CASE STUDY

INTEGRATED E-TICKETING SYSTEM IN CRAIOVA

COLLECTIVE PASSENGER TRANSPORT

Craiova's public transport system was designed in line with the CIVITAS and MODERN project's vision. It is an integrated system with three components: e-ticketing, video surveillance, and public transport fleet management. The real time information provided by the system is processed in the traffic management centre of RAT, the local transport company. The three structures are closely connected as they share a large part of the hardware and communication architecture. The on-board control units ensure the best performance and have proven to be an excellent technological solution. The traffic management centre (dispatch), the core of the system, integrates the software applications specific to each of the three subsystems. This new system makes public transport in the city more reliable, more oriented towards travellers' needs and enhances the service provided.

MUNICIPAL PROFILE

LOCATION
Craiova, Romania

POPULATION
298,000

LAND AREA
81.4 km²

CIVITAS BUDGET
EUR 2,591,585.61

Municipal context

Craiova, the capital of the Oltenia region, is a commercial and cultural centre located 200 km from Bucharest. Craiova is known for its university and is a centre for gas and petroleum, petrochemical, thermo and hydro power plants. The Craiova metropolitan area includes seven neighbouring communes and will be expanded in the future to include another 17 localities.

After Romania's accession to the EU, Craiova recorded rapid economic growth that was accompanied by an increase in motorised vehicles. As a consequence the air and noise pollution in Craiova, as in many other urban areas, is getting worse year by year.

To improve these conditions, public transport should play a leading role in the modal mix of the city, having a substantial share in the urban transport system and meeting the greater part of the demand for mobility.

CRAIOVA IN CIVITAS

Craiova (Romania) participated in CIVITAS MODERN. Under the motto "MObility, Development and Energy use ReductioN", CIVITAS MODERN connects the cities of Craiova, Brescia (Italy), Coimbra (Portugal), and Vitoria-Gasteiz (Spain).

PROJECT INFORMATION

Representing cities across Europe, each with a desire to preserve their historic and cultural centres from damage caused by private vehicles, the CIVITAS MODERN project enacted 42 measures that led to cleaner and better urban transport. Besides promoting sustainable mobility measures and interaction among the participating cities, CIVITAS MODERN specifically focused on encouraging strong cooperation among scientists and technicians to learn from experience and best practice throughout Europe.

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In Craiova public transport consists of 250 vehicles – trams, buses and microbuses – carrying annually about 65 million passengers. The city administration is aware that older vehicles should be replaced with newer models that are more efficient in terms of energy and fuel consumption, safer and more comfortable, and more environmentally friendly; and that public transport services should become faster and adjusted to people's needs in order to encourage a modal shift from private cars to public transport.

By joining CIVITAS MODERN, Craiova has reaffirmed its commitment to develop a clean and integrated urban transport system.

Introduction

The development of the local economy resulted in an increase in mobility needs and in the levels of car ownership. As a consequence, CO_2 emissions have risen, traffic has become more congested and streets less secure. This scenario calls for better and more organised traffic management, which is able to analyse traffic information.

This new system, which will align Craiova to the European Union cities, made public transport more reliable, more dedicated to passenger needs and able to provide enhanced services, which significantly reduced the use of private car.

Starting from the principle that good traffic management means less stress and more time for citizens, Craiova developed a complex system in which public transport information provided by on-site equipment are gathered into a global scheme. As a result, Craiova adopted a new e-ticketing system.

The e-ticketing system allows for real time collection and analysis of a large volume of data about passenger profiles, necessary to the management of the company. It also serves to limit the problem of fraudulent passengers. The new system includes two transport systems (trams and buses), in one common ticketing system, offering the possibility to analyse data as a whole. The e-ticketing system provides detailed and distinct financial data on each public transport mode: trams and buses. This new technology is very useful for the public transport company.

This is the first time that GPS fleet coordination and real time information access have been used in Craiova's public transport.

The CIVITAS Initiative allowed the city to use innovative technologies to develop the e-ticketing system by providing the opportunity to implement a pilot system and test the new technologies, and to learn from cities which already utilise a similar system.

Taking a closer look

The integrated system is a new conceptual approach, able to collect and analyse a large volume of data about passenger profiles, limit the number of fraudulent cases and optimise public transport services. The e-ticketing system is based on ITC technology and provides a new infrastructure to the public transport system.

BACKGROUND INFORMATION

In the last decades the number of vehicles has grown continuously due to increased mobility demand and the need to move quickly and across large distances. Increased congestion and traffic jams, as well as levels of pollution, led to the need of more efficient public transport. Craiova has a Public Transport network with a developed infrastructure that covers the entire surface of the city. The integrated system implemented within the MODERN project provides a comfortable service to passengers; at the same time, it is an efficient management tool for the public transport company.

The general goals of the system resulted from the aggregation of the three measures. The goals are: to increase the public transport capacity; attract as many users as possible to public transport services through providing a comfortable and safe system; and to improve management of the demand and revenues related to the public transport services.

The initial plan involved the development of three independent systems. Once the design and planning of the measures started, it was decided to develop only one integrated system consisting of the three components: e-ticketing, video surveillance, and info-mobility concerning the public transport fleet. The three components are managed within a single management system, with a single GPRS system and network as communication support.

The e-ticketing component of the system now runs on 80 buses and 27 trams, and is monitored by the central dispatch system. In addition, 30 automatic ticketing machines (including 10 automatic machines for paper tickets and recharging cards installed in passenger stations, and 20 recharging cards set inside of the RAT tickets selling points) completed the equipment necessary for the e-ticketing component. The electronic ticketing system is complemented by video surveillance in 15 buses and 10 stations, and by the on-board units in public transport vehicles and 20 digital panels in stations displaying real time information.

All of these components are connected to the central dispatch (the fleet management system), for the collection, processing and electronic reporting of data, ensuring the best performance and providing an up-to-date technological solution.

The installation of cameras in trams, buses and stations represent a new infrastructure solution in order to decrease the anti-social issues leading to the increase of safety and confidence in public transport.

The new traffic management system based on GPS / GPRS devices and on-board computers is used for the first time in the public transport fleet coordination and for provision of real time information to travellers about the arrival time of buses and trams.

Results

These are the tangible results obtained: e-ticketing system installed on 80 buses and 27 trams; 20 stations with digital panels displaying real time information; a traffic management centre (dispatch) for data collection, processing and electronic reporting; 30 automatic ticketing machines; 10 stations and 15 buses with surveillance cameras connected to the central dispatch; and a public transport fleet managed by using GPS/GPRS applications.

The evaluation strategy has focused on two key elements: economy and society.

The evaluation results based on the ex-ante values and ex-post first assessment are the following:

As expected, the preliminary evaluation data recorded a positive evolution, which is in line with the measure's main objective - to develop a modern public transport which ensures quality, safety and planning capacity for both passengers and fleet.

In 2011 and 2012, the average occupancy decreased compared with 2010 because RAT cancelled a number of discounted season tickets. In 2012, the average occupancy increased compared to 2011 but still remained lower than 2010. This is a result of some bus routes changing due to overpass and underpass construction.

For the trams, the average occupancy decreased in 2011 because of tram line interruption during overpass construction. However, in 2012 it increased more than both 2010 and 2011. In August 2012, the construction of the overpass finished and the trams operated on the whole line, without interruption.

Although the measure brings increased operation and maintenance costs, RAT had other qualitative benefits, such as:

- possibility of real time data transmission on passengers' profiles, necessary to RAT's management;

Indicator	Indicator variation	Indicator evolution
Acceptance level	8%	Increase
Awareness level (those who reported a "very good" and "fairly good" understanding of the measure)	77%	Increase
Quality of Service (those who reported "very good" quality or "very low quality" of the services provided by the system)	4%	Increase of satisfied people
Average occupancy (established as an average between buses and trams)	2.4%	Increase
Perception of security as a result of applying the video surveillance system in buses and stations		
Perception of safety conditions in buses and stations	6%	Increase
Perception of a lack of safety in buses and stations	6%	Decrease

Buses in use

Trams in use

Percentage of fraudulent travellers
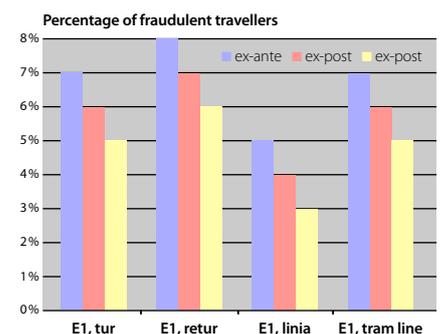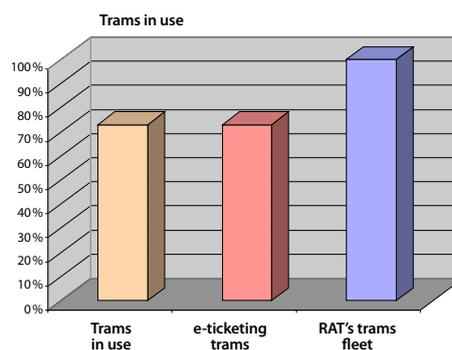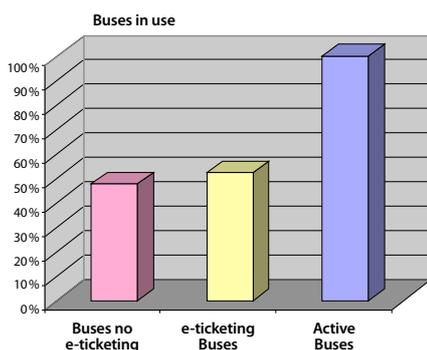
- collection of money in advance;
- reduction in fraudulent passengers;
- possibility to integrate two transportation systems (electric and road) in a common ticketing system.

Lessons learned

The lessons drawn by the city from the implementation of this package of measures are: amongst citizens, there is still a reluctance and mistrust regarding the use of travel cards, generated by insufficient knowledge of the new ticketing mechanism.

The functioning of the system still has issues from time to time, which leads to misinterpretation and the rejection of the system by some citizens; although these malfunctions were inherent in the early stage, they were corrected in the shortest time possible.

The system is complex for many travellers who have conservative principles. Most of the people who have travelled to other European cities have appreciated the presence of the new system in Craiova, which provides new technology, comfort, and safety during travel and the possibility to use time more efficiently.

Practical demonstrations for different stakeholder groups, including children, students, retired persons, employees, etc. are essential to show how the system works and to increase acceptance.

Upscaling and transferability

At the local level, the measures related to mobility management and quality of transport are part of the Integrated Urban Development Plan of Craiova. Moreover, the Municipality recently approved the Investment Plan for 2013, which includes several projects that will continue the MODERN innovative measures in the transition process towards a sustainable urban transport system.

The projects included in the Craiova Investment Plan for 2013 represent a further development of the IPTS, aiming to increase public safety by generalising the Craiova video surveillance system, and equipping all public transport with video cameras.

Since the beginning of the MODERN project, Brescia Mobilità and RAT Craiova agreed to share experience and knowledge about the electronic ticketing system.

The e-ticketing system applied in Craiova is a result of a transfer of the model and of the technical requirements from Brescia to Craiova – and therefore possibly to other cities.

A collaboration protocol was signed between the two technical representatives of the public transport companies of Brescia and Craiova, through which the model already existing in Brescia was studied and analysed in order to be adapted to the conditions in Craiova.

Brescia's experience represented the starting point in the configuration of the e-ticketing system implemented in Craiova.

As a result of the measure outcomes, the Municipality of Craiova City decided to make the acquisition of new clean buses a priority. It was decided that in 2013 50 new clean buses would be purchased. This acquisition is included in the investment list.

The acquisition will take place on the basis of the technical specification and the tender documentation developed within this measure.

The 50 new buses will be integrated in the e-ticketing system and the information management system.

It is the intention of RAT to apply the e-ticketing system to the entire fleet.

Budget and finances

The budget allocated to the integrated system was modified during the project implementation from EUR 1,036,741 to EUR 1,011,433. This was achieved through redistributing the budget among the three components of the system. In the original contract a large budget was assigned to the traffic management tools (EUR 590,641); subsequently the budget was shifted to the e-ticketing component of the IPTS which required more resources than the other two components for the demonstration purpose.