EXPLORING DRIVERS' PERCEPTION MANAGEMENT OF MOBILE PHONE USAGE WHILE DRIVING

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Abstract: New innovations are rapidly bringing more and more embedded and portable devices into vehicles. Although these technologies have many benefits, they can also be a source of significant distraction to the driver. For instance, using a mobile phone while driving significantly increases the risk of having an accident. Therefore, in order to develop a risk management plan to reduce the risk of using mobile phones while driving, it is important to understand the risk perception of drivers regarding mobile phone use while driving. Such an understanding will improve communication between decision-makers and drivers so as to develop a better risk management plan. The primary objective of this study is to identify how drivers perceive the risk of different driving distractions. A random sampling method was used and the sample of the study consisted of 422 participants who included students, administrative staff and teaching faculties from the University of Madras, Chennai. The results of the study indicated that checking social media, reading, writing, taking photos and searching for music via their mobile phones were perceived as being the most risky of the driving distraction activities. Applying principle component factor analysis, the results showed two factors explaining 92% of the variance. Factor 1 was labeled as 'fairness'; it explained 70% of the variance and it was associated with control, fairness, severity, mental concentration and legality. In addition, 'fairness' was found to be inversely associated with knowledge and voluntariness.

Key words:
Perception, Distraction, Decision –Making, Communication and management

I. INTRODUCTION

In 2015, there were 51.5 million wireless or cellular telephone subscribers in the kingdom of saudi arabia (ksa) yet the population of KSA in 2015 was just 31.39 million people. Thus, the ratio of the deployment of mobile telecommunications services at the population level is about 164% which can be explained by the fact that many of the population own two or more mobile phones (communication and information technology commission, 2015). The number of mobile phone users has increased for every age group, educational level, income bracket and regional sector of the population (insurance research council, 2000).along with the increase in mobile phone use, the amount of time spent on mobile phones has also increased over time (communication and information technology commission, 2015). As cellular phone subscriptions continue to grow, the use of these devices in motor vehicles is also likely to continue to increase, along with concerns about the safety of using them while driving (world health organization, 2013a). In recent years mobile phones have shifted from being strictly verbal communication tools to multimedia tools that allow users to surf the web, check their emails, listen to music, take photos and update social media profiles. These activities are easy to access but the distraction caused by these activities could result in impaired driving performance, including longer reaction times and shorter following distances (atchley, atwood and boulton, 2011).

1.1 Risk Management:

Risk management is a strategic challenge for organizations. The International Organization for Standardization (2009) introduced ISO 31000:2009 *Risk Management – Principles and Guidelines*, which provides helpful tools to manage different types of risk by offering a universal framework 'to assist the organization to integrate risk management into its overall management system' (ISO, 2009, p. 9). ISO 31000 (2009) defines risk management as 'coordinated activities to direct and control an organization with regard to risk'. Risk management is implicit in transportation practices. Transportation agencies set strategic goals and objectives (e.g. the reliable and efficient movement of people and goods) but their success is uncertain. Internal and external risk events can impact the achievement of these objectives.

1.2 Statement of the problem:

The Kingdom of Saudi Arabia has made the use of mobile phones while driving illegal, adding a new provision to the transportation rule (Ministry of Interior, 2013). Regardless of the law and the risks of using mobile phones while driving, many drivers continue to engage in this behaviour (Gharaibeh and Abu Abdo, 2011). In the latest available 'Annual accident report for the Kingdom of Saudi Arabia' (Ministry of Interior, 2009a), it was noted that driver distraction was not listed among the reasons for accidents. This absence of data could contribute to an under-reporting of mobile phone-related accidents. In addition, policymakers and the general public might not consider it to be a serious problem compared to fatality factors that could be reliable measures such as speed, passing a red light or not wearing a seatbelt.

The research objectives include:

1. To examine the overall risk perception of driving distraction activities.
2. To evaluate the influence of different risk characteristics on perceptions using the psychometric paradigm.

2.0 REVIEW OF LITERATURE

2.1 Road traffic accidents:

According to the World Health Organization (WHO) (2013a), road traffic injuries are the eighth leading cause of death among people aged between 15 and 29. Trends suggest that by 2030 road traffic accidents will become the fifth leading cause of death (WHO, 2013a).

The European Union Road Safety Report (2015) states that the overall number of road fatalities decreased in 2014 by 1% compared to 2013 and it has been reported that the UK had one of the world's lowest road fatality rates in 2014, with fewer than 30 deaths per million inhabitants. This is consistent with the Global Status Report on Road Safety (WHO, 2013a) which identified that the risk of dying in a road accident is lowest in the European region and highest in the African region. The Eastern Mediterranean is responsible for 10% of the world's road traffic deaths and, according to the WHO (2013b), it has the second-highest road traffic fatality rate among WHO regions. High-income countries in the Eastern Mediterranean region have the highest fatality rates among similar countries around the world.

2.2 Traffic accident rate associated with driver distraction:

One of the main causes of traffic accidents is driver distraction (McEvoy *et al.*, 2007a). The term distraction has been defined by the Oxford English Dictionary as: 'diversion of the mind, attention, etc., from a particular object or course; the fact of having one's attention or concentration disturbed by something'. Although the term driving distraction is subject to several interpretations, Lee, Young and Regan (2008) defined driver distraction as the 'diversion of attention away from activities critical for safe driving toward a competing activity' (p. 34). Driver distraction could either be internal or external to the vehicle. Internal sources include speaking on a mobile phone, eating/drinking, smoking, texting, reading or checking social media via a phone, adjusting the seat or changing music (Lee, 2008, ; Strayer and Drews, 2004). Meanwhile external distractions include shops on the side of the road, vehicle accessories on nearby vehicles, pedestrians crossing, events nearby (e.g. carnival or a road crash) or billboards/large advertisements (NHTSA, 2010a, 2010b, Titchener and Wong, 2010). Distractions can take several forms such as visual, manual or cognitive demands (Lee, 2008). Text messaging, for example, involves all three types of distractions, whereas changing the radio or listening to music could involve one or two distractions (McCartt *et al.*, 2006)With the increase in technological distractions such as smart phones, electronic billboards and on-board audio-visual entertainment, the prevalence of crashes caused by distraction is expected to rise which presents additional challenges for drivers (Titchener and Wong, 2010).

3.0 RESEARCH METHODOLOGY

Research methods are often divided into two main types: qualitative and quantitative (Alasuutari, Bickman and Brannen, 2008) but more recently a third paradigm has emerged which is referred to as mixed methods research (Creswell, 2003).

The research design for this study was a quantitative research method. According to Aliaga and Gunderson (2002), quantitative research involves 'explaining phenomena by collecting numerical data that are analysed using mathematically-based methods (in particular statistics)' (in Muijs, 2004; p.1). This study also employed a cross sectional approach which is widely used to capture the perceptions of people to a certain phenomenon or aspect (Vignoles, 2012). This study was conducted among students, teaching and administrative staff at the University of Madras between June and August 2017. Participation in this study was on a voluntary basis. Self-administered questionnaires were distributed to participants through the university's e-mail. The participants were informed about the purpose of this study and were assured of their privacy and anonymity.

3.1 Sample size and method:

Sekaran (2003) defines sampling as 'the process of selecting a sufficient number of elements from the population'. Random sampling was used in order to eliminate collection bias. In addition, it was used to be able to make an objective, statistically accurate inferences about the larger population of drivers in KSA (Mertens, 2010).

The sample size (ss) was determined from the following formula:

$$ss = \frac{Z^2 * (p) * (1-p)}{C^2}$$

Where:

Z = Z value (e.g. 1.96 for 95% confidence level)
p = percentage picking a choice, expressed as a decimal (.5 used for sample size needed)
C = confidence interval, expressed as a decimal (e.g., .04 = ±4)

Correction for Finite Population

$$New\ ss = \frac{ss}{1 + \frac{(ss-1)}{pop}}$$

Where: pop = population

From the above formula it can be seen that a sample size of 376 was needed from the population of 14,750. A total of 422 completed responses were received; i.e. 46 more responses than the minimum number necessary to reach the required sample

size. Based on the size of the sample, this research can give a reasonable estimate of the risk perception toward mobile phone usage among the general drivers. Specific characteristics of the sample and implications for generalizing the results to the wider population will be discussed in the results part.

4.0 DATA ANALYSIS AND INTERPRETATION

Table 1 and 2 presents the mean scores of the eight risk characteristics for the sixteen driving activities.

Table 1. Mean rating of eight characteristics of risk

Driving distraction	**Knowledge** 1=a lot	**Control** 1=controllable	**Severity** 1=not severe	**Fairness** 1=fair
Answering a call using hand-held mobile	2.91	2.38	3.72	2.91
Adjusting the seat position	3.07	2.47	3.36	3.07
Reading on a mobile phone	2.38	3.37	4.23	2.38
Looking for a CD/DVD to play	2.82	3.05	3.76	2.82
Dialing a phone number	2.68	2.95	3.66	2.68
Putting on a seat belt	3.22	2.04	2.86	3.22
Receiving a call on a hands-free set	3.27	2.09	2.96	3.27
Eating/drinking	3.17	2.80	3.44	3.17
Checking social media	2.45	3.76	4.28	2.45
Using a Sat NAV	3.18	2.54	3.25	3.18
Talking with a passenger	3.20	2.97	3.46	3.20
Writing a text message	2.41	3.75	4.23	2.41
Taking photos/recording video	2.61	3.41	4.04	2.61
Listening to the radio/music	3.56	1.75	2.57	3.56
Searching for music on MP3 player	2.73	3.35	3.85	2.73
Smoking	3.24	2.85	3.47	3.24
Standard Deviation	**.35**	**.60**	**.50**	**.75**
Coefficient of variation (C.V)	**11.68**	**19.10**	**20.73**	**31.43**

Table 2. Mean rating of eight characteristics of risk

Driving distraction	Mental Concentration 1= not much	Voluntariness 1= voluntary	Exposure 1=never	Legality 1=legal
Answering a call using hand-held mobile	3.86	2.79	3.58	4.48
Adjusting the seat position	3.48	2.88	2.40	2.92
Reading on a mobile phone	4.50	1.69	2.70	4.65
Looking for a CD/DVD to play	3.92	1.82	2.41	3.69
Dialling a phone number	3.97	2.45	3.47	4.11
Putting on a seat belt	2.82	3.70	3.17	2.15
Receiving a call on a hands-free set	2.96	2.69	2.81	2.89
Eating/drinking	3.49	2.22	2.84	3.62
Checking social media	4.59	1.51	2.39	4.66
Using a Sat NAV	3.44	2.98	2.78	2.68
Talking with a passenger	3.68	2.33	2.39	3.41
Writing a text message	4.59	1.77	2.51	4.62
Taking photos/recording video	4.41	1.68	2.41	4.48
Listening to the radio/music	2.41	2.46	3.89	2.06
Searching for music on MP3 player	4.16	1.74	2.63	4.14
Smoking	3.39	2.05	2.23	3.57
Standard Deviation σ	**.65**	**.60**	**.49**	**.88**
Coefficient of variation (C.V)	**28.58**	**16.32**	**15.32**	**37.29**

The association between different socio-demographic factors and the perceived risk of mobile phone usage while driving was analysed by Chi-square. A p-value less than 0.05 was considered to be statistically significant. Frequency distributions, including means and standard deviations, were computed for each of the sixteen distraction activities and for each of the eight risk characteristics. In order to ensure internal scoring consistency, the eight risk characteristics were revised.

5.0.CONCLUSIONS

Recently, a noticeable shift in driving distraction activities has taken place. Mobile phones have become a critical driving distraction. The distraction doesn't arise only from calling or texting but also from the newer technologies such as checking social media, taking photos, recording video and searching for music while driving.

Despite laws banning the use of mobile phones while driving, and increasing numbers of news reports of tragedies involving their use, mobile phone use while driving continues to increase in university, especially among the youngest drivers who are also the keenest adopters of mobile phone technology.

This study has concluded that although drivers know about the associated risk of using mobile phones while driving, they

voluntarily engage in this behaviour. Drivers perceive using new mobile phone technologies as uncontrollable, illegal, requiring a lot of mental concentration, and having severe consequences.

6.0. REFERENCES

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