

## INDUSTRIAL HERITAGE IN THE SMART CITY CONTEXT

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### Abstract

*Since the concept of the smart city emerged until now we have gotten to clearly associate it with technology - ICT (information and communication technologies) as the driving force for urban transformation. The paper tries to explain the more broader, holistic significance of the term and to place industrial heritage reuse in its context: (how) can industrial heritage reuse contribute to making a city smart(er)?*

**Keywords:** smart city, postindustrial city, urban regeneration, industrial heritage

### 1. Introduction

Since the concept of the smart city emerged until now we have gotten to clearly associate it with technology - ICT (information and communication technologies) as the driving force for urban transformation. The paper tries to explain the more broader significance of the term and to place industrial heritage reuse in its context. The main question we rise is: (how) can industrial heritage reuse contribute to making a city smart(er)?

### 2. Materials and Methods

In order to better place the subject of the industrial heritage into the broad context of smart cities, we must first try to understand the broader meaning of smart city concept, by reviewing the existing literature. We will then try to emphasize the industrial heritage role in the smart city development.

### 3. Smart City concept

Although the term "smart city", emerged in the 1990's, has become increasingly popular in the past decade in international policies and academia, there is still an ambiguity around this concept. Reference [1] gather in their paper 23 different and complementary definitions of what a smart city is, from the scientific literature. Therefore, this paper does not aim to bring a new definition for this context, but tries to present the broader picture for its understanding.

In the context of urban competition amongst cities, the concept of smart city represents a marketing tool. It may then be used with the various understandings, more or less holistic, by policy and

decision making urban key actors in order to attract investments, tourists, workers, or in order to promote different investments amongst communities.

The bibliographical references around the topic of smart cities revolves a lot around Hollands' theories. This author's research gave birth to many directions of analysis, but from his point of view, there was the intelligent city, that could become smart-er by following a more neo-liberal pathway rather than a neo-conservative one [3]. Throughout the vast work of Komninos's regarding intelligent cities [9], [10], four main components have been stated, those being:

- *the application of a wide range of electronic and digital technologies to communities and cities*
- *the use of information technologies to transform life and work within a region*
- *the embedding of such ICTs into the city*
- *the territorialization of such practices in a way that brings ICTs and people together so as to enhance the innovation, learning, knowledge and problem solving that the technologies offer.* [3]

In order to talk about smart cities we must also take into consideration the triple helix model: university – industry – government. The dynamic selection process taking place among institutions is defined by the way that they interact with each other [13] - in the eastern regions, for example, a type of innovation in which traditional universities support the development of local infrastructures [11]. A very good example of such an approach would be Krakow University of Technology, and so Krakow is a city that transparently reflects the triple helix model,

through this University in particular. “*The triple-helix model allows us to recognise that cultural development, however liberal and potentially free, is not a spontaneous product of market economies, but a product of the policies, academic leadership, and corporate strategies that need to be carefully constructed as part of an urban regeneration program.* [13]” But, the dynamic of the selection process is not biologically inherited, it is cultural [12], and so it is dependent of factors such as learning or the development of other competencies [13].

The smartness concept has only recently become highly popular in Europe and this high popularity came as a direct consequence of the fact that the “smart city” became an expression of the EU research funding mechanisms. The main engine for European countries where the national research funding is not high is The Seventh Framework Programme for Research and Technological Development and it introduces the smart city in the Energy Policy. This means that the Framework Programme would facilitate the implementation of a SET Plan (Strategic Energy Technology) which provides some funding schemes directly related to the “Smart Cities and Communities Initiative” [15]. Given this EU funding direction we can easily say that complementary to the great opportunity to attract funds for urban development there is also a high pressure for the governments to become more involved with the private sector and to develop sustainable ways of collaboration between the public, the academic and the private sector.

There are three important mechanisms that Vanolo [15] broadly presents in the paper “*Smartmentality: The Smart City as a Disciplinary Strategy*”, that are meant to govern the smart mentality device. These three mechanisms are:

1. Urban Charts and Benchmarking Analysis – this mechanism emphasizes the fact that the city, first of all, is a collective actor and proposes the use of classification techniques with multiple statistical indicators.
2. Merging Public and Private in the Pursuit of the Smart City – on one hand the smart cities are mainly based on technical parameters that cannot be understood by most people and on the other hand the majority of the technological issues are controlled and developed by private companies. So, in order for this mechanism to work the public – private partnerships are implied.
3. The Responsibilisation of the City and the Smart Citizen – there should be a moral obligation of the citizens to behave in a certain way and adhere to the collective project of building a smart city together. A very good example would be the lifestyle choices made towards a greener consumption and towards ecological tourism.

Reference [8] brings forward the fact that there is

no widespread definition of the smart city concept, but that it is rather an optimistic, generally suitable one, for the city of the future.

The research paper *Smart Cities: ranking of European medium-sized cities*, carried out by the Centre of Regional Science at the Vienna University of Technology, the Department of Geography at University of Ljubljana and the OTB Research Institute for Housing, Urban and Mobility Studies at the Delft University of Technology defined six different characteristics of the smart city in the section entitled “Defining smart city” [7]. These six characteristics are:

1. Smart economy – linked to entrepreneurship, innovation, flexibility of the labor market, ability to transform.
2. Smart mobility – accessibility to a local and supra-local scale, modern, sustainable, ICTs, safe transport systems.
3. Smart governance – participatory decision making, transparency, quality of political strategies and public services.
4. Smart environment – lack of pollution, attractive natural areas and sustainable management of the natural resources
5. Smart living – cultural and educational services that rise the quality of life, social cohesion, healthy environment and safe housing, etc.
6. Smart people – a good level of qualification of the human and social capital, creativity, public participation, tolerance.

<b>SMART ECONOMY</b> (Competitiveness) <ul style="list-style-type: none"> <li>▪ Innovative spirit</li> <li>▪ Entrepreneurship</li> <li>▪ Economic image &amp; trademarks</li> <li>▪ Productivity</li> <li>▪ Flexibility of labour market</li> <li>▪ International embeddedness</li> <li>▪ Ability to transform</li> </ul>	<b>SMART PEOPLE</b> (Social and Human Capital) <ul style="list-style-type: none"> <li>▪ Level of qualification</li> <li>▪ Affinity to life long learning</li> <li>▪ Social and ethnic plurality</li> <li>▪ Flexibility</li> <li>▪ Creativity</li> <li>▪ Cosmopolitanism/Open-mindedness</li> <li>▪ Participation in public life</li> </ul>
<b>SMART GOVERNANCE</b> (Participation) <ul style="list-style-type: none"> <li>▪ Participation in decision-making</li> <li>▪ Public and social services</li> <li>▪ Transparent governance</li> <li>▪ Political strategies &amp; perspectives</li> </ul>	<b>SMART MOBILITY</b> (Transport and ICT) <ul style="list-style-type: none"> <li>▪ Local accessibility</li> <li>▪ (Inter-)national accessibility</li> <li>▪ Availability of ICT-infrastructure</li> <li>▪ Sustainable, innovative and safe transport systems</li> </ul>
<b>SMART ENVIRONMENT</b> (Natural resources) <ul style="list-style-type: none"> <li>▪ Attractivity of natural conditions</li> <li>▪ Pollution</li> <li>▪ Environmental protection</li> <li>▪ Sustainable resource management</li> </ul>	<b>SMART LIVING</b> (Quality of life) <ul style="list-style-type: none"> <li>▪ Cultural facilities</li> <li>▪ Health conditions</li> <li>▪ Individual safety</li> <li>▪ Housing quality</li> <li>▪ Education facilities</li> <li>▪ Touristic attractivity</li> <li>▪ Social cohesion</li> </ul>

Fig. 1: Characteristics and factors of a smart city [7]

These characteristics and linked factors contributes to the understanding of the multi-faced aspects of this concept, which is far from being limited to ICT-led urban development.

After it's high-peak, the theory according to which the ICT owns the leading role in the development of a smart city became less radical, showing that the ICT

represents a tool for different components of a smart city, contributing to the connectivity and networking between communities, industries and information. (Townsend apud. Mardacany, 2014, p.3)

Reference [8] states that "*progressive smart cities must seriously start with people and the human capital side of the equation, rather than blindly believing that IT itself can automatically transform and improve cities*", while information and communication technologies is a good instrument for creating smart communities, enhancing their networking, education, participation, possibilities to get involved and influence in urban environment decision making processes and creating opportunities for citizen, community based bottom-up smart initiatives.

Some authors may have an even more radical perspective on ICT- led and business-led models of a smart city, like Mardacany, affirming that these are "*selling a dream that the ICT is capable of resolving all problems of a modern city: install a broadband fibre-optic socket in the cave and it will be converted into a modern house.*"(2014, p.12)

The smart city discourse has common roots with others, like intelligent city, knowledge city, sustainable city, innovative city, creative city, all oriented to an integrated urban development.

The paper "Smart Cities in Europe" [4] finds that the presence of creative class, the level of education and ITC use for public administration are key factors for urban wealth.

"Creative city" represents a global movement in the new economy models (service and knowledge-based, after the industrial economy collapse), promoting new approaches in urban planning. Florida (2004) identifies the creativity as the engine for urban development, through "creative class" (people engaged in science, engineering, education, IT, arts, design, media, education) and the 3 "T"s: - technology, talent, tolerance. The ICTs play a significant role in guiding the "creative cities" to become "smart cities".

#### 4. The smart postindustrial city - industrial heritage reuse in smart city context

When the de-industrialisation emerged, the economy of the cities had to take a turn from the industry based economy to a an economy of services and information, in order to find new means of attract capital and investors. In this context, cities become competitive with each other and urban regeneration programmes begin to take place, in order to promote new urban landscapes, attractive for investments and tourism, with new cultural and social character. Former, derelict industrial heritage played a major role in the process -factories, mills, plants, docks and other decommissioned industrial sites have been transformed into profitable areas for the economy and community – in housing, services, culture, entertainment, education, business etc.

Throughout the evolution of the smart city concept we must keep in mind the previously mentioned component of urban integrated regeneration, which can be achieved by recovering and reuse of industrial areas, which are often situated central, pericentral or near water elements. This has become a common practice in the past decades amongst the competitive cities of the world (London, New York, Manchester, Barcelona, Amsterdam, etc), whose former industrial areas, transformed into new uses, contributes to the economic, social, cultural and environment development.

Smart urban development has been proven to be efficient in fighting urban sprawl (Bronstein apud. Caragliuet all, 2011). Converting derelict industrial areas contributes to cities returning and valorising inside the inner city limits, through integrated regeneration of existing built fabric.

Starting from the characteristics and factors of a smart city identified by [7] - presented in figure 1-, figure 2 shows where adaptive reuse and industrial regeneration can and contribute to creating a smart(er)city.

<p><b>SMART ECONOMY</b> (Competitiveness)</p> <ul style="list-style-type: none"> <li>Innovative spirit</li> <li>Entrepreneurship</li> <li>Economic image &amp; trademarks</li> <li>Productivity</li> <li>Flexibility of labour market</li> <li>International embeddedness</li> <li>Ability to transform</li> </ul>	<p><b>SMART PEOPLE</b> (Social and Human Capital)</p> <ul style="list-style-type: none"> <li>Level of qualification</li> <li>Affinity to life long learning</li> <li>Social and ethnic plurality</li> <li>Flexibility</li> <li>Creativity</li> <li>Cosmopolitanism/Open-mindedness</li> <li>Participation in public life</li> </ul>
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Fig. 2: industrial heritage reuse contribution to a smart(er) city

One of the best examples of industrial heritage regeneration in smart city planning is represented by Barcelona's new 22@Barcelona project - District of Innovation, where 200 ha of industrial areas from Poblenou became a high-tech zone. This area was part of a top-down design approach through an integrated smart city plan. This top-down approach not only lacked community initiatives, but was also criticized, but even so, the citizens came to enjoy all the end-user ICT inclusive services. This is considered to be the most important urban regeneration project, in Barcelona, and also one of the most innovative in Europe, so far [14].

Some of the projects developed in order to improve the innovation sector of the smart(er)-to-be city are: the Media and ICT Center, The Nord Technology Park, the technology transfer center, the business incubator, the smart energy and building efficiency center, a TIC Cluster. All of the above have integrated and re-used the industrial heritage of the Poblenou area but one of the most interesting such project is considered to be 'Ca l'Alie Innovation Centre. 'Ca l'Alie is an old factory that once turned into an innovation center is to be shared by two multinational giants, CISCO and Schneider Electric, both providing the funding for the renovation of the factory. [17]

The building preserves its industrial aesthetics while respecting all the sustainable construction criteria, thus being a self-sufficient building.

## 5. Conclusions

The more integrative holistic understanding of what a smart city represents allowed us to outline in this article that industrial heritage can become an asset in a smart city.

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