

SMART CITIES RANKING: AN EFFECTIVE INSTRUMENT FOR THE POSITIONING OF CITIES?

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Abstract

Because of radical economic and technological changes cities are facing growing competition for investors, tourists, qualified labour or international events over the last decades (see Begg 1999). As a consequence city rankings have experienced a remarkable boom: On the one hand the comparison of cities can support investors in their choice of location, on the other hand it can be an important guide for the cities to judge their strengths and weaknesses and to define their goals and strategies for future development and better positioning in the urban system. However, there is some evidence that the discussion of city rankings is mainly concentrated on the final ranks totally neglecting (1) the methods and indicators used (see Schönert 2003) resp. (2) its purpose and effectiveness for strategic planning aiming at the strengthening of the position to be gained.

In front of this development, this paper concentrates first on the question what are the basic characteristics of national and international city rankings. Correspondingly, a selected number of city rankings are analyzed in order to identify different types of such rankings. Thereby, the number and features of the indicators used in these rankings as well as their methods of sequencing is described systematically. The sample of indicators and the complexity of the ranking approach itself constitute the base for a quality assessment of city rankings discussed within this paper. In particular, an own ranking approach („European Smart Cities“)¹ is described.

In the second part, the paper concentrates on the question how cities cope with the results and what are typical reactions of local governments and stakeholders. For providing insight into the way cities respond, it is described how they try to make use of their results to city rankings respectively how they reflect on the strengths and weaknesses revealed in the study. In this context different urban strategies for steering development and processes of learning in general, but especially with respect to urban planning and marketing, are discussed within this paper.

Answering these questions the paper concludes in proposals for making city rankings a more significant and effective instrument for steering economic, social and spatial processes in cities: recommendations for researchers and analysts dealing with the design and methodology of city rankings on the one hand and for local governments and stakeholders concerning the reasonable handling of results on the other hand are formulated.

¹ This ranking which was elaborated and published by an international consortium headed by the University of Technology Vienna (Giffinger et al. 2007)

1. Introduction and background

City rankings enjoy great popularity and increasingly attract public attention. In these comparative studies cities are evaluated and ranked with regard to different characteristics (e.g. economic, social, environmental etc.) in order to reveal the best (and the worst) places regarding these dimensions and activities. As rankings of cities are also linked to emotions and images, the media, politicians and other stakeholders quickly respond to the results of a new ranking when it is published, either with happiness or with consternation.

1.1 Importance of city-rankings

Dealing with the importance of rankings from the point of view of regional science, one has to take a deeper look at the background: As a consequence of strong economic and technological changes over the last decades cities and regions are facing growing competition for high ranked economic activities (see Begg 1999). On the urban level, cities aim at improving their competitiveness and their position in the European or national urban system. Since the European integration process has diminished differences in economic, social and environmental standards², cities have converged in their basic conditions for competition, which is increasingly scaled down from the national level to the level of cities and regions (see Storper 1995). This trend enhances the importance of specific local characteristics, which provide comparative advantages competing for increasingly footloose and mobile global enterprises, investors, tourists and capital (Parkinson et al. 2003; Giffinger et al. 2003).

Facing this development, urban competitiveness and corresponding strategic approaches with specific goals and modified instruments have become important efforts of urban politics (Tosics 2003). The comparison of cities within rankings can support investors in their choice of location on the one hand, but it can also be an important guide for future city development on the other. As rankings reveal particular strengths and weaknesses of the cities, policy makers are enabled set specific actions to work on certain problems and to implement measures for sustainable development when considering the results of a high-quality ranking or benchmarking. In addition to that, positive results in a widely published and approved city-ranking can also be used as a central part of a city's marketing strategy: a top-rank in a highly reputed city-ranking definitely helps to improve the international image of a city. Thus, city-rankings have become an important empirical base for disclosing comparative advantages and sharpening specific profiles and consequently for defining goals and strategies for future development.

Basically, the concept of comparing cities by using certain criteria is a known point of view in urban research ranging from the very first calculation of a rank size rule, to the theory of Christaller on the centrality of places and, currently, to the ongoing discussion on global cities. These concepts focus on an overall classification of cities (often based on network-oriented criteria), but in the content of this paper, the term "ranking" is used in a more precise way, as one is confronted with a very broad spectrum and conceptual confusion when examining the state-of-the-art on city rankings: many different terms like "city ranking", "comparison of cities", „benchmarking“, „city-scan“ etc. can be found. Therefore, constitutive elements of a city ranking – as the term is used in this paper – are that at least two cities are included, the structuring of cities are in an ascending/descending order resp. arranged in a hierarchy and the use of a combination of at least two indicators for building up the order/hierarchy.

Thus, for the purpose of this paper the definition of the term „ranking“ is quite restricted, but for certain issues a more expanded understanding of "city ranking" could be useful, for example to distinguish all kinds of ranking methods for cities according to the following dimensions:

- explorative vs. evaluative
- network-based vs. hierarchy-based
- target-group oriented (or specified on one single topic) vs. overall rankings

² In particular the adoption of EU standards and norms in the accession countries has accelerated this trend (see Pichler-Milanovic 2005)

1.2 Benefits and limits of city rankings

Tackling the question how the results of rankings can be applied in strategic policy advice for cities, it is necessary to examine and compare existing city-rankings thoroughly in order to detect their explanatory power and applicability in urban strategic planning. Mainly based on two empirical studies within that field (Fertner et al. 2007; Schönert 2003), one can point out the following assets of city-rankings with respect to issues of regional sciences:

Benefits

- Rankings attract attention
 - Call attention to issues of regional science in general
 - Stimulate a broad discussion on regional development strategies
 - As theatricality and production/stating of (mass-media oriented) policy gain more and more importance in general (not only caused by media, but also supported by the self-promotion of cities and promotion of policies by politicians themselves; see Meyer/Schicha/Brosda 2001), rankings can be applied to issues of city marketing etc.
- Rankings are a competitive instrument
 - Positive characteristics are made public outside the city itself
 - Cities are enabled find their position within the ongoing urban competition and to sharpen their profile
- City-rankings may initiate learning effects
 - Regional actors are forced to make their decisions transparent and comprehensible
 - Rankings focusing on a clearly defined issue provide more applicable results than rankings providing 'just' an overall list

Limits

- „Beauty contest“ and „recursive self-affirmation“
 - Discussion focuses on final ranks and complex interrelations and causalities are unattended or neglected
 - Public attention is mainly focused on the final ranking without considering the methodological aspects behind the ratings
 - The selective public perception of results enforces a confirmation of existing stereotypes and clichés
- Long-term development strategies may be threatened
 - Rankings strengthen competition between cities, which may have negative consequences like deregulation, structural and spatial problems, risk for socially acceptable city development etc. (see GIFFINGER et al. 2003)
- Unreflected handling of ranking results
 - Rankings are excessively acclaimed by the “winners” and ignored by the “losers”.
 - Cities (mainly badly ranked cities) oppose comparisons with others („benchmarking“) in general
 - In addition to that, rankings tend to follow a “generalistic” approach, as many financiers ask for clear results which can easily be communicated in public and so most rankings aim at finding the “best” or “most attractive” city in general terms totally ignoring the fact that different activities need different conditions

2. Typology of city rankings

As indicated before, not much research has been conducted on the methodology of rankings themselves and their importance for different actors or their impact on certain issues of city planning (still, there is discussion on the scope and content of city rankings and quite a lot of reflections on mathematical analysis

of data can be found). However, Fertner et al. (2007) define three distinguishing aspects by which city rankings can be compared and classified:

- Objective: The objective of the ranking is not only specified by its aim and its target audience but also by its spatial scope and the desired factors and indicators behind the ranking.
- Methodology: Methodology does not only include the way of data collection and processing but in a first step also the limitation of cities examined in the ranking.
- Dissemination: The way how the results are evaluated, interpreted and presented is crucial for the impact of the ranking.

Based on these considerations, this paper deals with two specific research questions on the types of rankings: how can one differentiate types of rankings systematically? What are the key issues to distinguish several city rankings? To answer these questions, a multiple correspondence analysis has been applied on 20 different city rankings published between 2000 and 2009. These rankings have been analysed along several dimensions, as listed in the following:

Figure 1. Dimensions for analysis and creation of typology of city rankings³

Dimension	Analysed indicator (examples)
Authorship and publication	Author(s) and sponsor(s) Type of publishing
Data base	Time scale of used data Source of data and/or raw data published? Method of calculation of overall-ranking
Use of indicators	Number of indicators Method of calculation Use of standardised values
Spatial dimension	Size of city sample Selection criteria for cities
Elaborateness of results	Overall-ranking Results for selected topics and cities Results available for free/liable to pay costs

By means of these dimensions, 5 types of city rankings can be identified by applying a multiple correspondence analysis⁴:

- 1) *Commissioned economy/consulting-oriented rankings with missing transparency* and documentation comprise quite many cities (scope: worldwide) without declaration of sample selection. These rankings apply a moderate number of indicators (median = 32) for calculation without documenting the indicators themselves nor the used data base, nor the method of calculation itself. The detailed results of the ranking are only partially available.
- 2) *Commissioned rankings with insufficient transparency created by expert panels or other private research institutes* work on varied spatial dimension and include many cities (median = 75) without making the city sample selection procedure really apparent. The used data base is not clearly documented either, although some of the original data is published within the quite detailed results (overall ranking, results on sub-rankings, etc.). A list of indicators (median = 43) is published, but the rankings do rarely provide information on the calculation method. Sponsors of these rankings are financial institutions, magazines or real estate agencies.
- 3) *Rankings compiled by magazines or NGO's without sponsoring* are usually created for one specific country or a whole continent by taking into account a comparatively low number of cities (median = 25). The selection of the city sample is conducted by population size and the calculation of the overall-ranking is done by average values. There is no consideration of missing values within the used data base, but the data base is made transparent for each indicator. The

³ Furthermore, some additional dimensions have been collected, such as date of publishing, types of indicators, objectives of rankings etc. These dimensions have not been considered for compiling the typology of rankings.

⁴ Model: N = 20 / Cronbachs Alpha (average value) = 0,944. Multiple correspondence analysis arranges objects or data measurements according to their similarity/dissimilarity along certain dimensions (see Blasius 2001).

documentation of the method used for the ranking is fair; however, the results are available in a very detailed way.

- 4) *Well-documented and methodically advanced rankings conducted by universities or economic research institutes with sponsors in different areas* (financial institutions, magazines, real estate agencies etc.) mainly focus on one country or one continent. The selection criteria for the city sample are either population size or a combination of different characteristics. All parts of the ranking are made transparent (entire list of indicators available, description of calculation method etc.) and the method used for calculation of the ranking is usually more advanced than those used within the other types of rankings described above (e.g. use of standardized values, consideration of missing values etc.). The data base is documented for each indicator and original data is published to some extent. The elaborateness of results is pretty well, too, focusing more on the overall-ranking and on methodological details than on the description of single cities or on thematic “Top10-Evaluation”.
- 5) *Special cases* (outliers; 2 rankings) cannot be allocated to one of the four above described types of city rankings.

The table given below shows the most important characteristics of the four different types of city rankings:

Figure 2. Characteristics of typology

	Type 1	Type 2	Type 3	Type 4
Number of rankings	3	3	4	8
Transparency of ranking calculation	very bad	bad	good	very good
Documentation of data base	very bad	bad	very good	very good
Number of indicators¹	32	43	51	29
Spatial dimension	worldwide	varying	country / continent	country / continent
Number of cities²	60	75	25	54
Transparency of city-sample selection	very bad	bad	very good	very good
Elaborateness of results³	2,17	2,67	2,75	2,62

3. Example: European Smart Cities – Ranking

Within chapter three, one of the rankings allocated to type 4 is described in detail, namely the European Smart Cities - Ranking. This ranking has been published in 2007 and explicitly deals with medium sized cities in Europe, taking into account their perspectives for development. Even though the vast majority of the urban population lives in such cities, the main focus of urban research tends to be on the ‘global’ metropolises.

As a result, the challenges of medium-sized cities, which can be rather different, remain unexplored to a certain degree. Medium-sized cities, which have to cope with competition of the larger metropolises on corresponding issues, appear to be less well equipped in terms of critical mass, resources and organizing capacity.

3.1 Ranking approach

As the Smart Cities ranking approach focuses on the specific situation of medium sized cities in Europe, the basic objectives of this ranking approach are defined as

- (1) transparent ranking of a selected group of cities
- (2) elaboration and illustration of specific characteristics and profiles of every city

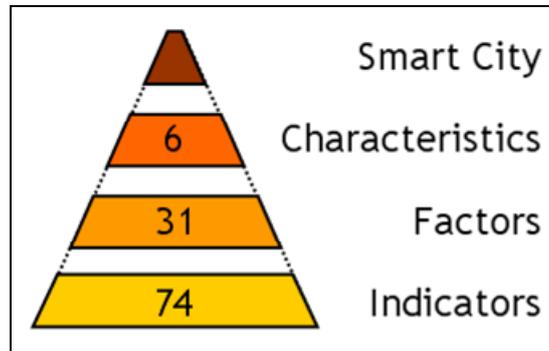
- (3) the encouraging of benchmarking between selected cities
- (4) detection of strengths and weaknesses for strategic discussion and policy advice.

In order to implement this approach we defined 'smart city' – based on round table discussion and literature research - as follows: "A Smart City is a city well performing in 6 characteristics, built on the 'smart' combination of endowments and activities of self-decisive, independent and aware citizens." (<http://www.smart-cities.eu/model.html>; found on 18th of June, 2008)

However, the term 'smart city' is not used in a holistic way but in most examples one emphasizes specific characteristics of different fields of urban development and even the awareness and participation of a city's inhabitants regarding special issues of urban development. Accordingly, 'smart' implies the implicit or explicit ambition/intention to improve its performance regarding urban development in the specific characteristics.

According to literature and a round-table-discussion, six 'smart' characteristics had been identified which are likely to be relevant: economy, people, governance, mobility, environment and living. These 6 characteristics we regard as the relevant group characterizing a smart city. They are broken down into 33 relevant factors (see list of factors in figure 2) which reflect the most important aspects of every smart characteristic. Finally, every factor of a smart characteristic is defined empirically through a group of corresponding indicators. In total, 74 indicators had been defined and used for operationalising the relevant factors. As the list of factors results from the definition in an idealistic way, two of the factors could not be defined empirically because of the lack of data. Thus, only 31 factors remained in the ranking procedure.

Figure 3. Description of smart city



To give an example: 'Smart people' as characteristic is defined through the 7 factors mentioned above in figure 2; for instance, the factor 'affinity to life long learning' is then operationalized through the indicators 'Book loans per resident', 'Participation in life-long-learning in %' and 'Participation in language courses'.

Figure 4. List of characteristics and factors

SMART ECONOMY (Competitiveness)	SMART PEOPLE (Social and Human Capital)
<ul style="list-style-type: none"> ▪ Innovative spirit ▪ Entrepreneurship ▪ Economic image & trademarks ▪ Productivity ▪ Flexibility of labour market ▪ International embeddedness ▪ <i>Ability to transform</i> 	<ul style="list-style-type: none"> ▪ Level of qualification ▪ Affinity to life long learning ▪ Social and ethnic plurality ▪ Flexibility ▪ Creativity ▪ Cosmopolitanism/Open-mindedness ▪ Participation in public life

<p>SMART GOVERNANCE (Participation)</p> <ul style="list-style-type: none"> ▪ Participation in decision-making ▪ Public and social services ▪ Transparent governance ▪ <i>Political strategies & perspectives</i> 	<p>SMART MOBILITY (Transport and ICT)</p> <ul style="list-style-type: none"> ▪ Local accessibility ▪ (Inter-)national accessibility ▪ Availability of ICT-infrastructure ▪ Sustainable, innovative and safe transport systems
<p>SMART ENVIRONMENT (Natural resources)</p> <ul style="list-style-type: none"> ▪ Attractivity of natural conditions ▪ Pollution ▪ Environmental protection ▪ Sustainable resource management 	<p>SMART LIVING (Quality of life)</p> <ul style="list-style-type: none"> ▪ Cultural facilities ▪ Health conditions ▪ Individual safety ▪ Housing quality ▪ Education facilities ▪ Touristic attractivity ▪ Social cohesion

All 74 indicators which we finally used in the ranking are obtained from the following data sources: Urban Audit (local, core), ESPON 1.4.3 project (FUA level), ESPON 1.2.1 project (NUTS 3), Eurostat database (NUTS 3, NUTS 2 or NUTS 0), various Eurobarometer special surveys and a study (Ministère de la culture, 2005) on creative industries (NUTS 0). Of course, the majority of all indicators (65%) are defined on the local level. Others which are derived from data on the national or NUTS 2 level are included because they provide additional information not only about the endowment of cities but also about the perception and assessment of specific developments.

In a second step questions regarding the selection criteria of cities as well as the aggregation procedure are dealt with from a methodological point of view: In order to make the ranking approach more transparent, the definition of the city sample is essential. In comparison to other ranking approaches the Smart-City approach considers only medium sized cities in Europe. As there is no clear and common definition of medium sized cities we defined four criteria for selection:

- Potential members are all functional urban areas in Europe (FUA): these are about 1.600 entities in Europe according to the findings in the ESPON 1.1.1 study including all 27 EU-member states as well as Norway and Switzerland. (Nordregio, 2004)
- Within this group 584 core-cities with a population between 100.000 and 500.000 inhabitants are selected because they represent cities not the largest cities or capital cities for most countries (exception Ljubljana)
- Within this group only such 364 cities are selected which have at least one university which indicates a precondition for knowledge based and smart urban development:
- Finally, the last selection criteria of the remaining cities is a catchment area of less than 1.500.000 inhabitants assuming that such 256 cities are not part of a metropolitan agglomeration.

So, 256 medium sized cities remain for a potentially ranked group. However, this number is reduced to 70 cities due to accessibility and quality of data; only few cities are considered although they have a slightly larger catchment area.

The aggregation procedure for defining the Smart-City ranking is the following: The above described indicators are defined in different ways and, thus, they show completely different levels of values and different ranges which are not allowed to be merged in any form. Very easily, such indicators are

standardized through a z-transformation resulting in a distribution with an average value '0' and a standard deviation of '1'.

Through this transformation indicators are now comparable and appropriate for any aggregation procedure. Assuming the substitution between indicators all (not missing) values are added up to the aggregated value for every factor resp. for every characteristic and in total for every city itself. As there are missing data which does not allow calculating the (standardized) indicator value, we finally do not use the sum of all values but the average value of the aggregated values divided through the case-specific number of values.

Figure 5. City sample and group rating
The darker the colour the better the rating



Source: Giffinger et al. 2007

Based on these definitions and methods smart cities are ranked according to their average value across all indicators. Empirical findings are produced and illustrated via tables, graphs and maps. For an overview of the cities and their grouped ranking see fig. 3.

Of course, ranking approaches and their findings will have more public attention the more dissemination of relevant results is enforced. As relevant empirical results we produced information about:

- the whole sample in order to show the position of distinct cities within the group or relative to other cities (bench marking)
- selected single cities in order to illustrate its specific profile of characteristics and corresponding factors.

According to the aggregation procedure every city shows a value for its smartness. In addition, for every city the profile regarding the six characteristics is displayed and indicates a relative heterogeneity in the city-specific bundles of characteristics at a first glance.

3.2 Impacts of dissemination

Results had been disseminated through two activities in 2007: (1) a press conference at the international fair EXPO REAL in Munich, Germany; (2) an own site in the internet <http://www.smart-cities.eu/> which is still online.

The press conference provoked attention and provided the dissemination of the results by international press. Newspapers in different European countries (Germany, Finland, Luxembourg, Slovenia and Austria)

reported about the Smart City ranking results. At least same importance for dissemination had the presentation of the webpage during the press conference. This webpage provides more information about the approach and the model, the ranking of all cities in total resp. due to distinct characteristics and, finally, allows the benchmarking for distinct cities illustrating corresponding results.

As expected these forms of dissemination provoked different reactions basically confirmed our results and mostly under the aspect of benchmarking. Besides, some cities reported and discussed the ranking on city-specific websites and took the detailed information for discussion of recent urban issues. Even not so well ranked cities made a statement on that results and agreed with their ranking due to the detailed and transparent approach.

More important: some cities decided to take up this findings for official policy issues; for instance Turku (see: http://www.utu.fi/en/research/researchs_turku/turku_was_ranked_high_in_the_ranking_of_european_middle-sized_cities.html; seen 19.8.2008); and, some cities decided to become object of the ranking although they had not been selected according to our criteria resp. they want to be partner in a more exclusive network of smart cities which expect more detailed information in order to bring forward their city development strategy.

Finally, some cities (like Graz, Linz and others cities in South England or in Slovakia) asked for a specific policy advice and proposals on strategic efforts based on the Smart City approach. In order to do such recommendations one has to answer the question what meaning rankings may have for the strengthening of urban competitiveness in a learning context.

4. Rankings in the context of urban competitiveness

As mentioned above, rankings are increasingly applied and used for a simple but in public discussion very effective benchmarking and branding of cities. The observed reactions of stakeholders in most cases do not have a profound and sustainable effect on cities which are object of this ranking – independently of their rank and success. However, from our perspective there possibilities to use the results of ranking approaches in a more effective way for the improvement of a city's competitive situation, but first one has to clarify what does urban competitiveness mean and how is competitiveness determined through its territorial capital.

4.1 Territorial capital as the base for urban competitiveness

In a more complex perspective competitiveness considers urban development not only in economic terms but also in terms of living quality and socio-spatial cohesion on the urban-regional level (Begg, 1999, Giffinger, et al., 2003). This means that a city which is competitive against others is able to increase its economic performance and wealth whereas other social and environmental factors of urban quality will not be endangered through economic development. Accordingly, urban development (economic and demographic growth) is seen as the outcome of a comprehensive understanding of competitiveness influenced by a variety of relevant factors in the economic social, demographic, environmental and cultural sphere.

The explanation of competitiveness is subject of academic discussion since many years. (i.e., Parkinson, 2003, or Begg, 1999). Besides, there is an increasing discussion on the relevance of territorial capital as the base for urban competitiveness. According to OECD (2001, p.13) it "refers to the stock of assets which form the basis for endogenous development in each city and region, as well as to the institutions, modes of decision-making and professional skills to make best use of those assets." Camagni (2007: 4ff) elaborated a simple taxonomy of components of territorial capital defined by two dimensions: one dimension represents the materiality; the other dimension represents the degree of rivalry. Every dimension is divided into three categories of materiality resp. rivalry providing in combination nine components and finally distinguishing tangible, mixed and intangible goods and private goods, club goods (inpure public goods) and public goods. Discussing these components Camagni identifies the 'traditional square' and the 'innovative cross' of corresponding goods.

This 'innovative cross' in particular indicates that networks and regional governance approaches in form of networks of private, semi-public and public partners as well as relational capital in form of the cooperative capacity in an urban agglomeration are crucial in importance. They are the base and the driving forces to activate potentials through corresponding initiatives. Explicitly, they aim at the enhancement of the territorial capital in form of specific intangible assets. This means from a strategic point of view that the creation of assets – in particular of intangible assets - becomes the most important driving force of urban-regional competitiveness because, finally, they provide absolute and relative advantages for economic activities. Relative advantages are mostly seen in the set of conditions which may change due to market dynamics (costs of labour force, real estate prices, etc.); absolute advantages are regarded as the most important forces for development so far they result from intangible and immovable assets.

From a cognitive perspective, learning processes may have a decisive impact on the enhancement of territorial capital over time: specific cooperative initiatives between different actors – depending on their cooperative capacity - create specific tangible and intangible assets. The more such initiatives are based on experiences and learning processes, the higher is the impact the territory's assets. They should provide better advantages for certain economic activities which make every city more competitive, the more relevant knowledge was gained. Thus, territorial capital will be enhanced if cooperative initiatives are the outcome of productive learning processes regarding the existing strengths and weaknesses of a given urban situation. Consequently, over time a process of accumulation or depreciation will take place strengthening or weakening the competitiveness of the metropolis.

4.2 *Strategies enhancing territorial capital*

As cities face growing competition, the enhancement of territorial capital becomes important. Crucial for this enhancement is therefore the use of strategies and instruments which seek for (new) possibilities of defining and strengthening its assets and which are based on learning processes. Facing the specific strategic efforts in many cities there is a consensual understanding of strategic spatial planning regarding it as collective efforts in order to re-imagine a corresponding urban region and to define priorities in corresponding fields of development. (Healey, 2004) Due to the concept of territorial capital, such strategies should not only define such priorities but should look to foster corresponding learning strategies which help to identify and to realize such priorities more effectively. Some specific characteristics are important for its success:

- a concentration of organizational capacities around common projects between private investors, stakeholders and (semi-)public actors
- a concentration on critical issues and on corresponding basic projects providing assets
- visions and priorities creating and enforcing collective action
- a process-oriented approach in the long run

However, which learning strategies may help to make strategic efforts more effectively?

Due to relative heterogeneous profiles with different strengths and weaknesses, there is no common and single approach appropriate for every city. Because of this heterogeneity and (very often) unknown potentials there is a great need to identify a city's individual profile of characteristics and assets. In order to explore them and to improve a city' territorial capital through strategic efforts, two corresponding approaches can be applied to encourage cities to improve their territorial capital as base for its competitiveness in a 'smart' way:

Evidence based approaches need a detailed description and analysis of the different fields of urban development and, finally, an assessment of strengths and weaknesses. The Smart City approach allows such an analysis in a rather differentiated way on different levels. Especially on the more disaggregated levels, empirical analysis can focus on specific issues based on a functional understanding of distinct fields of urban development. The assessment can be done in a twofold way: On the one hand the functional understanding helps to identify distinct factors influencing the 'smartness' of a city. On the other hand it allows specific benchmarking with other cities with regard to given types and profiles.

Based on this typology any city can be referred to cities belonging to the same type or to any other type to which a city aims to belong. Due to this reason, the 'Smart City' approach provides empirical evidence regarding the profile of a city in a differentiated way and the identification of groups of cities with typical profiles. Besides, the differentiated assessment of strengths and weaknesses helps to define relevant priorities in an efficient way.

Lesson drawing approaches concentrate on understanding the conditions under which policies operate in lending political systems and on creating proper conditions in borrowing political systems (Page, 2000). Applying this approach involves many steps: An important first question is from where experiences can be transferred (Robertson, 1991; Robertson and Waltham, 1992). Local governmental levels are likely to look to nearby local governments, assuming that they have most in common with neighbors. In this sense, subjective identification and political values are important in directing the search. Ideological compatibility, similarities in resources, psychological or cultural proximity, the availability of evidence and interdependence are other factors to be considered (Rose, 2001) when selecting cities from which a lesson can effectively be drawn.

5. Perspectives of smart ranking as an instrument enhancing territorial capital

Obviously, the positioning of a city within the urban system is the result of a complex interplay of economic, geographic and socio-cultural conditions, which are only partly locally determined. At the same time, a city's position is influenced by its strategic development strategies as a specific aspect of urban governance. Amongst other instruments the comparison and ranking of cities is one of the most productive approaches to identify a city's comparative advantages, potentials and weaknesses in relation to other cities.

What does this mean for specific recommendations of distinct cities?

Medium-sized cities have to cope with competition from the larger metropolises on corresponding issues, but appear less equipped in terms of critical mass, resources and often also institutional and organizing capacity. Furthermore, medium-sized cities may experience disadvantages because of lacking size but may offer assets not available in larger cities. Confronted with their particular challenges governments of medium-sized cities continuously search for answers in the form of policies and programmes. Facing global trends with rather similar challenges across distinct European cities it is likely that governments elsewhere have experiences in policies and programmes that address these challenges. With the help of city rankings, a lesson drawing-approach for developing strategies provides the possibility to:

- Classify all cities according to typical profiles
- Allocate such a city into a group of cities with similar profiles
- Look for comparable cities (as a whole or in specific characteristics)
- Select the best/good/worst practices from comparable cities and thereby avoid a 'reinventing the wheel'-approach by every city
- Elaborate adequate strategic efforts and projects

Possibly, strategic efforts by cities to compete with other cities and to strengthen their territorial capital can be based on a second option, namely concept of evidence based-model, which is built on the following principles:

- Detecting the strengths and weaknesses of a city through benchmarking on the level of smart characteristics
- Discussing groups of factors which are interdependent (both positive and negative factors)
- The evidence of existing handicaps and assets can be used as an empirical base for detecting and defining specific fields of economic activities as a precondition for specialisation or, said more generally, proposing objectives and strategic projects aiming at these strengths and weaknesses

What is the benefit of the Smart Cities-Approach for enhancing the territorial capital of cities and setting up strategic policies?

After weighing the advantages and disadvantages of the Smart Cities-Ranking approach for enhancing the territorial capital of cities, one can state that the advantages of this rankings procedure are the easy way for benchmarking and detecting strengths and weaknesses. The Smart Cities-Ranking analyses a wide range of factors which itself are defined by comprehensive bundles of indicators. Furthermore, besides the simple ranking, the hierarchical approach allows the identification of profiles on different levels in a comprehensive way. As it is a city ranking for medium-sized cities, it is more specific than evaluations of metropolises and is related to a particular functions of the cities themselves (eg. living quality, cultural aspects, financial services, biotechnology, ICT,...). On the other hand, the disadvantages come about the elaboration of the database (recently 74 indicators for 70 cities) depending on external sources like URBAN AUDIT (problem of valid and reliable data). Regrettably, the ranking approach is obliged to include data sources which have different spatial definition (NUTS 3 or even national). Moreover, this kind of comparison of cities (as every ranking) holds the risk of an easy misuse of disseminated data in public discussion.

To resume, we made different experiences elaborating this approach and using it for individual discussion of distinct cities. Its usability for the elaboration of strategic efforts and policy advice is given but has to be enhanced through further research and revision. However, the perspective that URBAN AUDIT provides new and recent data gives new opportunities for its inclusion into the Smart Cities approach providing then the possibility to compare specific characteristics and factors of urban development in a direct way on an ongoing basis or in a comparative way across other cities.

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