Acceptance of autonomous shuttles for passenger transport in a Greek city

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<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Motivation</strong></td>
</tr>
<tr>
<td>2</td>
<td><strong>Method</strong></td>
</tr>
<tr>
<td>3</td>
<td><strong>Results</strong></td>
</tr>
<tr>
<td>4</td>
<td><strong>Conclusions</strong></td>
</tr>
</tbody>
</table>
Motivation

• Public attitudes toward autonomous vehicles a key factor for usage
• Limited research available, mainly questionnaire surveys of a priori attitudes
• Objectives:
  • analyse a posteriori attitudes towards autonomous vehicles among autonomous mini buses passengers
  • compare a posteriori attitudes of regular users versus non users, to identify factors related to regular usage
Method

- Six autonomous mini buses in real operation in Trikala (November 2015 to February 2016)
- 11 passengers: 6 seated, 4 standing, 1 wheelchair user
- Dedicated bus lane along a 2.4 km loop – 29 minutes urban route, nine bus stops
- Operator in a remote control room and operator on board, mingled with the rest passengers
- 1490 trips, 4,030 km, 12,138 passengers
Passengers’ survey

• 15 December 2015 to 23 January 2016
• Questionnaires completed via face to face interviews with passengers at a bus stop
• Random selection of passengers at all 9 stops
• Themes:
  • Experiences and data about the last trip
  • Satisfaction
  • Perceived safety and security on board
  • Willingness to use
• 200 interviews, 95 male - 105 female, mean age = 37.6 years
Passengers’ survey: Mini bus integration into people’s mobility habits

**How many times have you used the bus?**

- Once: 40.0%
- Twice: 42.5%
- Three to five times: 17.0%
- More than five times: 0.5%

**Trip purpose**

- Social, recreational and sport: 46.50%
- Shopping: 12.00%
- Just to travel on ARTS: 23.00%
- Adult accompanying children: 6.00%
- Bureaucracy: 3.00%
- Education: 1.00%
- Health: 1.50%
- Return to home: 1.00%
- Work: 6.00%

**Usual means for the same trip**

- Car driver: 10%
- Car passenger: 20%
- Bus: 5%
- Walking: 75%
- Cycling: 15%
- Motorcycle: 5%
Passengers’ satisfaction with the mini buses
Passengers’ survey: Perceived safety and security on-board and willingness to use and pay

Would it be of value to use the mini buses in the city?
- Yes, on the same route: 53.5%
- Yes, on other routes: 37.5%
- No, it is not: 9.0%

What would you be willing to pay as ticket (compared to conventional bus)?
- €0.5: 16.5%
- €0: 54.0%
- €0.5: 21.5%
- €1: 8.0%
Citizens’ survey

- January - February 2016
- Postal questionnaire survey among Trikala residents
- Themes:
  - General attitudes towards autonomous vehicles
  - Attractiveness of expected impacts
  - Concerns
- Sample split
  - “Never used”, N = 105, 43 male - 62 female
  - “Regularly used” (responded having used it 2-4 times or more), N =318, 148 male – 170 female
Factors related to usage

- Regular users were younger than no users
- Significant relation between:
  - preferences for autonomous driving and usage of the autonomous mini buses
  - previous experience with driving automation and usage of the autonomous mini buses
  - perceptions of safety of autonomous vehicles and usage of the autonomous mini buses
Citizens’ expectations, concerns and willingness to use

- Most likely **benefits** due to autonomous vehicles
  - Smoother vehicle movements
  - Better navigation
  - Reduced energy consumption
  - Less emissions
- Most attractive **impact** of autonomous passenger cars:
  - Increased mobility of elderly and disabled
- Moderately **concerned** with:
  - Cost
  - Liability and security issues
Conclusions

• Autonomous buses well accepted and integrated in the people’s everyday habits in Trikala -> potential exists
• No safety concerns on-board the buses (low speed, awareness about the operator)
• Regular users:
  • preferred fully autonomous driving
  • believe that autonomous vehicles are safer than or at least as safe as human drivers
  • would prefer an autonomous bus without an operator on board instead of a similar conventional bus
  • would use an autonomous vehicle if it is available in the market
• Need to demonstrate autonomous vehicles in real operational conditions in varying traffic environments, possible via large field operational tests.
Thank you!

http://i-sense.iccs.gr/