PLANNING AND IMPLEMENTATION OF MOBILITY SERVICE (MAAS) IN ANDIJAN CITY

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Abstract

Mobility as a Service (MaaS) is an innovative mobility service that aims to redesign. by integrating multimodal transport and application-based technologies, providing services in railway, air transport and urban mobility, passenger transport under the control of a single operator. This is the planning process followed for MaaS in Andijan. Andijont aims to organize the activities of a single integrated operator of public transport, taxi, railway and air transport within the city.

Keywords: mobility as a service (MaaS); MaaS planning; Demonstration of MaaS; MaaS issues; Andijan MaaS

Introduction

The concept of Mobility-as-a-Service (MaaS) has been developed over the past decade to promote on-demand mobility in rail, air and urban mobility, passenger transport services. combines the modes of bringing under the control of a single operator. The International Association of Public Transport Authorities (UITP) defines MaaS: "MaaS is a system that integrates various transport services (e.g. public transport, car sharing, taxi, car rental, ride-sharing, etc.) into a single digital mobility offering with active mobility and efficient public transport as its core. . It offers the most suitable solutions based on this customized service MaaS is available anytime and offers integrated planning, booking and payment, as well as route information to ensure easy mobility and life without owning a car.[1]

MaaS aims to re-engineer the future of cities with unified operator management technologies (ICT) and application-based technologies for rail, air transport and urban mobility, passenger transport services.

MaaS provides a more convenient, more sustainable solution than owning and driving private cars, saving passengers valuable time, reducing congestion in city centers and suburbs, and subsequently reducing traffic accidents;

The assumption behind MaaS is that public transport services such as rail, air transport and urban mobility, or private vehicle ownership, maintenance and management, and cars will become more attractive.[2]

To this end, several studies have focused on implementing MaaS

This methodology was used for the MaaS transport driver planning process and provided guidelines for future MaaS routing schemes. Challenges identified are linked to lessons learned, recommendations for successful MaaS public transport planning and implementation. This study will contribute to expanding MaaS knowledge for setting up demonstration sites, describing a step-by-step planning and implementation method and lessons learned, supporting MaaS stakeholders (e.g. researchers, public authorities, transport service providers and operators, etc.).Uslub

MaaS allows travelers to combine public and private transportation. modes within or outside the city using a single app. A key success factor for MaaS is the use of a trusted account to book and pay for used transportation services. MaaS is often referred to as a tool to help improve transportation sustainability; however, a universal definition of MaaS has not yet been established.

Methods

The expected benefits of MaaS are aimed at optimizing existing public transport services within the city and increasing traveler satisfaction. MaaS can also improve network efficiency by optimizing supply and demand, especially during off-peak hours for certain modes/routes, reducing congestion, end-user transport costs and vehicle ownership, can lead to MaaS implementation.[3]

If the Maas is properly structured and priced, it can provide benefits, including public transport and active use of transport, and offer intermodal solutions, providing potential solutions for future mobility challenges. They suggested that automated vehicles and MaaS could reduce the need for private cars and provide more efficient and sustainable transportation options. Existing research shows that MaaS can help reduce dependence on private vehicles, reduce transport-related emissions, increase the reliability of the transport system, increase convenience and accessibility, reduce traffic congestion and save costs for users [4-6].

Planning and implementation

Results and discussion

The need to move from single-mode planning to multimodality and build resilience in the transport network consists in analyzing the flow of passengers by studying the planned movement of trains arriving and departing from the Andijan I railway station, as well as effectively distributing them to urban passenger transport.

Currently, there are types of passenger carriages:

SV – 18-20 2-seater coupe, wagons with two-seater coupe for long journeys;

SV lux-8 - 2-seater coupe wagons for long journeys, 2-seater wagon with a separate shower and shower with high comfort;

TSMK - 36-40 domestic 4-seater compartment wagons intended for long-distance travel;

TSMO - open-type boxcars with 54 beds

VA - "SHARQ" and "NASAF" inter-provincial wagons with hard seats and high comfort seats designed for suburban routes;

TSMB - baggage wagons designed for cargo transportation;
VR – wagon restaurant and wagon bars.
The train consists of 12-16 wagons, 2 of which, depending on passenger demand SV - 2 cars with 18-20 seats, 2 SV luxury-8 wagons, TSMK - 6 cars with 36-40 4-seater cabins, TSMO - 4 cars with 54 beds; SV Lux-8
If the flow of passengers coming from Andijan-I railway station is as below, how many buses USUZU, taxi, Nexia, private transport will be needed during the day to send them to their homes in vehicles [7,8].

	1	2	3	4	5	6	7	8	9	10	11	12
γ m	0,29	0,3	0,31	0,32	0,33	0,34	0,35	0,36	0,37	0,38	0,39	0,40
γmk	0,32	0,33	0,34	0,35	0,36	0,37	0,38	0,39	0,40	0,41	0,42	0,43

Based on the results of this observation, passengers arriving in Andijan on each route are taken into account
P094= (SV*2+ SVluk*2+ TSMK*6+ TSMO*4)***γ**=18*2+8*2+ 36*6+ 54*4)*0.3 =698 passengers
γ is the coefficient that takes into account the flow of passengers on the train arriving at each railway station, which was calculated by observing the actual situation [9-11].
P060= (SV*2+ SVluk*2+ TSMK*6+ TSMO*4)=18*2+8*2+ 36*6+ 54*4)*0.31 =721 passengers
P394= (SV*2+ SVluk*2+ TSMK*6+ TSMO*4)=18*2+8*2+ 36*6+ 54*4)*0.28=651 passengers
P391= (SV*2+ SVluk*2+ TSMK*6+ TSMO*4)=18*2+8*2+ 36*6+ 54*4)*0.295 =686 passengers
P062= (SV*2+ SVluk*2+ TSMK*6+ TSMO*4)=18*2+8*2+ 36*6+ 54*4)*0.31=721 passengers.
P150= (SV*2+ SVluk*2+ TSMK*6+ TSMO*4)=18*2+8*2+ 36*6+ 54*4) *0.305 =710 passengers
P092= (SV*2+ SVluk*2+ TSMK*6+ TSMO*4)=18*2+8*2+ 36*6+ 54*4) *0.315= 733 passengers
P098= (SV*2+ SVluk*2+ TSMK*6+ TSMO*4)=18*2+8*2+ 36*6+ 54*4) *0.325= 756 passengers
∑ P= P094+ P060+ P394+ P391+ P062+ P150+ P092+ P098=698+721+651+686 +721+710 +733 +756 = 11358 passengers
We will determine the flow of passengers going home through the analysis. Arriving passengers mostly left in private cars, taxis, and local taxis [5] Observing their distribution, we found it using the following formula:
1. We determine the number of passengers arriving from the station in private transport.

∑ Psh= P094*b094 + P060* b060+ P394* b394+ P391* b391+ P062* b062+ P150 b150+ P092 b092+ P098 *b098=(698*25+721*15+651*15+686*10 +721*25+710 *25+733*25 +756*20):100 = 1181 passengers

2. We determine the number of passengers who go home from the station by taxi.

∑ Ptx= P094*b094 + P060* b060+ P394* b394+ P391* b391+ P062* b062+ P150 b150+ P092 b092+ P098 *b098=(698*35+721*25+651*30+686*30 +721*35+710 *65+733*35 +756*35):100 = 2067 passengers

3. We determine the number of passengers leaving the station in taxi transport on the route.

∑ Pyt= P094*b094 + P060* b060+ P394* b394+ P391* b391+ P062* b062+ P150 b150+ P092 b092+ P098 *b098=(698*30+721*30+651*30+686*30 +721*30+710 *10+733*30 +756*30):100 = 1561 passengers

4. We determine the number of passengers leaving the station on the route bus.

∑ Pyt= P094*b094 + P060* b060+ P394* b394+ P391* b391+ P062* b062+ P150 b150+ P092 b092+ P098 *b098=(698*30+721*30+651*30+686*30 +721*30+710 *10+733*30 +756*30):100 = 739 passengers

In this way, the number of passengers and the number of cars they will need are determined. In order to determine this, through observation, fully arrived and waiting passengers sat in private cars. Passengers who arrived and waited sat in taxis. 50 percent of the arriving and waiting passengers sat in the taxis on the route. 7 passengers arrived and waiting passengers sat on the buses.

We calculate the number of cars needed for each train flight, depending on the type of transport, using the formula below to organize the transfer of passenger flow to motor vehicles at the railway station [12].

094 F Tashkent Passenger Central. → For Andijan-I

N094=∑ Psh/gn=174/4=43 Neksiya cars, private

N094=∑ Ptx/gn=244/4=61 Nexia cars, taxis

N094=∑ Pyt/gn=209/3.5=70 Damas cars, taxi on route

N094=∑ Psh/gn=70/7=10 ISUZU buses

060F Tashkent Passenger Central. → Andijan-I

N060=∑ Psh/gn=108/4=27 Nexiya cars, private

N060=∑ Ptx/gn=180/4=45 Nexiya cars, taxis

N060=∑ Pyt/gn=216/3.5=61 Damascus cars, taxi in the direction

N060=∑ Psh/gn=144/7=21 ISUZU buses

394F Urgench → Andijan-I

N394=∑ Psh/gn=98/4=24 Nexiya cars, private

N394=∑ Ptx/gn=195/4=49 Neksiya cars, taxis

N394=∑ Pyt/gn=195/3.5=56 Damascus cars

N394=∑ Psh/gn=98/7=14 ISUZU cars

391 Bukhara → Andijan-I

N391=∑ Psh/gn=69/4=17 Nexiya cars, private

N391=∑ Ptx/gn=206/4=51 Nexiya cars, taxis

N391=∑ Pyt/gn=206/3.5=59 Damascus cars, taxi in the direction

N391=∑ Psh/gn=206/7=29 ISUZU buses

062F Tashkent Passenger Central → Andijan-I
N062=∑ Psh/gn=180/4=45 Neksiya cars, private
N062=∑ Ptx/gn=252/4=63 Neksiya cars, taxis
N062=∑ Pyt/gn=216/3.5=62 Damascus cars, taxi in the direction
N062=∑ Psh/gn=72/7=10 ISUZU buses
150E Moscow from Kazan → Andijan-I
N150=∑ Psh/gn=180/4=45 Nexia cars, private
N150=∑ Ptx/gn=468/4=117 Nexia cars, taxis
N150=∑ Pyt/gn=72/3.5=21 Damascus cars, taxi in the direction
N150=∑ Psh/gn=-/7=0
092F Tashkent Passenger Central. → Andijan-I
N092=∑ Psh/gn=183/4=46 Nexiya cars, private
N092=∑ Ptx/gn=257/4=64 Neksiya cars, taxis
N092=∑ Pyt/gn=220/3.5=63 Damascus cars, taxi in the direction
N092=∑ Psh/gn=73/7=10 ISUZU buses
098F Tashkent Passenger Central. → Andijan-I
N098=∑ Psh/gn=189/4=47 Nexiya cars, private
N098=∑ Ptx/gn=265/4=66 Nexia cars, taxis
N098=∑ Pyt/gn=227/3.5=65 Damascus cars, taxi in the direction
N098=∑ Psh/gn=76/7=11 ISUZU buses

Calculation of passengers arriving at the railway station by train and the process of transferring them to a motor vehicle[6]:

094 F Tashkent Passenger Central. → For Andijan-I
PTY 698=Psh43ta + Ptx61ta + Pyt70+ Pav10
060F Tashkent Passenger Central. → Andijan-I
PTY 721=Psh27ta + Ptx45ta + Pyt61+ Pav21
394F Urgench → Andijan-I
PTY 651=Psh24ta + Ptx49ta + Pyt56+ Pav14
391 Bukhara → Andijan-I
PTY 686=Psh17 + Ptx51 + Pyt59+ Pav29
062F Tashkent Passenger Central → Andijan-I
PTY 721=Psh45 + Ptx63+ Pyt62+ Pav10
150E from Moscow Kazan → Andijan-1
PTY 720=Psh45 + Ptx117+ Pyt21+ Pav0
092F Tashkent Passenger Central. → Andijan-I
PTY 733=Psh46 + Ptx64+ Pyt63+ Pav10
098F Tashkent Passenger Central. → Andijan-I
PTY 756=Psh47+ Ptx66+ Pyt65+ Pav11

Thus, the process of transfer of passengers arriving on each flight by train to a motor vehicle, the number of passengers in the transport is transmitted from one transport to another through MaaS. The required number of vehicles is determined by the number of passengers arriving and departing on each train journey [13].
Implementation of transfer from railway transport to road transport through MaaS technology saves the useful time of passengers and optimizes the loading of

vehicles. The number of vehicles required for optimal loading of public transport is determined.

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