

Subduing global ecological threats in cities: governance, business, and wicked problems

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Abstract English

The development of big cities is determined by the ability of their key actors to bring about successful solutions to existing and emerging challenges. African big cities and countries have considerable, although not yet fully exploited, potential. The chapter wants to point out some of the new challenges that big cities will be exposed to in terms of the need for sustainability of their ecosystems and to present some concepts for use to cope with these challenges. These challenges mean significant opportunities for urban firms. All urban actors will be challenged to best reconcile their different interests so that the resulting effects benefit not only firms, but also the urban population in terms of more comfortable living in a healthy environment and environmental sustainability. Parallel phasing concept (PPC) and constructed regional advantage concept (CRAC), unlike traditional approaches, consider the cross-sectional plane of the economic space and thus adds another dimension to the analysis by using the integration of three spaces (physical, cyber-physical and digital) and three knowledge bases (analytical, synthetical, and symbolic). The term parallel reflects the simultaneous integration of different kinds of space together with active-adaptive approaches to phenomena such as openness, creativity, flexibility, or variety that it is needed for the analysis of complex urban phenomena. A combination of CRAC, Penta helix (5H), multi-level governance (MLG), and PPC concepts was performed to describe the dynamic and competitive components of big cities. The transformation of African big cities and their actors may be assisted using those concepts. Their rapid embedment in urban/national policies may be an important factor affecting successful urban development.

Français abstrait

Le développement des grandes villes est déterminé par la capacité de leurs acteurs clés à apporter des solutions efficaces aux défis existants et émergents. Les grandes villes et les pays africains disposent d'un potentiel considérable, bien qu'il ne soit pas encore pleinement exploité. Le chapitre veut souligner certains des nouveaux défis auxquels les grandes villes seront exposées en termes de nécessité de durabilité de leurs écosystèmes et présenter quelques concepts à utiliser pour faire face à ces défis. Ces défis signifient des opportunités importantes pour les entreprises urbaines. Tous les acteurs urbains seront mis au défi de concilier au mieux leurs différents intérêts afin que les effets qui en résultent profitent non seulement aux entreprises, mais aussi à la population urbaine en termes de confort de vie dans un environnement sain et de durabilité environnementale. Le concept de phasage parallèle (PPC) et le concept d'avantage régional construit (CRAC), contrairement aux approches traditionnelles, considèrent le plan transversal de l'espace économique et ajoutent ainsi une autre dimension à l'analyse en utilisant l'intégration de trois espaces (physique, cyber-physique et numérique) et trois bases de connaissances (analytique, synthétique et symbolique). Le terme parallèle reflète l'intégration simultanée de différents types d'espace avec des approches adaptatives actives de phénomènes tels que l'ouverture, la créativité, la flexibilité ou la variété nécessaires à l'analyse de phénomènes urbains complexes. Une combinaison des concepts CRAC, Penta helix (5H), gouvernance multi-niveaux (MLG) et PPC a été effectuée pour décrire les composantes dynamiques et compétitives des grandes villes. La transformation des grandes villes africaines et de leurs acteurs peut être accompagnée à partir de ces concepts. Leur intégration rapide dans les politiques urbaines/nationales peut être un facteur important affectant le succès du développement urbain.

I. Introduction

The successful development of big cities (hereafter referred to as cities), including African ones, is still not complexly analyzed and their mechanisms of functioning are still unclear. However, their development is significantly influenced by the ability of their key actors to bring about successful solutions to existing and emerging urban challenges. Several studies have investigated the governance and competition/cohesion balance of cities in the current environment (e.g., Brzica, 2022; Ache,

Andersen, and Maloutas, Eds., 2008). Economic development of cities is examined in many directions and in different contexts (UN, 2015; Rondinell, Johnson Jr., Kasarda 1998). The formation of big cities is related to the processes of segmentation, growth, aggregation, and emergence. Big cities contain very high number of city actors characterized by various sizes, activities, goals, and strategies. However, due to the complexity of big cities and the specificity of the conditions in which they find themselves, the best practice approach often fails.

The development of cities is determined by the ability of their key actors to bring about successful solutions to emerging challenges. Cities have considerable, although not yet fully exploited, potential. The new challenges that cities will be exposed require securing sustainability of their ecosystems. These challenges will mean significant opportunities for domestic and foreign firms. All actors will be challenged to best reconcile their different interests so that the resulting effects benefit not only entrepreneurs regarding their goals, but also the urban population in terms of comfortable living in a healthy environment and environmental sustainability. Cities are strategic enough to make connections globally and small enough to reflect local needs and opportunities and to involve stakeholders in decision-making process. They have potential to promote synergies among urban actors.

Parallel phasing concept (PPC) (Brzica, 2017b), as our concept of the development of urban/regional socio-economic systems, and constructed regional advantage concept (CRAC) (Asheim et al., 2006), unlike traditional approaches, consider the cross-sectional plane of the economic space and thus adds another dimension to the analysis by using of the integration of three spaces (physical, cyber-physical and digital) and three knowledge bases (analytical, synthetical, and symbolic). The term “parallel” reflects the simultaneous integration of different kinds of space together with active-adaptive approaches to phenomena such as openness, creativity, flexibility, or variety that it is needed for the analysis of complex phenomena, as are cities and their actors. Using all dimensions from PPC can provide new opportunities for firms and help cities reduce environmental burden.

II. Conceptual section – CRAC, WPs, PPC and governance problems

Previous papers and research studies usually analyzed the elements on the surface and interior layer of cities and then predicted the formation mechanism of cities based on the difference of these components. For example, Asheim et al. (2006) reported that since the main component in center of big cities was business and service oriented one, whereas that on the suburb was industrial (synthetic KB), thus deduced that various KBs induced the development of city profiles and finally the formation of city structures by heterogeneous segmentation. In this kind of process, CRAC, PPC and 5HC may induce the development of urban districts by heterogeneous segmentation/fragmentation. Similar processes based on application of other policy approaches were also reported in literature.

Complex cities’ structures require complex analytical approach for the study of their structural elements (business/non-business actors and other segments). Three analytical concepts were used. Multilevel governance was adopted from Brzica, Waszkiewicz, and Belof (2014), Corfee-Morlot et al. (2009), and Brzica (2014). Approximately four conceptual models of big cities were submerged in one by a conceptual synthesis; the city model was preliminarily simplified using a PPC to remove most of the elements (except polluted air and water) present in big cities.-After such a conceptual change, most

of the city actors (such as NGOs and firms) in big cities were described within the complex and changing environment. Then the holistic approach was used in a preliminary phase for contextual monitoring, prior to CRAC, Penta Helix Concept (5HC), and PPC introduction.

Successfully coping with fundamental emerging challenges is difficult, as they are essentially unpredictable. Dynamic complex environment has already been discussed in various works (Bar-Yam, 2005; Boulton, Allen, Bowman, 2015; Byrne, 1998; Byrne and Callaghan, 2014; Cilliers, 2001; Smith and Jenks, 2007; Urry, 2003). The development of environmental technology is mainly driven by regulation. While research and development of environmental technology is ongoing in cities, city administrations play a minor role in financing this research activity. The environmental pressures have led to constraints on the urban industry and this has created many new opportunities. Urban firms can offer valuable assets for this emerging environmental market, even though the dynamics of processes are quite different here from their traditional business operations.

There are changes in development trends leading to challenges to which firms must respond quickly and adequately. Emerging newcomers in the urban economic system mean not only opportunities, but also represent threats to the prosperity of established firms (Brzica, 2017a). New forms of parallel cooperation and competition (co-ompetition) create other challenges (see Mueller and Schurr, 2016, Simandan, 2017, Fitjar and Rodrigues-Pose, 2014). The complexity of the urban environment means that often-isolated events and small incentives lead to far-reaching consequences for the nature of the urban business environment. Interactions among urban actors generate uncertainty for future urban development.

Perhaps the most pressing environmental problems in cities are those dealing with the air pollution and disposal of waste. Efforts to develop cities in the area of improving living conditions and attractiveness also carry the risks of increased vulnerability. An example may be the reduction of the diversity of energy sources and the resulting risk of power outages. Greater transformations of cities can also increase their vulnerability. The level of resilience of the main city segments varies. Some cities have sufficient capacity to return to normal operations. However, large-scale, and costly transformations can limit capacities (such as financial and human resources) to deal with sudden threats, reducing the resilience of cities. It is therefore important to plan significant transformations in a timely and sufficient manner.

The modern development of the mega-city of Cairo, for example, took place in an unplanned form, which led to the emergence of many problems. Most of Cairo's dwellings were built in informal housing estates that lack the necessary public services and infrastructure security has not kept pace with rapid growth. The quality of the mega-city's environment has suffered because of unplanned growth, leading to an increase in pollution and respiratory diseases. Traffic in this mega-city is notorious for congestion, and many Cairo's neighborhoods and housing estates are under-connected with the rest of the region. This mega-city therefore came up with the concepts of a global, green, and interconnected region (Cairo Vision 2050):

- *Global Region:* The new plan for Cairo envisions that this mega-city will become a global gateway between Africa and the Middle East, whose strategic location and unique past can serve as a stimulus for the growth of trade and tourism.
- *Green region:* the main objective of the new plan is to modernize the region's informally developed and illegally seized settlements, to provide a basic level of decent living and access

to properly functioning public services. The plan also focuses on new public parks, nature conservation areas and public squares to help green this mega-city.

- *Connected region*: improving roads and extending public transport systems are a way of reducing pollution, helping firms to do business, and enabling them to do so residents move easily between residential and commercial areas.

It is necessary to specify what role city initiatives can play in creating visions and defining development strategies. Urban agendas prioritize broad areas of technologies and identify/promote key projects to spur urban development. There is important role of cluster initiatives that they play in the identification and implementation of modern technologies and projects. Business actors and their initiatives play important role in the institutional arrangements that support transformation agendas. Identified must be the interplay between urban strategies and urban stakeholders' interests. Cities must ensure a more active participation of the corporate sector in the different institutional arrangements supporting urban transformation. Cities also need to find the right mechanisms and incentives to achieve these goals. It must be identified what challenges they have experienced in the implementation of these urban strategies and what have cities/city actors can do to address these challenges.

Constructed regional advantage concept and PPC, as our concept of the development of socio-economic systems, deal, unlike traditional approaches, with a dynamic complex environment (Brzica, 2017b, Asheim et al., 2006). Parallel Phasing Concept considers the cross-sectional plane of the economic space and thus adds to the analysis another dimension of the integration of three spaces and other elements. It shows a considerable variety of cities' subsets and affects the dynamic and unpredictable behavior of many actors operating in urban environment. Complex urban structures include many different actors that have an impact on changes in urban environment and on processes in cities. Their different interests make it difficult to govern cities. Solving this governance of complex urban entities problem requires considering the human and societal perspective, dealing with a new type of hard-to-solve wicked problems (those that do not have a clearly "good" solution), and using new approaches to city governance. Successfully coping with new problems is important for big cities and their actors. The term parallel in PPC reflects, as already mentioned, the simultaneous integration of different kinds of space together (physical space; cyber-physical space and digital space) with an active-adaptive approach to phenomena such as openness, creativity (Florida, 2012), flexibility (McKelvey and Holmén, Eds., 2006) or variety (features of the environment). All of this is necessary for the description and analysis of complex phenomena.

Cyber-space forces city administrations to re-conceptualize their spatial situation. Solutions to cities' environmental problems are not straightforward. Nor are all such problems open to quick technological and policy solutions. Decision-making on sustainable urban environments requires a perspective that extends beyond city physical frontiers and short-term priorities. The urban strategy's environmental/development goals can only be successfully achieved by coordinated actions of all stakeholders. When creating a strategy and trying to enforce social innovations, it is necessary for urban politics to consider macro-organizational changes; behavioral parameters of 5HC actors (their interactions and dynamics); use of all three spaces and different knowledge bases.

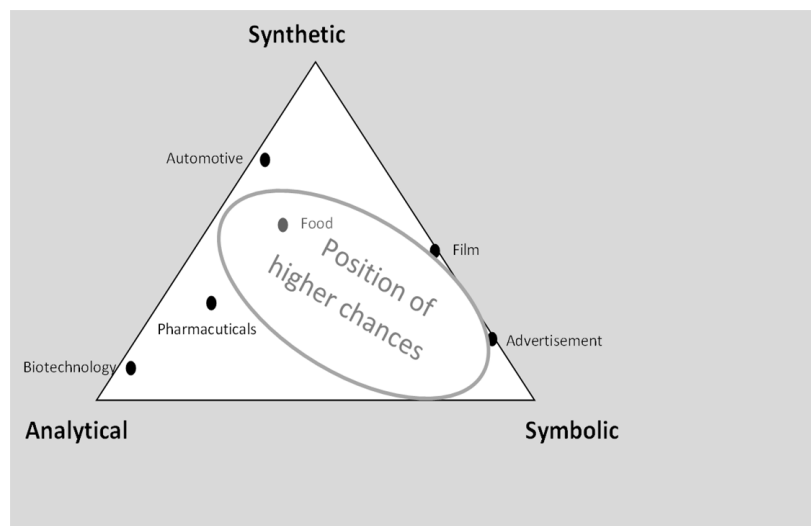
II. 1. Constructing Regional Advantage Concept

The European Commission's DG Research report (Asheim et al., 2006) represented a pooling of expertise and information resources from several countries. The report, focused on regional development, provides a good guideline for solving a challenge resulting from growth of cities. The work was prepared summarizing scientific findings regarding regional development and the new concept on regional development. Figure 1 shows a graphical representation of the differentiated knowledge bases from the CRA concept. The whole concept is based on three key elements:

- Related variety
- Differentiated knowledge bases (analytical, synthetic, and symbolic)
- Distributed knowledge networks

These three dimensions provide the basis for formulating trans-sectoral platform policies for possible use in a wide range of industries. The CRA concept has been applied, e.g., in Trieste (Italy) and Brno (Czech Republic). An important part of the concept is the distinction between three knowledge bases: analytical, synthetic, and symbolic.

Figure 1: Graphical depiction of differentiated knowledge bases from CRA concept (Position of higher chances is an example)



Source: Adapted from Asheim (2010) and modified by Brzica, D.

For the environmental sustainability of cities, mixing the use of all three knowledge bases seems to be a good strategy. The ellipse in the Figure 1 indicates an area that could be characterized as a hypothetical position of higher chances. That is, the area of business activities that can bring a shift in economic urban development.

II. 2. Wicked Problems

Wicked problems (WPs) are specific types of problems (Head, 2008; Termeer, Dewulf, and Breeman, 2013; Brzica, 2021). They are characterized by some specific features: no definition exists; there is no opportunity to learn from previous solutions; they involve many various stakeholders with different interests and goals; there is no good/bad solution to WPs; the impossibility of learning from past decisions, ambiguous optimal solutions, etc.

Successful solving of wicked urban policy challenges requires a set of actions that go beyond specialization of individual departments. There are several urban governance models trying to improve situation in urban governance, because the functioning of big cities must be strengthened in several areas. Such areas are economic and financial resilience (the ability of a system to maintain financial stability); social resilience (the ability of a city to respond to shocks); organizational, managerial, and administrative resilience (the ability of city leaders to anticipate challenges threatening the stability of the environment and the ability to respond quickly to such challenges). Institutional resilience means having a set of formal/informal institutions to ensure urban resilience, especially in the context of population activity. In all these areas and their intersections, several wicked problems arise. The situation will be further complicated by the development of cities in the direction of connecting all three spaces from the PPC concept.

II. 3. Parallel Phasing Concept

When creating an urban strategy and trying to enforce social innovations, it is necessary for urban politics to consider macro-organizational changes, behavioral parameters of 5HC actors (firms, non-profit organizations, academia, public sector, and citizens), their interactions, and dynamics. Parallel Phasing Concept uses Penta Helix Concept to highlight the fact that the urban economic space cannot be perceived only as the physical space of action of 5HC actors. It means that the operational dimension of urban entities must contain the entire set of urban actors (5HC actors), three knowledge bases (synthetic, analytical, and symbolic) as well as the three types of economic space integrated (physical space, cyber-physical space, and digital space).

Figure 2: Parallel Phasing Concept (Parallel spaces segment only)

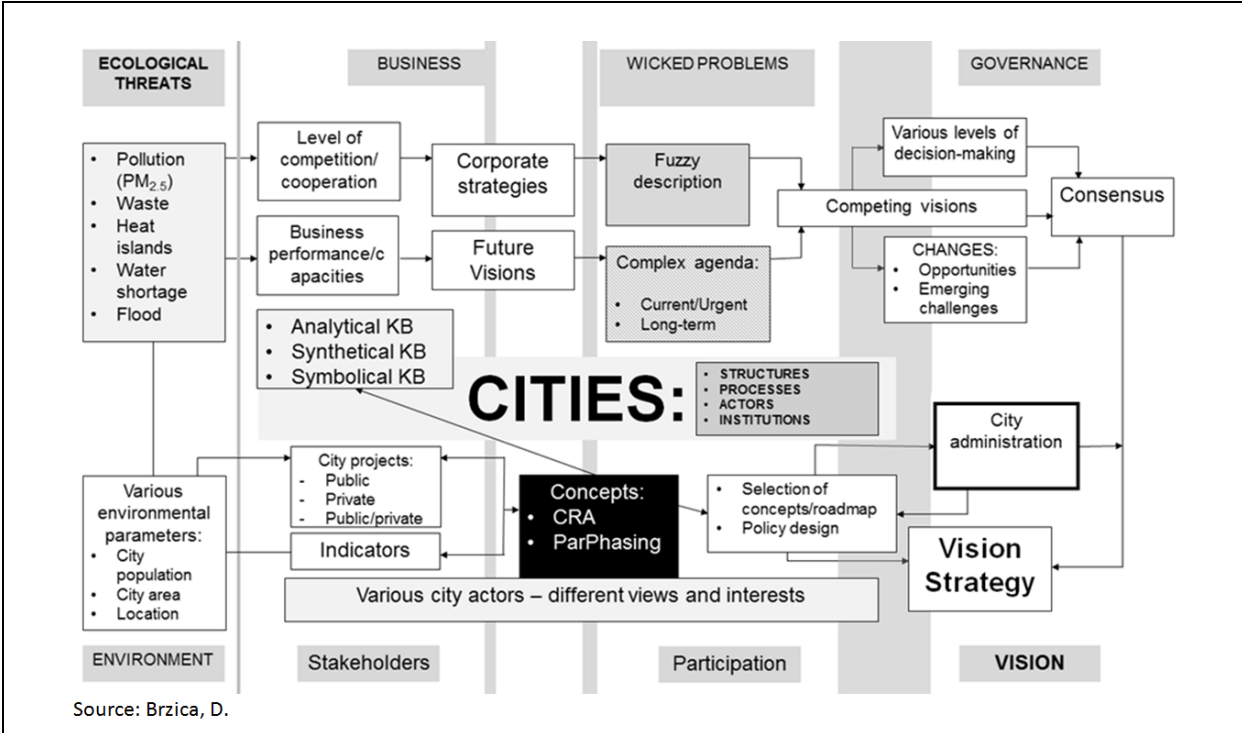
		Parallel spaces		
		<i>Characteristics of urban business environment</i>		
		Physical space (I)	Cyber-physical space (II)	Digital space (III)
Corporate/city dimensions	City dimension	Traditional administrative activities (office-based) <ul style="list-style-type: none"> • Governance • Management • Services • Others 	Semi-virtual activities <ul style="list-style-type: none"> • Energy networks • Other utilities networks • Global marketing (large-scale cities) 	Emerging city activities <ul style="list-style-type: none"> • Artificial intelligence • Smart city (transport management etc.) • Digitalization of city space • The same as in (I) but virtual office-based (assisted by AI)
	Corporate dimension	(IV) Traditional production/service activities <ul style="list-style-type: none"> • Industrial production • Trade • Services • Consulting • Others 	(V) Robotics/Semi-virtual production facilities <ul style="list-style-type: none"> • Cyber-physical production units • Robotics 	(VI) Virtual business <ul style="list-style-type: none"> • Virtual shops • E-commerce • B2B platforms • Services (consulting, banking, finance etc.) • AI-base services and consulting

Source: Brzica, D.
Note: AI = Artificial Intelligence

Cyber-space forces city administrations to re-conceptualize their spatial situation. Solutions to cities' environmental problems are not straightforward. Nor are all such problems open to quick technological and policy solutions. Decision-making on sustainable environments requires a perspective that extends beyond city frontiers and short-term priorities. The urban strategy's environmental and development goals can only be successfully achieved by coordinated actions of stakeholders.

A holistic approach means accepting a varied mosaic of factors, processes, and actors. Intensive interactions in the context of 5HC of firms, non-profit organizations, academia, public sector, and citizens require a new perception of urban economic space, as an integration of three types of space (physical, cyber-physical and digital), become necessary for the actions of firms and other actors. In this context, the roles of the individual 5H actors are gradually changing. A holistic view of the role of 5H actors is important, but also important is the role of dynamic firms in the urban economy, as they represent leaders of change in creating strategic diversification and advantage. Penta Helix Concept actors, but especially dynamic firms, disrupt the static urban environment with spontaneous and targeted interactions. Competition, "unlearning" processes, and other aspects help environmental phase transitions. In addition to the interactions of heterogeneous urban actors (from 5HC), social innovations are also important in urban development. The main components of cities are business and non-business actors. After implementation of complex urban strategies, the intensity of urban transformation reaches environmental sustainability threshold. Increased economic activity potentially contributes to the increased quality of big cities. As shown in Figure 3, the complexity of mega-cities is enormous. With the increase of concentration of city population, complexity gradually appeared, and so did intensity of interactions among city actors.

Figure 3: Parallel phasing concept II (cyber-physical and virtual dimensions omitted)



II. 4. Governance problems

Effective (multi-level) governance also plays an important role in the context of environmental challenges (Brzica, 2014; Brzica, Waszkiewicz, and Belof, 2014). Successful solving of wicked urban policy challenges requires proper urban governance model. The reason for looking for solutions regarding urban governance is, e.g., that the functional area does not correspond to the existing boundaries of local/regional administration, and at the same time many strategic decisions and service provision must be made at this level. Few experiments have been carried out in this direction mainly because of the rejection by other levels of governance (OECD, 2006). Even the most advanced big cities have gained limited autonomy only (London, Montreal). Examples are given in the OECD documents (OECD, 2006, 2020a, 2020b; OECD/UN-HABITAT/UNOPS, 2021). The most radical solutions involve the creation of new authorities at the functional level, either by including an additional level of administration (London) or by expanding the boundaries of existing big cities (Montreal, Istanbul). There are also various forms of cooperation between existing bodies (specialized agencies, informal cooperation agreements, etc.). There is diversity in scope – some collaboration is multifunctional (Lyon) and others are created for individual services such as transport (Athens, Philadelphia). An effective governance model helps firms/residents realize their goals.

Many cities are responding to new challenges. Multi-level urban governance can help to upgrade decision-making. The shift towards greater devolved powers in areas related to the revenue side of cities, as well as in decisions on the use of urban resources (urban expenditure), is also widespread. The City Working Group (PSPM, 2002) identified some time ago the causes of urban decline in the United Kingdom and recommended solutions to bring people back to cities and suburbs. It has created a new vision for urban revitalization based on the principles of quality projects, social welfare, and environmental responsibility. Cities implemented changes due to various shortcomings that threatened their position and prospects. The example of the United Kingdom in the field of urban planning in the past has shown that the system did not consider the specific needs of urban areas and was not attuned to the inherent complexity of compiling and submitting urban areas for construction. Planning and planning decisions take a long time. Therefore, a more comprehensive system of visions, strategies and planning is required, with an emphasis on strengthening the various functions of cities. The intention was to move to a non-confrontational and participatory planning approach. A positive and proactive planning system must be based on partnership between local authorities and other stakeholders, with the full involvement of the local community concerned based on the experience of other approaches to spatial planning. Two of the main conclusions of the PSPM were that development plans should be simpler, more flexible, and strategic documents, closely integrated with other local strategies. They should not include detailed policies at local level and the formulation of detailed planning policies for recovery can be better implemented as part of an area planning process that involves the preparation of an integrated spatial model plan and provides more opportunities for residents to participate in decision-making than through the traditional PSPM planning process.

Large, dynamic, and innovative firms also play an important role as one of the major urban actors. Many firms in cities are already making profit on the new market potential. Those firms that try to meet this environmental challenge may acquire comparative advantage vis-à-vis their competitors. Understanding these trends will become important if urban-located firms want to provide valuable products and services. Cities should provide an environment supportive for firms located on their territories, as it is not always easy to adjust business operations to new challenges.

Success often depends on the effective mix of existing capabilities with new technologies, methods, and knowledge.

With the dynamic development of cities, there is an increase in the number of inhabitants and the extent of the built-up area. The urban transformation requires a balance between city centers and their suburbs, as well as between industrial, commercial, residential and tourist/heritage components. Residents should be able to be close to work, but at the same time, they should be protected from disturbing activities (manufacturing, traffic) that make their home unpleasant by noise, air pollution, light pollution, or higher temperature. The efficient use of land is also necessary for successful urban transformation together with monitoring changes in the improvement of the quality of land and buildings in cities. Here belongs assessing the impact of different urban policies and market effects; monitoring the type and density of housing in different locations of cities (including the accessibility dimension); and monitoring the success rate of development of localities suitable for housing construction.

III. Results and Discussion

When creating an urban strategy and trying to enforce social innovations, it is necessary for urban politics to consider macro-organizational changes, behavioral parameters of 5H actors, their interactions, and dynamics. The PPC extends 5HC (Penta Helix) to highlight the fact that the economic space cannot be perceived only as the physical space of action of 5H actors. It means that the operational dimension of urban entities must contain the entire set of entities to face wicked problems and local/global challenges:

- Various types of urban actors (5H);
- three KBs ((synthetic, analytical, and symbolic); and
- three types of economic space integrated (physical space, cyber-physical space, and digital space);
- (multi-level) governance model(s).

Urban strategies tend to be wide-ranging, encompassing many elements and processes. They include, e.g., ideas about the direction of cities (visions and strategies for their achievement); a comprehensive timeframe for implementing the changes; a description of the context, challenges and objectives of the strategies; a set of programs, projects and initiatives to be implemented within the urban strategy framework; an overview of various 5H actors involved in the implementation of strategies; the available resources for the implementation of the transformation and ideas how to obtain and use them to support the desired changes. For activities for which firms in cities may find a market, it is necessary to ensure that all relevant factors on the cost/benefit side are considered. Urban firms should carefully consider implication when preparing their local and global business strategies. The assessment of business opportunities made by firms represents a basis for determining the size and scope of their production within each of the KBs.

The success of the future development of cities is related to a complex set of changes in different areas (in addition to the points mentioned):

- urban economy, education, energy;

- environment, financing and budget, fire rescue/crisis management;
- urban governance, health protection, recreation, safety, flood protection;
- (solid) waste management, telecommunications/ICT, innovation;
- transport (public/individual), urban planning, water supply/waste water.

This set of transformational changes is critical for progress in urban transformation. The development of cities requires accepting changes in the entire mentioned complex of areas, considering their effects with respect to the environment and increasing the attractiveness of cities. Changes in the urban economy are reflected in the perception of the dynamics of changes of its actors, the extent of their influence or the forms of their actions. The synthesis of the CRAC, PPC, WPs extended perception of the complexity of structures and processes in current urban business environment.

The challenges associated with these changes are an important signal for politicians, entrepreneurs, and citizens that their success and the success of the cities in which they live will depend on knowledge/effective tools to cope with the increasingly demanding requirements for their performance. It can also help to manage WPs more effectively.

Urban transformations are carried out differently in stable and unstable conditions. The nature of the conditions also influences the motivation for entering the transformation of the city. Under conditions of stability (a state where the system works in a normal way), changes can be implemented to the extent given by the common intersection of interests of a large part of urban stakeholders. The processes leading to consensus in this case do not have to be complicated and the goals are usually easy to achieve. However, it is likely that finding the slightest common intersection of interests will suffice to partially improve the city's functions and insignificantly increase its dynamics.

In conditions of instability, the implementation of the urban transformation is more complicated. The urban actors have different motivations, and instability brings fears of further complications. Cities are often forced to save or use resources to solve current short-term problems. If there is even a minimal intersection of the interests of urban actors, then this extent may not be sufficient to maintain the smooth functioning and developing of the city. The mismatch of interests in the implementation of changes can manifest itself in different areas. Reducing material/energy expenditure on goods and services may affect one group of urban actors, while pressure to reduce toxic emissions may be criticized by other urban stakeholders. Firms, for example, may feel harmed by the pressure to need higher levels of material recycling, to maximize the sustainable use of renewable resources, and to increase the durability of products.

The following three groups can be considered as the main risks and "vulnerabilities" of approaches to transformations at urban level:

- The question of WPs. The transformation that must address this specific type of problem is challenging, and it is not easy to find consensus for change.
- A situation with "lock-in" occurs when the transformation (and the investments associated with it) is directed in the wrong direction of urban development, like how the city developed in the past. The changes are then modest and insignificant.
- A radical change of direction that has no connection with past urban development or builds on any of the strengths of the city's development from the past may be risky. In this case,

there may be complications regarding the lack of experience and lack of motivation of urban actors.

The transformation of cities can lead to complications in all the above areas. The urban transformation affects many aspects of the lives of city dwellers, and its results in turn influence the decisions of incoming investors, talents, and tourists. Landry (Landry, 2016) presents the results of an overview of 30 studies on factors that affect local economic development. Eleven regularly cited factors were identified: location; physical characteristics; infrastructure; human resources; finance and capital; knowledge and technology; sectoral structure; quality of life; institutional capacity; entrepreneurial culture and community identity and image. The most frequently reported factor (25 out of 30) was quality of life, followed by human resources and infrastructure. Landry's research on the impact of culture and creativity on investors' location decisions showed that considering "soft" infrastructure such as quality of life or culture (the symbolic knowledge base within the CRA) is becoming increasingly important.

One of the risks of urban transformation is the misdirection of the overall direction of the functions, structures, and dynamics of these urban entities. Efforts to continue traditional segments of production or to preserve the seemingly functional parameters of cities from the past do not lead to an improvement in the situation. Cities may be stuck in a position where the potential for desirable change is diminished and transformation is reduced to allocating resources to similar productive and other activities already applied in the past. A so-called lock-in entity may be created and performance, attractiveness and potential for change may be lost.

The success of the future development of big cities is related to a comprehensive framework for the strategy of cities. The following areas provide basic information about the scope of urban changes: economy, education, energy, environment, financing and budget, fire rescue and crisis management, governance, health protection, recreation, safety, flood protection, waste management, telecommunications/ICT, innovation, transport (public and individual), urban planning, water supply and waste water. This set of transformational changes is critical for progress in urban transformation. The development of big cities requires accepting changes in the entire mentioned complex of areas, considering their effects with respect to the environment and attractiveness of cities.

Parallel phasing means coping with the trend of the need to integrate three types of space, while simultaneously adapting to specifics of a complex environment, characterized by dynamism, variety and other components mentioned above. Thinking in the dimensions of PPC can help individual actors in the formulation of such strategies/policies, which will bring them the elimination of excessive heterogeneity in areas where excessive heterogeneity tends to harm. Sometimes, business "windows of opportunity" gradually disappears and competitive pressures increases gradually with foreign investment inflow increased. It may be attributed to the environmentally unstable urban strategies, which may be easily converting cities into "locked" environment.

IV. Conclusion

The specific characteristics of different cities are not always considered adequately in current development policy concepts but achieving the appropriate balance between economic, social, and environmental issues has an important spatial impact. A combination of CRA, Penta helix (5H), multi-

level governance (MLG), and PP concepts was performed to describe the dynamic and competitive components of African big cities. The transformation of African big cities and their structural components (actors) may be assisted using CRAC, 5HC, MLG and PPC. The rapid embedment of presented concepts in policies towards/of African big cities may be an important factor affecting their development. The increase of business actors in Africa's big cities may remain crucial factors affecting the formation of competitive environments. Application of CRAC, PPC, 5HC and MLG indicated that the main components of big cities cope with both environmental sustainability and urban competitiveness challenges. That is, the formation of competitive urban environments in cities may be enhanced by the adoption of mixture of CRA, PP and MLG concepts.

Different intensity of urban transformation in the development of the city's ecology brings different levels of risks. Examples of resilience segments point to these risks. The intensity and likelihood of potential threats to cities may be determined not only by the frequency and intensity of external influences, but also by internal economic, financial, organizational, administrative, or technological parameters of cities. Moreover, events such as important unexpected changes ("black swans") can complicate the situation. The scale of the urban transformation may lead to an increased risk of weakening resilience of cities to sudden shocks in the short term. Managing the transformation in the long term means a chance to improve the environmental situation of cities and their resilience.

Recommended policies should be aimed at initiating technology-specific regulations such as appliance standards and energy "labels" for buildings as well as providing better information on ways how to conserve and save energy. The identified new challenges in the context of urban transformation show that transformation goes beyond traditional forms of urban regeneration in terms of content and scope. The number of cities opting for large-scale changes related to visions of a modern city attractive to life and business is expanding. However, city leaders do not always correctly estimate the possibilities and potential of their cities, and they are forced to step back from ambitious environmental goals, change them or postpone their implementation until later. Traditional partial measures at the level of cities, in order to achieve their "green" setting, cannot replace a comprehensive urban transformation. Partial changes to promote sustainable urban development are more effective if they take place in parallel, on a large scale, and affect as many urban structures, actors, and processes as possible.

CRAC, 5HC and PPC can be used in the transformation of cities. Cities may have the potential to strengthen or weaken their positions on their development trajectory. Important places, where urban actors can gain advantages for further dynamic development, arise in so-called windows of opportunity. These occur randomly and are related to processes such as the appearance of a "black swan". PPC/CRAC means coping with the trend of the need to integrate three types of space, while simultaneously adapting to several specifics of a complex environment, characterized by dynamism, variety, and other components. The operational dimension of urban entities must contain the entire set of urban actors (all 5HC actors), three knowledge bases (synthetic, analytical, and symbolic) as well as the three types of economic space integrated (physical space, cyber-physical space, and digital space). Thinking in the dimensions of PPC/CRAC can help urban actors in the formulation of such strategies/policies at the urban level, which will bring them the elimination of excessive heterogeneity in areas that excessive heterogeneity tends to harm. It can also help to manage wicked problems more effectively. Cities have a great chance to successfully engage in all knowledge base categories of business activities and avoid lock-in situations.

The transformation of African big cities and their actors may be assisted by using a combination of CRAC, 5HC, MLG, and PPC concepts in urban policies. Their rapid embedment in urban policy-making may accelerate dynamism of big cities and may be an important factor affecting successful urban development.

V. References

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