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Webinar on Smart Cities—Q&A

In terms of Smart City research, if you had to pick one key enabling technology, which one would it be?

Christos G. Cassandras: Given my personal interest on the transportation aspects of Smart Cities, my choice would be the emergence of Connected Automated Vehicles (CAVs). More generally, "wireless connectivity."

Carlo Alberto Nucci: I would add that the smart grid—and smart grids related technologies—Is one of the key enabler for the implementation of the concept of smart city.

Gilles Betis: While empowerment and engagement are known as enablers to change behaviours and to allow new services to work as expected, civic techs are very important to be developed. Civic techs is a general word to cover these aspects, from collaborative economy to e-governance, crowdfunding or social networks (see The Knight Foundation, The Emergence of Civic Tech: Investments in a Growing Field, December 2013). Key technologies in this area are cybersecurity and blockchain, to get confidence and resilience.

We have many wildfires this year. Drones have been very helpful for first responders. Traffic optimization would have been very helpful for evacuees and first responders.

Christos G. Cassandras: There is indeed a whole community and a branch of network optimization focusing on optimal evacuation problems and related technologies that can assist their solution implementation. The use of drones (or other mobile sensing devices) would be one of those technologies.

Carlo Alberto Nucci: I agree that drones can be devices helpful for first responders, but it is probably the optimization software behind them – that needs to be developed having in mind also the concept of system resiliency - which is even more important.

Gilles Betis: Drone technologies have to be considered as a branch of robotics. In the case you mention it is useful to perform a job which is not directly possible to be done by a human. What's at stake is to develop more and more autonomous behaviours for drones.

Where do you think governance stands in terms of priority, when we want to achieve sustainable smart cities?

Christos G. Cassandras: I defer to Gilles and Carlo Alberto on this, but I would say that it should rank at the top or very near. In my experience, we often develop amazing technologies for Smart Cities but their deployment is impossible without proper policy implementation and economic incentives.

Carlo Alberto Nucci: I fully support—and concur with—Christos opinion. This has been clearly the case of PV systems in Italy.

Gilles Betis: Governance has a key role in smart cities. Innovation rely on different aspects: technology, societal and economical, and finally political innovation. Political Innovation means that new types of governance has to be found. The role of governments is the same regarding handling a vision and managing the execution of this vision until it is implemented and during operations. Political innovation stands in finding the right incentives and the right regulations. Regarding the vision, the identification of the problems, the design of the solutions and the operational management, governance bodies in the smarts cities need to become animator of a participative process, involving all the actors of the city ecosystem: city users, economical actors (entrepreneurs), urban service providers. Problems are so complex and so specific to the context of each city, that no cut-and-paste can be effective and efficient, and need to be handled as an innovation process to provide the city with customized or original solutions.

What is the role of PPP in smart city development?

Christos G. Cassandras: PPP could stand for Point-to-Point Protocol (in a communication context) or Public Private Partnership. Assuming the latter, again I defer to Gilles and Carlo Alberto, but my experience is that without such partnerships any progress made would be ephemeral and unsustainable.

Carlo Alberto Nucci: Indeed, one of the conclusions of my presentation, which I did not have the time to go through in order to stay within the available 15 minutes, reads: "Academics with different background not only need to cooperate with each other and with industrial players more than for any other technical challenge, but they also need to interact and cooperate with local municipality governances and regional communities."

Gilles Betis: Public-Private-Partnership is one of the different ways a city can fund, design and run solutions to improve infrastructure, services, etc. This is generally a package that commits the city in a multi-year or multi-decade contracts towards a service and industrial company or consortium. This is not

the only one, since cities can also manage the whole process by themselves, internalizing some tasks and contracting other tasks.

Due to the complexity of the problems to be solved, many cities think that PPP is a good way to do things when internal skills are not developed enough. However, defining and contractualizing a PPP is also very demanding for municipal team's skills, or there is a huge risk that the PPP will be catastrophic for the city when there is a change in the context or when usages and business models evolve (see the Autolib case—shared electric cars—recently in Paris).

At the end of the day, what is the most important, independently of the choice of the contractual arrangement, is the maturity of the municipal team, elected people and managing employees. Training and coaching is a prerequisite of successful projects for smart cities project's development.

For decentralized control, all the CAV have interaction with each other. If we have fault how we could recover them?

Christos G. Cassandras: It is a very valid question and it is one that applies not only to CAVs but also other similar IoT-like applications. Decentralization helps (since it limits critical operations to a single CAV and reduces the chance of a failure), but the issue remains. There are several researchers that are working on this very problem, but it is not one where I myself am an expert. Certainly, the multi-agent system model you mention is applicable as a starting point but I don't have any further concrete details to provide you with. If you are interested in this problem and have the expertise to study it, I would definitely encourage you to do so.