POSSIBLE CHALLENGES OF INTEGRATING ICTS INTO THE PUBLIC TRANSPORTATION SYSTEM IN THE FREE STATE

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INTRODUCTION

Information Communication Technologies (ICTs) are becoming a huge part of the public transportation systems all over the world. ICTs in public transportation, also known as Intelligent Transportation Systems are relatively new in South Africa and even unheard of in some parts of the Free State province of South Africa. These technologies, which include electronic fare payments, Variable Message Signs, Automatic Vehicle Location, CCTV surveillance, mobile applications and the internet are yet to be implemented in the Free State province. The uptake of ICT solutions in public transportation in other countries was based on assumptions that it will improve public transportation through these technological developments. It was thought that technology will improve service delivery, therefore reducing the existing barriers towards public transportation and resulting in the public being more patriotic to public transportation systems (Nelson and Mulley, 2013).Challenges are likely to be encountered when integrating ICTs into the public transportation at all stages of the process, from planning how to use the solutions to the functional stage of the fully integrated public transportation system. Therefore, before deploying these technologies, these possible challenges should be considered, taking into consideration the current state of public transportation, its management, commuters, operators and drivers.

MOTIVATION

Public transportation systems all over the world and in South Africa are improving because of ICT while the Free State's public transportation system is still very much conventional and inefficient with no ICT integration. Considering how ICTs have improved transportation in other areas, implementation should be considered in the Free State. Stakeholders may not all be positively affected by ICT solutions in the public transportation system and even though ICTs may lead to good results, challenges and negative impacts may be encountered when integrating ICTs into the public transportation system at all stages of the integration process, i.e. from planning stages to the final stage where the public transportation is fully integrated with ICT.

CURRENT PUBLIC TRANSPORTATION SITUATION

Bus rank in Bloemfontein with information display boards

Mini-bus taxis at a taxi rank
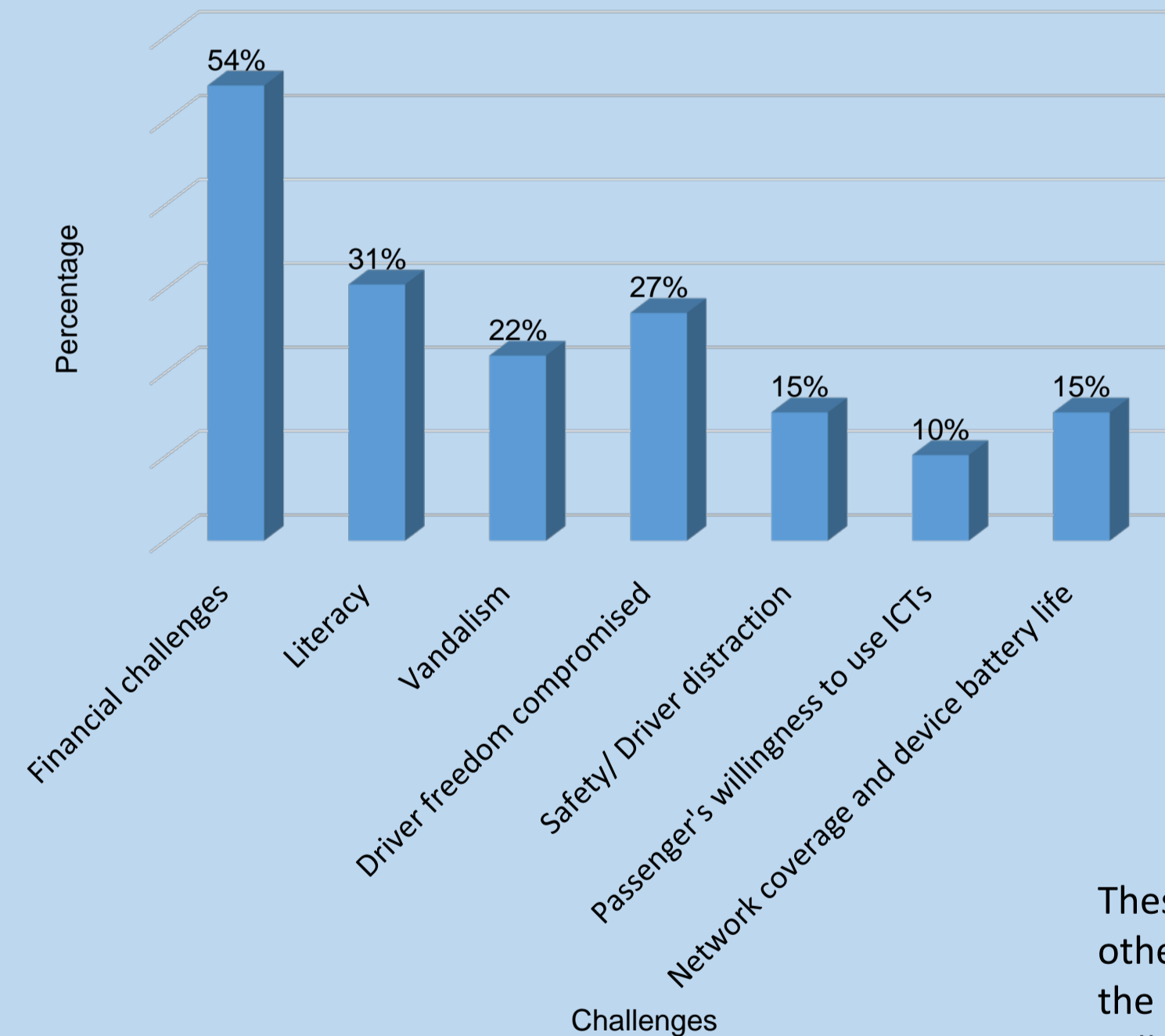
STUDY AREA

RESEARCH QUESTION

What challenges are likely to be faced by stakeholders in integrating ICT solutions into the public transportation system? The public transportation system has many stakeholders who may encounter varying challenges at the different stages of integration.

METHODOLOGY

Qualitative data gathering through questionnaires and interviews was used. Stratified random sampling was used for fair representation of all stakeholders. Data was gathered between June 2015 and August 2015. Both questionnaires and interviews respondents were passengers, operators, drivers, transportation planners, IT professionals and academics in order to provide a heterogeneous overview of challenges from all the stakeholders perspectives.

RESULTS

Challenges Likely to be faced in integrating ICT solutions in the public transportation system

Challenge	Percentage
Financial challenges	54%
Literacy	31%
Vandalism	22%
Driver freedom compromised	27%
Safety/ Driver distraction	15%
Passenger's willingness to use ICTs	10%
Network coverage and device battery life	15%

These challenges are influenced by other findings on the study regarding the types of ICT stakeholders were willing to use and those operators were willing to provide in future.

Technologies likeliness to be incorporated into public transportation system

Technology	Percentage
Provision of free Wi-Fi at bus ranks	18%
Provision of Bluetooth kits for drivers for communication on the road	22%
Installing buzzers for passengers to alert drivers to stop	44%
Tracking devices in vehicles	34%
Vehicle speed monitors	40%
Count down timers for vehicle departure and arrival time at stations / rank	10%
Online booking for seats	20%
Provision of online ticket purchasing platform	24%
SMS notifications to passengers in cases of delays	26%
Placing information display screens at bus stops	26%
Installing map and route display screens	32%
Installing available seat detectors	22%
Installing screens for video games and music	24%
Installing CCTV	28%

OVERCOMING THE CHALLENGES

To overcome these challenges:
- ICT education
- Community outreach and awareness programs
- Reduced prices on electronics
- Improved ICT infrastructure
- Law enforcement
- Creating demand for ICT in the public transportation system
- Legislation supporting public transportation through ICT
- Private sector involvement
- Taking responsibility by political leaders, provincial and municipal decision makers
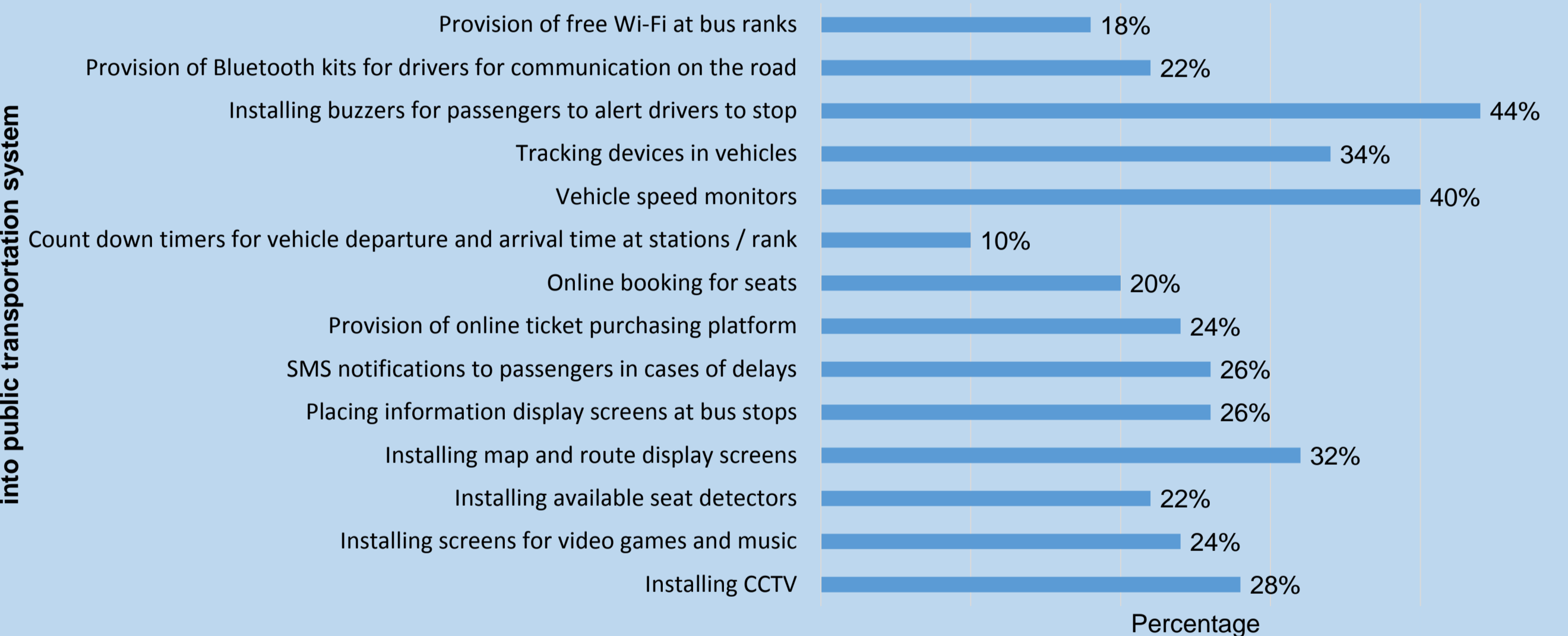
DISCUSSION

As the public transportation system is a government controlled but run by private companies and individuals, politics play an integral part in any major decision making that involves public transportation. Skills and competence are needed for the integration process to be fully operational. Resistance to these technologies and applications by stakeholders may also be encountered. The public should have the ability and knowledge to use the applications and devices once they are in place and be willing to use them. Education and awareness of ICT solutions should be promoted to the public because these are some of the may lead to resistance of the system. Results further showed that most stakeholders may face financial challenges that my substantially curtail successful integration of ICTs into the public transportation system. Another major challenge is the infrastructure; even though some ICT solutions can work within the current infrastructure, it needs to be expanded to support other technologies and as well as ensure efficiency.

REFERENCES

1. Maritz, J and Maponya, G. (2010) *Development, use and potential contribution of appropriate ICT –based service systems to address rural transport related accessibility constraints – Emerging lessons from case studies in South Africa* : 29th Annual Southern African Transport Conference, "walk Together", CSIR International Convention Centre, Pretoria, South Africa, 16 -19 August 2010, pp 13
2. Nelson, J. and Mulley, C. (2013). T*he impact of the application of new technology on public transport service provision and the passenger experience: A focus on implementation in Australia*. Research in Transportation Economics, 39(1), pp.300-308.
3. Nair R.M and Devi L.S (2011) *Sanskrit Informatics: Informatics for Sanskrit studies and research*. Centre for informatics research and development, Kerala. Pp 113-114
4. Toba L, Campbell M, Schoeman D, Lesia P. (2012*) A Critical Examination of Public Transport: A Case Study of Mangaung Metropolitan Municipality, South Africa*. 48th ISOCARP Congress 2012. MLM Public Transport
5. Wilkinson, P. (2002). *Integrated planning at the local level? The problematic intersection of integrated development planning and integrated transport planning in contemporary South Africa. In*: Planning Africa 2002: Regenerating Africa through planning. School of Architecture and Planning, University of Cape Town, pp.1-9.