Smart Transportation Applications' Business Models: A Comparison

Leonidas Anthopoulos
Associate Professor
University of Applied Science of Thessaly, Greece
lanthopo@teilar.gr

Amel Attour
Associate Professor
University of Sophia Antipolis, Nice, France
amel.attour@gredeg.cnrs.fr

ABSTRACT

An increasing amount of applications can be located in several cities that attempt to deal with mobility issues like traffic management, transportation safety, congestion control, taxi booking, car sharing, carpooling etc. The aim of this work in progress article is to collect information with regard to carpooling applications and attempt to recognize the underlying business models.

CCS CONCEPTS

• **Security and privacy** → Human and societal aspects of security and privacy • **Human–centered computing** → C**ollaborative and social computing**; *Collaborative and social computing systems and tools*; Social Networking Sites

KEYWORDS

Smart transportation, congestion, smart city, carpooling, business models, mobility

ACM Reference format:

L. Anthopoulos and A. Attour. 2018. ACM Sample File for WWW 2018 Proceedings and Companion Submissions. In *The 2018 Web Conference Companion (WWW 2018), April 23-27, 2018, Lyon, France*, ACM, New York, NY, XX pages. DOI: https://doi.org/10.1145/3184558.3191520

1 INTRODUCTION

Smart Mobility concerns one of the smart city dimensions according to several smart city (SC) frameworks and benchmarking models [1; 2]. Several so-called "hard" and "soft" smart services are offered under this SC dimension, which range from traffic and congestion management; to transportation safety and street monitoring; and even to car-sharing and carpooling accompanied by the corresponding web and mobile applications.

WWW '18 Companion April 23-27, 2018, Lyon, France.

ACM ISBN 978-1-4503-5640-4/18/04.
DOI: https://doi.org/10.1145/3184558.3191520

Smart mobility emerging field rises questions with regard to the value source that makes it so attractive. Google Scholar alone, returned more than 6,000 articles for the terms "smart mobility" in early 2018, the 30% of which were published after 2017, numbers which demonstrate the attention that scientists pay in this particular subject.

In this respect, this paper aims to identify different business models and present a primary comparison of the existing ones. Due to the broad scope of the available smart services, this paper focuses on the business models that concern carpooling applications and services. More specifically, this paper attempts to provide with answer the following research questions:

RQ1: what different smart mobility services exist?

RQ2: what business models appear to lie behind smart carpooling services?

Both these questions are important to be answered, since users' interest in smart mobility services is being increased according to literature evidence, while carpooling emerges according to empirical evidence from Greece and France, countries of reference of the authors. Moreover, the determination of SC source is a critical issue [3] and in this respect, the identification of the business models that map the value source of the available smart carpooling services is important to realize the potential growth of this market in the reference countries.

The remainder of this work in progress article is organized as follows: section 2 explains the terms that concern this article, while the following section 3 collects and compares the evidence from the reference countries (Greece and France), and some discussion is of the outcomes is given. Finally, section 4 contains some conclusions and future thoughts.

2 BACKGROUND

Smart mobility is one of the major SC dimensions according to several widely accepted SC frameworks and benchmarking models [2]. This dimension has been provided in an attempt for SC architects to specify the appropriate assets (facilities and services) for smart transportation services [1]:

- **Parking Guidance Information Systems (PGI):** they collect information from detectors (loop detectors, machine vision, ultrasonic, infrared, microwave and lasers) and provide parking space information to the drivers.
- **Transit-Based Information Systems:** provides parking space information and public transportation schedules in Park and Ride facilities.
- **Smart Payment Systems:** they employ advanced payment technologies (contact methods (debit, credit cards),

contactless methods (smart cards, RFID cards), and mobile communication devices (mobile phone services)) to replace conventional parking meters.

- **E-parking:** combines parking reservation and payment systems. A driver could check the availability, reserve for a parking space at a given destination, and pay when leaving.
- **Automated Parking:** it is a computer-controlled system that allows customers to drive their cars into a bay, lock their cars, and let the computer do the rest.
- **Car or bike sharing:** it concerns a fleet of cars or bikes, which a user can pick up from specific places, use them and return them to specific spaces too.
- **Carpooling:** it's a system which enables drivers to communicate their destination with others that can pick up and deliver. Participants share the trip's costs.

Beyond the above smart mobility services, several mobility innovation can be located [4]: public bus route calibration to clients' positioning has been tested and has become a usual public transportations mean (i.e., Seoul OWL bus [1]); car reservation and rating via platforms like Uber®[2] that connect drivers and passengers has become a novel dominant market, which affects traditional ones; transportations' mean selection (i.e., Kapsch Fluidtime®[3]) is another smart application, which enablers travelers to select the appropriate means for their trip among others via several criteria (i.e., trip's duration and cost etc.). The above products are only some of the available SC mobility technologies, which are all based on different business models.

3 RESEARCH METHODOLOGY

Carpooling service is being growing and more and more passengers appear to find it an attractive, alternative mean for their daily or occasional mobility. In this regard, the authors attempted to locate and compare the carpooling services in Greece and France as reference countries, due to their origin and their access to empirical evidence. Moreover, the corresponding business models were tried to be identified and the outcomes are summarized on Table 1.

Table 1: carpooling services in the reference countries

Carpooling service	Payment method
Carpooling.gr[4] (Greece)	Open/Free
ShareMyCar.gr[5] (Greece)	Proportion per passenger's cost
Karzoo[6] (France)	Open/Free
Blablacar[7] (France)	Proportion per passenger's cost
Wever[8] (France)	Open/Free
Instant System[9] (France)	Proportion per passenger's cost

[1] http://english.seoul.go.kr/seoul-expands-late-night-owl-bus-service-areas/
[2] https://www.uber.com
[3] https://www.fluidtime.com/
[4] http://carpooling.gr/
[5] http://www.sharemycar.gr/
[6] http://www.karzoo.eu/en
[7] https://www.blablacar.co.uk/
[8] https://www.wever.fr/
[9] http://www.instant-system.com/fr/index.php

The first outcome is that carpooling has become an alternative platform for smart mobility and alternative applications simplify passengers' access to the service. This service brings together providers (drivers) with users (passengers), which meets the innovative marketplace business model [5, 6] (like Airbnb and Uber). Moreover, different types of data are being produced during service execution (although this type of smart mobility service does not appear directly in crawling [4]).

4 CONCLUSIONS

This article is a work in progress, which the authors aim to investigate further and evolve. In this respect, the authors started from presenting alternative smart mobility services/products that are being offered in the SC context, which is an emerging market. Moreover, they grounded the problem and the corresponding research questions: RQ1 aims to locate alternative smart pooling services that exist today. The authors started from their countries of reference (Greece and France) and determined that 5 different smart pooling services are being offered (Table 1), some of which (Karzoo and Blablacar) to concern international smart mobility products. The authors aim to proceed with the identification of competitive ones in other countries and compare them in detail.

On the other hand, RQ2 aims to detect the business models that lie behind carpooling smart services. The ones that have been located in this paper (Table 1) seem to follow alternative payment methods, while they all collect passengers' and trips' data. All of them bring together service providers and users, which leaves space to consider the innovative marketplace business model to be the appropriate one. Nevertheless, it has to be investigated and justified further.

REFERENCES

[1] Leonidas G. Anthopoulos. 2017. Understanding Smart Cities: A Tool for Smart Government or an Industrial Trick?. Springer International Publishing. DOI: 10.1007/978–3–319–57015–0
[2] Leonidas G. Anthopoulos, Marijn Janssen, Vishanth Weerakkody. 2016. A Unified Smart City Model (USCM) for smart city Conceptualization and Benchmarking. International Journal of e-Government Research (IJEGR), 12(2), pp. 76-92.
[3] Leonidas Anthopoulos, Panos Fitsilis, Christos Ziozias. 2016. What is the Source of Smart City Value? A Business Model Analysis. International Journal of e-Government Research (IJEGR), 12(2), pp. 55-75.
[4] Vaia Moustaka, Athena Vakali, Leonidas G. Anthopoulos. 2018. A systematic review for smart city data analytics. ACM Computing Surveys (under review)
[5] Karl Tauscher, Sven M. Laudien. 2017. Understanding platform business models: A mixed methods study of marketplaces. European Management Journal, DOI: https://doi.org/10.1016/j.emj.2017.06.005
[6] Amel Attour, Pierre Barbaroux. 2016. Architectural knowledge and the birth of a platform ecosystem: a case study. Journal of Innovation Economics & Management, 1(19), pp.11-30