PhD in Management, Production and Design

Research Title: Innovative HMI system for “Pop.Up” mobility concept

Funded by	Italdesign

Supervisor	Italdesign: Ralph Hermann Schuenemann, (IG/EE), ralph.schuenemann@italdesign.it PoliTo: Prof. Paolo Marco Tamborrini, PhD Andrea Di Salvo paolo.tamborrini@polito.it andrea.disalvo@polito.it

Contact	www.italdesign.it; http://www.italdesign.it/project/popup/

Context of the research activity	The research activity is characterized by two main themes which refer to sustainable mobility and in particular to Interaction Design, in its components called User Experience Design and User Interface Design. The project proposed by Italdesign, Pop-Up, aims, in fact, to provide a strongly disrupting concept that integrates not only the peculiarities of the Autonomous Driving, which are nowadays widely discussed, but also a futuristic and achievable vision of the mobility system. Up to now the scientific community and the car manufacturers have focused on researches that are related on the one hand to the level of automation reached through technologies, on the other hand published results underline the contrast between keeping the driver inside the control&command loop and the management of infotainment systems. In this project Italdesign and Polito aim, instead, to go beyond the single concept of management of interfaces, in order to create a completely different mobility experience. In this way the research will consider: services, already present in the scientific literature; concepts developed by companies rather than car manufacturers that have been studied for all the occupants of the vehicles. Services will deal with sustainable urban mobility considering it as a complex set of quantitative and qualitative factors able to enhance the experience and the

	comfort of the users during the commuting. One of the most interesting aspects is to explore smart services and interfaces through the data information collected from users behaviour, vehicles, mobility, city info-system, IoT. Services, for example, will be studied not only to suggest more sustainable behaviour modes but also to structure different social and pragmatic/useful uses of vehicles in the urban mobility overall system. These smart service applications will be analysed as an integration of users daily personal smart devices, such as smartphones and wearable technologies, and they will be cross-contextual oriented in order to be adaptable to different modes and contexts of use. One of the purposes, in fact, is to avoid or mitigate the time gap that actually interrupts the activities of the users, no matter if he or she is working or listening to the latest news or communicating with his/her family. These services could also create interactions between the hosts of the vehicle in different modes like privacy-mode, community-mode, family-mode etc. Consequently all the interfaces (the embedded ones rather than the portable ones) should be critically analysed into different categories like, for example: adaptability to the user's conditions and real-time needs; adaptability to the surrounding context; adaptability to the vehicle status; user personalization. The adaptability to the user's conditions parameter refers to the capability of the interface to modify itself directly monitoring the human's physical-emotional conditions. Using personal devices, like wearable ones or smartphones, that include sensors, the status of the user can be communicated to the vehicle. In this way the interface system can change in order to show useful information or advices to the people on board, or modify the hierarchy of the displayed data, rather than avoid useless information. The adaptability to the surrounding context parameter refers to the connectivity of the vehicle to the whole mobility system via smartphone or other connected devices. In this way data coming from the context can be inserted into the interface to help the decision process. The adaptability to the vehicle status parameter refers to the possibility of modifying the interface to focus the attention of the user only on a defined set of data. This includes safety critical parameters but also data connected to a proper and sustainable behaviour. Finally as the vehicle is becoming more and more a shared means of transport, users need to personalize the interface in order to transport their visualization on different vehicles.

	This concept preserve, of course, the safety critical data visualization and can be explored in order to design a brand user experience.

Objectives	The research has several goals to be faced and developed during the three years research. First the candidate will create a system of actors who will relate with the project in different modalities. This first step is essential to understand needs and future desiderata of the actors in relation to the new mobility system, following the methodology of Human Centered Design . To follow the candidate will provide an analysis of possible applications in terms of innovative technologies, contents, interactions, languages related to sensory and cognitive perception. At the conclusion of this phase, the candidate will create the architecture of the system interfaces connected not only to the Popup project but also to the system like, for example: personal devices, services that will control and monitor, actors who bother to collect data for the management of the complex system. At this point the project will proceed with the design and prototyping, in close collaboration with Italdesign that owns skills and technologies to realize virtual and physical mock-ups. Specifically, the verticalizations of the project will be agreed between Italdesign and PoliTo's supervisors in order to pursue common goals that will enhance both the industrial process and the scientific research path. The last stage of the process will be the validation of the results, meaning the followed process, the quality of interaction and the user experience, through tools agreed upon with the company.

Skills and competencies for the development of the activity	The candidate should have the skills that characterize the culture of Design and specifically the ones related to Interaction Design and Innovation Design. He or she should be able to handle the methodologies and the tools, as well as the necessary software to the representation of the project in order to create from the first wireframes, to the static and dynamic interfaces. It will be considered of particular relevance the ability to simulate the behaviour of an interface through the use of communication means such as, for example, the video.