Electronic Ticketing in Kosovo

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How to Use Technology to Improve Public Transport in Kosovo

Introduction

The intricate political disposition surrounding Kosovo’s annexation from Serbia still haunts the country’s ability to streamline its regional operations. While Kosovo declared independence in 2008, Serbia fails to recognize their independence and thus most parts of the north remain fractured. The most affected system in the northern part is the transport system. Kosovo has three main modes of transport, which include roads transport, air transport, and rail transport systems.

Nevertheless, despite having these systems and necessary infrastructure to address transportation needs for the local community, these systems remain ineffective and vulnerable to malicious attacks. This work explores the possibility of introducing electronic payment system in public transport as a way of digitizing the transport payment system.

Background on Kosovo’s current public transport

Kosovo’s public transport system includes railway system, airports, and roads. The railway system covers a span of 430 kilometers, which is under the 1.435 – m gauge standard. International comparison of this railway system places Kosovo at position 115. Railway system is significantly cheaper but less flexible in the route to use.

There are 10 airports in Kosovo. Four of these airports have paved runways while another 4 airports have unpaved runways. The remaining 2 airports are heliports for helicopters. Kosovo has a total road network of approximately 1,926 kilometers of which 1,668 kilometer is paved and the remaining 258 kilometers is unpaved.

Public transport in Pristina is relatively old. The buses are slow although their prices are cheap. Taxis too are significantly cheaper. A bus ticket can be as low as € 0.40. There are monthly city bus cards that go for € 10. Tickets are usually bought in the bus while others may be bought at specific bus terminals.

Challenges to current public transport

The current public transport system is faced with numerous challenges. First, this transport system is prone to attacks. Since everyone knows that the bus conductor collects all the money and remits that amount to a specific station and at a specific time, then it becomes easy to predict a routine and strategize an attack. Thus the bus, conductor and the service providers are prone to attacks for hosting cash rather than conducting safe money transfers.

Secondly, the possibility of some customers desisting from paying during a trip is likely to increase exponentially. This would deny the bus company funds in form of fare paid for a trip. In addition, the government would be denied funds in form of taxation for using these services.

Proposed technological alternative

Given these challenges, it is imperative for the government in conjunction with players in public transport service to design a new payment system whereby a customer swipes a card to pay rather than carry cash. Electronic payment system is a developing idea that is being adopted worldwide. This form of transaction is safer and effective in curbing the menace inherent to robberies.

This work proposes the use of smart card for payment. Designing a new smart card that customers can top up this card and use it to pay for their fares whenever needed is a sound alternative.

The smart cards

Smart cards are increasingly becoming a relevant mode of transaction for everyday life. A smart card is able to collect and store personal financial statement and make prompt payments on a bus. The bus conductor can swipe the card on a digitized smart card reader and deduct the exact amount required for that trip.

Thus a user does not need to carry coins around to settle his/ her bill. Smart cards have multiple applications based on the design and scope of coverage of these cards. Some smart cards have the capability to be used as Visa cards while others are specifically designed for transport transactions only.

How smart cards function

A smart card is basically a hardware that has a chip engraved in it. This hardware uses cutting-edge technologies to store and encrypt user data. Among the data collected and stored in the smart card include user identification, mode of contact, financial transaction, and possible confirmatory short messaging service (sms) system. Different firms have different designs.
Since this card is an on-card storage system, another hardware specific to the company that designed this card is used to retrieve, decrypt, and perform deductions or additions to the customer's card.

**Types of smart cards**

There are various types of smart cards in the market. Current technology has made it possible to initiate chip cards of various kinds. The first category of these cards is the contact cards, which is ISO7816 compliant. This card offers storage for contacts and is used as SIM card for mobile telephony (Card Logix Corporation n. pag.). This card has a memory section and a CPU section with varied degrees of processing speed.

Another type of smart card is the contactless card. This is a CPU/ MPU card that uses an 8 bit symmetric key and has a math coprocessor (Card Logix Corporation n. pag.). This card has a memory section that is a 125 kHz proximity card. It uses MIFARE and other proprietary software protocols at UHF (Card Logix Corporation n. pag.).

The third type of smart card is the multi component card, which includes a vault card section, bio-assaying fluidics sensor card, fingerprint section, and a one-time password display card (Card Logix Corporation n. pag.). Most of these cards have single interface while some have dual interface. In this case, the contactless card is the most appropriate for transport system because the user just swipes the card on a customized reader to pay the fair. Recent inventions on magnetic readers and QR readers make it possible to integrate wifi connectivity to the card reader for near-real-time transaction.

**Operating systems behind smart cards**

Different companies use different operating systems for their smart cards. Some companies use JavaCard Operating System, which is a software platform developed by Sun Microsystems. This platform is significantly popular due to its architectural intricacies and independence.

Another smart card operating system is the MULTOS, which is an acronym for Multi-application Operating System. This operating system is similar to Multi Application Card Operating System (MACOS), since it offers a platform for multi component cards.

**Smart card scanning and transaction process**

First, the smart card scanner is set with the actual value to be deducted from the card. Then the card is placed next to the scanner, which detects the details and confirms the amount. It subsequently initiates deduction and sends confirmatory message to the customer. In most cases, the customer/ owner of the card receives a short message service (SMS) confirming the actual amount deducted from the card. This makes it easier for the customer to lodge complain whenever excess deductions are done.

When crediting the card, a different system is design to send money to the customer’s card. The customer hands money to an agent of the card company and the agent conducts transaction by sending money to the card. This is done by swiping the card against another scanner.

**Benefits/ advantages of using smart cards**

Smart cards have numerous advantages. First, the smart card is significantly secure. Once a card is stolen, the owner can call the card company and request the card to be closed. Once the company has closed the card, no withdrawals can be made from that card until either the card is found by the owner who seeks reactivation or another card is issued.

Secondly, Smart cards can be used as reward cards for individuals who frequently use them and travel a lot. These rewards can then be redeemed for other commodities or free rides at specific times.

**Challenges/ disadvantages of using smart cards**

While smart cards have numerous advantages, it is also clear that storing huge sums of money may lead to huge losses. Recent trends indicate attacks on smart cards with malicious financial transactions undertaken on behalf of the owner.

**Practical applications around the world**

Smart card payment is already in use in various parts of the world. For instance, England uses the Oyster Card, while in Slovenia they use Urbana card. Recent development in regions like Kenya has seen emergence of a smart card payment system dabbed Beba Pay.

**Prices and economic impact**

The price of these cards is significantly small when produced in large quantities. When this process is made mandatory for all bus services, it will be easier to track financial transactions leading to huge profits for the company and country.

**Conclusion**

In conclusion, Kosovo needs radical approaches to public transport payment system. Utilization of smart cards will help eliminate threats and errors in transaction while offering secure payment system.
Works Cited


