Business exploitation of AUTOPILOT project

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1 Objective

Innovation doesn't only require new technologies and products, but also sustainable business models. In the European knowledge economy, production and services are based on knowledge-intensive activities. These activities contribute to an accelerated pace of technical and scientific advance.

Therefore, an important part in the innovation activities in the AUTOPILOT project is the exploitation of business opportunities. Exploitation will encourage and facilitate the sustainability of the AUTOPILOT results as well as demonstrate the potential of IoT technologies to create new business opportunities and foster the entrepreneurship within the autonomous driving use cases which are being tested at the pilot site level. The business processes and models at the six Europe-wide pilot sites are validated with the KPIs (Key Performance Indicators) the dependability, robustness, resilience, adaptability and sustainability. Exploitation subsequently facilitates the large-scale uptake of these business solutions across different cities in Europe.

2 Exploitable input

For evaluating the results, the partners involved in the work started to conduct first results in general market research. These results were matched and discussed with stakeholders inside and outside the project environment at the local pilot sites events. As every pilot site organized at least one public event the strength and weaknesses/ opportunities and threats of the pilot site specific use cases could be evaluated. Dedicated questionnaires to validate KPIs relating business processes at the pilot site have been filled by each pilot site partners, showing their exploitation interest.

3 Expected output

The exploitation of AUTOPILOT is going to develop a generic **exploitation plan** and roadmap per scenario which exploits the large-scale deployment, the time to market of the needed technology, the policy and regulatory framework as well as identifying new markets, new customers and new strategies for the stakeholders. It shows the KPIs for the dependability, robustness, resilience, adaptability and sustainability of the piloted technology at the pilot sites.

Direct benefits from the project results for the consortium and its individual partners are stated. Furthermore, the **lessons learnt** and strategies during/ after the project and the sustainability (e.g. the follow-up initiatives) are being mapped.

Exploitation will transfer some of the aspects of the pilot site to give an overview of how these future mobility services with use cases of AUTOPILOT could look like, and give recommendation for business exploitation strategies for further uptake

The goal is to evaluate **four upscaled scenarios** derived from the use cases and services at the pilot sites. A business case is a sustainable, upscaled implementation of the piloted scenarios. D5.5 will cover a "start-up" business approach, meaning that the service is run by a new ITS start-up with a low number of employees and fast implementation.

4 Résultats

4.1 Services deriving from AUTOPILOT

The exploitation of the automotive services must consider **a strong authentication of the users** for two reasons: the value of assets managed by the platform and affected by service requests from end-users is high and may potentially have effect on the environment as well, and it is expected there will also be legal obligations of the operators to provide information about end-users in the same way as it is currently provided for banks (KYC).

The **identity derivation** developed in AUTOPILOT is a specific feature **providing identities with high level of assurance** that may be requested for critical use cases. **This is higher than conventional logins used** for most mobile applications and may be a differentiator for the deployed service in the same way as advanced security scheme provided. The authentication service itself is not necessarily linked to the IoT services and it may be deployed as an independent application or existing KYC solution may be used if it implements all required features. It is an opportunity to deploy the service and provide it to smart city services or existing organizations for a transaction fee. Good example of similar approach are private authentication solutions used for both public and private services in Scandinavia (Bank ID). It is expected that newly deployed solutions would like to leverage on existing authentication solutions (e.g. social networks) in order to get large user base without need to register. The success of the newly deployed authentication solution depends on friction during user enrolment, user experience and on the way the solution is presented to end users with regards on security and privacy.

There are **new specific threats** to business exploitation of digital document-based identities: vendors of mobile phones. It may be expected that in near future there will be more extensive support of digital and derived documents directly in mobile OS which means that there will be a change in the landscape. The mobile API would be available for any App developer and would provide sufficient level of security. The document issuance would still be in hands of government organizations, but App may leverage on the API and existing documents. This approach has two weak points: the government (and subsequently App developers) **would need to convince the end users** that this concept is not used for tracking or spying on the users and **accessibility**. Even though the API may be available on all operating systems of defined version the real security may vary depending on mobile phone vendor. This means the government would need to deal with a situation that security of documents may not be aligned for all the users. These two weak points **provide an opportunity for Identity providers to offer their solution** with clearly defined business plan, security and privacy rules.

With the increasing adoption of IoT, **new security challenges** need to be addressed as the threat of attacks is moving from the digital to the physical world, leading to even more severe safety implications. In IoT's adoption, especially in AUTOPILOT, security is critical because we want to make sure we can trust data flowing between sensors, actuators, rules engine and the other components of the architecture.

Cyber security features in IoT augmented AD context can be grouped in two broad categories which can impact safety and national security:

1 **Prevent an attacker** form compromising the vehicle (which concerns safety, availability, confidentiality, integrity);

2 **Allow law enforcement to block a vehicle** even while in manual driving mode, to prevent from causing damage (terrorism, driver loses control, ...)

While taking part to the Autopilot project Thales Italy further developed the technologies related to autonomous driving adapting them also in the Light Rail Transport sector.

Thales Italy addresses **an innovative vehicle internal IoT network architecture based on the concept of elasticity** aiming to form the technological basis for the advancement of urban mobility systems through the realization **of autonomous tram concept**. The architecture is based on the integration of sensors, a network and computing platforms, which need to be protected, within the vehicle. This solution allows the delivery of two essential functions for autonomy:

- **the NGAP** (Next Generation Autonomous Positioning), an innovative positioning solution allowing the tram to localise itself in the surrounding environment with the benefit of minimising the number of sensors on ground.
- **the ADAS** (Advanced Driver Assistance System), which implements a collision warning system to support the driver in detecting and recognizing obstacles around the tram close to the track line.

4.2 Business deriving from AUTOPILOT

With the rapid development of autonomous vehicles, it is necessary to explore new business opportunities, especially under the assistance of internet of things, which accelerate the penetration in vehicle markets. **Automated valet parking** and **shared autonomous vehicles** will be the most active cases promoted by autonomous driving. The development of autonomous vehicles (AVs) are primarily driven by the need for an optimal transport system and high quality of life

According to the previous studies (Greenblatt and Shaheen 2015; Bagloee et al. 2016), the adoption of AVs can contribute to decrease in energy and fuel consumption, pollution and traffic congestion, whilst increasing safety and transport accessibility, to some extent. As indicated, AVs will be a predominate point of **reducing energy consumption and emissions** for road transport, with an **estimated reduction of approximately 40%-60%.** Furthermore, it has been estimated that through introducing AVs**, traffic jams can be reduced, and travel time can be saved**, due to increased road capacity and improved traffic flow from better utilized transport infrastructure

Many of the uncertainties and negative impacts that are predicted around AVs could be mitigated by the increased integration with the internet of things (IoT). IoT is a promising network system which communicates and transfers data or signal via a variety of smart devices (e.g. sensors, cameras, mobile phones) through cloud-based platform, without any interference from human. Current development focuses on the contribution of IoT to the functionality of AV **guidance system**. For example, to track the vehicles' locations in real time effectively, Global Positioning System (GPS) positioning devices, Global System for Mobile (GSM) and General Packet Radio Service (GPRS) **communication systems** with the control units were adopted and installed on the vehicles.

The development of AV systems based on IoT presents a huge potential for **improving people's quality of life** in an effective way, which can be achieved by different activities, such as automated valet parking (AVP), shared autonomous vehicles (SAVs). SAVs for example, includes a variety of different mobility service modes, such as station-based, free-floating, and peer-to-peer car sharing. The test about free-floating car sharing service was conducted in London, finding that 37% of users clearly indicated that their attitude on private vehicles ownership has been affected by the adoption of free-floating car sharing. Thus, it presents a potential to decrease the number of private cars and lead to an eco-friendlier environment for the public.

Based on the reviews of the current business models about autonomous vehicles and IoT, few studies are conducted on the **business models of AVP and SAVs assisted by IoT to date**. However, the analysis of business model is quite important for all the stakeholders

Preliminary conclusions show, in the new business models, AD package and service providers of AVP and SAVs are new stakeholders, which link the car owners, car industry, also car parking for AVP and tenant for SAVs. The existence of AVP and SAVs will bring about more jobs opportunities and increase the revenue of the nations. IoT plays an important role in promoting autonomous driving so that it provides much more convenience for car users. The adoption of IoT technology also promotes the evolution of the current business models related to AVs.

Shifting markets and revenue pools

1. Driven by shared mobility, connectivity services, and feature upgrades, new business models could expand automotive revenue pools by ~30 percent.

2. Despite a shift towards shared mobility, vehicle unit sales will continue to grow, but likely at a lower rate of ~2 percent p.a.

New competition and cooperation

3. Within a more complex and diversified mobility industry landscape, incumbent players will be forced to simultaneously compete on multiple fronts and cooperate with competitors.

4. New market entrants are expected to initially target only specific, economically attractive segments and activities along the value chain before potentially exploring further fields.

Plus d'informations :

info@autopilot-project.eu

https://autopilot-project.eu/