# Perceptions of Female Drivers Using Mobile Driving- Aided Applications in Saudi Arabia

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*Abstract* - **Although is highly inadvisable for drivers to use their smartphone while driving, certain mobile applications provide driving assistance. These apps may come in the form of intelligent surrounding awareness apps that can alert the driver of anything amiss, for example by way of detecting potential hazards and providing collision warnings. Such apps are particularly useful for new and unexperienced drivers, as applicable to most women in Saudi Arabia where the ban on driving has just been lifted. The views and perceptions on the use of this kind of application provides valuable insight into its potential value and efficiency. Regrettably, there is a lack of studies on the user perception of mobile driving-aided applications in general and that of Saudi Arabian women drivers in particular. As a result, this study undertakes an exploratory survey to investigate the readiness of Saudi Arabian women to use mobile driving-aided applications and their perceptions. 329 respondents participated in the survey. The result indicates that a considerable number of respondents welcome the use of mobile driving-aided applications.**

*Index terms:* **Mobile Application, Driving Aid, Users Perception, Readiness.**

## I. INTRODUCTION

Smartphones and mobile app services are constantly gaining in popularity and have changed the way people organize their daily routines, communicate, and manage their affairs. Nowadays, most people rely on their smartphones and the services they provide in their day-to-day activities. Most businesses have already gone mobile, and more and more transactions are being efficiently executed on mobile platforms. Users spend 86% of their time on their smartphones using mobile apps, a fact which points at the enormous potential of these programs [1]. Records show that smartphone services in the US market have risen to 56% in 2013 and that 83% of the population never leave their home without their smartphones [2]. In Saudi Arabia, 22 million people are using internet services via their smartphone [3].

Only very recently, Saudi Arabian women have been allowed to drive their own cars. This means that Saudi Arabia is going to experience a huge population shift in terms of drivers who used to be 100% male. Unfortunately, most Saudi Arabian women are going to be unexperienced beginners on the road, as they had not been allowed behind the steering wheel. Therefore, a mobile application that aids in the navigation process may prove to be highly useful for these women drivers. Although using your smartphone while driving is certainly inadvisable, mobile navigation aid systems do certainly assist in directing drivers to any desired location.

This kind of applications does not require any interaction and therefore do not distract the driver while identifying the shortest and fastest path to their destination. A mobile application that can assist drivers on Saudi Arabian roads would certainly put the Saudi Arabian authorities at ease as well as the new women drivers themselves. Such an aided application is able to reduce complicated driving tasks to simpler tasks whenever required. It can utilize the driver's smartphone and aid them in effectively performing their driving task. It allows the beginners behind the steering wheel to keep track of their progress and alerts them to their shortcomings in real time. An intelligent application is able to keep a detailed track record, learns and is also able to make suggestions. Furthermore, all forms of safety means are provided for the driver. The application can keep track of surrounding objects and alert the user of potential hazards ahead and suggest possible responses. Although such an application would not be interactive, it may possess features that can warn the driver of possible dangers based on their level of predictability. Driving analytics enable to keep track of any shortcomings of the driver and also the performance metric of the driving quality.

The major concern related to the effectiveness of such a driving-aided application has to do with its potential users. It is technically possible to design and customize such an application. However, the decisive factor is the user's readiness to adopt and use such an application. In another words, the cost and effect of such an application determines whether it is feasible or not rather than its possible development. A number of studies have been conducted on driving-aided applications, which have identified certain challenges such as stop sign alerts to increase driving safety [4], mobile application for safe driving [5], safe driving in the urban environment [6], safe driving at intersections [7], and voice recognition [8]. Unfortunately, a review of these existing studies reveals that the user's views and perceptions have been ignored. Thus, there is the need to examine and evaluate the perception of mobile app users and their readiness to use such mobile driving aided apps. Therefore, this study aims at investigating the perceptions of Saudi Arabian women in regard to mobile driving aided applications.

The remaining sections of this paper are as follows: Section 2 briefly discusses the related work of the study,

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Section 3 describes the research methodology, Section 4 offers the analysis, Section 5 summarizes the results, and Section 6 presents the conclusion of the study

## II. RELATED WORK

Mobile apps and self-service technologies such as smartphone apps are defined as "end-user software applications that are designed for a cell phone operating system and which extend the phone's capabilities by enabling users to perform particular tasks" [9]. This definition clearly reflects the function of the smartphone as a platform on one hand and mobile apps as the software that makes the device valuable to consumers by providing content on the other. In fact, "smartphones aren't very "smart" without the software apps that give them their usability and versatility" [10]. SST or self-service technologies have become ubiquitous in modern life, and self-service technology is defined as "a technological interface that enable customers to produce a service independent of direct service employee involvement" [11] and includes different types of services such as banking, booking, appointment, and the like where the user uses it independently without having to personally interact with any customer care or front desk employee.

Most of these apps have been enthusiastically adopted by smartphone users [12]. Based on the existing literature, SST have been categorized according to specific interfaces serving different purposes from the customer perspective [13]. The differentiation between internet and non-internet SST is appropriate for classifying mobile apps as the many online-based interfaces identified by Meuter et al. are served by mobile apps (package tracking, financial transactions, health information, self-training, etc.). In comparison, non-internet SST empirical research is far less elaborate [14].

The general government self-service technologies available online can be considered as being in the early stage of implementation. The adoption of such technologies has been well researched in consumer contexts but little research exists in the government context where knowledge workers interact with technology to access information related to the offered services [15]. Although governments try their best to reach out to their citizens, using technology constitutes a challenge, especially in terms of security, content, and presentation. In addition, E-government has been extended to incorporate other technologies beyond websites. Today, mobile government or M-government constitutes one of the channels of service communications. The use of mobile applications helps government agencies to reach a much larger number of citizens at an instant since the citizens are reachable online most of the time [16]. In the area of driving apps, however, the considerable number of studies on the challenges of mobile application use [4-8] have yet to address the perceptions of the users and their readiness to make use of such mobile driving-aided applications.

## III. RESEARCH METHODOLOGY

In general, the research methodology reflects the steps of research and describes the approach that was put into practice in the research process. Thus, the specific research methodology used to conduct this study takes the form of exploratory survey. The selection of this method is justified based on the fact that the study intends to assess options subjectively in order to allow each subject to record his or her views and perceptions.

The study was conducted in Saudi Arabia, and the study population consists of young Saudi Arabian women, the majority of them studying at local universities. The sample included 329 respondents who participated in the survey, and a structured questionnaire was designed as the data collection instrument. The respondents' perceptions were captured through a 5-point Likert type scale (1 = strongly disagree and 5 = strongly agree). The designed online survey form was made available to the respondents who were invited to participate in the survey. The data were gathered and analyzed through descriptive statistics.

## IV. ANALYSIS AND RESULTS

The collected data from the estimated numbers of population for this research were used for the analysis. At the onset of the study, it was anticipated that all women in Saudi Arabia could theoretically participate. As a result, the research employed a random approach. Most women who responded were university students. The effort was made to extract experience groups related to the area of study randomly. Descriptive statistics were used to analyze the collected data. Figure 1 shows the demographic characteristics of the responses. It was gathered that all the respondents were females, specifically with the following distribution: those aged 17-20 years made up 13.1% of the total number of respondents and those aged 21-25 made up 56.8% and thus constituted the majority of the sample, those aged 26-25 made up 21.9%, and those aged 30 and above made up 8.2%. This distribution showed that most of the respondents were young adults.

The responses to the question on the most important applications used by the respondents on their mobile device revealed that mobile applications for general services scored highest. "Request for fast food" exerted responses of 14.9% from the respondents, whereas 25.8% of the respondents frequently used an app to call a taxi. 59.3% of the respondents used applications related to buying online products (see Figure 1). In terms of responses related to interface interactions, the majority of the respondents were using the Astor mobile application (65.5%). 12.7% of the respondents' interactions were related to uploading only, and 21.8% stated that they did not need the application. 58.2% of the respondents stated that that they did not drive and that they would never drive. This result indicated a very strong resistance and a lack of readiness on part of the women to put themselves behind the steering wheel, even though the ban on women driving has already been lifted by the Saudi Arabian authorities.

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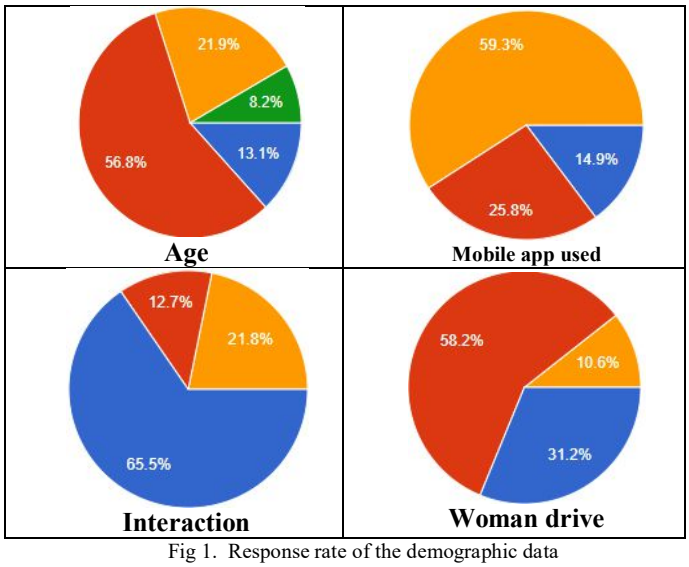



Fig 1. Response rate of the demographic data

The participants' responses indicated agreements on the following driving related issues: security, correct traffic signal, use important signals, availability for use, tips during my driving, emergencies, finding near proximity, and distress message (see Figure 2). The first response, which measured 40% of agreement responses related to the mobile driving app capability. 40.7% of the respondents thought that it should provide security commands. 47.6% agreed that a leadership app provided correct traffic signal information. 45.9% viewed the presence of alert options for correct traffic signals on the mobile app for driving as helpful and important.

Having a command interface within the mobile driving app easily available for use at anytime and anywhere with high degree of interaction received 46.2% of agreement. The respondents expected that the application should be flexible. Detailed advice and guidance given while driving was welcomed by 45.7%. Emergency options were valued by 44.7% as a necessary feature. Distress messages were rated as important by 45.9% of the respondents.

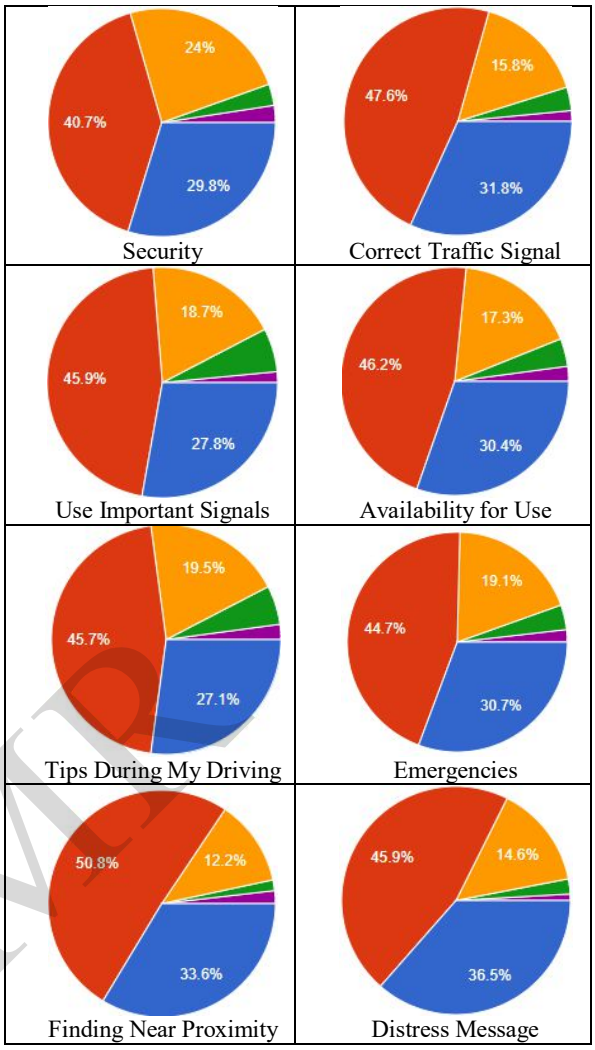



Fig 2. Response rate of the mobile app for driving data

## V. CONCLUSION

The value of using smartphone apps while driving lies in creating a specific mobile app that increases the driver's efficiency and safety. An intelligent mobile app is required to keep track of all the driving details that are necessary. The driver's positive and negative performance can be continuously assessed and evaluated by the app in order to correct potentially dangerous courses of action and warn of impending hazards. Given such useful features, such an app will be most beneficial for new and inexperienced drivers. Now that the Saudi Arabian authorities have lifted the ban on driving for Saudi women, such a driving app can help them feel more empowered and confident behind the steering wheel. This study investigated the women's views and perceptions on mobile driving apps in order to make up for the lack of studies on the perception and readiness of mobile driving-aided applications, especially in Saudi Arabia. The finding indicated that majority of the respondents would most certainly adopt the use of mobile driving apps, even though not all of them had begun driving their own cars yet.

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