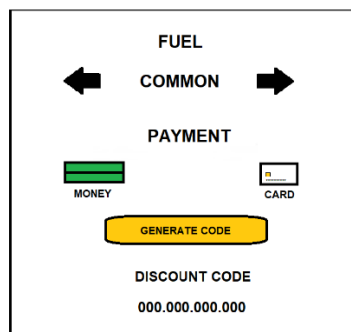

Figure 10 - If available, the discount will open this small window.

Source: Reproduction

In it the driver selects the fuel type, making the change of fuel by the black arrows; choose the type of payment (cash or card); presses the yellow button, where a code will be generated, which the user will show to the attendant when filling up.
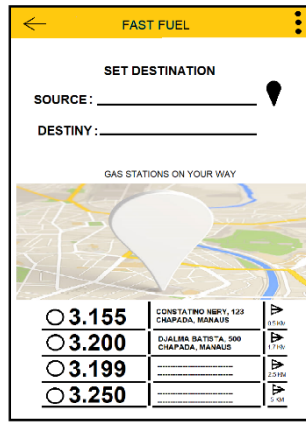
Figure 11 - Route Screen

Source: Reproduction

• In 'Origin' the driver enters the starting address or presses the adjacent black image, which will identify the location by the mobile phone;

• In 'Destination' is placed the end point of the route;

• In the image (MAPS) the app will show various stations that will be on or near the route;

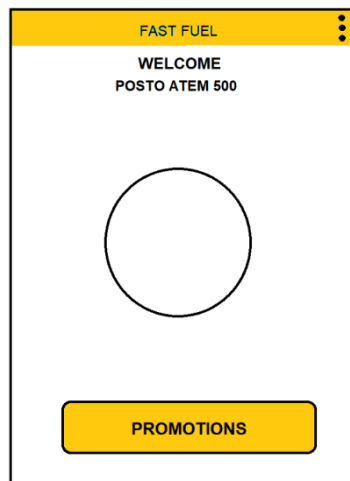• Below the image (MAPS) will be displayed a list of rank on the route with the best prices.

Figure 12 - Home screen of homeowner app

Source: Reproduction

• It shows the name of the station;

• The round image is where will be the brand of the establishment, which clicked will show the window with prices and option of editing them;
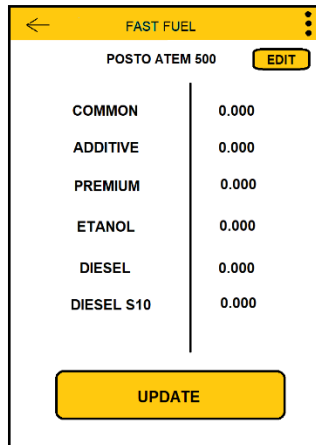
• Also contains the 'Promotions' button.

Figure 13 - Pricing Screen

Source: Reproduction

Shows all types of fuel and their prices.

Pressing the edit button enables the field where prices can be changed. Also enables the refresh button, which saves the changes.
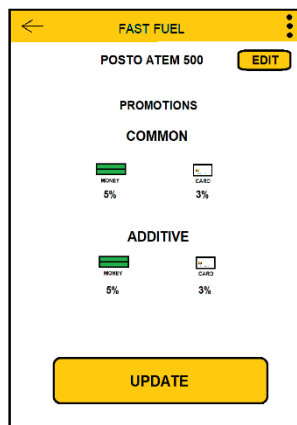

Figure 14 - Promotions screen for the post owner

Source: Reproduction

In this screen will be displayed all fuels that the owner can offer discount or not, putting the percentage of discount that will be given. Press By clicking edit the owner can put the% off and then, pressing update, the changes are saved.

4.2 Audience Survey

The questionnaire was applied to drivers with National Driver's License (CNH) types A, B, C, D and E in Manaus. The questions designed for the driver aim to draw a profile of the people interviewed and to know the public opinion about the application in question. The procedure performed for data collection was applied by an online questionnaire with 11 questions in Google Forms.

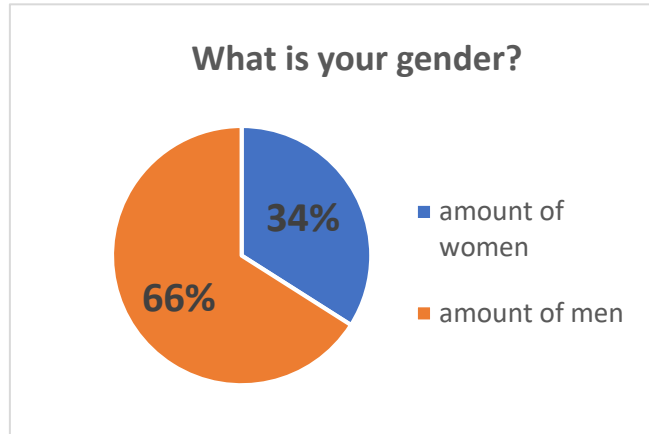In total, 101 people participated in the survey, 65.3% men and 34.7% women.

Figure 18 - Percentage of Audience Participation

Source: Reproduction

The age range of the public is varied, being well distributed between 18 and 60 years, although the largest amount is concentrated in the range between 22 and 45 years.
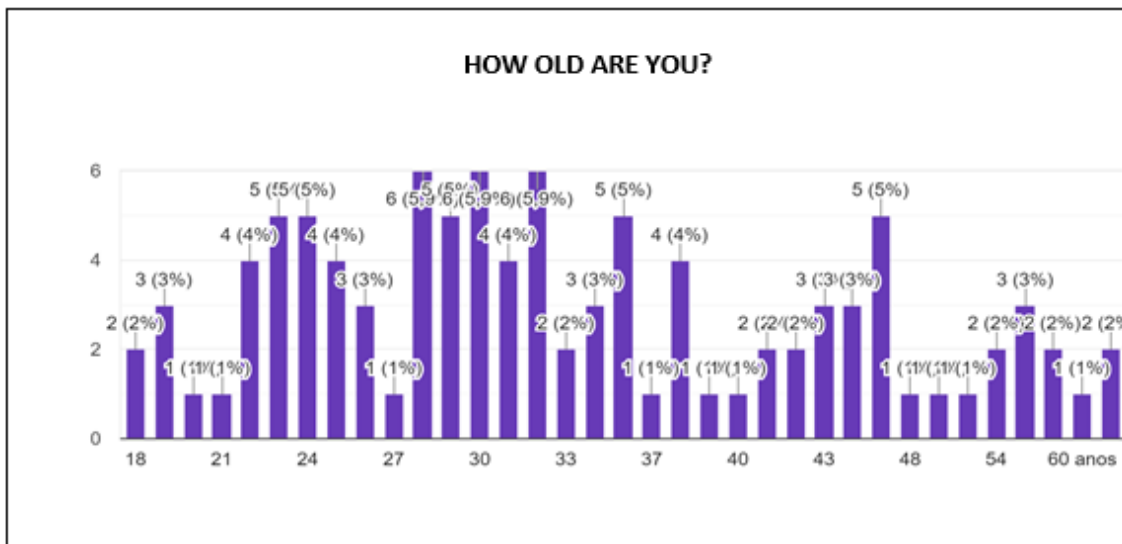

Figure 19 - Age range of survey audience

Source: Reproduction

Most participants have CNH B (57.4%) and A (45.5%). Already the number of people who do not have a portfolio and participated is greater than the sum of those with qualifications C, D and E, as shown in the graph.
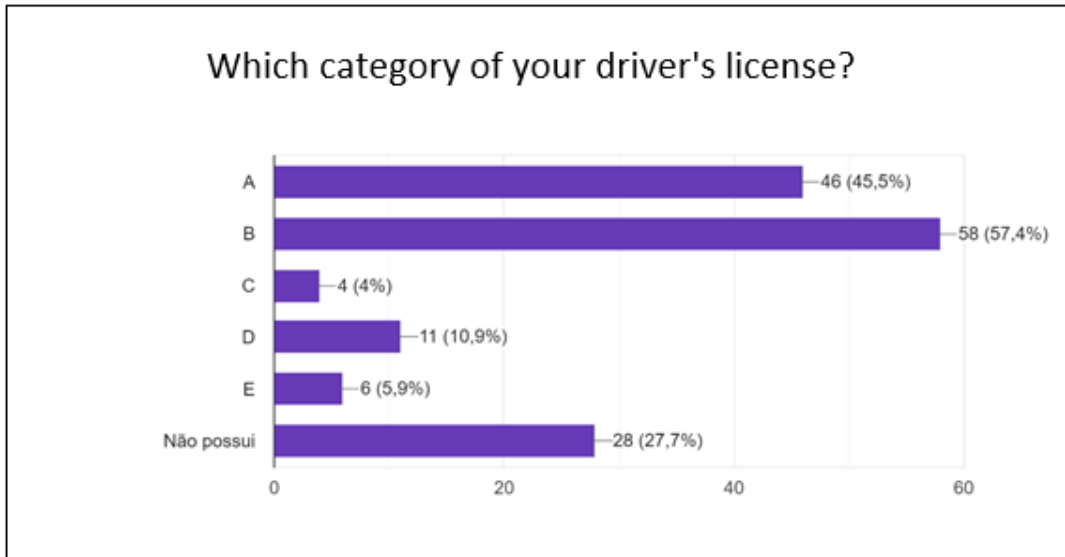
Figure 20 - Number of drivers in each type of driver

Source: Reproduction

An important data raised is the percentage of people who use smartphones, a percentage of 94.1%, a relevant factor considering that this tool is important for application use.
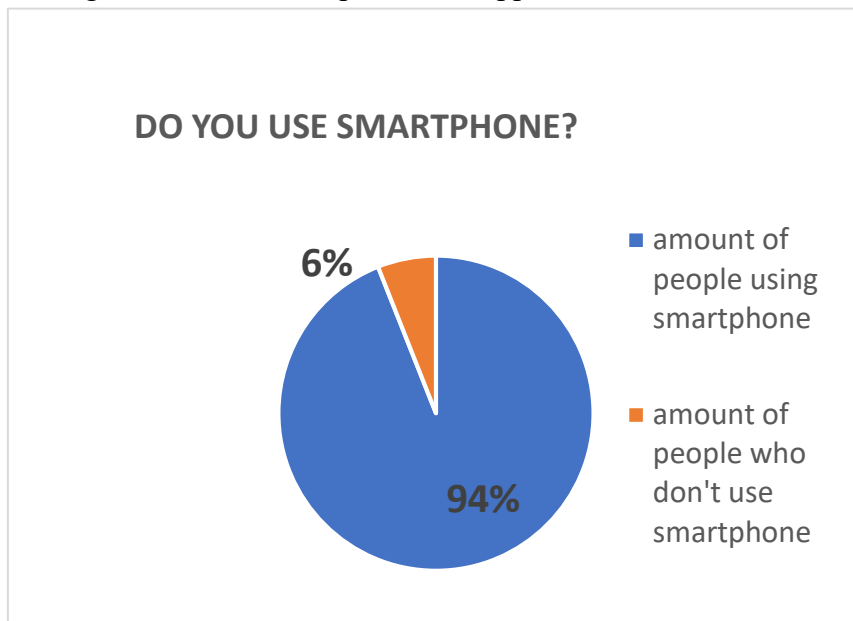

Figure 21 - Most audiences use smartphones

Source: Reproduction

In a second moment of the research, questions were presented for participants to express their opinion about the situation in Manaus regarding the supply at local stations. Regarding the price of fuels, the dissatisfaction rate is high, 63.4% consider the values charged terrible. No participant rated the prices as good or great, as the chart indicates.

What do you think about the price of fuels?

0% 0% 6%

31%

63%

- great
- good
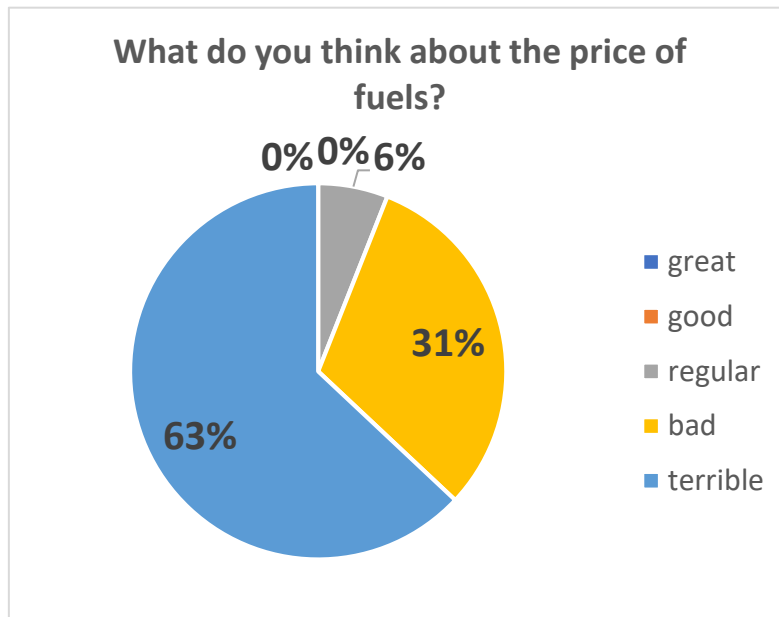- regular
- bad
- terrible

Figure 22 - Most public disapproves of fuel prices

Source: Reproduction

Of the 101 people, 70.3% consider it difficult to access gas stations that cover affordable prices. Only 7.9% said they had no difficulty finding budget-priced establishments.

Do you have difficulty finding affordable gas stations in your area?

23%

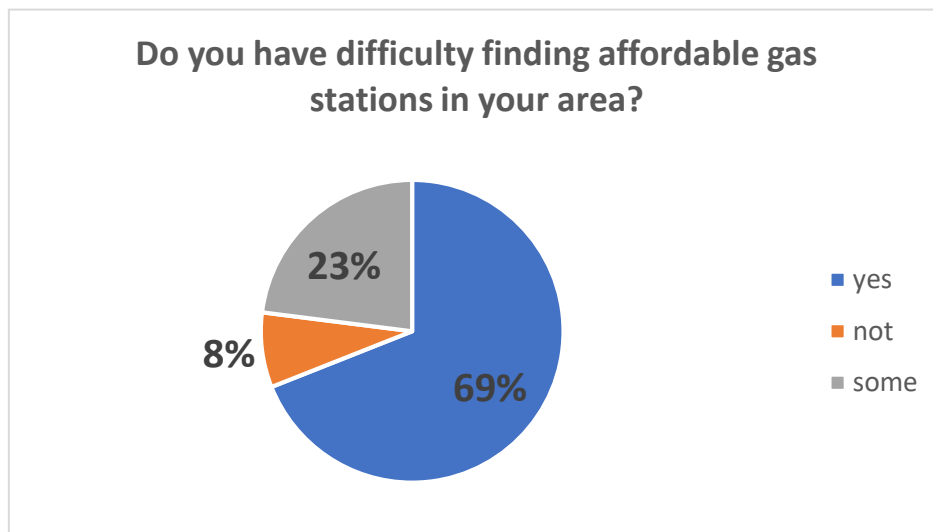8%

69%

- yes
- not
- some

Figure 23 - Most cannot easily find good-priced jobs

Source: Reproduction

Based on this, the majority of the public states that they would like to receive information from other drivers about outlets in Manaus (90.1%) and to be notified about promotions at the stations (95%), as shown in the following graphs.
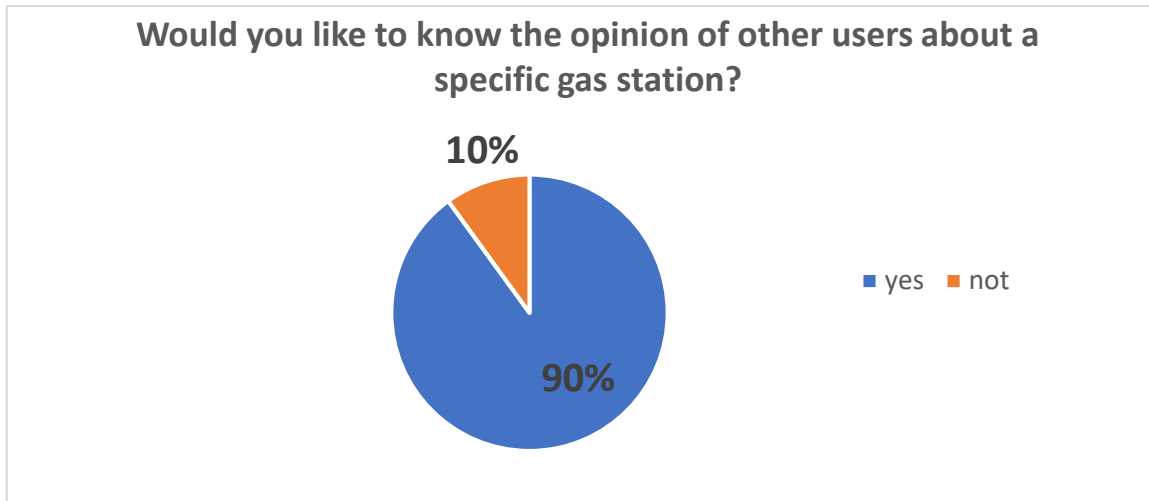
Figure 24 - Opinion on driver's exchange of ideas

Source: Reproduction

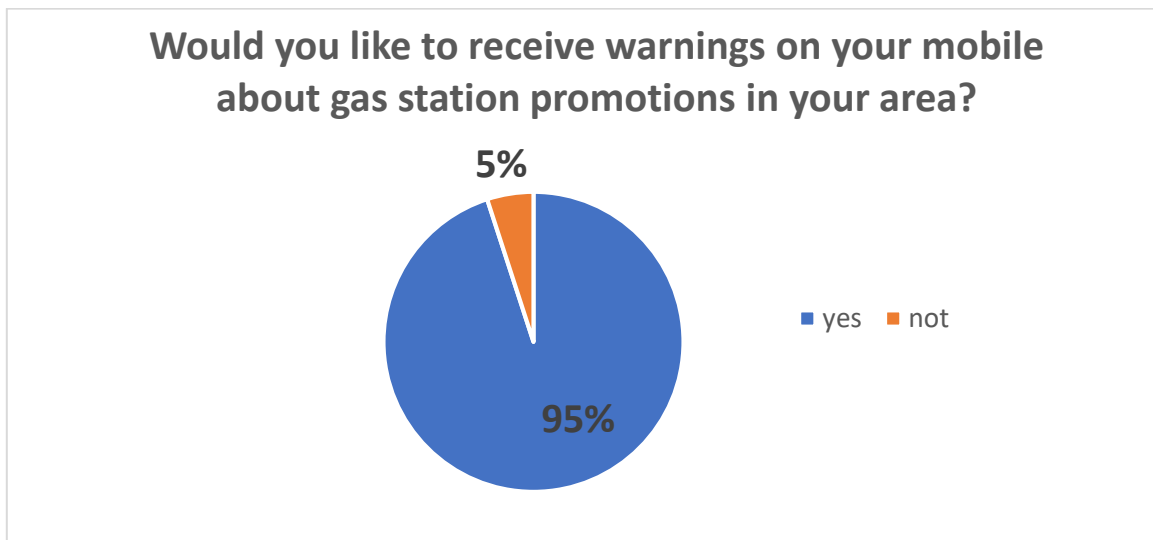Figure 25 - Opinion on promotion sharing via mobile

Source: Reproduction

In order to know about the acceptance of the prototype by the potential users, a scale of optimal, good, fair, bad and very bad was made about the idea of the application to measure the possibility of using the developed prototype. It is possible to observe that the public concentrated the answers in excellent (76.2%) and good (23.8%).

What do you think about having an app to query and compare the price of fuel?

0% 0% 0%

21%

79%

- great
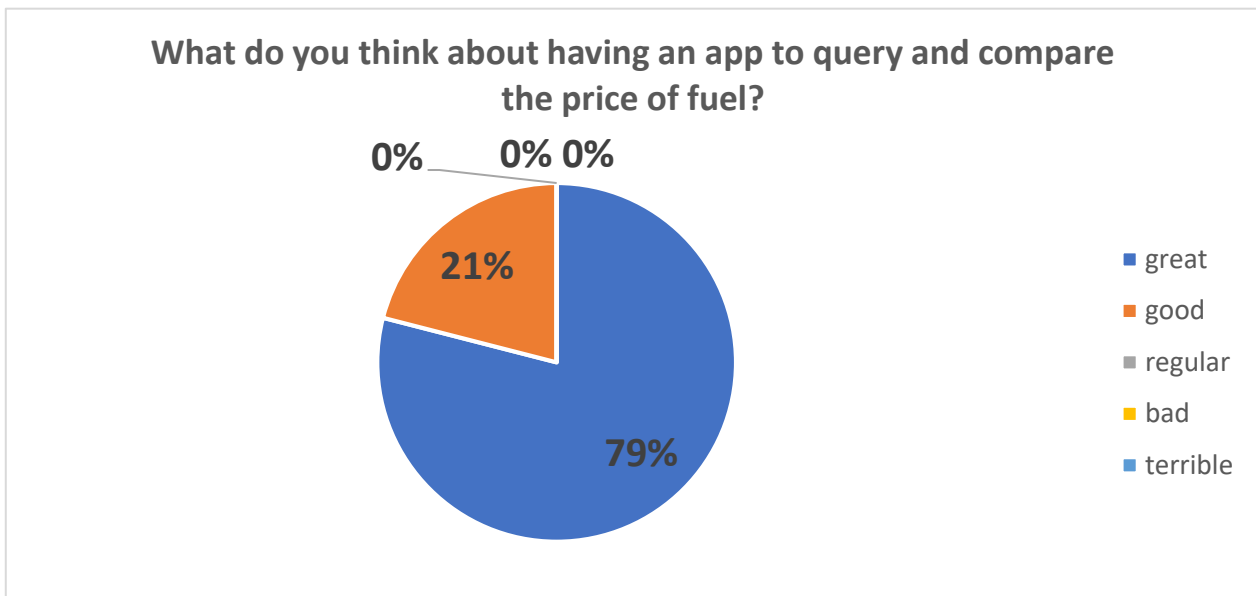- good
- regular
- bad
- terrible

Figure 26 - Application reception by audience is positive

Source: Reproduction

5. Discussion

After conducting a survey on the situation of Manaus in relation to the number of vehicles and stations and analyzing the answers obtained through the online questionnaire, it is observed that the idea of launching an application that helps drivers is not only necessary but well accepted by the possible ones. users.

As stated, 63.4% of respondents think the prices charged for fuel and 30.7% bad. Of the 101 people who participated, 70.3% consider it difficult to access gas stations that cover affordable prices. There is high dissatisfaction among the population regarding this service. On the other hand, 90.1% of the public stated that they would like to receive information from other drivers about establishments that supply in Manaus and 95% would like to be notified about promotions at the stations. Considering that 94.1% use smartphone and the varied age of the audience, so most are able to have the app.

Based on the audience's opinion of the questionnaire, application acceptance is positive. On an optimum to very poor scale of the app idea, most responses were great (76.2%) and good (23.8%), with zero for fair, poor, and very poor. This indicates that there will be people interested in using the application, which will have a relevant practical utility to meet a need that is part of the daily life of the population.

6. Conclusion

With rising fuel prices, especially gasoline, and more cars and other types of vehicles on the city's streets, people are looking for places where they can fuel so as not to escape the monthly budget. However, as they have no place to consult prices on a unified basis, drivers often choose to pay for the product from the nearest place or on their way to work, for example.

With an app, that can change. Quickly, the user can check the values and location of where to go to supply, and this safely, since the data will come directly from the administration of the establishment. On the other hand, entrepreneurs can also benefit. The owner can simply attract customers by entering promotions in

the form of discounts, as shown earlier on the screen where will be displayed all fuels that the owner can offer discount or not, by entering the percentage of discount that will be given.

The simple and accessible application interface available for Android and IOS systems may not be a way to solve the fuel price problem, as this involves government issues, but it can make life easier for drivers on a daily basis.

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