Demonstrating automated road transport systems in local contexts: the case of CityMobil2 in Trikala[1].

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Keywords: driverless buses, CityMobil2, Automated Road Transport Systems, Large Technological Systems, cultural fitting of technology.

1. Introduction

The topic of the present text is located in the thematic of social inclusion and mobility. More specifically, we will discuss aspects of an on-going case study which involves two main actors. First, the mobility technology of Automated Road Transport Systems (ARTS), which in our particular case has the form of driverless buses. Second, a European project aiming to test and promote this technology as feeder to existing means of transport, in other words to be used as Demand Rapid Transport System (DRTS) for "last mile connection".

Our endeavor intends to contribute to a theoretical understanding of the introduction of new mobility technologies into social contexts. On this direction, we focus on a concrete contemporary case study: the demonstration of the CityMobil2 driverless buses on a local context, that of the Greek city of Trikala.

This attempt is built on the following three sequential points:

1. Mobility systems are merely sociotechnical systems
2. The development of new technologies demands the assemblage of material and organizational resources
3. The demonstration of driverless buses in the Greek city of Trikala included cultural contextualization, or as we conceptualize it: a de-laboratorization process.

[1] We would like to thank sincerely the participants of the research for their time to discuss with us, providing us in this manner with the empirical material on which this contribution to the conference builds on.

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2. Beyond the technical

In order to support the claim that non-technical factors are of crucial importance on the issue of technological implementation, we shed light on two historical cases where the introduction of new mobility technologies was unsuccessful.

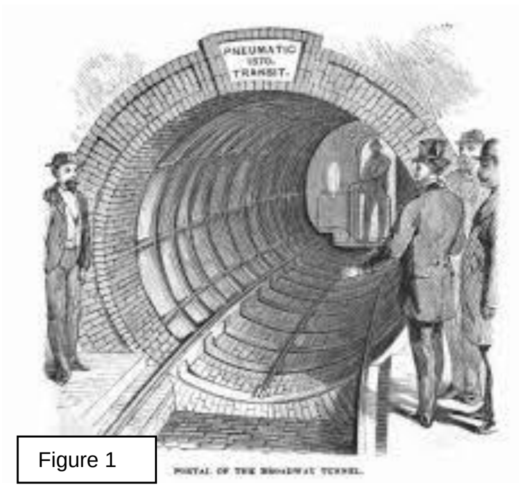

Figure 1

The first one comes from the 19th century US and it could be characterized as the forefather of Elon Musk's Hyperloop. It was the Beach Pneumatic Transit (Figure 1) which was intended to operate in the underground of New York, traveling in a vacuum tube with the push of a large fan (Beach, 1868/2005). Its function was based on the principles of a vacuum train (hyperloop), and part of the era's media were defining it as the next generation of mobility (Beach, 1870). Though, the hostility from local political authorities as well as from organizations like the postal service, combined with the fact that it never escaped the character of a public attraction[3] delayed (?) its introduction as a mass transit system (remains to find out in the future).

Figure 2

The next historical instance of mobility systems is Aramis (Figure 2), which took place between 1969-1987. Aramis was a Personal Rapid Transport System (PRT) resembling the DRTS, which was designed to provide individualized mobility services by small cars running on an extended network of train rails. At the time, it was regarded as a very promising technology, possessing the advantages of private cars while erasing the disadvantages of mass transport. According to Latour's research on this failed endeavor, two major reasons resulted to the cancelling of its introduction to the mass transportation system of Paris. On the one hand, was the lack of organizational coordination,

[3] http://www.nycsubway.org/wiki/Beach_Pneumatic_Transit

while on the other, the fact that this technology came out of fashion before its implementation (Latour, 1996). What we could further complement on the above is that the isolation of Aramis to its testing field did not give it a chance to claim a place into the existing urban mobility structure

As the aforementioned examples suggest, technological development and implementation are two processes which are characterized by the omnipresence of:

- political priorities
- cultural perceptions
- social realities

By informing our case with this remark we attempt to answer to the following question:
How was the demonstration of CityMobil2 automated buses implemented by the local authorities in Trikala?

For this purpose, we employ Hughe's Large Technological Systems (LTS) as a working concept to highlight the special character of our case. Briefly, his theory builds on a System Engineering perspective, including aspects both of Mechanical Engineering and Engineering Management. According to the LTS theory, successful innovation demands effective coordination of material and organizational resources (Hughes, 1987).

3. CityMobil2 in Trikala

CityMobil2 was a multi-stakeholder project funded by the EU's 7th Framework Programme for research and development with main objectives: to inquire and promote citizens' acceptance along with the assessment of economic and legal aspects concerning the technology of ARTS. To do so, CityMobil2 organized demonstrations in various cities of the European Union.
The urban context we study is the city of Trikala located in the middle of continental Greece. It is an agricultural and touristic city of 80.000 residents. The city has been nominated three consecutive times (2009, 2010 and 2011) as one of the 21 most intelligent communities worldwide (CityMobil2, 2016). Regarding the cultural background, very eminent music figures of the Greek traditional folk genre originated from Trikala, denoting and signalizing the music tradition that the city possesses.

Figure 3

Concerning the artifact of the demonstration (Figure 3), it is an automated electrical vehicle for passenger urban transport, equipped with advanced GPS and sensors. The bus can drive with a speed of 20km per hour at most on a separate traffic lane. It has the capacity to transport up to 10 people. During the demonstration, it was monitored from a control center by a human agent, who was able to intervene by stopping the vehicle if that was necessary.

4. Implementing the demonstration

There are three key facts regarding the demonstration. First, it was opened to the public from November 2015 to February 2016, preceded by a trial period. Second, the project was carried out with the collaboration between local (e-trikala development agency, local government), national (ministries, Technical University of Athens) and EU partners (CityMobil2, Industrial developer of the vehicles). Third, Trikala was the only city were the demonstration took place in the city center, thus rendering Trikala the pilot of the project.

Applying LTS in our case we trace technical as well as organizational aspects that were fixed and reconfigured. On the technical level, the following actions were taken up:

- creation of an exclusive bus lane
- removal of parking spots from the city center
- development and installment of a sub-system of smart traffic lights that would give priority to the bus
- digging of a network of fiber optics.

On the organizational level, the below processes took place:

- reinterpretation of the legal framework and specifically of the conceptualization of the driver (see United Nations, 1968, p.11).
- negotiation and issue of plates from the Ministry of Transport
- acquirement of car insurance from a respective company for the case of an accident

The above suggest that i) the bus needed a lot more than invisible electromagnetic signals to find its way in Trikala, ii) as every LTS (or quasi LTS) it needed material and organizational coordination and iii) the adjustments, according to the turbulence they caused, manifest the disruptive character of the artifact in its struggle to fit in the existing mobility system.

Beyond the necessary technical and organizational arrangements, what also took place was another, diverse set of activities. To start with, the buses had names; in particular they were named after distinguished local music legends. Moreover, popular songs exclusively of the above artists were being played during the routes. Finally, there was organized an exhibition under the title "The car in Ancient Greece", powered by a renowned museum of ancient Greek technology.

Considering these, the case moves further from merely infrastructural and institutional concerns. More specifically, the vehicles were dressed up with and were transmitting recognizable signs. Hence, particular cultural resources were employed, contextualizing the artifact into the local surroundings.

5. Towards a theoretical contribution

To summarize, the demonstration was implemented: i) through a lot of technical fixing/configuration of the urban traffic environment/system and ii) by employing cultural resources (real or invented).

An attempt to reconstruct the story reveals that the artifact was neither merely subjected to mechanical engineering parameters nor solely depended to sealed organizational negotiations. Not only did the bus escape these contexts, but it was also rendered carrier of recognizable signs. In other words, it was contextualized in a cultural narrative. We define the above process as *de-laboratorization*.

Concluding, while LTS describes the techno-organizational fitting of a technology to society, de-laboratorization refers to its cultural fitting. This concept could contribute to stabilize the disruptive aspects inhibiting the base of a quasi LTS. Thus, de-laboratorization could be the source for legitimization that a technological introduction implicates, independently of the social inclusion premises it holds.

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Figure 2. Retrieved from: http://www.podcar.org/Editor/2014/11/is-london-smarter-or-paris

Figure 3. Material collected during the fieldwork.