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## How transport users perceive personal safety apps



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### ABSTRACT

Fear of crime and a perceived sense of being unsafe have the potential to discourage individuals from using public transport. This paper presents analysis of the results of a survey on aspects of personal safety apps and how individuals perceive them in relation to their personal safety, privacy and their preference to purchase them. It explores their willingness to download for free or purchase such an app, their impression of features that an app might include such as revealing their location, how they would rate police force monitoring if included as a feature of the app and finally how they would rate a personal safety app against other technologies used to improve perceived transport user safety. The results show that the majority of respondents would consider downloading a personal safety app. Lower levels of engagement with technology, a higher level of education, being resident in the city of Dublin (as opposed to surrounding regions) and privacy concerns tended to make females less likely to consider downloading the app. These findings were not repeated for males. The results suggest that younger respondents were more likely to be negatively impacted by the inclusion of a facility to report location in an emergency on the app, while the older age groups were more likely to be unaffected. For the location tracking feature, cluster membership, gender and resident outside Dublin were significant. Less than half of the respondents would be negatively influenced in their decision to buy the app if a cost of €1.79 were introduced. When respondents were asked about the inclusion of police monitoring as a feature of the app, the results suggested that police monitoring had a more definite effect on perceived personal safety than on privacy.

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## 1. Introduction

Much attention, in recent times, has been given to research on security in transport, and deservedly so e.g. [Srinivasan, Bhat, and Holguin-Veras \(2006\)](#) used a stated preference survey among a sample population in New York, USA to examine the impact on mode choice for intercity business trips of attributes, including security, in light of security and attitude changes in the aftermath of the attacks of September 11th, 2001. [French and O'Mahony \(2008\)](#) assessed the risk of a terrorist attack on a sample set of bus routes in Dublin, Ireland. [Potoglou, Robinson, Kim, Burge, and Warnes \(2010\)](#) looked at people's willingness to trade between privacy and freedom, on the one hand, and security on the other, when travelling by train. [Patil, Potoglou, Lu, Robinson, and Burge \(2014\)](#) also considered privacy and security trade-offs in relation to surveillance in European metro travel. Their preliminary results suggest, among other findings, that any of the forms of CCTV considered were preferred to no CCTV, and that data retention was preferred to no data storage. [Rohlich, Haas, and Edwards \(2010\)](#) examined the use of security awareness campaigns in the hope of getting transport users to alert officials to suspicious and potentially

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harmful activity. The paper takes the perspective of the terrorist threat to public transport facilities. Fink (2003) reviews some methods employed for security, from the perspective of anti-terrorism, by looking at several case studies.

In addition to security concerns, fear of crime has the potential to put individuals off using public transport (TfL, 2011), and is likely to have a greater impact on individuals' perceptions of the security of public transport than terrorism (Beecroft, McDonald, & Voge, 2007). Glasson and Cozens (2011) say that the fear of crime is an area in need of research, separate from actual crime, as fear of crime can deter people from using an area. Survey based research conducted by Delbosc and Currie (2012) found that 50% of respondents reported feeling safe on public transport and that a sense of safety on public transport was positively related to frequency of public transport use (although the coefficient was only the third largest of four variables tested). Eboli and Mazzulla (2012) conducted a study of travellers on train lines around Milan, Italy, to assess survey respondents' ( $N = 16,718$ ) ratings out of 10 for their level of satisfaction with 33 service attributes, and the importance they place on each. The most highly ranked attributes for importance were Travel Safety, Personal Security on Board and Personal Security at the Station. Seven latent exogenous variables were included in their structural equation model: Safety, Cleanliness, Comfort, Service, Additional Services, Information and Personnel; and one latent endogenous variable for Service Quality. The variable Safety was best explained by Personal Security on Board, however, it was found to have a small impact on Service Quality (Eboli & Mazzulla, 2012).

This paper presents analysis of the results of a survey on aspects of personal safety apps and how individuals perceive them in relation to safety, privacy and their preference to purchase them, with particular focus on their potential use in transport. The paper starts with a review of relevant literature in the field and this is followed by a summary of the methodology used in the research. The results section commences with analysis of responses on the background of the respondents, such as whether respondents own a smartphone or not. The respondents' predisposition towards downloading such an app, or not, if it were available for free is also assessed and the impact of other app attributes on respondents' likelihood to indicate that they would download it for free are presented. This is followed by the results of questions aimed at assessing the impact of various app features, such as location tracking, on respondents' preference for downloading the app. The reported impact on respondents' attitudes if such an app were to be monitored by the state police force or a private security company is then presented. This is followed by the results of respondents' stated preferences for security different technologies including personal apps which were presented to them during the survey and the impact the technologies would have on them. The paper concludes with a summary of the key findings and a discussion of their implications for policymakers.

## 2. Background

Previous research into the mitigation of fear in public places has looked at the infrastructure in place that would improve people's sense of safety. Painter (1996) looked at how improving street lighting would affect street safety and use by pedestrians after dark. Kim, Ulfarsson, and Todd Hennessy (2007) investigated variables that influenced the mode a person may use to get to a light rail stop, along a light rail transit (LRT) route in Missouri and Illinois. Multinomial logistic regression (MNL) of an on-board survey ( $N = 407$ ) found that crime rate at the stop was among the variables found to be significant to the mode individuals used to get to or from the LRT stop. Werner, Brown, and Gallimore (2010) focussed specifically on walking to a light rail stop and examined the relationship with the 'walkability' of a person's home street in Salt Lake City, USA. The results found that continuing riders (people using the light rail before and after the stop opened) lived on blocks with higher walkability scores. Three measures, one of which was safety from crime were more positive for continuing riders than non-riders. The authors conclude that a more walkable starting point (that is the street on which the respondent lives) is linked to greater likelihood of the respondents walking to the light rail stop and that safety from crime is important for walking to the transit stop (Werner et al., 2010).

Cozens, Neale, Whitaker, and Hillier (2003) state that people who use rail transport have a heightened sense of crime risk compared to what is reported in official statistics. In a case study conducted in South Wales in the UK, they found that high percentages of respondents felt personal safety fears when at the train station (75%), on approaching it (73%) and when on the train itself at night (60%). Their results also show that fear increases at night, with females having higher fear levels than males in general. The authors found that visibility of and by others was mentioned by respondents in all the focus groups as being a crucial dimension to their feelings of safety (Cozens et al., 2003). In looking at what improvements to the station would help them feel safe, CCTV was second only to more/better lighting in terms of the number of respondents mentioning it. Of the measures in place in the Ann Arbor, Michigan region, which were considered by Wallace, Rodriguez, White, and Levine (1999), more police and lighting were also deemed most effective at improving people's sense of safety. The analysis was conducted on a survey of the local transport authority's fixed route bus passengers. Among the measures that had been taken by the transit authority, the most noticed, both on board vehicles and in transit centres was video cameras. However, they had the lowest level of influence on feelings of safety at transit centres (Wallace et al., 1999). The four measures considered in the transit centre were (in order of decreasing influence) 'More police around', 'Increased lighting', 'Emergency phones' and 'Video cameras'. In multiple regression models, the cameras were only found to be significant to the journeys made after dark.

Dahlgren and Morris (2004) investigated what it was that passengers wanted at their bus stops. The study combined observations of passengers at bus stops, surveying passengers on board the bus and a passengers' focus group. Passengers were asked "Do you always feel safe waiting at this bus stop?". The characteristics of the bus stops were then analysed in

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