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## Creativity in the Smart City

**Abstract :** Miniaturization of microprocessors created the possibility to embed information technology in the built environment. This pervasive technology provides cities with a potential to become smarter. Challenges that cities are facing nowadays have led to interest in smarter cities and the role that creative people should play in the smart city is often emphasized. But is the smart city infrastructure really ready to involve the creative industry and creative citizens?

### Information technology and the built environment

In the eighties of the previous century, computers started to change the way we live and work. In its turn, the Internet changed the way we use computers. And more recently, the miniaturization of microprocessors changed it even further. In this way, step by step, information technology (IT) has been forming the basis for a new era: over the past decades, we slowly moved from the era of the stand-alone computer, via the era of the networked computer to the era of pervasive computing.

Because of these developments and especially the miniaturization of technology, more and more technology is being embedded and carried around in our built environment, from interiors of buildings to public space. The roles technology can play in and for the built environment are diverse, from regulating traffic based on air quality measurements in order to maintain a certain level of air quality, to intelligent camera surveillance, to citizens that can influence the lighting in a public space. These are examples of technology that is aimed at making *direct* improvements to spaces, in the form of ambient intelligence or pervasive computing.<sup>1</sup> However, technology can also help more *indirectly* to make improvements to cities. For instance, by automatizing data collection that gives insight into aspects of the city such as the use of a shopping area in the center of a city. With a combination of sensors and apps, data can be collected about how many people are entering the area, preferred routes, what people are doing there with whom and how they appreciate their stay. Civil servants, citizens, architects, urban planners and other creative people can use these data to enhance the quality of the city.

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<sup>1</sup> Whether the improvements intended with pervasive computing solutions are actual improvements is often called to question, especially from a privacy perspective.

## **A new role for creative people**

In the nineties of the previous century architects started to pay attention to the role they could play in the digital world, in order to improve the digital spaces people started to inhabit, for instance in games and simulations. More recently when the era of pervasive computing emerged, a new and almost opposite perspective came up. Architects and urban planners started to pay attention to the role digital technology could play in the built environment. And now, also for other creative people, both technical and non-technical, both professionals and enthusiastic citizens, the possibilities to contribute to the smarter cities that emerge because of embedded technology seem almost inexhaustible.

There are several reasons why creative minds need to play a role in the smart city. Among those reasons is the fact that the challenges cities are and will be facing during the current century, such as urbanization and problems caused by environmental changes, require some seriously creative solutions. Another reason is the fact that at the moment in many countries municipalities do not have the money nor the right kind of employees for the kind of technical and creative problem solving that is required.

## **What is needed to let creative people take on a central role in the smart city?**

Some of the cities that currently carry the label smart city have mainly been shaped by large multinational IT companies according to a fairly closed model. However, definitions of smart cities often emphasize the co-operation between municipalities, citizens and companies. For this "partnership" or "engagement" model, more open and democratic smart city infrastructure is needed.

That is what we are working on and experimenting with in our program on open data and smart cities. In this program we carry out several projects together with creative and technical companies and municipalities. The projects are aimed at improving cities by involving creative and technical companies and, last but not least, citizens.

An important basis for the program is provided by an open platform called FIWARE. This platform was developed in a European project of the same name. In 2015, over 30 cities in Europe signed a letter of intent to use the platform as a basis for their smart city and open data initiatives. The name of this European initiative is "Open & Agile Cities". One of the cities we work with, Enschede, was among the first cities in the Netherlands to sign this letter of intent, together with larger cities such as Amsterdam and Rotterdam.

The platform allows the generation, collection, publication and querying of data, and more. It includes an application programming interface (API) to make the stored data easily available for companies and citizens for creating useful applications.

In our program we do not only address the possibilities of the direct use of the data for applications. We also study the possibilities of visualized (real-time) data in design processes, including co-creation processes, for well-informed improvements to the city.

Besides implementing and experimenting with the FIWARE platform and studying the possibilities it creates for data-driven creative solutions we investigate other types of open infrastructure. For instance, hardware that provides creative people with a foundation for their creativity, such as street furniture and surfaces with integrated technology that can be used for purposes such as routing, information or entertainment.

With our program we aim to enhance and promote the democratic potential of smart cities and open data and, last but not least, to tap into the immense problem-solving and wellbeing-enhancing potential of the creative industry.