Security and Safety Factors Influencing the Adoption of Cashless Payment Systems among Passenger Service Vehicles in Nairobi City, County

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Abstract: Among important innovations that have been encouraged by the Kenya government is the use of the moneyless payment system among Matatus or what is referred to as Passenger Service Vehicles (PSVs). The system is a means to enhance safety for commuters. This innovation has however not be adopted due to lack of clear systems and structures. The study was to identify security and safety measures influencing the adoption of system. The study was an empirical research paper which employed the use of exploratory research design and descriptive research design methods. A sample of 99 SACOO managers was selected through systematic random sampling. The questionnaire was used to collect data and data analyzed by use of descriptive statistics and Correlation. The ANOVA test indicated lack of significant influence of security and safety as individual factors of adoption (p-value was 0.354). However, other factors influenced the adoption such as: poor network failure, use of faulty gadgets, lack of adoption structures and use of multiple smart cards. The researcher recommends that the governments to issue one card system that also has security features that can be used across all means of transport; improve technology network and create awareness on benefits of adoption.

Key Words: Cashless payment systems, e-ticketing, industry size, Matatu SACCOs, technology adoption, smart cards.

INTRODUCTION AND BACKGROUND

The study sought to analyze individual factors influencing the adoption of cashless payment systems as a factor of security and safety among Passenger Service Vehicles (PSV's) in Nairobi and examine factors limiting this process. The use of cashless payment systems if adopted would ensure safety of commuters, efficient transport, enhance service delivery and hence increase profits for the business owners. Technology is an important aspect in improving the safety of commuters, improving efficiency and operations of organizations and business entities. However, technology can either be well accepted by users, adopted or rejected depending on the benefits or gains that are promised. Due to the importance of any given innovation, it is necessary to explain its benefits to users so that acceptance is guaranteed (Chuttur, 2009).The increasing role of transport revolution and technology has contributed to the evolution of the competitive management. According to Regan and Song (2001), the following observations are evident as a result of the effects of technology adoption in the transport industry: development of new services; improved economy; efficient services; improved security; satisfied owners and satisfied customers among others. The dissemination of transport innovation will therefore open up new opportunities for the development of the country especially in increased social entrepreneurship and industry growth. Their main purpose is to give added value to its

functions through and paperless payment systems gives greater efficiency and security as a way of conducting business (World Bank, 2011). E-ticketing makes the integration method easier to carry through because it can manage a more complex price and fare system while harmonizing amongst fares of different operators or modes of transport as described by Graham and Mulley (2012). Each vehicle operator especially Matatus can keep its own single fare system and the smartcard acts as an advanced means of payment across other modes of transport. fare system and the smartcard acts as an advanced means of payment across other modes of transport.

Rationale

The fundamental purpose of this research was to ascertain that both commuters and business owners who had invested heavily in the Matatu industry should be assured of their safety and protection while on transit. The passengers should also be handled well during their travel so that business activities are not interfered with causing unnecessary delay, loses and inconveniences to commuters. Owners are also able to get the full profits that are generated by the end of the day as well as the government to benefit in terms of revenue collection through taxes due to automated payment systems that are easy to monitor and track business processes. Improved safety therefore equals greater development for individuals and the general economy. The methodologies previously studied in the transport sector did

not provide enough information on the lack of adoption of the cashless payment systems in Kenya.

Research Hypothesis

H_0: There is no significant influence of safety and security as individual factors on adoption of cashless payment systems among Passenger Service Vehicles in Nairobi

EMPIRICAL REVIEW

Individual factors are one of the important determinants of adoption of technological innovation as explained by Li and Atuahene-Gima (2002), in their study on agency activity in Chinese technology. They found out that employees would adopt and implement a given technology depending on how they perceived it, understood it and were comfortable to apply it to their daily use. Studies by Talukder (2012), found that individual factors such as importance of the technology to user, usefulness to improve business, personal ability to be creative, experience with a similar product, image of the technology and level of information related to the technology among others factors had strong influence on implementation process.

Many employees expressed concern that if a technology did not improve their work process then they would not be comfortable to adopt and implement it according to Fuller, Vician, and Brown (2006). The technology in place had to improve the work process significantly and be easy to use for it to be accepted by the staff. If a member of staff or individual thought that the new machine or equipment will quicken work process or improve efficiency as they worked, then the innovation will be adopted (Lee, 2004). Most employers desire to recruit those employees that have had past experience with a given technology. This ability by the employee reduces apprehension and enables the staff to quickly use the innovation as found out by Venkatesh, Morris, Davis and Davis (2003). The ability to have used a certain machine in the past gives the employee a competitive advantage especially when being hired or seeking a new job. Venkatesh et al (2003), also found out that employees who exhibited a high level of independence were ready and willing to adopt a new technology than those who worked under supervision.

Safety in use of a technology and status as described earlier plays a great role in adoption and implementation of a given technology. An employee may perceive that the ability to use a certain machine or using a new technology will increase his safety, self-worth and hence lead to improvement in work performance, position or self-image as found out by Fuller, Vician, and Brown (2006). This individual factor therefore makes the employee to adopt the innovation with relative ease. Lee, Rhee and Trimi (2006) found out that employees expected appreciation when they adopted a given technology. Sometimes organizations are encouraged to make use of opinion leaders, models, and change agents so as to encourage employees to adopt a given technology with relative ease (Talukder, 2012). These personalities are perceived as being of a higher socio status and employees or society would desire to copy them especially if they are advertising the use of cashless payment system that is used in public transport for the common man (Chandrasekaran & Tellis, 2008).

METHODOLOGY
RESULTS AND PRESENTATIONS

The study employed the use of exploratory research design and descriptive research design. Exploratory research design was to gather relevant and pertinent information in an effort to connect useful information and identify a useful explanation on the state of the adoption of the cashless payment system Descriptive research design sought to study and understand interactions that occur during events and so as to gain sufficient understanding of the study and be able to draw conclusions that are accurate in nature so as to infer the research findings (Leedy & Ormrod, 2010).

The study employed systematic random sampling by selecting every 2nd SACCO manager from a list of registered Matatu SACCOs in Nairobi (197 in number) hence a number of 99 managers. The study made use of questionnaires as the research instrument tool to collect data. Multiple regression and Correlation were used in data analysis.

Respondents were willing to adopt the cashless payment system and thought it was useful as indicated by a mean of mean of 2.60 and SD of 0.813 on table 1 below. Respondents had no fear of using new gadgets if well taught as represented by a mean of 2.57 and SD 0.668. Respondents were not categorical that they had used similar machines elsewhere as represent by a mean of 3.46 and SD of 0.804. The managers felt that the innovation was not cumbersome but was easy to use once taught (mean 2.41, SD-0.928). Respondents were however not comfortable to change to the cashless payment system since it interfered with their profit making and was time wasting due to network failure as indicated by a mean of 3.50 and SD of 0.777. The managers also agreed that there the system had no security features for safety purposes and hence it was ignored as indicated by a mean of 2.07 and SD of 0.660

Benefits of using cashless payment system

The respondents agreed that there would be benefits of using the cashless payment system as indicated on table 1 below: Respondents agreed that there would be improved profits if the system was used (mean of 2.34 and SD of 1.092). They agreed that there would be improved security due to passenger information as represented by a mean of 2.16 and SD of 0.868). Other benefits mentioned were owner satisfaction (mean of 1.87 and SD of 0.714), and they agreed that there would be customer satisfaction (mean of 2.33 and

SD of 0.728). The managers also strongly agreed that there would be improved tax collection by the government as indicated by a mean of 1.86 and SD of 0.434. Some respondents also agreed that there would be reduced cost of doing business since losses will be reduced as indicated by a mean of 2.65 and SD of 0.931. In short, the findings imply that if the system is well managed, benefits will be realized.

Table 1: Descriptive statistics on benefits of cashless payment system

	N	Minimum	Maximum	Mean	Std. Deviation
Improved profits	92	1	4	2.34	1.092
Improved security (due to passenger information)	92	1	4	2.16	.868
Owner satisfaction	92	1	4	1.87	.714
Customer satisfaction	92	2	4	2.33	.728
Improved tax to government	92	1	3	1.86	.434
Reduced cost of doing business	92	2	4	2.65	.931
Valid N (listwise)	92				

Statistical analysis
Correlation Analysis Influence of individual factors on adoption of cashless payment system

Table 2 below shows that there was a slight influence of magnitude 0.080, 0.143 and 0.108 respectively (this is an average of 0.110 indication of slight influence of individual factors on adoption of cashless payment system).

Table 2: Correlation Matrix of individual factors on adoption

		System adoption	usefulness	Experience	Ease of use
System adoption	Pearson Correlation	1	.080	.007	.108
			.450	.948	.307
usefulness	Pearson Correlation	.080	1	.027	.062
		.450		.800	.554
experience	Pearson Correlation	.145	.027	1	.422
					.000
	Sig. (2-tailed)	.175	.800		
Ease of use	Pearson Correlation	.108	.062	1	1
					92
	Sig. (2-tailed)	.307	.554		

Correlation is significant at the 0.01 level (2-tailed)

Regression Analysis of individual factors on adoption
The information on table 3 below indicated that adjusted R square of 0.001 means that the variables studied contribute to 0.1% of the factors that influence the adoption of the cashless payment system and hence other factors contribute to 99.9%

of the adoption process. Since the R is 0.028, a conclusion was made that individual factors is positively correlated with the adoption of system but the relationship is very weak since R is close to 0.

Table 3: Model Summary of individual factors on adoption

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.167[a]	0.028	.001	2.334

a. Predictors: (Constant) usefulness, experience, ease of use

ANOVA Results
From the ANOVA results on table 4 below, the p-value is 0.354 greater than significance level; meaning the level of influence of individual factors among them security factors and adoption of cashless payment system was not significant; hence we don't reject the null hypothesis that there was no significant influence of Security and safety as

individual factors on adoption of the cashless payment systems among Passenger Service Vehicles in Nairobi.

Table 4: ANOVA Results of individual factors on adoption

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.460	2	5.730	1.050	.354[b]
	Residual	485.442	89	5.454		
	Total	496.902	91			

a. Dependent Variable: system adoption
b. Predictors: (Constant), usefulness, experience, ease of use

Regression Coefficients of individual factors on adoption
From the coefficient model below (table 6) we can conclude that on average, for every expression of usefulness of innovation by manager, there was 0.203 likelihood of adoption of cashless payment system; similarly on average, for every one unit level experience by manager, there was a 0.338 likelihood of adoption of cashless payment system. For every one unit level of ease of use, there was 0.137 likelihood of adoption of the cashless payment system.

Table 6: Regression Coefficients of individual factors on adoption

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	5. 1.942	1.321		1.470	.145
1	usefulness	.203	.303	.071	.672	.503
1	experience	.338	.337	.116	1.002	.319
1	Ease of use	.137	.292	.054	.467	.642

Dependent Variable: number of PDQ machines bought by SACCO

CONCLUSIONS
Based on the findings, the study found out that much as individual factors among then secuirty and safety of a system was a factor on influence of the adoption of that cashless payment system, the level of influence was not significant since the p-value 0.354 was greater than level of; hence we don't reject the null hypothesis that there is no significant influence of security and safety as individual factors on adoption of the cashless payment systems among Passenger Service Vehicles in Nairobi. The study concluded that for an innovation to be acceptable enough to be adopted it should be useful to the recipient; enhance security by feeding the smart cards with passenger information and details; the recipient or beneficiary should have prior experience dealing with a similar product and should not be cumbersome to implement or use.

RECOMMENDATIONS
The government should issue one smart card that is embedded with security features and information details of card holder that can be used by all passengers irrespective of the mode of transport. The cards should encompass passenger personal profile to enhance security and safety. The internet network should also be improved in the country for it to be successful. The Matatu crew should also be well trained on the benefits of the system so that they can effectively implement it.

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