SMART Prague 2014 – 2020

SMART City concept

The SMART City concept has not yet been clearly defined in academic literature; nevertheless, there are certain common aspects of SMART City which appear in most academic as well as conceptual documents on this topic. In particular, the following attributes are mentioned in relation to the SMART City concept:

- High-quality network infrastructure in the city and its effective utilization for fulfilling the economic, social and other needs of the city’s inhabitants
- Urban development of the city that is supportive of enterprise and innovations
- Cities have an efficient structure of public services that enables economic growth while ensuring social inclusion
- Emphasis on the development of creative, innovative and high-tech fields, including the development of qualified workforce and appropriate infrastructure
- Emphasis on environmental and energy sustainability of the city development

The above mentioned elemental attributes are aptly summarized in the following definition of SMART City. SMART City is understood as a modern urbanistic concept, whose fundamental vision is the attainment of interconnection between highly-developed city infrastructure (in areas of energy, telecommunications, transportation and environment), business enterprise, and education and educational institutions in the city’s territory into one maximally effective and functional whole. This emphasis on comprehensive approach is likewise reflected in the European project of Vienna University, which defined the basic dimensions of the SMART City development as follows:

1. SMART Economy
2. SMART People
3. SMART Governance
4. SMART Mobility
5. SMART Environment
6. SMART Living

From the definition above it is evident that the SMART City concept is relatively tractable and that it can be adapted to the degree of development of a particular city and its needs. For instance, the initiative Smart Cities and Communities (and the related initiative Covenant of Mayors), which is supported by the European Commission, focuses in particular on three out of the above-mentioned six dimensions, i.e. SMART Mobility, SMART Environment, and SMART Living (especially with

2 Ibid.
3 Hollands, R.G. (2008): Will the real smart city please stand up?, City, Volume: 12, Issue: 3, Publisher: Routledge, Pages: 303-320
5 http://eu-smartcities.eu/
6 http://www.eumayors.eu/
regard to energy savings in buildings and grids). On the other hand, the city of Amsterdam, for example, chose to focus particularly on innovation and enterprise in its SMART City concept, i.e. on the dimensions of SMART Economy and SMART People.

In this analytical study – Prague SMART City – the concept of SMART City is treated from a broader perspective and it focuses especially on comprehensive interlinking of all the dimensions of the SMART City concept into one functional whole which seamlessly connects onto projects that Prague already implemented for its citizens in the past.

The Concept SMART Prague 2014 – 2020

Prague’s key characteristics

Prague is undoubtedly one of the important European metropolises. In terms of population, Prague ranks 15th in the EU (data from 2011) with 1,245,213 inhabitants. In terms of land area, Prague is among the middle-sized cities in the EU with the total area of 496 km². Prague (as the cohesion region NUTS 2) significantly exceeds 160% of the average regional GDP per capita in the EU, and Eurostat ranks Prague as one of 10 regions with the highest GDP (in 2007 Prague placed 5th). In the “net” ranking of large European cities (so-called level NUTS 3) Prague ranks very well around 50th place.

In regard to the SMART City concept, the following key characteristics are relevant for Prague:

1. Prague is one of the most advanced and most competitive cities in the EU
2. Prague is an important centre of culture and arts and the city centre is inscribed on the UNESCO World Heritage List, which makes it one of the most popular tourist destinations in the EU
3. In the past, Prague has implemented a number of projects, which strengthened its position in all the six dimensions of SMART City (as defined by Giffinger et al. 2007)

Ad 1) According to the European Commission study (2007), Prague is classified as a re-invented capital. Such city is characterized by its above-average economic performance, high growth of GDP and added value, and by its significant share on the economic development and competitiveness of the whole country. Cities classified as re-invented capitals are centers of international importance with developed business sector (especially the service sector), which attract and support talented people from the home country and from abroad, develop innovations and have developed infrastructure. The study also states that in order for a city to advance from the re-invented capital stage into a so-called knowledge hub (which is the equivalent of SMART City according to the characteristics defined

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7 http://www.amsterdamsmartcity.com
9 http://www.urn.cz/cs/clanek/209/ekonomika
10 Ibid.
12 Ibid., chart on p. 85
by this study), further strengthening in the areas of innovation, enterprise and infrastructure is required, together with their more intense interconnection for maximum utilization of the ensuing synergies.

Ad 2) The historic centre of Prague is composed of the most expansive cultural monuments of this type which are protected by the UNESCO\(^\text{13}\) and take up an area of 1106 ha\(^\text{14}\). This makes Prague one of the most attractive tourist destinations in Europe and in the world\(^\text{15}\), however in reality it also limits the implementation of some measures to a certain extent (e.g. in transportation, thermal insulation of buildings, etc.), which needs to be taken into account in the Prague – SMART City concept proposal.

Ad 3) As the Strategic Concept for the City of Prague (or the implementation document Program of Implementation of Prague’s 2009–2015 Strategic Concept) shows, Prague has made significant investments in a number of projects during the past 20 years\(^\text{16}\), which led to strengthening of all the individual dimensions of the SMART City as defined by Giffinger et al. 2007\(^\text{17}\). After all, the fact that Prague is capable of attaining the objectives of the SMART City concept thanks to its past investments and activities is further demonstrated in the above-quoted assessment from the audit of cities performed by the European Commission (2007)\(^\text{18}\), which identifies Prague as an international hub and re-invented capital, as a city which from the greater part fulfills all the dimensions of the SMART City concept. However, in order for Prague to fulfill the position of SMART City completely, it is necessary to make use of synergies which ensue from the projects that have already been implemented, to interconnect them and complement them in areas where shortcomings are still present,\(^\text{19}\) and above all, to actively engage all the subjects in the city in these projects (businesspeople, citizens, universities, non-profit organizations, etc.) – because the SMART City

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\(^{13}\) Data from the UNESCO database; only the city centres of Rome, Bath, Banská Štiavnica, Ferrara and Bern, which are cultural monuments protected by the UNESCO, are more expansive than the historic centre of Prague

\(^{14}\) For comparison – the protected centre of Vienna has an area of only 371 ha, the centre of Rome 1485 ha

\(^{15}\) Prague is among the top 36 most important European destinations according to the MasterCard Global Destination Cities index, holds 16th position in the Top 25 Destinations in the World ranking (Travelers’ Choice 2012) according to www.tripadvisor.com, and appears in TOP 100 destinations on the web www.traveleye.com (84th position), World’s Top 50 Travel Destinations in 2013 according to the TravelBlog web, etc.

\(^{16}\) Cf. e.g. http://www.urm.cz/cs/mestske-investice/page/3/sort/DOBA_VYSTAVBY+ASC

\(^{17}\) Ibid.

\(^{18}\) Ibid.

\(^{19}\) According to the analyzed data and international rankings, Prague needs to intensify its performance especially in the area of innovations (e.g. Innovation Cities Top 100 Index 2012-2013: City Rankings classifies Prague in the area of economic and social innovations as a hub – i.e. cities which are significant in the area of innovations, but do not attain the level of development as cities which this ranking classifies as so-called nexus – i.e. cities which achieve worldwide significance in the area of innovations), to complete its infrastructure projects – in particular those which are interconnected with environmental protection and with measures for fighting the climate change (among other, the completion of environmental infrastructure – cf. the not too positive ranking of Prague in the Green City Index – 24th position out of 30 European cities assessed in 2012, or the results of the study TomTom 2011 which focused on the most congested cities in Europe – Prague did not rank badly – actually it became the 15th least congested city out of 50 cities assessed, but it is evident that implementation of other projects in the area of transport infrastructure and transportation will be necessary).
concept will not and cannot function in Prague without active participation of citizens and other subjects.

The position of Prague in international rankings

This section summarizes the key international city rankings which include Prague and which are the most important for the definition of the SMART City concept in Prague. Among these rankings or indexes are the following:

1) Mercer's Quality of Living (2012) – 69th position out of 221 worldwide (1st Vienna, 2nd Zurich, 3rd Auckland)
   a. Political and social environment
   b. Economic environment
   c. Social and cultural environment
   d. Health and healthcare
   e. School system and education
   f. Public services and transportation
   g. Leisure time
   h. Consumer goods
   i. Housing
   j. Natural environment

2) Siemens Green Cities Index (2012) – 24th position out of 30 in Europe (1st Copenhagen, 2nd Stockholm, 3rd Oslo)
   a. CO₂
   b. Energy industry
   c. Buildings
   d. Transportation
   e. Waste
   f. Water
   g. Air quality
   h. Public administration and natural environment

3) Liveability Index Economist Intelligence Unit (2011) – 60th position out of 140 worldwide
   (1st Melbourne, 2nd Vienna, 3rd Vancouver)
   a. Spatially Adjusted Liveability Index – green areas, congestion, natural assets, cultural assets, connectivity, isolation and pollution

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20 Some examples of public engagement in implementation of SMART City strategy is the already mentioned Amsterdam (http://www.amsterdamsmartcity.com), Chicago Climate Action Plan (http://www.chicagoclimateaction.org) or Lyon (http://www.business.greaterlyon.com/lyon-smart-city-strategy-policy-france-europe.347.0.html&L=1).

High citizen participation rate on projects implemented by the cities is likewise required in projects of SMART Specialisation and in documents SMART Cities and Communities.


22 Prague was not assessed in this indicator; it is a purely urbanistic assessment of the quality of the city layout.
b. Stability
c. Healthcare
d. Culture and natural environment
e. Education
f. Infrastructure

4) Innovation Cities Top 100 Index 2012-2013: City Rankings – 55th position out of 100 worldwide (1st – 2nd Boston, New York, 3rd Vienna)
   a. Cultural assets
   b. Human resources
   c. Interconnectedness of markets

5) UN City Prosperity Index (2012) – 23rd position out of 70 worldwide (1st Vienna, 2nd New York, 3rd Toronto)
   a. Productivity – investment, export, consumption
   b. Life quality – education, healthcare, public space
   c. Development of infrastructure – infrastructure, housing
   d. Environmental sustainability – atmosphere, CO2, inner pollution

   a. Innovation – Prague – 2 out of 3 points
   b. Enterprise – Prague – 2 out of 3 points
   c. Talent – Prague – 3 out of 3 points
   d. Connectivity – Prague – 2 out of 3 points

   a. Macroeconomic indicators– GDP, GDP per capita, GDP per km², real economic growth (5 year average), employment rate, productivity, patent activity and presence of international corporations (cca 181st position out of 500)
   b. Quality of businesses (82nd position out of 500)
   c. Structure of industry (53rd position out of 500)
   d. Human resources (5th position out of 500)
   e. Capital endowment (129th position out of 500)
   f. Institutional environment (113th position out of 500)
   g. Quality of life (88th position out of 500)
   h. Connectivity (82nd position out of 500)

The above mentioned rankings and evaluations of the cities, no matter how heterogenic they may appear at the first sight, share one area in common – they are comprehensive – and therefore a better ranking is awarded to cities which were able to interconnect all the dimensions of the city through their developmental projects into one functional whole that provides good quality of life for its citizens, opportunity for innovation and growth of added value to its business entrepreneurs, all this while adhering to the principles of environmental protection and sustainable development.

23 Ibid.
24 Cities which ranked well (knowledge hubs in size similar to Prague): Amsterdam, Cologne, Copenhagen or Lyon
25 www.guecp.org
Proposed axes of SMART Prague 2014 – 2020

The analysis of international rankings for the project SMART Prague 2014 – 2020 shows that in case of Prague, the understanding of the SMART City concept cannot be limited solely to the narrow perception of the SMART concept in the context of European SMART Cities and Communities – i.e. a perception that focuses only on transport, energy, telecommunications and environmental networks – but instead it should address broader interconnection of business enterprise, society, culture and education. For this reason, the concept of SMART Prague 2014 – 2020 consists of three basic axes:

1) SMART Infrastructure
2) SMART Specialisation
3) SMART Creativity

The individual axes are mutually interconnected and the focus on maximum strengthening of Prague's strong points and suppression or elimination of its weak points and risks to further development.

SMART Infrastructure

SMART Infrastructure is an axis which focuses on the development of infrastructure in Prague as an essential prerequisite for long-term sustainable development of the city and for the increasing of the quality of life of its inhabitants. Connectivity and the interconnection of individual city areas through transport, energy, environment and telecommunications infrastructure form the fundamental cornerstone for constructing a particular city as an international hub and they are the key elements in the concept of SMART City as presented e.g. in the European initiative European SMART Cities and Communities. In most international rankings, good city infrastructure is one of the key parameters which separate the “champion” cities from the average ones. The concept SMART Infrastructure includes the following areas:

1) Transport, transport infrastructure and mobility, stationary traffic
2) Energy and environment infrastructure, sources of energy and energy efficiency
3) ICT infrastructure
4) Safety infrastructure

Ad 1) Transport, transport infrastructure and mobility, stationary traffic

In the long term, Prague boasts one of the best ranked systems of municipal mass transport in Europe and in the world – cf. for example the results of the Eurotest 2010 ranking\textsuperscript{26} conducted by the German association ADAC, in which Prague scored 4\textsuperscript{th} out of 23 large European cities following Munich, Helsinki and Vienna. This ranking demonstrated that the main advantages of Prague's mass transport are, apart from its relatively low prices (particularly in comparison with Western European cities) especially the good connections between the city centre and peripheral parts of Prague, and good connections within the Prague centre itself. Other strong points included the easy-to-understand fare structure, information on barrier-free transport and availability of transport-related

\textsuperscript{26} http://www.eurotestmobility.com/eurotest.php?itemno=353&lang=EN
information in English and other languages, and the user-friendly web application for simple connection search on the internet. The survey also highlighted the possibility of transporting bicycles in the metro and trains and the sufficient number of seats reserved for handicapped persons, wheelchairs and baby carriages. As for the weak points of Prague mass transit, the survey identified especially the following: access to the airport is possible only by bus. Other weak points mentioned were long intervals of suburban transport connections, poor availability of ticket-selling machines apart from metro stations and the fact that only coins could be used for payment in these machines. Inadequate marking of exits from the metro system was likewise mentioned as a weak point. Another identified disadvantage was also the relative scarcity of parking places for bicycles and the fact that the city does not operate any official rent-a-bike system.

In terms of transport infrastructure, Prague’s long-term problem is related to the still unfinished Prague ring road, which leads to congestion overload both in the centre of Prague and in residential areas with all the accompanying negative effects (especially air pollution, noise, delivery problems, traffic accidents, etc.). According to the City Congestion Index TomTom 2012, in terms traffic permeability, Prague ranks 31st out of 59 cities assessed, and congestion occurring during the morning rush hours is seen as the most problematic. These problems can be solved by the expansion of intelligent transport system technologies (ITS) or cooperative systems in transportation.

Prague has the largest network of charging stations for electromobiles in all of the Czech Republic and the city is a pioneer in supporting electromobility in the Czech public administration, together with being the administrator of the project “Praha elektromobilní,” which has been supporting the development of this innovative concept in cooperation with energy suppliers in its territory already since 2011. The development of electromobility is further instigated by massive support for the development of alternative fuels from the EU, which proposes up to 13 000 charging stations for the Czech Republic. In regard to the transport density in the territory of the Capital City of Prague, it is to be expected that the efforts at substantial expansion of the network will be concentrated especially here. The purchasing power of Prague citizens, their innovation potential, and short daily commuting distances logically mean that the majority of electromobiles are and will be operated in Prague. The support for the development of electromobiles for public transport (metro, trams, electricbuses) as the only really clean city transport can help to reduce emissions and create synergies with the advancing concept of SMART Grid. Another important element of the city infrastructure is obviously the infrastructure for pedestrians and cyclists. In the Eurotest 2010 survey of pedestrian crossings and markings for pedestrians, Prague did not fare too well in comparison with other European cities. The main shortcomings which the survey identified included relatively poor visibility of pedestrian crossings (also caused by many cars parked in parking places and out of them in the close proximity of the crossings), insufficient availability of crossings for persons with limited mobility (even the barrier-free crossings have a slope which is too steep and

27 http://www.hybrid.cz/mapa-stanic/?t=ele; http://www.elektromobily.org/wiki/PluginMap.eu
makes crossing in a wheelchair difficult) and for vision- and hearing-impaired persons. The lighting of pedestrian crossings at nights was found unbalanced. While the survey found the night visibility of some crossings to be above-average, in other parts of the city it was absolutely inadequate. Another weak point mentioned in relation to pedestrian crossings was that the system with the countdown to the green signal, which improves pedestrians’ orientation in the traffic situation, is seldom used in Prague. On the contrary, the sufficient number of pedestrian crossings was assessed positively. Regarding bicycle traffic, Prague is not among the cities friendly to cyclists. Naturally, this is largely caused by Prague’s topography and the extensive area of the strictly protected UNESCO zone, which does not allow disruptions of the public space by large bicycle stands, etc. On the other hand, part of the problems is also caused by non-systematic construction of bicycle paths31, which apparently had not been used primarily for transportation within the city in the past, but rather for leisure cycling. Owing to this, longer bicycle paths, which in the warmer months could be used not only for leisure cycling but also for commuting to work or school from the peripheral parts of Prague or from the adjacent towns and villages in the Central Bohemian region (e.g. the cycling paths A1 and A2), do not have safe B+R bicycle parking facilities at metro stations along their routes, and on the contrary, in places where B+R parking facilities are located32, there is usually no bicycle path which could be used for the purpose of commuting.

Like in most large cities, the crucial problem of Prague lies in stationary traffic. In the past years, Prague has significantly increased the capacity of park-and-ride (P+R) parking lots, which serve mainly for visitors to Prague and for inhabitants of the Central Bohemian region, but the number of parking spaces in the in P+R parking lots still remains significantly low in comparison with cities in Western Europe33. The capacity allocation of P+R parking lots also reveals that their capacity is not sufficient in all of the main arrival routes to Prague (for example, the directions from the south and north would require further increase in the parking capacity). Parking in the city centre poses even greater problem. As was stated above, Prague suffers from congestion caused by traffic routed through the city centre, and the introduction of paid-parking zones in the inner city districts had not really solved the problem either; moreover, the process of obtaining residents’ cards is quite complicated, and in the city centre there are relatively few places for paid parking with parking machines, where payment by coins usually remains the only option. Due to the high number of vehicles which pass through Prague daily, the monitoring and enforcement of rules related to stationary traffic is difficult as well (cf. the example of pedestrian crossings which are often partly blocked by incorrectly parked vehicles).

31 Meaning separate paths for cyclists and roller-skaters, not lanes for cyclists on the roads.
32 Zličín – by the metro station Zličín (line B), Nové Butovice - by the metro station Nové Butovice (line B), Radotín – by the railway station, Ládví - by the metro station Ládví (line C), Letňany - by the metro station Letňany (line C), Holešovice - by the metro station Holešovice (line C) and another by the railway station, Černý Most - by the metro station Černý Most (line B), Rajska zahrada - by the metro station Rajska zahrada (B), Břežany - by the railway station, Skalka - by the metro station Skalka (line A), Hostivař - by the metro station Depo Hostivař (A), Opatov - by the metro station Opatov (line C)
33 In comparison with Vienna, the number of P+R places per 1000 inhabitants was about 33% lower in Prague (however, this ranking comes from 2009 http://www.eurotestmobility.com/eurotest.php?itemno=297&lang=EN, in 2012 the difference was only 22%).
Visitors to Prague and foreign employees and owners of businesses in Prague frequently complain about the uncomfortable connection with Václav Havel Airport and the city centre, together with the already-mentioned problems with parking in the city, availability and price of garage parking spaces and the outer and inner transport in Prague in general. This conclusion is evident from the survey European Cities Monitor 2011\textsuperscript{34}, in which Prague ranked 31\textsuperscript{st} out of 36 evaluated cities in terms of outer transport in 2011 (which is the worst result since 1992\textsuperscript{35}) and in terms of inner transport connections it ranked 30\textsuperscript{th} out of 36 cities (which again makes for the worst ranking since 1992). The deteriorated ranking of Prague does not necessarily have to indicate any significant worsening of its transportation, but it can also be explained by the fact that the other cities in the evaluated sample have made more evident progress when compared to Prague.

\textbf{Ad 2) Energy and environment infrastructure, sources of energy and energy efficiency}

With regard to the energy and environment infrastructure, the situation in Prague is significantly worse than in the advanced states of EU 15. Siemens Green Cities Index 2012 ranked Prague in comparison with other European metropolises as follows:

- CO\textsubscript{2} emissions – 25\textsuperscript{th} position out of 30
- Energy – 24\textsuperscript{th} position out of 30
- Energy efficiency of buildings – 26\textsuperscript{th} position out of 30
- Transportation – 26\textsuperscript{th} position out of 30
- Water management – 10\textsuperscript{th} position out of 30
- Waste and land management – 14\textsuperscript{th} position out of 30
- Air – 20\textsuperscript{th} position out of 30
- Environmental management of the city – 27\textsuperscript{th} position out of 30

Considerable space for improvement is found especially in areas of energy and energy efficiency, and in combating the climate change. (Issues related to transportation were already discussed in part A of this section). In spite of substantial investment in the improvement of energy efficiency of buildings and infrastructure in the territory of Prague (e.g. thermal insulation of prefab housing blocks, saving mode for lighting, investments for reducing losses in the power grid, etc.), these measures are still not sufficient to ensure maximally economical and effective usage of energy in Prague, which in turn relates to the unsatisfactory performance of Prague in mitigation of climate change. Great potential for the concept SMART Infrastructure is also found in the linking of energy savings in buildings and the introduction of the concept of intelligent buildings, which will be economically efficient, energy efficient and efficient in relation to their influence on the outside environment and which will enable multipurpose utilization and reconfiguration. In the future they will also become fully capable of integration to the SMART Grid. It is necessary to admit that the increasing of energy efficiency as well as the implementation of renewable energy sources and a number of other ecologically oriented measures are difficult to put into practice in Prague due to the extent of the UNESCO protected zone in the city centre, nevertheless it is an undeniable fact that Prague does have areas for

\textsuperscript{34} http://www.urm.cz/uploads/assets/soubory/data/strategicky_plan/Analyzy/atraktivita_podnii_prostr_cushwakefield-6_12_ccelek.pdf

\textsuperscript{35} In 2008 Prague placed 31\textsuperscript{st} as well
improvement here, and that these need to be specifically targeted and reduced during the 2014 – 2020 period. The concept SMART Infrastructure also presumes that investment measures for increasing energy efficiency and improving energy and environment infrastructure will be implemented simultaneously with the development of science, research, development and innovations in this area, which after all connects to the programs supported by the EU within the FP7 framework and prepared under the framework Horizon 2020. In the field of energy efficiency and environment infrastructure, Prague is an active member of the Eurocities group, where it presented a number of projects including the use of ICT projects for mapping and development of infrastructure for energy and environment. In particular, investments in map bases and GIS models, which assist not only the planning and development of municipal infrastructure, but also help to inform the citizens, to develop intelligent applications and above all, they play a vital role in crisis management, such as during floods. The map bases are available at http://www.urm.cz/cs/uvod. The collection of data and data bases also serves for the gradual implementation of the projects SMART Grids and SMART Metering.

Ad 3) ICT infrastructure

Prague is doing relatively well in regard to the access to internet and telecommunications services and the amount of their utilization for the e-Government services and other applications for the citizens and for ensuring the inner operation of the public administration. High-speed internet coverage in Prague reaches nearly 100% and beneficial competition exists among individual internet providers in the territory of Prague. Both cable internet and wireless internet coverage is available. As for the e-Government applications, Prague fares quite well in this area – in 2009 it even ranked second out of 100 cities evaluated by the UN Survey 100 Cities e-Government (right after Soul, and surpassing metropolises such as Hong Kong, New York or Shanghai). Prague attained high ranking in this survey particularly for its significant improvement in providing information via the internet, for the high user value of its applications and for the range and transparency of informing its citizens in general. Although Prague failed to keep the second position in the subsequent years, the fact that e-Government is its strong point can be also reinforced by the last survey performed by Rutgers University Digital Governance Worldwide, which ranks Prague as the fourth best city after Soul, Hong Kong and Madrid.

Prague has an extensive web portal www.praha.eu, which offers a wide range of information about the city’s activities, including information on grants, budget, maps and other forms of visualization of many of the city’s activities and its numerous semi-budgetary organizations and other subordinate institutions. Prague also made significant investments to the digitalization of its agenda in the past years – document services, economic information system, system for information on the

36 www.eurocities.eu
37 Šolc, J. (2010): Prague – Smart City striving for energy sustainability, 22nd – 26th March 2010, Sustainable Energy Week, Brussels, Belgium
39 Although it would merit a discussion whether all e-Government projects really were the best “value-for-money”…
40 http://news.rutgers.edu/medrel/newark-2013/seoul-and-toronto-ac-20130118
environment, map databases, etc. Prague is gradually expanding the range of its applications for the public, while also keeping up to date with new technologies (applications for smartphones and tablets). As for the ICT infrastructure and e-Government, what is important for Prague and the fulfillment of the SMART Infrastructure concept is the increase in utilization of these systems by the individual subjects in the Prague territory and the development of the existing applications in connection with other objectives and priorities of the city (e.g. applications for transportation, applications oriented at SMEs, etc.).

However, in spite of all the above-mentioned positive facts there are also several negative evaluations pertaining to the telecommunications and information infrastructure in Prague. European Cities Monitor 2011, for instance, ranked the quality of telecommunications in Prague as 34th out of 36. (which is the second worst rating since 1992 right after the year 2010 when Prague scored 35th out of 36). What caused this unfavourable ranking was apparently the generally poor state of incorrectly regulated statewide market with mobile telephone services, where low competition between the providers results in high prices of telephone calls and in a limited offer of services in general – which is basically something that Prague cannot change. What would merit a deeper analysis, though, is whether Prague adequately promotes the range of services offered to business entrepreneurs in the electronic format, as well as the electronic tools and applications which are provided for citizens – and whether the relatively poor ranking in this category is not partly caused by the fact that the citizens are not even aware about many of these services.

**SMART Specialisation**

The European Commission defines SMART Specialisation as a tool for creating a competitive advantage for regions through appropriate selection of economic and business areas in which a region should specialize. The objective of the implementation of the SMART Specialisation concept in the EU is increased competitiveness of the EU in global markets. Owing to the coordination of SMART Specialisation strategies, destructive and pointless competition among research and development institutions in the EU and in the individual EU states should be eliminated, and on the contrary, complementarity and cooperation should ensue and thus enable the EU to face tough competition with non-European countries in the global market.

The fundamental building elements of the SMART Specialisation concept are the identification of global trends and their transformation into a strategy for development of certain fields which have the potential to be highly competitive in global markets, identification of strengths and opportunities which ensue from the setup of the local economy, and the ability to systematically develop new fields. This section of SMART Prague 2014 – 2020 summarizes the key principles of SMART Specialisation in Prague and a detailed and more specific discussion of SMART Specialisation will be provided in a separate strategy of the Capital City of Prague for this area.

One of the main characteristics which sets Prague apart from all the other cities in the Czech Republic is the high concentration of educational and research & development institutions in its territory or in the catchment area of Prague (i.e. in the Central Bohemia region). In the territory of the Capital City of Prague, there are five large prestigious public universities: Charles University, Czech Technical University, Institute of Chemical Technology, University of Economics, and Czech University of Life Sciences, and around twenty private universities. The Academy of Sciences of the Czech Republic and its institutes have their seat in Prague and most of their activity is concentrated
here, which makes Prague a centre of education whose significance exceeds the borders of the Czech Republic (cf. the maps below – governmental science institutes and university science institutes). Prague is a very attractive destination for students, scientists and those working in R&D, which naturally leads to a higher rate of internationalization for universities and research, development & innovation institutes (RD&I) that are located in Prague.

![Maps showing the distribution of institutions and R&D expenditures in regions. Source: EEIP](image)

Prague is also an attractive locality for research institutes run by private businesses. The Czech Statistical Office data show that in 2011, 482 business research institutes had their seat in Prague, which is the greatest number in the Czech Republic, and another 224 of such institutes were found in the adjacent Central Bohemia region (where many of the companies moved in order to be able to apply for EU funding during the period 2007 – 2013). The research institutes in the territory of Prague can be also characterized by their size: more than a third of the largest research institutes as for the number of employees and their total expenses for research, development and innovation, are located in Prague.

In comparison with other cities in the Czech Republic, Prague possesses a developed infrastructure of services for students, foreign researchers and experts working in private research centres. There are private schools and kindergartens offering education in foreign languages, doctors who speak foreign languages and are able to treat foreigners, and most of the services – including public services and information about them – are available at least in English, which further strengthens the internationalization potential of Prague and its chances to become a Central European knowledge hub.

The above-mentioned survey of the European Commission – Urban Competitiveness: the Drivers of Competitiveness – found that Prague has space for improvement in the area of innovation, enterprise and connectivity (as discussed already under SMART Infrastructure); on the other hand, all surveys identified Prague’s inhabitants as its clear advantage and strength. For instance, the survey...

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41 Although to what extent they are financially accessible would merit another analysis.
Global Urban Competitiveness Report from 2010 ranks Prague as the fifth best among 500 cities assessed in terms of quality of human resources, with the following categories evaluated:

- **Health (20th out of 500)**
  - Average life expectancy
  - Infant mortality
- **Literacy (15th out of 500)**
  - Adult literacy
  - Ratio of university-educated persons
- **Labour market (73rd out of 500)**
  - Available workforce
  - Ratio of available workforce in population
- **Talent (5th out of 500)**
  - Number of managers per 1000 inhabitants
  - Employment in high-tech service sector
- **Education development (88th out of 500)**
  - Number of universities
  - Presence of outstanding universities (by global ranking)
- **Labour costs (49th out of 500)**
  - Disposable income per capita
  - Cost of living in Mercer’s ranking

The main advantages of Prague in terms of human resources as identified by the survey are the high ratio of university-educated population, the presence of universities and science institutes in the city territory, employment in high-tech fields and the presence of senior business executives (since many top-notch Czech and international companies have their seat in Prague). Another remarkable aspect which gets positively reflected in international rankings is the health of the population (owing especially to good availability of healthcare).

As for the structure of industry and business environment, Prague also scored relatively well in the survey Global Urban Competitiveness Report, in spite of the fact that the Czech Republic itself does not score particularly well in international rankings. (such as e.g. Global Competitiveness Index of the World Economic Forum, Doing Business of the World Bank, Corruption Perception Index Transparency International etc.). Prague placed 40th out of 500 in the ranking of the presence of international companies in its territory (headquarters or branch offices of companies from the Forbes 2000 list) – which is considered a success in the competition of other 499 cities evaluated, and it demonstrates the attractiveness of Prague. Prague was also ranked well in terms of its industry structure (53rd out of 500), based on the following criteria:

- **Development of manufacturing industry (81st out of 500)**
  - Ratio of manufacturing industry
  - Number of company seats of international manufacturing companies
- **Development of tertiary sector (14th out of 500)**
  - Ratio of tertiary sector
  - Number of company seats of international wholesale and retail trade companies
- Number of company seats of international consulting and law businesses
- Number of company seats of international companies the media and advertising

- Development of financial sector (87th out of 500)
  - Ratio of financial sector
  - Number of company seats of international financial corporations
  - Number of subsidiaries of international financial corporations

- Development of high-tech fields (50th out of 500)
  - Number of company seats of international software companies
  - Number of company seats of international high-tech companies

Industry Driving Force

Prague’s weakness in terms of enterprise, science, research and innovation, and SMART Specialisation in general is insufficient interconnection between RD&I institutes and businesses. The lower rate of interconnection is partly caused by the urban layout of Prague, where university buildings, RD&I institutes and businesses are spread all over the city and do not create a compact zone or unit where all these subjects would be able to interact on regular basis. On the other hand, if appropriate intervention in used, such setup creates an opportunity for more integral interconnection between these institutions and the City of Prague. Systematic interlinking of the city’s activities with RD&I and businesses should occur under SMART Specialisation, and this would subsequently contribute to the improvement of the business environment in the city, the strengthening of innovation performance and the general increase of the city’s competitiveness.

Prague formed a group of experts in order to specify the fields to be targeted under SMART Specialisation and to prepare the new Regional Innovation Strategy of the Capital City of Prague (http://www.rishmp.cz/jnp/), which will develop the concept of SMART Specialisation in Prague specifically. In general, it can be observed that in comparison with other regions in the Czech Republic, in terms of RD&I Prague’s strength lies in the significant concentration of R&D institutions within the Czech Republic in the following fields (as becomes evident from the table below):

1) Medicine
2) Natural sciences
3) Humanities and social sciences

This combination turns Prague (and the catchment area of the Central Bohemia region) into an attractive centre for the development of science and research in the area of Life Sciences and in the area of applied R&D on the basis of humanities and social sciences. Prague also boasts top institutions in the field of chemistry which are unique within the Czech Republic. High concentration of R&D institutions in Prague and in the Central Bohemia region also increases Prague’s potential as

42 A good example would be for instance Amsterdam (http://amsterdamsmartcity.com/?lang=en) which puts into practice a number of SMART Specialisation concepts in cooperation with the city, businesses and educational institutions, and which could serve as an inspiration and example of good practice in incorporating SMART Specialisation into the SMART City strategy. Specific forms of cooperation in Amsterdam can be seen e.g. on the projects of Living Lab (http://www.openlivinglabs.eu/livinglab/amsterdam-living-lab).
the centre of interdisciplinary study – however, due to low mutual permeability between universities and other public and private centres of R&D this potential remains largely unused. One of the roles that Prague could play in SMART Specialisation could be a systematic support of projects that will contribute to the development of interdisciplinary studies and thus strengthen the scientific and research potential of the private and public sector in Prague.

Table: R&D institutions in the regions in the Czech Republic classified by fields of study

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From the perspective SMART Specialisation, the findings of the European Cities Monitor 2011 survey come of interest: in the area of human resources (which are the key building elements of the entire SMART Specialisation) these data suggest that at least from the viewpoint of foreign businesses and investors, the availability of workforce in Prague is becoming worse (dropped from 17th position in 2000 to 26th position out of 36 in 2011). On the contrary, what can be regarded as a positive sign, is the improvement in the language ability of the workforce in the territory of Prague (from 27th position in 2000 to 20th position in 2011).

The core network of kindergartens, elementary and secondary schools and vocational schools and higher professional schools is Prague's long-term asset for attaining sustainable SMART Specialisation. Investment into the improvement of their quality, development and cooperation with universities, businesses and other municipal organizations have the potential to ensure the development of human resources for R&D and for innovative enterprise.

**SMART Creativity**

Prague has been an important cultural metropolis of Central Europe and the centre of arts, culture and creativity for several hundred years. This unique tradition is reflected not only in the outstanding architecture of the historic city centre, which is one of the most expansive municipal zones in Europe protected by UNESCO, but also in a diverse array of subjects active in many areas of the cultural and creative industry. A number of schools focusing on arts are located in the territory of Prague (including the Academy of Arts, Architecture and Design in Prague, the Academy of Performing Arts in Prague with its Theatre Faculty, Film Faculty and others) and the city is the most important centre of R&D in the field of humanities, including arts (cf. the research conducted in museums, libraries and other organizations in the territory of Prague). Prague's unique public spaces create a stimulating environment for the development of arts and related creative industries, which is, among others, demonstrated by Prague functioning as the traditional centre for the film industry and audio-visual enterprise.
There are many international surveys which point to the close connection between the development of creativity and the economic prosperity and competitiveness of countries and cities. For example, the Canadian think tank Martin Prosperity Institute (led by Richard Florida, a well-known expert in this field) in its survey Creativity and Prosperity: The Global Creativity Index examines the relation between creativity and economic development, global competitiveness, index of happiness, enterprise, and the development of human resources. The results demonstrate that there is a strong positive correlation between these factors and creativity. Global Creativity Index evaluates creativity on the basis of three elemental dimensions – so-called 3T – technology, talent and tolerance. Czech Republic has not ranked among the first 25 countries in this index and the survey from 2011 does not state its precise position.

In general, it should be noted that Prague does not rank among creative cities in any international surveys. This is probably caused by the fact that creativity, arts, and creative industry were not a priority for the previous city administrations – which is also the reason why Prague does not conduct any regular data monitoring in relation to creativity. Most of the dimensions which are assessed by international surveys are thus not being monitored in Prague. The dimensions, which are evaluated in the most recent (and the most comprehensive) index of creative cities currently available, include:

1) Structure and extent of creative fields
2) Microproduction (creative and cultural content generated by the city’s inhabitants for free – this includes especially works of arts published on social networks, youtube and on the internet in general – this sub-index combines the dissemination of ICT and the assessment of content which is generated by users)
3) Infrastructure for the creative industry and the city’s brand in this area
4) Participation and expenses
5) Public support
6) Human assets
7) Global integration
8) Openness, tolerance, and diversity

Within the EU context, it needs to be mentioned that the European Commission has already identified the creative industry in Europe as one of the long-term competitive advantages of EU 27 in several declarations and analyses, and emphasized the significant potential of creative industry as an employer. (According to the EC communication from September 2012, the creative and cultural sector in the EU generates around 3,3% GDP and employs 6,7 mil. persons especially in small and middle-sized enterprises. The EC further stated that the creative and cultural industry has a significantly positive influence on the global image of Europe). The importance of creative and cultural industries in Europe became apparent, among other, during the financial crisis in 2009 – 2011 when these fields displayed significantly anti-cyclical development, i.e. they successfully grew in

43 http://martinprosperity.org/media/GCI%20Report%20Sep%202011.pdf
spite of the contraction of the banking and financial sector. It should also be noted that the creative and cultural industries in general contribute to the employment of young people, and the increasing of the youth employment rate is one of the fundamental objectives of the EU as well as of the Czech Republic at the national level.

Although various studies dealing with the subject of creative cities disagree whether it is creativity which attracts enterprise and contributes to the economic development, or whether it is conversely the enterprise and economic development which in the end function as a stimulating agent for the development of creative and cultural fields, it remains indisputable that there is significant interrelation between the development of innovations, creativity, culture, and quality of life, which a city with such a solid historical foundation in this area as Prague can use for its development and benefit.

According to the analysis The Importance of Cultural and Creative Industries in the European Union, the Czech Republic and the Capital City of Prague 46 conducted by the Prague Institute of Planning and Development (URM), Prague is doing relatively well in terms of structure and extent of creative fields. The structure of this industry is very diverse in Prague: among the creative enterprises there are very small enterprises which focus on culture and cultural services, as well as large enterprises in cultural and creative fields (IT, media, etc.). According to the above-mentioned URM analysis, in the Prague’s territory there are a total of 9,892 active economic subjects which operate in various fields of the cultural industry, and which make up 3.3% of the total count of all active economic subjects operating in Prague. According to the URM estimate, at the same time they form about one third of the cultural industry in the Czech Republic, and they generate a full half of the gross added value generated by the cultural industry in the Czech Republic. As for the creative industries, the URM survey found that a total of 27,725 local units of active economic subjects were present in the territory of Prague, which stands for 9.3% of the total number of local units of active economic subjects operating in Prague.

In terms of infrastructure for the creative and cultural industries, Prague certainly does possess a good foundation. In the city there are high-quality universities focusing on arts, design, social sciences and humanities. The inspiring environment of the protected historic centre and other localities in the city increases Prague’s potential to serve as a hub of international importance for artists and creative people from all over the world. What further contributes to the attractiveness of Prague is its relatively strong brand (although particularly in this area it is not being developed intensely enough, as became evident from the fact that Prague does not appear in any better-known rankings of creative cities) and the so far relatively positively perceived ratio between the cost of living in Prague and the quality of life 47. What can be seen as positive in relation to the infrastructure for the creative industry, culture and arts which has historically developed in Prague is the fact that Prague has a solid foundation for further strengthening in this field represented by its human resources (this is suggested by the table of R&D institutions in the regions, where Prague unequivocally stands out as the most important centre in the Czech Republic in humanities and social science fields).

47 Nevertheless, European Cities Monitor 2011 indicates, for instance, that in terms of quality of environment for employees, stagnation is evident in Prague – in 2011 the city ranked 27th out of 36 evaluated cities.
Prague has further advantageous conditions for the development of creativity and the related development of enterprise and technological and non-technological innovations: especially the diversity of its human resources and talents. Owing to its base of foreign businesses and universities, Prague is a locality with a high ratio of educated foreigners, and in general, diversity is considered a good foundation for the formation of creative cities. Prague’s problem in this area is however the insufficient utilization of this potential for the improvement of the environment in the city. Diversity actually pertains not only to foreigners, but also to social inclusion. Using the potential of various groups of the population in the city – e.g. handicapped people, senior citizens, etc. – significantly increases the creative potential of the entire community and creates an environment which is suitable for the development of culture, arts, and a well-developed participative civic society.

**Links between the concept SMART Prague 2014 – 2020 and the OP Prague - Czech Republic Growth Pole**

The above-described concept SMART Prague 2014 – 2020 summarizes the main areas that Prague should focus on in the upcoming six years in order to attain the level of developed western European countries in terms of economic development, quality of life and competitiveness. The concept SMART Prague 2014 – 2020 thus forms a general platform for specific interventions from the Operational Program Prague - Czech Republic Growth Pole 2014 – 2020 (OP Prague). The objective of the concept SMART Prague in combination with the OP Prague is to achieve the targeting of interventions financed from the EU funds and co-financed from the municipal funding so that a maximum development effect for the city and maximum positive synergy from the individual activities are attained. The interconnection between SMART Prague and the OP Prague is shown in the diagram below, and the individual areas are further discussed in detail.
From the diagram above it is evident that the concept SMART Prague is broader than the OP Prague itself, which focuses solely on problematic areas which can be effectively solved by interventions executed directly by the Capital City of Prague and which at the same time maximize the effectiveness of these interventions by focusing on the overlapping of the individual SMART areas – i.e. focusing on maximum positive synergies. In this way, the OP Prague attains the maximum thematic concentration possible in accordance with the EC requirements. However, the concept SMART Prague also covers other areas where intervention from all-state operational programs should be directed (such as OPD, OPŽP, OPVVV, OPZ, IROP), for instance as part of the ITI instrument (Integrated territorial investments).

The diagram presents 4 specific areas of positive synergies that the OP Prague focuses on. These are the areas where the interventions from EU funds can have the greatest positive effect – the reason

48 OPD – Operational program Transport managed by the Ministry of Transport; OPŽP – Operational program Environment managed by the Ministry of Environment; OPVVV – Operational program Research, development and education managed by the Ministry of Education, Youth and Sports; OPZ – Operational program Employment managed by the Ministry of Labour and Social Affairs; IROP – Integrated regional operational program managed by the Ministry of Regional Development
being that they positively affect the broadest range of identified problems. In the diagram above, these areas of synergy are marked with numbers 1 – 4, and it is apparent that they correspond to the overlapping areas of the axes SMART Prague and the proposed OP Prague as discussed before. The following section provides a brief description of the individual areas.

Area 1

The area marked with number 1 interconnects the concepts SMART Specialisation and SMART Infrastructure. It consists in effective utilization of smart solutions and R&D projects for the purpose of developing the city’s infrastructure – in transportation and mobility, environment, energy and energy efficiency. The complex character of the city development necessitates innovative solutions in areas of infrastructure and in complying with the energy and CO₂ requirements, which will make possible the economic development of the city while maintaining its sustainability and eliminating a long-term negative impact on the quality of life in Prague.

From the perspective of area 1, the most important overlapping with the OP Prague is to be found in the support of low-carbon strategies, city mobility and the adaptation to climate change (in accordance with the OP Prague investment priority I.P.2.2). As was already stated in the section which discussed SMART Infrastructure, international surveys show that the main obstacles for Prague’s competitiveness in comparison with other countries are the following:

- Problematic city mobility especially in terms of stationary traffic, individual transportation and the traffic flow management
- Stagnant (albeit still high) quality and extent of coverage of public transportation as a direct substitute of individual transport
- Negative impact of the traffic situation in Prague on the environment (especially air pollution and high level of noise)
- Unused potential of energy savings and intelligent buildings

The above-mentioned problems with mobility and infrastructure in Prague do not have a simple solution given the situation in the capital city – and their solving will require the use of innovative approaches. For this reason, there is significant overlapping between investment priorities I.P.2.2 and I.P.1.1 in Area 1 – i.e. the strengthening of research and innovation infrastructure for the development of high level of research and innovations, and in particular the strengthening of these infrastructures for the needs of the city and its projects (specific objective I.P. 1.1). Activities, which maximally utilize synergies ensuing from the development of infrastructure for science, research and innovation and which at the same time have positive impact and overlapping with the problems of city infrastructure and city mobility, can come in the following forms:

- Contractual research, development and innovation for solving Prague’s problems in the areas of transportation, environment and related problems (will be specified by Regional Innovation Strategy of the Capital City of Prague)
- Supporting the development of research centres and infrastructures in the territory of the Capital City of Prague with increased emphasis on the relevance of these centres in relation to infrastructural problems of the city
• Practical implementation of innovative solutions in the areas of transportation, mobility and environment (pilot and test projects for new technologies and methods – e.g. advanced ITS, cooperative systems in transportation, electromobility, intelligent buildings, etc. – the concept of Living Lab)

• Supporting communication and cooperation between institutions in the Capital City of Prague and organizations in the areas of science, research, development and innovations – information exchange and cooperation on regular basis leading to long-term sustainable solutions to the problems of the city

Area 2

Area 2 focuses on smart solutions in the areas of education and general development of human resources and their interconnection with the concept of SMART Specialisation. As stated above, the human resources potential is one of Prague’s most important assets and at the same time it functions as the main source of the city’s attractiveness for foreign investors. The increasing diversity of Prague’s population, pressure for innovations (both technological and processing) and the intensifying global competition increases the pressure for systematic development of human resources and the maximum utilization of their potential. Crucial for future development are especially the strengthening of the school system, social innovations and activities aimed at minorities, gender equality, inclusion and retention of the workforce in the labour market (relevant to students, senior citizens, etc.) and projects which focus on general skills and development of creativity and enterprising spirit of the city’s inhabitants.

As was already explained in the section dealing with SMART Specialisation, Prague’s most serious problems in this area are the following:

• Stagnant quality of workforce (particularly evident in international surveys based on subjective opinions of investors – which demonstrates the reasons for Prague’s stagnating or declining attractiveness in international rankings over a period of time) and its increasing costs

• Insufficient utilization of capacity in institutions of research, development and innovation for the development of the city and its organizations from the perspective of human resources and for increasing the city’s attractiveness to entrepreneurs

• Insufficient pressure at maximum utilization of all groups of human resources on the territory of the city – including handicapped persons, minorities and the still increasing number of senior citizens, etc.)

• Stagnant quality of the core education system in Prague, which – if left unsupported – is not able to effectively adapt to challenges brought about by global competition

The above-mentioned problems are located at the borderline between SMART Specialisation and SMART Creativity (since they include work with human resources diversity at all levels – and not only in the area of research, development and innovation and at the university level – instead they focus on a holistic and creative approach to their development) and from the perspective of the OP Prague they include the whole scope of thematic objective 10: Education and learning and in the thematic objective 9 they cover the investment priority I.P.3.4. Some activities aimed at solving of problems in this area include:
• Investments and systematic development of the education system in cooperation with universities and RD&I institutions in the territory of Prague and in cooperation with municipal organizations
• Development of all groups of human resources– including projects aimed at life-long learning, social inclusion, employment of young people and senior citizens, etc.)
• Investments in systematic and long-term sustainable public services – social, healthcare-related and educational – which contribute to increased quality of life and satisfaction of the population and which are attractive for qualified workforce (both domestic and foreign)
• Development of creativity, enterprising spirit and other general skills particularly among children and young people in Prague, both through the school system and apart from it

Area 3

Area 3 focuses on infrastructure as the necessary prerequisite for the development of enterprise in the city – particularly in relation to small and middle enterprises. High-quality infrastructure and the availability of physical capital are some of the key assets that the city should offer to business enterprises. The synergies between the development of enterprise and the infrastructure for enterprise are highly positive, and at the same time, their harmonic interconnection helps to keep the city’s economic development sustainable and beneficial for increasing the quality of life. Another important contribution of interventions in this area is the fact that they affect not only highly-qualified workforce, but that they have a positive impact on low- and mid-qualified employment as well.

Problems pertaining to area 3 were summarized in sections SMART Creativity and SMART Infrastructure above. In relation to the OP Prague, the following problems become particularly apparent:

• Lack of interest and support and infrastructure (not only technical, but institutional as well) for transformation of ideas, research outcomes and creativity in enterprise
• Stagnant quality and accessibility of public services (perceived especially through indicators which fall under the heading “quality of life” in international surveys) for human resources in the territory of Prague– i.e. especially investment priorities I.P.3.1, I.P.3.3

The main activities in this area are especially investments in the targeted areas mentioned above, which will contribute to systematic improvement of enterprise and living in Prague, which in turn should become reflected in subsequent improvement of the quality of life in the city and in its increased attractiveness.

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49 The support of SME will be provided from municipal interventions; support of SME from the OP Prague will be aimed especially at the utilization of innovative approaches and the development of creativity for the needs of the city as part of I.P.1.1, and also I.P.3.2 in the social area.
Area 4

Area 4 constitutes a crucial overlapping between the OP Prague and SMART Prague 2014 – 2020. It covers convergence areas of the development of creative potential and enterprise, infrastructure, as well as smart specialisation in science and research. Interventions in this area synergically interconnect the important subjects which participate on the operation and development of the city-municipal institutions, businesses and universities. The key activities in this area include the development of innovative enterprise, (including innovative social enterprise), including such conditions for its development as ensuring high-quality mobility, increasing energy efficiency, changes in the education system, and greater interconnection of businesses and universities on projects in which the city participates or which the city supports. The possibility of financing these interventions in Prague from multiple EU funds is a significant aspect for maximal utilization of the positive synergy potential in this area, since the projects mentioned require the development of human resources as well as targeted investments in physical capital.

Area 4 deals with crucial problems which are apparent from the overall look at Prague’s weaknesses (both objective weaknesses and subjectively perceived weaknesses) in international rankings. What appears to be the most poignant problem is the neglected and uncoordinated communication and activity of the city towards the key affected groups on its territory – those are particularly institutions of science, research and innovations, institutions of university-level education and businesses.

Although a glimpse at the economic and scientific base of Prague clearly reveals that the presence of both small and large innovative companies which generates goods and services with high added value and the presence of institutions of science, research, innovations and university-level education is an obvious and significant advantage of Prague in comparison with other cities in the Czech Republic and in the V4 region, in the last few years Prague has not been able to use this potential systematically – one of the important reasons being the lack of communication and coordination of the city’s activities in this area. A similar issue is seen in another area of synergy – energy and environmental efficiency of the city – where Prague in spite of significant investments (ICT, waste management, infrastructure) does not present the image of a highly efficient city – again, the cause of these obstacles being that Prague failed to achieve effective coordination of these individual components in this highly overlapping area. This negatively affects the attractiveness of the city and the conditions that Prague creates for business enterprise, as well as the perceived image of Prague.

Under the OP Prague, these very complex and transversal issues are addressed in particular by investment priorities I.P.1.1, I.P.2.1 and I.P.3.4 (especially in the area of innovation-based social enterprise, otherwise in area 2), and then also by the overall management of the OP Prague through the concept SMART Prague 2014 – 2020. The new perception of Prague’s problems not only from the perspective of shortcomings in the area of human resources and/or physical capital, but rather as problems of coordination and communication, constitutes a significant step forward in comparison with the previous programming period 2007 – 2013.

Some of the key activities included in area 4:

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50 The support of institutions of higher learning in Prague is an inseparable part of the city’s strategy, and these institutions will be able to submit projects under the OPVVV (Operational program Research, development and education).
- Systematic identification of investment areas with maximum benefits for the city as well as for the impacted groups of businesses and RD&I institutions – these areas include e.g.:
  - Seeking effective solutions for increasing the city's energy efficiency (which has a positive impact as a stimulating agent for enterprise, decreases energy costs and creates opportunities for applications of innovative solutions and new methods in the construction industry, planning, economy, etc.)
  - Supporting the development of innovative enterprise, (including innovative social enterprise), in cooperation with the city, RD&I institutions as well as partners from large Czech and foreign companies – for whom the development of innovative enterprise (especially the SMEs) creates an opportunity for investment, cooperation, and activities in the area of corporate social responsibility development
  - Supporting specific research and development for the city and its projects and assistance for the subsequent commercialization of the outcome of this activity both in the Czech Republic and abroad – this type of cooperation between the city, RD&I and businesses not only has the potential to effectively solve the problems of the city, but it also has the potential to positively shape the city's image and its attractiveness for investments and for highly-qualified workforce

The relationship between the investment priorities and the OP Prague is represented by the following diagram.
Assessment of the relevance of thematic objectives of OP Prague to the axes of SMART Prague 2014 - 2020

The following chart shows the links between the individual thematic objectives and investment priorities in relation to the individual areas of SMART Prague. The assessment was conducted on the scale of 0 - +++++ (a negative link cannot occur in any of the cases), and the number of + indicates to what extent a particular investment priority contributes to the solving of problems and development areas under the individual axes of SMART Prague. It is apparent that all the selected thematic objectives of OP Prague have strong links to the areas of SMART Prague – meaning that they really address the solving of the identified problems of competitiveness and attractiveness of the city on the national and above all on the international level.

<table>
<thead>
<tr>
<th>1. Strengthening research, technological development and innovation (TO 1)</th>
<th>SMART Infrastructure</th>
<th>SMART Specialisation</th>
<th>SMART Creativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP 1.1 Promoting business investment in R&amp;I, developing links and synergies between enterprises, research and development centres and the higher education sector...</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>2. Supporting the shift towards a low-carbon economy in all sectors (TO 4)</td>
<td>10</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>IP 2.1 Supporting energy efficiency, smart energy management and renewable energy use in public infrastructure, including in public buildings, and in the housing sector</td>
<td>+++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>IP 2.2 Promoting low-carbon strategies for all types of territories, in particular for urban areas, including the promotion of sustainable multimodal urban mobility and mitigation-relevant adaptation measures</td>
<td>++++</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>3. Promoting social inclusion, combating poverty and any discrimination (TO 9)</td>
<td>7</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>IP 3.1 Investing in health and social infrastructure which contributes to national, regional and local development, reducing inequalities in terms of health status, promoting social inclusion through improved access to social, cultural and recreational services and the transition from institutional to community-based services</td>
<td>+++</td>
<td>++</td>
<td>+</td>
</tr>
<tr>
<td>IP 3.2 Providing support for social enterprises</td>
<td>+</td>
<td>+++</td>
<td>++++</td>
</tr>
<tr>
<td>IP 3.3 Enhancing access to affordable, sustainable and high-quality services, including health care and social services of general interest</td>
<td>+</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>IP 3.4 Promoting social entrepreneurship and vocational integration in social enterprises and the social and solidarity economy in order to facilitate access to employment;</td>
<td>+</td>
<td>+++</td>
<td>++++</td>
</tr>
<tr>
<td>4. Investing in education, training and</td>
<td>4</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Vocational training for skills and lifelong learning (TO 10)</td>
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<tr>
<td>IP 4.1 Investing in education, training and vocational training for skills and lifelong learning by developing education and training infrastructure</td>
<td>++++</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>IP 4.2 Reducing and preventing early school-leaving and promoting equal access to good quality early-childhood, primary and secondary education including formal, non-formal and informal learning pathways for reintegrating into education and training</td>
<td>0</td>
<td>++++</td>
<td>+++</td>
</tr>
</tbody>
</table>

*Prague, 31st December 2013*