9 Knowledge Cities versus Smart Cities - discussion triggered on occasion of the case of Timisoara, Romania

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9.1 Abstract

“Smart City” is a term which denotes a current “hype” in characterizing advanced cities being equipped with up-to-date ICT infrastructures. This article aims at investigating the difference between a city defined to be smart and a city which is profiled as a knowledge city. Starting point is a presentation on Timisoara, Romania, presented as a template of a Smart City at the 2015 and 2016 NETTIES conferences. Reflections also include the example of Vienna, Austria, the author’s home place. An short outlook to the future of smart / knowledge cities is given for perspective.

9.2 Some definitions first

Smart in a personal dimension means to master some quick intelligence or ready mental capability, to be very good at learning or thinking about things, to be clever, readily effective, witty and showing good judgement.
A city is a large and permanent human settlement. There is no agreement on how a city is distinguished from a town or a municipality in general meanings. Cities usually have a particular administrative, legal, or historical status based on local law.
After Wikipedia [1] “a Smart City is an urban development vision to integrate multiple Information & Communication Technology (ICT) and Internet of Things (IoT) solutions … to manage a city’s assets including information systems, schools, libraries, transportation systems, hospitals, power plants, water supply networks, waste management, law enforcement, and other community services. … ICT allows … to interact directly with the community and with the city’s infrastructure and to monitor what is happening in the city, how the city is evolving … Through the use of sensors integrated with real-time monitoring systems, data are collected from citizens and devices … then processed and analyzed. The information and knowledge gathered are key to tackling inefficiency.
Today (2016) 78% of European citizens live in cities, and 85% of the EU’s GDP is generated in cities. Many European cities are forerunners in the much-needed transition towards a low carbon, resource efficient and competitive economy. Cities are central to delivering on key challenges for Europe’s society and economy: jobs, growth and investment, innovation, energy- efficiency, low-carbon development and CO2 –reduction.

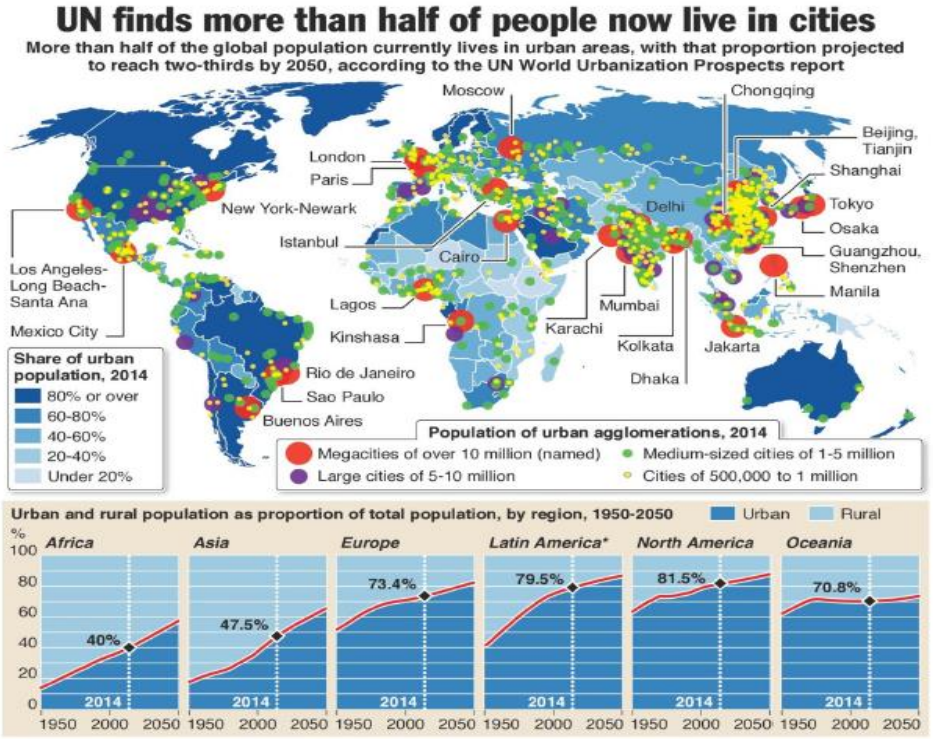

Fig. 1 UN's analysis of the distribution of inhabitants in cities and rural areas

In Wikipedia, no entry on Knowledge City could be found when this article initially was written. After the "IGI Global Publisher's dictionary" [2], "a Knowledge City is a city that searches for the creation of value in all its areas and develops high standards of life, cultural support and economic development, among other aspects including higher level of income, education, training and research, at the same time it is a regional knowledge economy- driven city with high value added exports created through research, technology and brainpower and purposefully designed to encourage the nurturing of knowledge".

9.3 Timisoara as a template for a Smart City

Timisoara in Romania, as Radu Vasiu introduced in [3], is a city which may well serve as a template for the current status of a midsize smart city, and even more as a vivid location where the process of implementation is not only a matter of a technical investment program, rather than also to get citizens and guests involved in the city's development. It follows a roadmap as has been worked out in general by expert communities organized within a European Commission's framework, as published by the European Innovation Partnership on Smart Cities and Communities (EIP-SCC) , [4] – see Fig 2 .

For the citizen as well as for any visitor of Timisoara, using the Open Data Sets as provided by the city government in cooperation with Politehnica University of Timisoara, and the consortial Smart City Association, smart phone apps have been developed covering mainly location based identifications of public places such as administration offices, museums, art monuments or street histories.

Fig. 2 Transforming an EU designed roadmap into a concrete local implementation

In addition and amongst several initiatives, The Innovation Labs 2016 program of Timisoara organized by the two local tech agents TechLounge and BanatIT in partnership with Orange, Carrefour and The Romanian-American Foundation organized a hackathon thus getting event external contributors to Timisoara's smart city development engaged. (By the way, his hackathon was run during the conference NETTIES 2016 to which this article is devoted). Timisoara's Innovation Labs program fosters the learning-by-doing quest to nurture hatching ideas of its participants into thrilling new services for the city. It is clear and conforming to the definition of a smart city, that in the case of Timisoara, smartness is created by the design intelligence of those being invited, mainly from the IT-technological and creative community.

Smart City concepts, however, are going beyond the IT intelligence horizon. The claim evolves towards the idea of a city which is developed with a holistic framework in mind, as is shown in Fig. 3. As R. Vasiu [3] referring to B. Cohen [5] points out, that a true smart city would be developed in a concerted approach covering six different aspects synchronously, as are: smart economy, … mobility, … environment, … governance, … people, and … living.

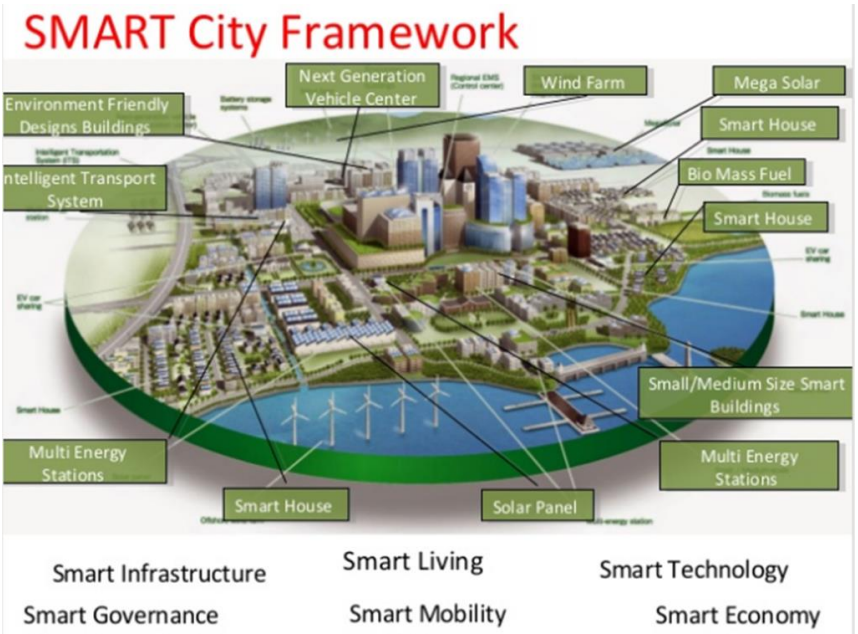

Fig 3. A holistic technological framework of a Smart City

To give guidance how these many different dimensions can be managed, the European Innovation Partnership (EIP) on Smart Cities [6] initiated six action clusters which, in the case of Timisoara , mirrors the concerns to be addressed by any city government, which are

- Business Models, Finance and Procurement
- Citizen Focus and Involvement
- Integrated Infrastructures & Processes across Energy, ICT and Transport (including Open Data)
- Policy & Regulations / Integrated Planning
- Sustainable Districts and Built Environment
- Sustainable Urban Mobility

Although by definition, a smart city in its first instance is defined by its installations and uses of ICT technologies, it should be recognized that from a political and societal perspective the involvement of humans in their role as citizens in this list ranks top, at least second. We will see that the human aspect is a key discrimination factor to differentiate smart cities versus knowledge cities.

9.4 The evolution towards knowledge cities

The concept of a city as a knowledge city has been discussed since long by e.g. F.J. Carillo [7] or A. Bounfour and L. Edvinsson [8]. A recent conference [9] within the 10 years' series of the "Knowledge Cities World Summits" was exclusively devoted to the profiling and identification of knowledge cities.

In history knowledge often has been associated with science. Cities as e.g. Vienna, Austria, long before they committed to be perceived as a knowledge city called itself to be a science city, referring to the many universities and research facilities the city is hosting. Such transformation in denotation in German language is supported by the nearness of the spelling of the terms science = Wissenschaft and knowledge = Wissen, thus the notation Wissenschaftsstadt easily transforms into Wissensstadt. This is not only a matter of wordings rather than an extension indicating the inclusion of all citizens.

The historic evolution from sacred and isolated locations of science and knowledge towards open cities for its knowledge citizens as intensively involved key stakeholders is explained by Fig. 4 first time introduced by Debra Amidon [10] in 2004

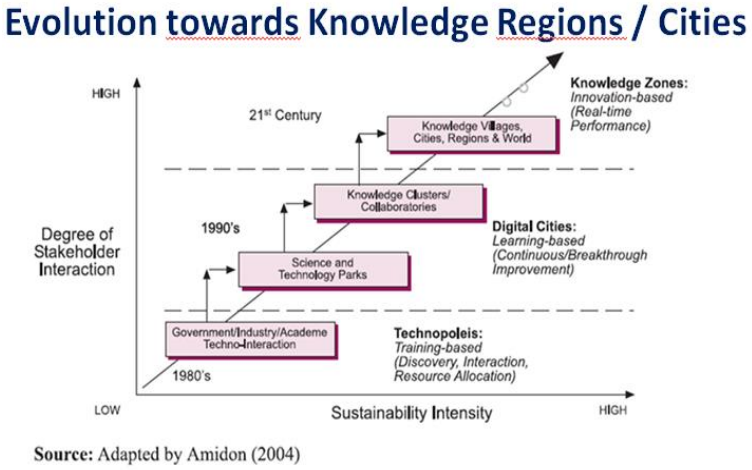

Fig. 4 The historic evolution towards knowledge cities

The idea of a city as a more and more open place and space for knowledge exchange goes in parallel to a modern understanding of a university embedded in a city, thus developing towards a multiversity, as has been defined already in 1963 by Clark Kerr [11] stating (quote): “The ‘Idea of a University‘ was a village with its priests. The ‘Idea of a Modern University‘ was a town with intellectual oligarchy. The ‘Idea of a Multiversity’ is a city of infinite variety… This city is more like the totality of civilization as it has evolved… and movement to and from the surrounding society…“ (Remark: Humboldt Cosmos Multiversity (www.humboldt-cosmos-multiversity.org), of which the author is the current president, aims to be such a future discourse platform which once may complete the classical university).
The more the concept of knowledge is being accepted as an economic issue in terms of a common valued good, i.e. a good everybody should have access to, the more politics is asked for policies creating “knowledge spaces” and motivation to develop knowledge at large. In the case of Romania, which naturally also maps to Timisoara, its former science minister Adrian Curaj took this idea as a challenge and initiated a study [12] on how his country may master the transition to become a knowledge nation by introducing concepts for the identification and its further development of the country’s intellectual capital. (Fig. 5)

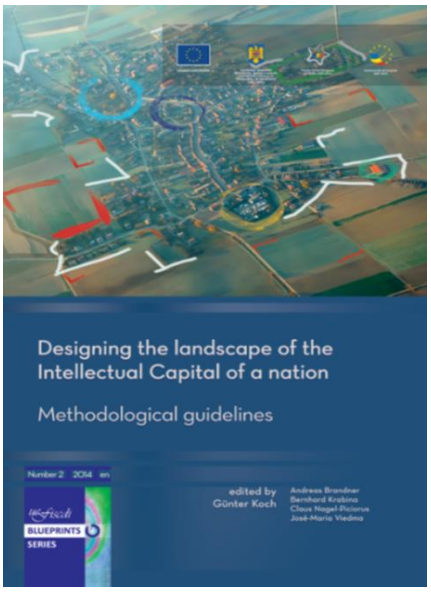

Fig. 5 Cover page of the study on how to turn a whole nation like Romania into a knowledge country

9.5 Differentiating Knowledge Cities from Smart Cities

The Economist taking up the discussion on the future of cities in 2016 [13] in a poll found out that citizens would prefer that smart (city) technologies would give them better opportunities to enter communication with “their” city, i.e. with those running the city, i.e. the city administration. Participation and feedback communication, a requirement supported by 58% of the citizens, as well as other wishes of citizens towards the city government looks to be positioned high in the priority list – see Fig. 6. In this picture also some statements from city managers having been involved in The Economist study are quoted, the majority confirming that the ultimate goal of any

smart city development must be a better integrated communication between all stakeholders constituting the substance of any city.
Taking this in mind and applying the criteria which define what a knowledge community e.g. a knowledge region shall be, it becomes clear that the Knowledge City is a concept well based on the existence of a smart city as a sufficient but not necessary requirement, however it aims at a higher level which is the humanistic perspective of a city model.

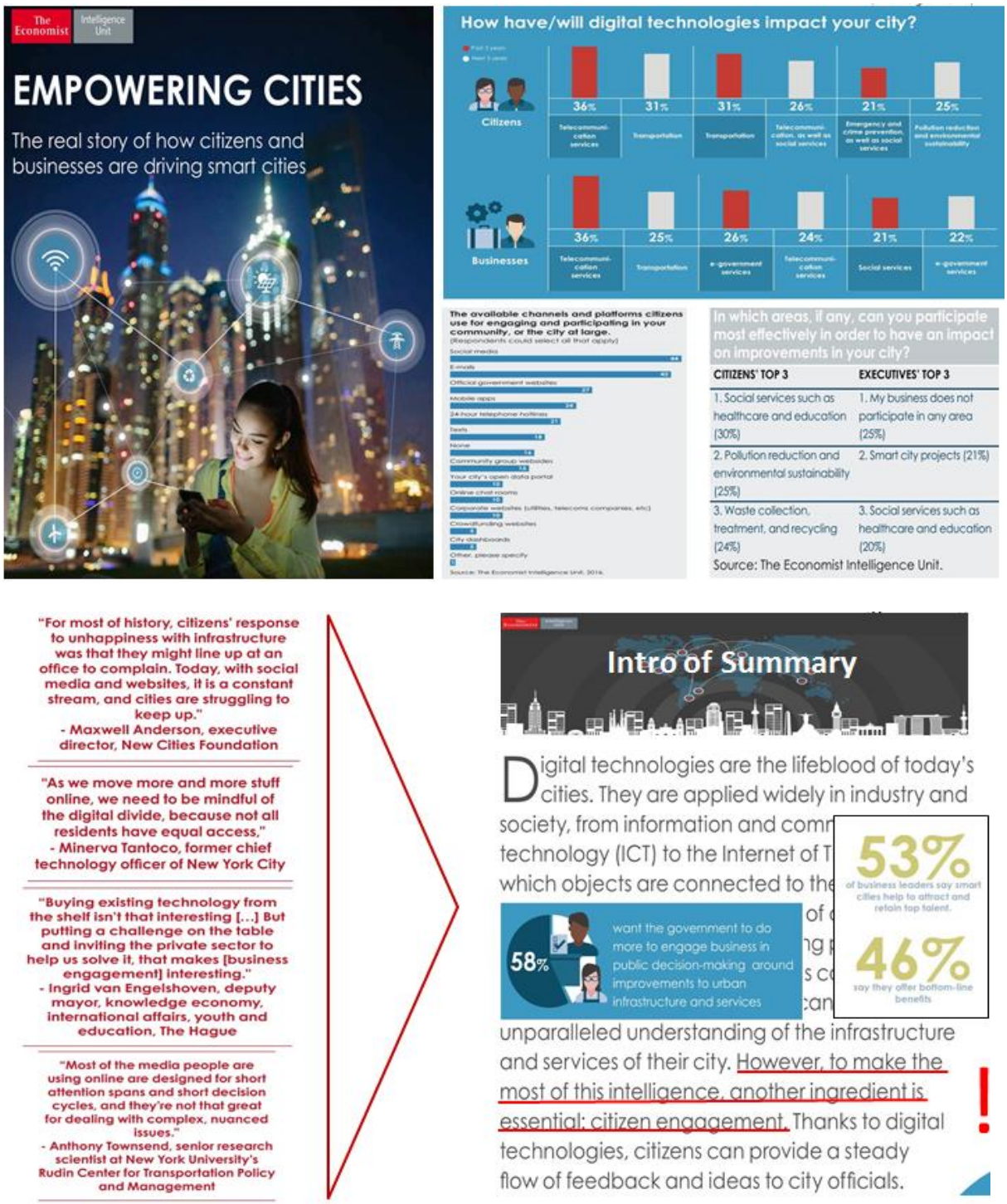

Fig. 6 A condense summary from the Economist study

In this understanding – inspired by Maslow's model of the hierarchy of human needs [14] – the suggestion is to model a city also in terms of layers, starting from the physical bottom structure of buildings and housings, further stepping upwards by introducing hard infrastructure on a next higher level, then the ICT hardware and software levels and further the next upper "layers" – each one using the underlying ones - where the highest levels are defined by the human and humanistic needs. To state it even sharper: The so far discussions about smart cities are reflecting the lower level "hardware layers" offering the many functionalities a smart city is based upon, whereas the knowledge city is defined by the highest "soft(ware) layers" made by people – as demonstrated in Fig. 7.

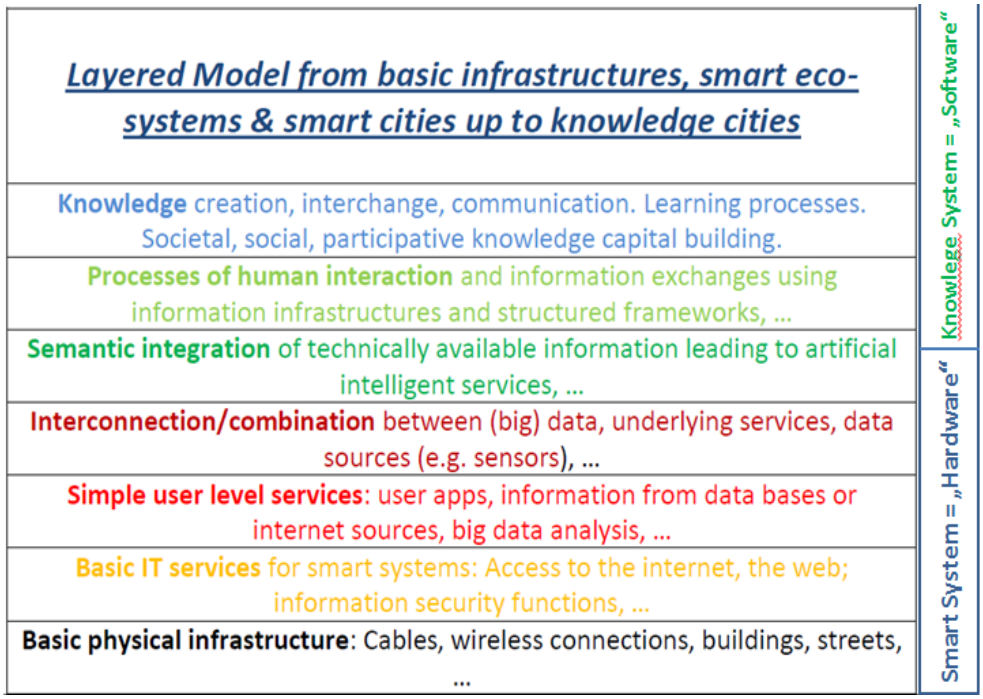

Fig. 7 Definition of a Knowledge City built upon a Smart City by means of a layered model (© G. Koch)

For instance the city of Vienna, marketing itself by stating that it is "different", in its self definition as a smart / knowledge city, it comprises the dimensions of

- resources, i.e. buildings, infrastructures, energy supply, mobility etc.
- quality of life, i.e. environment, healthcare, social inclusion, participation
- innovation, i.e. economy, research – technology – innovation (RTI), education

which have to be designed and developed synchronously, equally and in a balanced way. I.e. Vienna clearly sticks to the criteria to be a true knowledge city. Vienna is on its best way to succeed by maintaining its always top rankings as a most livable place, since the city government tries its best to combine top down strategies with bottom up participative communication, and as well tries to follow the success of implementations by (partly) applying methods of intellectual capital measurements (Fig.8 right up).

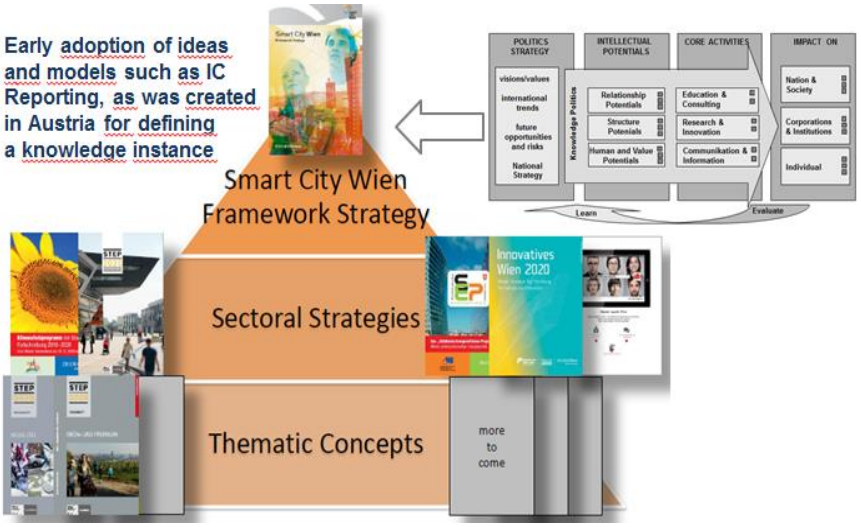

Fig. 8 A well structured process for developing a city from smart towards a knowledge city, as applied by Vienna

On a discourse level, the discussion space addressing a Smart City in comparison to a Knowledge City also shows differences in some cultural instances. In the Smart City space, subjects of concern and the language used are more technocratic, whereas subjects of discourse in the Knowledge City tend to be humanistic. Fig. 9. tries to capture this idea in a comparison between the two concept spaces. In a simplified conclusion we may say, that in a knowledge city we expect to meet diverse people with different cultural and knowledge backgrounds, a multitude of institutions offering spaces and platforms for exchanges and being more driven by social intelligence instead of technical intelligence only.

Smart City	*Criteria*	Knowledge City
physical	*„physicality“*	immaterial
immobiles	*main asset type*	intellectual capital
hardware	*comparison in IT*	software
infrastructure networks	*co-fct./co-oper. model*	innovation & knowledge system
public + private administrations	*key institution(s)*	Higher Education Institutions (HEIs)
make daily life easier/liveable	*main role to citizens*	offering (life long) learning + commun.
consultation	*participation*	coworking
grand design directive	*management paradigm*	guided self organization
managing complexity	*main mgt. competence*	“political” & cultural influencing
“techn. / org. intelligence”	*main participant qualification*	social and societal intelligence

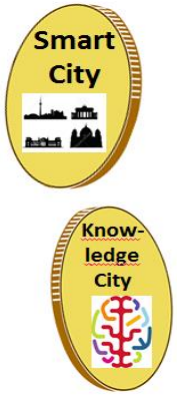

Fig. 9 Comparing Smart Cities to Knowledge Cities as two different sides but of one coin (© G. Koch)

9.6 The future of smart / knowledge cities

As we learned, the tendency of growth of cities is unbroken and we may even conclude, that cities by size, weight and political importance may outweigh nations. Europe during the so called Lisbon strategy period in the first decade of this century started to discover itself as the “Europe of the Regions”. We may soon discover that it will be the “Europe of the Cities”.

Cities, although they have and will maintain their own characteristics, are becoming less and less self contained and self sufficient. They have the potential to be much better and much more intensely interconnected by means of transport infrastructures for global connections – e.g. airports – as well as by high volume data communication. With little fantasy we can predict, that no more countries will constitute the future structure of living areas rather than cities, especially future metro- and megapoles will become the powerhouses in global development. In support of this idea see Fig. 10 caught from an internet blog.
The closer and more dense interconnections and communication by technological means will be, the more they will foster the tendency towards virtualisation and immaterialisation of the future globalized economy – despite the fears that re-nationalisation in the 2nd decade of this century will stop this process. Especially cities have developed their own specific cultural and knowledge competences and aggregated them over long historic periods. Combining their mutually complementary potentials across the globe will open doors for new and not yet known innovation both in technological and societal dimensions for the benefit of urban living conditions. We are looking forward to a new society forming their own new global "republic" independent from existing and restricting national or regional limitations: The global Knowledge Republic .

Fig. 10 Future political geography will be constituted by cities rather than by nations

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