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DEVELOPMENT VEHICLES OF METROPOLITAN AREAS AND AGGLOMERATIONS

Andrzej Klasik, Florian Kuźnik

University of Economics in Katowice

1 Maja 50, 40-287 Katowice, Poland

andrzej.klasik@ue.katowice.pl, florian.kuznik@ue.katowice.pl

Abstract: The article aims at presenting the philosophy and model of the *development vehicle* to be understood as a new concept and tool to investigate and program local and regional development processes. The practical issues covered by the article include the identification and discovery of development vehicles, the elements of which can be observed in Polish metropolitan areas and agglomerations.

Keywords: territorial development vehicle model, development vehicle, discovery of development vehicles, identification of development vehicles.

JEL codes: R10, R58, O18

1. The philosophy of development vehicles

A development vehicle reflects the desire to fully understand the future through the metaphorical move into another, future reality. The essence of the vehicle is movement in the dimension of time and space. Understanding the future seems to be a prerequisite to designing change. First of all, the vehicle is a mobile structure that enables the virtual transfer of metropolitan areas and agglomerations into a different reality that is difficult to imagine.

Territorial development vehicles emerge in certain territories characterized by motor abilities and unique potentials leading to the instilling of tacit knowledge. This definition of development vehicles shows that specific mechanisms driving and stabilizing the trajectory of change are their immanent components. Metropolises and metropolitan areas are naturally destined as the territories in which

development vehicles appear. A variety of development vehicles can be identified in metropolises and large metropolitan areas.

A vehicle for the development of particular territories, metropolitan areas and agglomerations is, in the strict sense, the economic strength of new businesses growing out of the combination of various art fields and groundbreaking technological innovations. They create new specializations for cities and urban agglomerations as well as new business models. The choice of a vehicle represents the will expressed by leaders to participate in both discovering and creating the future of various territories.

Development vehicles allow for the multi-meaning use of the word “port” from which we are going on a journey in a vehicle – a ship or a plane. The port can mean a starting point, a new beginning, new routes and trajectories towards the future. It also means destinations opening up new worlds. In both meanings, a port brings with it the experience of searching, discovering and conquering the future in combination with a sense of security and risk awareness.

The concept of a development vehicle and the understanding of its nature as a tool used for uncovering the future and a metaphorical move into the future favor people with a high degree of mental, intellectual, professional and residential mobility. This means that only people with high potential for creativity are able to travel in time and discover new worlds. Creative individuals have a chance to grow against the cultural background whose central attribute is openness to the world and experiencing its multiple diversity.

Thinking in terms of development vehicles in all their complexity is a novelty in urban and regional research. The examples of vehicle-based thinking can be the research paper *The Flight of Ikarus* (Ducruet et al. 2013), in which the transformation process of the city was shown as a series of flagship projects, as well as the concept of regenerative cities (Giradet 2015) as the transition from linear urban metabolism to circulatory metabolism. The distinctive feature of vehicle-based thinking can be characteristic of large foresight projects. These are such projects which succeed in creating the scenarios of a new reality going beyond the routine horizons of perceiving the future (Loveridge 2009). In this approach, foresight should be closely related to innovations and it should provide innovative knowledge oriented towards creating the future (Melkas & Outila 2013). Vehicle-based thinking can also be identified in the approaches to development that emphasize dependence on changes in development pathways (Simmie 2013). Discovering a new development pathway forces us to think about the whole range of future events, processes, phenomena and prerequisites for the emergence of creative solutions, etc. These elements form the vehicle framework, which determines transition into a new, future reality.

The concept of a driver is often used in vehicle-based thinking. The British report (*Towards an Urban Renaissance 2005*) mentions three drivers that will shape the future of cities and urban renaissance in the specific conditions of Great Britain. These drivers are:

- technical revolution in ICT, which, in the social dimension, makes up the “age of information”,

- the ecological paradigm leading to the more responsible shaping of urban development,
- changing lifestyles that will result in new forms of urban space development.

Drivers can be captured in more detail. Accordingly, one can look at the logic of how one chosen factor operates. Such a driver may be the social process of creating new places in a city's space (Palermo & Ponzini 2015). Place-making is the process of turning certain new ideas in concrete spatial forms. Some places, generated in a long social process or ingeniously designed, become the foundation for deep transformations of urban space and create completely new development processes. Another example of thinking in terms of one driver can involve design defined as a factor behind innovation and innovative development (Green et al. 2013). Design is considered a major tool and a causative factor of innovative development, and not only as one of the components of the innovation implementation process.

Vehicle-based thinking may focus on development mechanisms. This is important if we want to emphasize the importance of regulatory mechanisms of political and managerial nature. Change control mechanisms, varying from city to city, lead to capturing the characteristics of change patterns that can be attributed to individual cities (Rao 2007). In the era of digitalization and smart growth, the mechanism that explains development processes well is the mechanism for the emergence of network connections. It is participation in various networks and at different spatial levels that makes cities enter new developmental patterns (Neal 2013, p. 6).

Future trends are the synthesis of vehicle-based thinking. Trends anticipated or expected in the future allow for the deduction of various impulses and development determinants, which over time may contribute to certain development trends. Development tendencies can be captured through carrying trends. Thinking in trends is characteristic of foresight undertakings aimed at analysing or creating multiple futures as a result of development initiatives and policies. A good example of a foresight-based approach combined with the formulation of development policy, including cohesion policy, involves scenarios concerning the future of Europe and the European Union's cohesion policy (*Making Europe...* 2013). Thinking in trends also emerges in theoretical work attempting to capture and systematize various patterns of urban development (Rao 2007). In this perspective, considerations concerning development policies appear in a natural way (Thayer 2013). The ability to capture carrying trends is best expressed by a metaphorical move into a different, new reality. When we notice future, long-term trends, it is also easy to determine their development outcomes.

2. The territorial development vehicle model

A development vehicle can be defined in subjective and objective terms. Subjectively, a development vehicle refers to creative individuals and communities. Creative individuals and communities draw on the creative background, which consists of the potentials and culture of a given territory. Objectively, on the other hand, a development vehicle can be defined in two ways. First, it concerns different types of

devices/vehicles. Second, it involves works, projects, products, events that have the causative power to discover, create and acquire the future. Development vehicles are more than development driving systems. The vehicle is a complex device; it has various systems and mechanisms associated with the driving system. An important component of the development vehicle are regulatory mechanisms. Works and projects, products and events are development vehicles if they launch new development horizons and prospects transformed into carrying development tendencies that can be summarized in two synthetic categories – results and outcomes. Then, the vehicle gives rise to such carrying development tendencies. In order to trigger development tendencies, works and projects as well as products and events must enter the circulation of market and political mechanisms. Markets, including investment markets, and policies, including strategic development policies, determine the economic and social utility of everything that results from the activity of creative individuals and communities. Being a development vehicle has a specific territorial range – temporal durability.

The above considerations can be used to outline the model of the territorial development vehicle, which is graphically presented in Fig. 1.

The model of a development vehicle consists of the following components, which can be considered as combined driving systems and regulatory mechanisms:

The intellectual “corpus” of the development vehicle comprises creative individuals and communities immersed in the culture and potentials of a given territory.

The propulsion system of the development vehicle comprises works and projects as well as events and products that generate the intellectual potential of a territory.

Market and political mechanisms combine the driving system and the motion system, ensuring the dynamics and stability of the results and outcomes of territorial development.

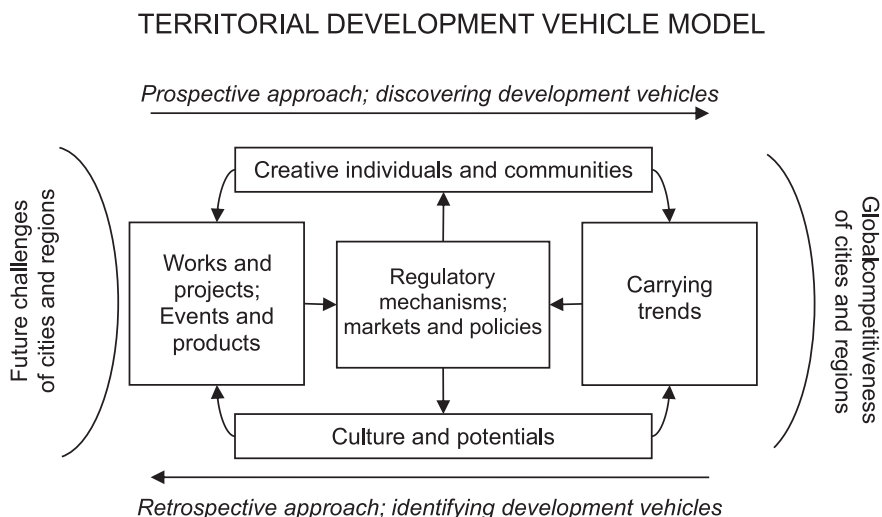


Fig. 1. The territorial development vehicle model

Source: Own elaboration (A. Klasik, F. Kuźnik).

The motion system of the development vehicle creates carrying trends that trigger a strategic change, add dynamism to development and ensure the durability of development processes.

2.1. Works and projects, events and products

The propulsion system of the development vehicles of cities and urban creates a vector composed of *works and projects, products and events*. Artistic and scientific works and projects are given the form of intellectual property under legal protection (WIPO 2004). These works and projects become growth generators that trigger development processes in cities and regions. They accelerate or catalyze development processes. Their deficit induces the duplication of certain types of development pathways of other territories or directly contributes to the emergence of crisis situations and declining processes in those cities and regions where the incubation and creation of new works and projects is of marginal character.

Innovative projects and big events give rise to new activities, industries and sectors. When cities and regions manifest commitment in this respect, they gain the status of innovative cities and regions, and some of them are granted the status of cities and regions of great events. The concepts of creative cities and regions developed, implemented and disseminated by good practices, as well as the concepts of smart cities and regions, co-create the global trend shaping the future of the urbanizing world (Landry 2008; Andersson 2011). Globally recognizable cities and regions, which are the centres/territories of civilizational and cultural development, introduce states and their supranational blocks into an expanding stream of flows and exchange as well as into competition and cooperation on a global scale.

2.2. Creative individuals and communities

The corpus of development vehicles is constituted by creative individuals and communities immersed in the culture and potential of a given territory. This is the creative class of big cities and metropolitan territories (Florida 2010), which consists of people in creative professions, creative professionals of various occupations and operational staff accompanying creative processes. Creators, designers, managers and technical staff make up teams which turn development vehicles into real entities that can take various institutional forms.

Sometimes, a given territory features something more, namely creative environments. It is a material and technological interpretation of the development vehicles of cities and urban regions as places – clusters of buildings, parts of cities, or cities and urban regions as a whole. Creative environments defined in this way comprise hard and soft infrastructure for generating new ideas as a basis for developing projects, events and products. This is hard infrastructure composed of research, educational and cultural institutions with equipment, meeting places, and other facilities. This is also soft infrastructure of social networks, interpersonal bonds and relationships, mutual interactions occurring directly in interpersonal contacts, including those happening through information and communication technologies (Landry 2008).

The interpretation of the corpus part of development vehicles of cities and urban regions may also be expressed with the idea of linking their development with the category of creativity in the form of creative capital (*Creative Economy Report* 2008). This involves creative capital which characterizes territorial communities. It is co-created by mutually interacting components of such capitals as: institutional, human, social, cultural. It is a new, complex form of capital that manifests itself in the course of collectively organized creative processes in which residents, civic groups and local communities participate. Their participation in the creation of development projects of cities and regions is carried out using the methods and procedures of creative thinking.

2.3. Culture and potentials

The foundation of territorial development vehicles is the culture and potentials of cities and urban regions. Culture combined with territorial development can be interpreted both anthropologically and functionally (Throsby 2010). Culture as a set of values and practices allows for the uncovering of the identity of territorial – local or regional – communities, which is particularly important for the recognition and assessment of cultural factors in urban development and the development of metropolitan territories (Duxbury et al. 2016). In functional terms, defining culture allows for the separation of various cultural activities that make up the cultural sector. The combination of the cultural sector and creative industries leads to the building of a new foundation for the development of cities and urban agglomerations (Klasik 2010). Culture and interculturality of metropolitan territories are at the very core of sustainable growth (Wood & Landry 2008; Duxburg et al. 2016).

In development vehicles, potentials of territorial development are attributed the role of forces generating changes (Rondinelli et al. 1998). The development and prosperity of metropolitan areas and agglomerations are determined by such forces as:

- educational systems that prepare human resources with high qualifications and adaptability,
- conditions that make up the quality of life attractive for international investment,
- services and infrastructure supporting global competitiveness of enterprises,
- technological potential of small and medium-sized companies,
- civic leadership and collective actions that modernize and develop urban infrastructure,
- mechanisms of cooperation within urbanized territories,
- public-private partnerships that develop employment opportunities.

A variety of the potentials of big cities and urbanized areas comprises the three key factors for the incubation and discovery of development vehicles (*In Recognition...* 2016):

- the best combination of character, history, culture, public spaces and aesthetic standards in the given conditions, which makes metropolitan areas and agglomerations unique, stable and friendly for residents and visitors alike,

- the ability to attract different talent, interested stakeholders and investment to stimulate sustainable business and economic growth, including the necessary resources: human capital, modern industries, thriving shopping centres, and universities focused on incubating technology and innovation,
- the integration of digital and physical networks, databases, intelligent technologies and processes to effectively combine individuals and services in a way that enhances collaboration and productivity.

2.4. Regulatory mechanisms; markets and policies

Mechanisms of territorial development are multi-layered structures composed of:

- relationships between actors/stakeholders of the urban or regional scene,
- relationships of activities located in a city and region,
- relationships between places used or created in urban and regional space.

The relationships between the actors of the urban or regional stage are social relationships based on values/interests stemming from geographical proximity and the belonging to the same urban or regional space. They define the social capital of a city and region constituting the governance mechanism, including actions, projects and activities contributing to territorial development, its results and outcomes (Torre 2011).

The relationships between activities located in a city or region are functional links, including economic bonds, between outlays and outcomes. Their reflection in modern business models, strategies and practices are clusters and districts of companies and institutions (Foord 2008) as well as technological and creative start-up communities (Feld 2013).

The relationships between places created in urban and regional space are spatial connections. They involve the connections (and flows) as well as interaction between residential spaces, business spaces and public spaces (Klasik et al. 2016). The creation and transformation of urban and regional space is interdependently regulated by two basic mechanisms of the spatial economy, namely the real estate market and spatial planning. These mechanisms shape spatial structures, investment and territorial development as well as life and environment in urban areas (Klasik & Kuźnik 2017).

2.5. Carrying trends

The urban world is subject to global trends. The global trends shaking up the economic development of cities and urban regions in the 21st century include (Rondinelli et al. 1998):

- the growing importance of international exchange, investment and competition,
- the increasing global mobility of capital, people, goods, services, information and ideas,
- the impact of knowledge, creativity, technological innovation and innovative projects, that drives growth,
- the growing importance of industries based on knowledge and art,

- the decisive role of global markets and sectors, including the global market created by metropolises and metropolitan regions,
- the emergence of new business models, including flexible business forms and practices,
- the establishment of international strategic alliances,
- cities, regions, universities, technology centres and business environment institutions

The urban world also reveals the global trend caused by the birth of not only the creative class, but also a new type of class – *the consuming class*. The concentration of consumption and investment, which is part of global urbanization, is a great opportunity for new businesses, in particular for technology-based industries and creative industries. Varied and evolving connections and combinations of these industries are already becoming the engines of creative and smart growth and, in the future, they will be even more deserving of such a label. The wave of new consumers in cities and metropolitan regions will become a driving force behind demand for physical and capital resources located in urbanized areas. This leads to the emergence of turning points and the reorientation of the existing urbanization flows triggered by the changing relationships between agglomeration costs and benefits (*Urban World... 2012*).

In the retrospective approach, the model of a development vehicle can generally be used to explain the strength, interdependencies and mechanisms of territorial development both in cognitive and explanatory terms. The approach uses development vehicles in the analytical cycle. This means proceeding from the identification of contemporary trends, through regulatory mechanisms to works and projects, events and products. The prospective approach, which is exploratory and design-oriented in nature, uses the building blocks of development vehicles in reverse logic, treating the incubation and creation of works and projects as well as events and products as a starting point. The modelling of the dynamics of market and political relationships is based on the ground, which consists of culture and potentials. Creative individuals and communities constitute the intellectual corpus of the development vehicle. The final stage of discovering development vehicles involves gradually emerging new, carrying trends. Carrying trends translate into creative and intelligent development assessed in terms of direct and final results.

According to the presented philosophy of vehicle-based thinking, the territorial development vehicle is rooted in two central concepts of territorial development. These are: the challenges of the future and the global competitiveness of cities and regions. In the first case, development vehicles are a tool used to seek a comprehensive and coherent answer to the following questions:

- what future challenges the city and regions will be forced to cope with,
- what future challenges worth undertaking may become the aspirations of leadership and territorial communities.

The connection of development vehicles with the category of global competitiveness involves the positioning of cities and regions in international exchange and competitiveness. This means that the development vehicle becomes a new type of tool. It combines strategic foresight and strategic management, it merges visions and

strategies. The philosophy of thinking and the modelling of territorial development with the use of development vehicles are a new methodological proposal worth analysis and practical verification in urban and regional research (Kuźnik 2013).

3. Identification of development vehicles of metropolitan areas and agglomerations

The identification of development vehicles in the retrospective approach consists in recognizing:

- carrying development trends in the sphere of technology, art, new business, space shaping,
- driving mechanisms stemming from the dynamics of market forces and investment processes and decisions,
- creative activity of people gathered in institutions and companies and driven by the culture and potential of a place,
- *the new* and *novelties* in the form of a variety of products of human intellect.

The identification of the development vehicle in retrospection involves the unveiling of its subsequent layers, starting from the outer layer, the final one targeting the wide environment in the sense of exchange and flows. It is created by carrying trends combining new technological, artistic, economic and spatial trends. The core of the vehicle is made up of works ranging from artistic to scientific. In terms of application, they are the basis for developing projects, events and products.

At the conference entitled *The local and regional development vehicles* (Ustroń Śląski, November 2016), the first workshop session resulted in the working material that is the basis for identifying three profiles of the development vehicle. These are profiles of development vehicles characteristic of metropolitan areas and agglomerations:

- a vehicle for the development of a technological economy in metropolitan areas and agglomerations,
- a vehicle for the development of innovative business and residential settlement,
- a metropolitan development vehicle.

The analysis of each of the three profiles points to the diversification of the life cycle phases of particular metropolitan areas and agglomerations. The workshop participants represented various centres and urban agglomerations and they defined the nature of the development vehicle according to how advanced metropolitan processes were in the decade 2005–2015. Arranging mutual relationships between each of the distinguished profiles indicates that the initial stage of metropolitanization found it useful to apply the development vehicle called “*The vehicle for the development of the technological economy of metropolitan areas and agglomerations*” (Table 1).

In the years 2005–2015, the process of strategic change was based on three key trends. Technological and cultural changes – initiated and developed by academic, research and design environments – triggered a variety of innovative processes. Businesses and activities that grew out of innovative processes gave an incentive for new sectors of activities to emerge and aspire to compete and trade on a global

Table 1. The vehicle for the development of the technological economy of metropolitan areas and agglomerations. Retrospective approach

Carrying trends	The launch of the strategic change process Restructuring of the economy, including industry Technological and cultural changes triggered by academic circles Radical transformations in the tourism and recreation sector in sub-regional systems
Regulatory mechanisms	Driving innovative processes and generating innovative projects in various industries in cooperation with research and development institutions and the business environment
Creative individuals and communities	New technologies that mark new patterns of entrepreneurship and business
Culture and potentials	Traditional and new industries with international competitiveness of high potential for added value A sector of medium-sized companies rooted in the region International business clusters with products of global competitiveness Clinical medicine with research, design and pharmaceutical facilities New grid of metropolitan and regional transport infrastructure, including road infrastructure, ensuring external connectivity of the region Regional and agglomeration rail transport with hubs; modernization and extension of lines and equipment
Works and projects, events and products	Branded export products marking the strategic position of the region Modern financial products and services New healthcare products and services

Source: Own elaboration (Tables 1–7).

scale. The cultural change generated by academia introduced researchers and students into the European research and education space. New generations of human capital fed the economy of cities and urban agglomerations, changed the identity and culture of companies and institutions, and became the foundation of start-up communities. In many cases, they were global micro- and small businesses from the beginning. The technological and cultural change was influenced by international investors and companies that transferred new technologies, organizational culture and business models to urban areas.

The condition for initiating strategic technological and cultural change was the successful restructuring of traditional economic sectors. In many places, restructuring processes – unfinished and inconsistently conducted – did not lead to unleashing achievable outcomes of the technological development vehicle.

The emergence of a tourism and recreation sector based on natural features and material infrastructure, which was subject to civilizational and market conversion, was a complete novelty. An unexpected trend in the tourism and recreation sector resulted in substantial infrastructural investments in the cultural sector. Urban and agglomeration tourism benefits from a new creative industry called the meetings and events industry.

Both public intervention and strategic management tools and domestic and foreign business investment became the instruments of regulatory mechanisms. The years 2005–2015 created opportunities for accelerating technological and cultural changes as a result of the European funds allocation.

Table 2. Development vehicle of innovative business and residential settlement of metropolitan areas and agglomerations. Retrospective approach

Carrying trends	Spontaneously emerging business zones and settlement zones, also in connecting spaces of thriving cities
Regulatory mechanisms	The mechanism of the business and housing real estate market The European Union procedures, standards and funds creating a new mechanism for conducting development policy Mechanisms of civic participation and territorial self-government
Creative individuals and communities	Business environments launching innovative processes and future economic specializations Visionary leadership and leaders of strategic change Civic and professional environments organizing original ventures
Culture and potentials	Identity, the culture of a place and material heritage giving rise to new business and civic activities
Works and projects, events and products	Large integrated projects of creative and development nature

A certain advancement of metropolization processes in metropolitan areas and agglomerations can be observed in innovation and urbanization processes. In the case of urbanization processes, metropolization is reflected in the reconstruction of city centres aiming to develop leisure services offer, but it also is characterized by suburbanization undertaken by more affluent social strata.

The development trend of the vehicle called *the vehicle of innovative business and residential settlement* is reflected in the emergence of spontaneous business and settlement zones, also in connection spaces of thriving cities. This means that, in spatial separation, new business zones emerge embracing mainly free areas and, to a limited extent, areas recovered after liquidated economic activity, characterized with brownfield features. In the new business zones of big cities, first and foremost, international business as well as growing micro- and small business is located. In contrast, new residential settlement zones come mainly in the form of single-family housing or housing estates in suburban areas. High class condominiums are predominantly based in downtown areas.

This type of the development vehicle is founded on real estate markets and private sector investment, where construction and business sector entities as well as households operate. Complementary to the market mechanism, the public policy mechanism came into play, allocating public and private funds, regulated by the procedures for the European Union funds use in the subsequent EU programming and budgeting periods. Infrastructural facilities and new generations of public services and modern business services offered support for the creation of business zones and residential areas.

The analysis of the content of the entire chain constituting a development vehicle would require a case study for a selected metropolitan area or agglomeration. At this stage, we only present carrying trends and regulatory mechanisms.

The most advanced stages of metropolization processes traditionally characterize the largest Polish cities. In particular, it can be assumed that this applies to the metropolises of Warsaw, Kraków, and Wrocław, which are considered to be Polish

Table 3. Development vehicle of metropolitan areas and agglomerations. Retrospective approach

Carrying trends	Driver technological industries and creative industries in metropolitan areas
Regulatory mechanisms	The networked character of nascent metropolitan activities combined with the institutionalization and internationalization of metropolitan areas
Creative individuals and communities	Creative communities and science and culture institutions
Culture and potentials	The architectural or symbolic uniqueness of urban spaces attracting visitors and great events
Works and projects, events and products	Large integrated projects of creative and development-oriented nature International events and products related to festivals, concerts, congresses, etc.

metropolises of success due to the strengthening metropolitan functions of international recognition. Despite many difficulties associated with the revitalization of degraded urban and post-industrial areas, the Upper Silesian Metropolis also succeeded in making a breakthrough. The strategic axis of Katowice–Gliwice–Sosnowiec constitutes the metropolitan character of the entire urban agglomeration.

Advanced metropolization processes in metropolitan areas and agglomerations are expressed primarily in the economic sphere. The growth in the technological and creative economy reinforces the accuracy of the interventions undertaken earlier, such as education activities, R&D projects and costly infrastructure investments. High technology sectors may give rise to industries that will drive the growth of innovation clusters that have high potential for global competitiveness. In the sectors of creative economy, metropolization permeates mainly the industry of great cultural events and business meetings.

The rapid growth of technology industries and creative industries becomes possible due to expanding cooperation networks embracing markets and global connections. The network contacts of a new metropolitan economy cause that global connections also include other metropolitan activities. This way, network mechanisms contribute to the internationalization of metropolitan spaces.

4. Discovering development vehicles of metropolitan areas and agglomerations. Prospective approach

Discovering a new generation of development vehicles is associated with the imagination of perceiving and associating the weak signals appearing in an evolving environment. Their connection with emerging, nascent endogenous potentials can trigger the process of incubating new ideas, developing innovative projects that may result in new original events and products. The first phase of discovering development vehicles involves, therefore, new works and projects, events and products. The second phase is the assessment of old regulatory mechanisms and the opening of the way towards designing the general shape of new regulatory solutions. As a

result, the third phase makes it possible to reach out both to the culture and potentials of metropolises and metropolitan areas and, what is even more important, to evaluate creative individuals and communities in order to discover those with pioneer traits. The evaluation of metropolitan culture and potentials will allow for the unleashing of creative and entrepreneurial capital. In consequence, the fourth phase reveals the seeds of new, carrying trends.

The result of the second workshop session organized at the conference mentioned above was the working material the analysis of which led to the discovery of several development vehicles. These are four development vehicles that can be uncovered in the horizon up to 2030, in a civilizational and cultural perspective. According to the criterion of complexity and advancement of metropolization processes, they can be classified in the following way:

- a development vehicle based on the social and business attractiveness of city centres,
- a development vehicle for metropolitan areas and agglomerations based on energetic refurbishment,
- a vehicle for the development of creative economy in metropolitan areas and agglomerations,
- a vehicle for metropolitan development in network systems.

The origin of the development vehicle based on the attractiveness of city centres lies in large and bold revitalization projects. They may involve cultural heritage, but they may also be completely new architectural and urban projects. They will both give rise to the development vehicle if they result in a significant increase in the socio-cultural and business attractiveness of a city centre. The socio-cultural attractiveness of a city centre is primarily addressed to creative communities: academic, cultural and artistic. Basically, it involves building the metropolitan character of the city centre and increasing the metropolitan awareness of the residents. The business attractiveness of a city centre is focused on the cultural sector and creative industries as well as the creation of a diverse, sophisticated offer of leisure services in the emerging centres and zones of metropolitan space.

Table 4. Development vehicle based on the social and business attractiveness of city centres

Works and projects, events and products	Revitalization projects oriented towards entrepreneurship and social innovations
Regulatory mechanisms	Large infrastructure projects A new style of co-management of a city; synergy of citizenship and self-governance with entrepreneurship and creativity
Culture and potentials	Redeveloped large spaces in city centres High quality metropolitan and regional public transport
Creative individuals and communities	
Consequential trends	Technological and product development in businesses of the leisure industry Spontaneously established clusters of companies creating centres of local business in metropolitan areas and agglomerations

A new opening in the discovery of the vehicle oriented towards increasing the socio-cultural and business attractiveness of the new city centre economy is determined by the launch of mechanisms combining the initiatives of public authorities leaders, a new generation of entrepreneurs and active civic communities. Such a driving mechanism accelerates the emergence of new economy and social innovations.

New, extensive architectural and urban projects, including redeveloped centrally located spaces, attract renowned artists, artistic and cultural events, and international audiences. The reshaped street quarters and even entire downtown districts increase the number of people visiting metropolitan areas and agglomerations for business, cultural, educational and recreational purposes. As a result, metropolitan areas and agglomerations position themselves more effectively and strengthen their recognizability in international space. Exhibition projects, including art installations that build a city brand, constitute a separate component in the offer of creative events and products aimed at the global audience. Local creative products are of complementary significance as a result of the implementation of various revitalization projects using cultural and post-industrial heritage.

The works and projects as well as events and products mentioned above make creative economy a pillar of the economic growth of metropolitan areas and agglomerations through their participation in global alliances and networks.

The foundation of the development vehicle based on energetic refurbishment embraces groundbreaking technological innovations in power engineering related to the use of renewable energy sources. New wind, solar and heat pump related technologies have become relatively cheap, widely available and subject to rapid modifications. The still missing links in the energy technology chain, such as energy storage, are gradually being solved. Portable energy reservoirs and system solutions that facilitate the storage of energy, for example by organizing the time of charging electric cars, have already been marketed. In urban transport, a new type of car with an electric or hybrid engine begins to manifest its vehicle character. Passive buildings have a similar character, which, in connection with ecological urban transport, changes the location tendencies of residents and companies.

Table 5. Development vehicle of creative economy in metropolitan areas and agglomerations

Works and projects, events and products	Architectural and urban projects, artistic installations, and exhibitions building a city brand Redeveloped large spaces in city centres Revitalization projects oriented towards entrepreneurship and social innovations
Regulatory mechanisms	Cultural diversity developed in European and global city networks Large infrastructure projects
Culture and potentials	High quality metropolitan and regional public transport
Creative individuals and communities	
Carrying trends	Big global companies building their growth based on teams of creative professionals Constant presence of branded creative products on global markets

Table 6. Development vehicle of metropolitan areas and agglomerations based on energetic refurbishment

Works and projects, events and products	Projects of new energy platforms in metropolitan spaces Designs of new residential estates based on passive buildings New products developed based on groundbreaking technological innovations in the field of renewable energy sources, e.g. energy reservoirs An electric and hybrid engine launching a new car and radically changing urban transport
Regulatory mechanisms	The urban spatial reconstruction mechanism based on passive residential, office and public buildings New local development policies based on the criterion of urban energy efficiency Territorial communities and social agreements for the management of the facilities of new, dispersed energy
Culture and potentials	Intellectual and social potential for new energy and against climate change New culture of life in metropolitan spaces; bicycle oriented culture that changes the functioning of city centres, urban agriculture using renewable energy sources
Creative individuals and communities	Small and medium-sized technological businesses of the new energy sector
Carrying trends	Development of the closed-circuit economy in metropolitan spaces Decarbonization of energy; co-existence of great corporate energy and new energy in dispersed systems

The acceleration of the energy refurbishment of metropolitan areas and agglomerations is progressing due to the new mechanisms that also facilitate the entry into new pathways of urban development. The first mechanism is the mechanism for urban redevelopment based on passive buildings. On the one hand, this is a market mechanism stemming from the architectural and urban offer of architects and construction companies. On the other hand, legal regulations – EU directives, domestic construction and spatial planning law – and local planning practices that can clearly favour zero-energy (passive) construction come into play. Additionally, local development policies play a role as part of the urban closed-circuit economy.

Table 7. Metropolitan development vehicle in network systems

Works and projects, events and products	Centers of knowledge, creativity and innovation in polycentric structures Modern business services that associate the core activities of industries and help break down barriers between industries The growing diversity and intensity of the functions performed by domestic and international institutions in the regions
Regulatory mechanisms	Ongoing metropolitanization of regions launched by the bottom-up method and the method of flagship projects
Culture and potentials	Regional airports as places opening metropolitan agglomerations to the global world
Creative individuals and communities	Activity and mobility of creative and innovative communities in contact networks and partnerships
Carrying trends	Metropolitan development of regions in bipolar systems Macro processes for the technologicalization of the economy and the community of regions Focus on logistic activities, wholesale trade and business meetings around airports

Energy facilities of the new energy industry, which are used in households, municipal economy and business, are dispersed. They are not based on large installations – power centres. The dispersed new energy sector automatically triggers the emergence of “energy communities”, which, in cooperation with local authorities, make it possible to take advantage of new energy developments more effectively.

The foundation of the metropolitan development vehicle in network systems involves thriving centres of knowledge, creativity and innovation, developed in polycentric structures. These centres gather people of science, art and business supported by various types of infrastructure facilities. New original ideas are incubated in such places. Knowledge, creativity and innovation require connections and flows in global networks. New ideas become the core of metropolization processes.

Metropolitan growth is increasingly intercultural and multidisciplinary. Its multidisciplinary character is supported by modern business services facilitating inter-industry relations and integration. Institutions of international status strengthen the position of metropolitan areas and agglomerations by organizing contacts, alliances, networks, projects connecting partners from different parts of the world, or the agencies of existing international organizations.

5. Conclusion

Research on local and regional development can lead to the identification of a particular philosophy of development vehicles. This applies to various epistemological approaches as well as foresight studies on the development of cities and regions. The study proposes the territorial development vehicle model, which appears as a mobile structure that allows, in a virtual sense, for the transfer of cities and agglomerations into the future reality. The logic of the model is based on such key concepts as the intellectual corpus, the propulsion system, the motion system and regulatory mechanisms. The workshops carried out with an interdisciplinary group of urban and regional researchers enabled the identification and discovery of various types of development vehicles for metropolitan areas and agglomerations in the Polish space.

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