Smart Payments in Public Transport

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> Artificial Intelligence for Road Safety and Mobility Workshop

> > 8th UN Global Road Safety Week

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Smart Payments in Public Transport

Project partner:

Department of Transport Planning and Engineering (NTUA)

- Duration of the project:
 2 months (March 2024 April 2024)
- The research was carried out in cooperation with <u>VISA</u>

VISA

Streets for Life

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Introduction

- The use of contactless payments has emerged as one of the most modern and convenient transaction methods for services and goods worldwide
- Public transportation systems should adapt to societal advancements
- Integrating contactless payments using smart cards into public transport makes these systems a more attractive option for daily commuting
- Widely used in Europe (e.g., London's Oyster, Paris's Navigo), contactless systems enhance urban mobility and efficiency







Objectives

- Evaluate Greek public transport passengers' preferences regarding contactless payments via bank card
- Identify the factors influencing their acceptance of this payment method
- Examine the main reasons that lead passengers to either prefer or avoid using contactless payment systems, as well as the role of demographic characteristics



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Methodological Approach

- Acceptance and preference survey among public transport passengers
- > 2 different online surveys were conducted on:
 - 452 participants in Athens (n=340) and Thessaloniki (n=112)
 - 316 participants in 11 cities (Irakleio, Karditsa, Patra, Larisa, Naousa, Chalkida, Ioanninam Chania, Kozani, Corfu and Volos) where tap and ride is already available on urban buses

The surveys employed a representative sample, accounting for age, gender, education, and other demographic characteristics



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60 min

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Results – Descriptive Statistics

- 8 out of 10 citizens express willingness to adopt contactless payments on public transport once available
- 7 out of 10 state they would use public transport more often if such a service were offered
- 9 out of 10 users stated that the tap & ride system has significantly improved their daily routine
- Benefits of the solution:
 - 29% Time saving
 - 23% Convenience
 - 21% Cashless Ticket Purchase

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Results – Logistic Models

- Binary logistic regression model:
 - Age, marital status, and openness to technology significantly influence the adoption of contactless payments
 - Interest in receiving information about digital payments increases the likelihood of adoption by over 4 times

> Multinomial logistic model:

- Users interested in convenience and efficiency are more likely to increase public transport use with contactless options
- Negative attitudes toward technology correlate with a lower likelihood of using digital payment systems



Variables	Coefficients	P-Value	Odds Ratio
Intercept	-0.707	0.065	-
Age [45-54]	1.003	0.033	2.73
Marital Status [married/cohabiting with a partner]	0.522	0.048	1.69
Difficulty in purchasing tickets due to lack of bank cards	-0.581	0.033	0.56
Interest in information about bank card payment systems	1.496	<0.01	4.46
Need for information from the bank about new payment methods	-0.801	<0.01	0.45
Ability to purchase tickets without cash	0.824	<0.01	2.28
Positive attitude towards technological innovations	1.333	<0.01	3.79

Variables	Coefficients	P-Value	Odds Ratio	Coefficients	P-Value	Odds Ratio
	"I would use PT more" option			"I would use PT less" option		
Intercept 1	-0.381	0.308	-			
Intercept 2	-	-	-	-0.561	0.362	-
Marital Status [married/cohabiting with a partner]	0.488	0.037	1.63	-0.939	0.026	0.391
Difficulty in purchasing tickets due to payment barriers	0.471	0.045	1.6	-	-	-
Interest in information about bank card payment systems	1.568	<0.01	-	-	-	-
Speed/convenience in ticket purchases	-	-	-	-1.291	<0.01	0.275
Cashless ticket purchase preference	-	-	-	-0.852	0.049	0.427
Negative attitude toward technological innovations	-0.873	<0.01	0.42	-	-	-

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- Contactless payments contribute to safer and more efficient public transport environments by reducing the need for cash handling
- Promotes inclusivity by simplifying access for all demographic groups through user-friendly ticketing
- Enhances the overall commuting experience, encouraging a modal shift towards public transport
- Supports sustainable mobility goals by fostering a modern, digital, and accessible transport system



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Scientific and Social Impact

- Enhanced user experience through fast, safe, and easy payments
- Increased acceptance of tech innovations by public transport users
- Boost in public transport appeal and ridership potential
- Valuable aggregated data for transport planning and service optimization
- Support of digital transformation and sustainability in urban mobility



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Future Challenges

- Need for broader demographic and geographic data to generalize findings across Greece and other countries
- Addressing digital literacy gaps and building trust in data security and financial technologies
- Integration of contactless systems with emerging technologies like biometrics and mobile apps
- Balancing innovation with accessibility to avoid excluding passengers unfamiliar with or resistant to digital tools





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