# MobKas, Decision Tools for Purchasing Used Vehicle

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**Abstract**. The government tax policy about Tax Amnesty and progressive tax for vehicle owner culminating the escalation of used vehicle market. Purchasing used vehicle in Indonesia is not that simple since approximately more than 20 criteria needed to be taken as consideration. Prospective buyers confront challenging task to decide used vehicle that best suits their criteria. MobKas (stands for Mobil Bekas (used car)), web based decision tool for purchasing used vehicle was developed to overcome this problem. This application will support potential buyers to minimize the number of options that need to be considered when purchasing used vehicle based on selected criteria. MobKas application has been tested by a group of prospective buyers and 80% of them stated that this application has proven successful assisted prospective buyers when purchasing used vehicle.

## 1. Introduction

Cars and motorcycles are kind of land transportation that favorable assisting humans in daily activities. Land transportation control substantial aspect in the success of national development in the economic, social, cultural, political, defense and security [1][13]. For instance, in the economics sector, transportation serves as the infrastructure to distribute people and/or goods, infrastructure spur regional economic growth, and the infrastructure that supports trade to other economic sectors [1]. Indonesia transportation contribute significantly in developing sovereign, independent, and mutual aid country as the vision of the 7th President of the Republic of Indonesia [13].

According to the data [12] on average 20% to 50% of public transportation in various regions in Indonesia is not feasible to use based on safety and comfort. In terms of amenity, most of public transport passenger are not satisfied due to the waiting time and traveling time, additionally public transport are often crowded with passengers [11]. In terms of safety, mostly public transportation is in poor condition and not feasible to accommodating passenger. In addition, the speeding driver's habits to get more passengers are threatening the safety of passengers [11]. This directly afflicted people preferences to use private vehicles, either cars or motorcycle [14][20][9]. According to [16], transportation expert stated that public transport operating in the capital city solitary is only around 40%, the rest is private vehicles. This data sustained by Jakarta Bureau of Statistics agency (BPS) that exhibit about 70% of the capital's residents prefer to use public transport compared to private vehicles [4]. While in Surabaya (2nd biggest city in Indonesia), the ratio comparison between public transport and private vehicles passenger is 1:27. Private cars owner is around 60.48% and motorcycles around 22.35% [18].

Weakened economic conditions in Indonesia lead in increased demand for used cars [19][2]. Mobil88 used car sales in the period January to April 2015 increased by 15%, while online sales of

used cars at one of the dealers in Jakarta increased by 30% in 2015 [19][2]. One of the reasons people prefer used cars than new cars is the price issue [19][2]. Used car prices are considered more rational than the new car, but the selection of used cars need more criteria to consider than a new car [2]. It is necessary to avoid disappointment while purchasing used car because buyer must consider several aspects such as body condition defects, machine defects, or worn car components. Additionally, the government policy about tax amnesty and progressive tax for vehicle owner triggering alternative trend of purchasing used vehicle.

Deciding suitable used car by visiting every seller is inefficient related to the number of seller, especially in Surabaya city. Additionally, visiting every used car seller does not necessarily yield satisfactory results; in a short time, a lot of energy, time, and costs beyond the price of the car itself. Not to mention, broad criteria that need to be considered, often makes people confront challenging options to determine the right choice[5][7]. Information obtained through the print media, friends advice, relatives advice, or sellers increase the pool of decision and occasionally contradict one another. Therefore, application that capable to support potential buyer by minimizing the number of options that need to be considered in accordance with the criteria is essential and crucial[3][6].

Kaewman et al have been conducted a research about the usage of K-Nearest Neighbour method to help selecting used car on online basis. Criteria used are vehicle type, brand, model, year, size, price and type of engine [10]. The result of this research showed that (DSS) present highly effective and sustainable tools for searching vehicle [10].

Related research also conducted by Hamdhani et al and Pardede et al. On Rizal's research, several criteria used are: documents, engine, interior, exterior, and year [8]. Whereas on Pardede's research used less number of criteria which are car category, buyer budget, passenger capacity, and fuel capacity [15]. Moreover Pardede'sresearch are likely directed to help sales on marketing new car from only one brand which is Toyota. The outcome from this research indicated that the application successfully assisting sales on car marketing, and also helping prospective buyer to decide their best car among available option with less time [15].

In real condition on current growth of automotive world, there are lots of other and new criteria that must be considered on choosing used car. Current research only provides limited criteria, globally, and impractical to add additional criteria. On account of this condition, an application was developed. An application provided lots of criteria that could be utilized by user as their consideration when purchasing used car and new criterias could be added later based on user suggestion.

## 2. Data Analysis

First step in this research is to determine the criteria that will be used to decide in purchasing used car. Three types of surveys were conducted by observing used ads/exchanges in the newspaper, observing used car sales ads and examining guides for selecting used car via the Internet, and finally administrate discussion with the realtor and some prospective buyers.

Observations conducted on used car sales ads in the newspapers were randomized to 50 advertisements published by JawaPos in December 2015. At the same time the observations also conducted on some internet sites that sell used cars (olx.co.id, mobil123. com, warungmobil.com, and otosia.com) and websites that provide purchasing guide for used cars. Information displayed by used car salesman in newspapers and the Internet is used as a material analysis to determine the search criteria. Detail survey of the newspaper could be examined in Table 1. Details of the survey results of four different webs could be examined in Table 2. Fuel Information, the amount of car tax, and car specification are information that rarely appears. While the additional information that appears most is the possibility of the negotiable price, credit, trade, and tax month. Based on data collected from few website there are additional criteria to consider when purchasing used car: purpose (e.g. for business, family, transportation of goods), type of use (e.g. city car, SUV (Sport Utility Vehicle), MPV (Multi Purpose Vehicle), and the number of passengers. All of these additional criteria is already represented by the criteria of the type of car.

**Table 1.** Newspaper Survey Result[a]

| Information (*Basic*) | Number of respondents | Information (*Basic*) | Number of respondents |
|---|---|---|---|
| Car build year | 45 | Accessories (e.g.. Audio, TV) | 8 |
| Car brand (e.g. Xenia, Avanza) | 50 | Area Code License Plate | 7 |
| Car types | 37 | Secondhand count | 8 |
| CC | 7 | Price | 28 |
| Mileage | 10 | Additional Information (e.g. negotiable option) | 38 |
| Transmission | 25 | Seller information (e.g. contact number) | 50 |
| Color | 35 | Car Condition | 26 |

[a] Source: JawaPos Newspaper, published on December 14 and 19 2015.

**Table 2.** Used Car Online Store Result[a].

| Information | Frequency | | | |
|---|---|---|---|---|
| | Otosia | WarungMobil | Mobil123 | OLX |
| Car build year | 15 | 15 | 15 | 15 |
| Car brand | 15 | 15 | 15 | 15 |
| Car types | 15 | 13 | 14 | 12 |
| CC | 15 | 12 | 15 | 4 |
| Mileage | 7 | 14 | 12 | 8 |
| Transmission | 15 | 12 | 15 | 15 |
| Color | 13 | 15 | 15 | 15 |
| Body Condition | 4 | 12 | 12 | 8 |
| Machine Condition | 3 | 5 | 9 | 9 |
| Accessories (e.g. Audio, TV) | 3 | 14 | 10 | 10 |
| Fuel | 1 | 1 | 14 | 0 |
| Area Code License Plate | 10 | 15 | 15 | 8 |
| Secondhand count | 3 | 15 | 2 | 6 |
| Price | 14 | 15 | 14 | 15 |
| Additional Information | 9 | 15 | 15 | 14 |
| Completeness of letter | 3 | 2 | 1 | 6 |
| Tax rate | 0 | 4 | 0 | 0 |
| Seller information | 15 | 15 | 15 | 15 |
| Photo | 15 | 14 | 15 | 15 |
| Car Specifications (e.g. number of doors, passenger capacity) | 0 | 0 | 15 | 0 |

[a] Source: olx.co.id, mobil123.com, warungmobil.com, otosia.com data collected on January 14, 15, and 18 2016.

A used car broker stated that the most important things to consider when buying a used car are the physical condition and the condition of the engine from the car. This is because the physical condition and the condition of the machine affect the maintenance cost and the selling price. In order to make the data on the physical condition and the engine of the car accurately as possible, then the prospective buyer needs to have the knowledge and thoroughness when checking directly and when test driving the car. Another thing to consider is the car brand, type, transmission, color, car build year, completeness letter (BPKB, sales invoices, vehicle registration), and price. While the results of an interview session with twelve respondents who are looking for used cars stated that the respondents usually determine car brand and the type of car to buy. In the process of searching the car, respondents

using the criteria of car type, price, car's build year, mileage, area code licensing plate, automobile fittings (accessories), fuel consumption, and resale price. In addition, two of the respondents who are knowledgeable about cars, tend to do the checking and trying directly to ensure the physical condition, the condition of the car engine to be purchased, and the character of the car. The character of the car is believed to affect the condition of the car. Both of these respondents state that as much as possible to purchase a car directly from an individual because car from a broker or dealer usually undergo some makeover. While respondents that do not have knowledge about cars tend to purchase used car from a dealer because of the huge options available.

Based on the analysis it could be concluded that the direct examination yield more satisfactory results. Nevertheless this is generally not viable, especially to potential buyers who do not have adequate knowledge about the details of the car specifications. In addition, the direct search takes time, effort, and tiny cost because they must have to approach each seller. To overcome this, current research focusing on developing application that can help prospective used car buyers to make a preliminary selection. The criteria used in this study are: the purpose of purchasing car, car build year, area code license plate, car brand, type, transmission, color, price, physical condition / body, engine condition, cc, mileage, second hand count, completeness letter (BPKB , Invoicing sales, vehicle registration), accessories, payment (credit / cash / trade), fuel consumption, the resale price and the type of seller (broker / dealer / individual). Some information such as: the character of the car and photos could not be used as search criteria because it needs to be done directly. Although the car picture is not used as a criterion, this picture is kept stored as one of the data that can be viewed by prospective buyers. This is expected to convince buyer after seeing pictures of cars from a variety of positions.

## 3. Result and Discussion

Applications planned to handle four different users: prospective buyers/visitors, members, vendors, and admin. Prospective buyer/visitors could read the articles about the car, observe the car for sale list, examine at the list of car dealers, and search for cars based on certain criteria. Member, have same benefit with prospective buyer as well, and in addition, could submit articles or leave comment related to the article, the seller, and the listed car. In order to become a member, prospective buyers/visitors must register in advance. Someone who wants to sell the car must first register as a seller. After admin verified the data, new sellers could register the cars to the application. Admin here is user with highest role and able to administer anything related with the application. Admin job are input list of criteria for searching feature; input new articles and organize articles that appear on web page; perform verification of prospective buyers/visitors and prospective seller; verification of new articles sent in by member/sellers; disabling member, cars sold, and seller.

Homepage of the application can be seen on Figure 1 [17]. Prospective buyers/visitors can see list of cars that are sold or access desirable car based on specific criteria via the "Locate Car" top menu. Admin, members or sellers must login to be able to access this application in accordance with the access right.

"Locate Car" feature allows the prospective buyer to determine the criteria intend to use for the search process, see Figure 2[17]. Here in after, the prospective buyer is required to fill the weight of each of the selected criteria. Based on the criteria and the weight, the application will examine for three cars that best meet the criteria according to the weight given. The search results are displayed in sequence from the most appropriate of selected criteria. Example of search results can be seen in Figure 3 [17]. All results could be compare easily using comparing feature which displayed all related car specification on each car in one page, see Figure 4[17].
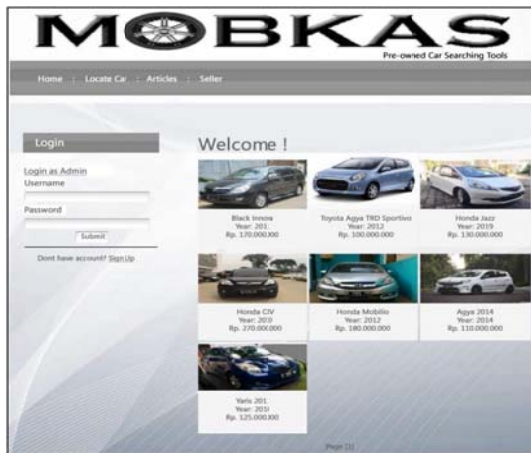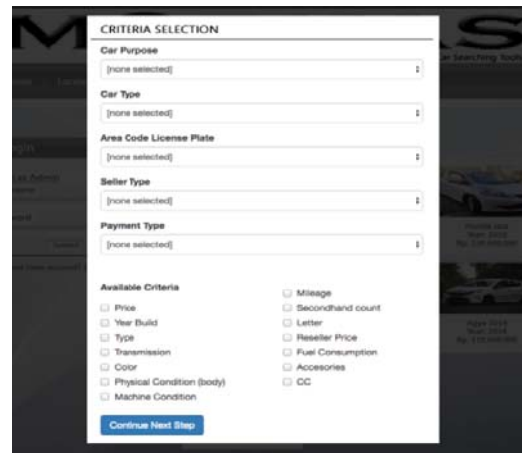
**Figure 1.** MobKas Homepage


**Figure 2.** Criterias Selection


**Figure 3.** Searching Result


**Figure 4.** Comparing Result

In order to validating the application result, several test conducted on ten prospective buyers. Simple random sampling method is used to pick 10 respondents in the shopping district Darmo Trade Centre (DTC) Surabaya [17]. Observation divide into two parts: provide opportunity for respondent using the application and then proceed with interview session related to the effectiveness of the application. Around 80% of potential buyers stating that the application provides accessibility in finding used cars that match their selected criteria because it can reduce the time, effort, and cost of the search, either directly or through advertising [17].

## 4. Conclusion

Mobkas supports prospective buyers in purchasing used car based on criteria determined by buyer itself. Mobkas has been tested by ten prospective buyers and 80% captivated by application features. It advise prospective buyers to only observe important prioritized criteria and also limited number of options of used cars, therefore could saving time, labor and cost. Further research will prioritize in collecting enormous data regarding used cars accordingly the options of cars could extended and more varied.

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First of all, welcome to Bali, Indonesia, and welcome to the first International Conference on Informatics, Technology and Engineering (InCITE) 2017!

It is still vivid in my memory, one and a half year ago, when some colleagues and officials of our Faculty of Engineering discussed the possibility of organizing an international event, to substitute national seminars that some of our study programs held annually or bi-annually. The call for an international event is a necessity given 30 years of Faculty of Engineering's existence, and the dawn of University of Surabaya's Silver Anniversary next year. Such a level of maturity prompts us to contribute more to a larger scale. An international event will have greater exposure to international community, and consequently greater impact to us all.

The following process, however, was far from easy. We were inexperienced, but we were faithful to our mission. It took us some time until we were able to formulate the conference theme, found prominent scholars in the selected theme, and negotiated with them. We are very grateful that all four speakers whom we approached are here with us today, to deliver their insights on opportunities and challenges in sustainable technology and innovation. Let's give our big hands to them!

Sessions beyond those with our invited speakers will deliver four sub-themes, namely: *sustainable design & innovation*, *sustainable manufacturing & processes*, *sustainable energy & earth resources*, and *the role of IT in sustainable enterprise*. We are glad to inform you that our conference has attracted 67 papers from the first round of acceptance. After careful selection by a panel that consists of high-profile international reviewers around the world, we passed 50 papers. We are thankful to our international reviewers who worked very hard providing feedback to the submitted papers. We are indebted to such great service that they have given.

I sincerely hope that the exchange of knowledge throughout this event, be it from within the substance of academic papers or during the conference time, will enhance our professional network and benefit us in the long run. Thank you to all our speakers, reviewers, participants, and most of all my committee members who have been hand-in-hand with me in this long journey! You all have made our dream come true!

We hope you will have a wonderful conference and memorable stay in Bali thisweek. We are looking forward to seeing you again in the next two years!

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