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HYBRIDIZATION OF DEVELOPMENT IN SECTORIAL APPROACH – CASES FROM GREEN ECONOMY AND REAL ESTATE

HYBRYDYZACJA ROZWOJU W UJĘCIU SEKTOROWYM – PRZYKŁADY BRANŻ ZIELONEJ GOSPODARKI I SEKTORA NIERUCHOMOŚCI

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Summary: The article refers to the issues linked with defining hybridization of development concept, along with its application to sectoral approach. Its aim is on the one hand an attempt to strictly define the category of hybrid development in a context of inputs, products and effects, and on the other hand an initial verification of the hybridization of development concept within the green economy and real estate sectors. This allows defining and solving the following research problem: how should the hybridization concept be understood and what are the effects of its manifestation in selected green economy and real estate sectors? Conclusions arising from the research indicate that linking quite different inputs, and then creating on their base multifunctional and elastic solutions leads in consequence to hybrid or patchwork changes taking place in sectors and territories. These kinds of processes can suggest appearing of new patterns of development, arising from the mechanism of neo-liberal capitalism, territorial legacy and globalisation.

Keywords: hybridization of development, resilience, green economy, real estate.

Streszczenie: Artykuł podejmuje problematykę definiowania koncepcji hybrydyzacji rozwoju, w tym z wykorzystaniem podejścia sektorowego. Jego celem jest z jednej strony próba doprecyzowania kategorii hybrydyzacji rozwoju w kontekście nakładów, produktów i efektów, z drugiej zaś wstępna weryfikacja koncepcji hybrydyzacji w branżach zielonej gospodarki oraz sektorze nieruchomości. Wnioski wynikające z badań wskazują, iż łączenie dalece odmiennych zasobów, tworzenie na ich podstawie rozwiązań wielofunkcyjnych i elastycznych prowadzi w konsekwencji do hybrydowych, czy też patchwork'owych przemian dokonujących się w układzie branż i terytoriów. Tego rodzaju procesy mogą sugerować pojawienie się nowych wzorców rozwoju, wynikających z współwystępowania mechanizmów neoliberalnego kapitalizmu, dziedzictwa oraz globalizacji.

Słowa kluczowe: hybrydyzacja rozwoju, rezyliencja, zielona gospodarka, nieruchomości.

1. Introduction

The article is a conceptual introduction to the hybridization of development in a sectoral approach. The empirical illustrations of the hybridization concept arise from reflections on hybridization in selected green economy and real estate sectors. Preliminary research onto the hybridization shows that building capacities for resilience in both businesses and territories often manifests itself in the pursuit of functional diversity by creating modular, flexible solutions towards the changing needs. As a consequence, the increase in density of functions can be likened to hybrid or patchwork transformations taking place in sectors and in space.

Therefore the theoretical aim of the paper is an attempt to define the concept of hybridization and the dimensions of its analysis in terms of inputs, products and effects. The empirical aim is to verify the concept of hybridization in sectoral terms in the context of the green economy and real estate sectors. This issue is justified by the following research problem: how should the hybridization concept be understood and what are the effects of its manifestation in selected green economy and real estate sectors? In the methodological layer, the article is based on a review of literature and case studies approach.

2. Towards the concept of hybridization of territorial development

The concept of hybridization develops in the context of building resilience abilities [Drobniak 2017a; Patkar, Keskar 2014; Sýkora, Bouzarovsky 2012], including its attributes for building and enhancing the adaptability of territories and sectors to changing, external conditions. The category of “hybrids”, by itself, is most often seen in the context of the effect of: crossing two elements belonging to very different entities, combining different cultures, technologies, solutions [Drobniak 2017b, p. 58]. The constitutive hybridization characteristic is the high level of distinctness of the merged elements, which through synergy leads to new multifunctional solutions.

Striving for functional diversity of products and creating solutions that show modesty and flexibility are one of the ways to effectively adapt to rapidly changing needs and technologies. In economic terms, the hybridization is a way of maintaining or gaining competitive advantage. In broader sense, it strengthens the ability to adapt quickly to changes in the environment, i.e. it promotes resilience. The impulse for hybridization of solutions is most often driven by the need of growth in conditions where a completely new technology – changing the current paradigm – has not been discovered yet.

It is therefore economically justifiable to use alternative technologies (whereas breakthrough technologies are not known yet), based on combining elements with

significant levels of dissimilarity. Thus, the hybridization can appear as a way to create transitional solutions that enable industries and territories to survive the stage of technological shock, or the period of intensification of competition.

The hybridization of socio-economic development can be analyzed in three dimensions at least, i.e. hybridization at *input* level, hybridization at *solutions* level (products and services), hybridization at *effects* level [Drobniak 2017b, p. 61].

Creating solutions, including hybrid one, requires the use of inputs. The variety of inputs used in the hybridization approach encompasses the ability to combine far different: competencies, materials, technologies, financing methods, legal solutions, distribution channels, sales techniques, etc. Accessing and then combining inputs with a high level of heterogeneity is, on the one hand, a condition for hybridization and, on the other, it involves the complexity of the process of creating solutions.

At the level of solutions, hybridization means creating new products, services whose properties have new, functionally extended features, but often embedded in the “old” existing structure. The example can be a science and technology park, which conducts nanotechnology research, and which is located in the newly renovated post-industrial facility [Duszczyk, Kessenides 2016, p. 79] or new smartphone model using the current operating system.

At the level of effects, the hybridization is considered in the context of the use of hybrid solutions, i.e. products and services with higher functionality. Combining different elements expressed in functionally expanded the nature of the products (functional diversity). Their modularity favors the emergence of multi-dimensional effects of different scales and different non-linear range in both the industries and territories [Kickelbick 2007, pp. 202-206]. For example, hybrid solutions for vehicles bring the need for adjustments in other sectors of the economy, from the energy suppliers and infrastructure providers to the legal solutions, accounting and transactional services for the entire process. Introducing solutions for remote employment opportunities significantly increases the mobility of human capital, making it more “non space-attached” [Holton 2000, pp. 142-143].

Hybridization analysis can be considered industrially and territorially. The research on territorial hybridization conducted by Golubchikov, Badyina and Makhrova [2014] referred to the analysis of the differences in the effects of the development of Russian cities. The high level of this diversity for the authors is the cause for defining the assumptions explaining the different dynamics of cities development based on mutual interactions between the post-socialism legacy and the forces of the neo-liberal capitalism. This means that spatially hybrid development is a type of uneven development resulting from the influence of neo-liberal capitalism, for which in terms of effective capital allocation, only those places in space that provide a satisfactory return on investment are relevant. Significant differences in the dynamics of the development of cities and post-socialist regions have also contributed to the introduction of the hybridization of development by Sýkora and Bouzarovsky. According to them, the post-socialist legacy generates the multiple

dynamics of transformation [Sýkora, Bouzarovsky 2012, p. 51]. The multiple dynamics of transformation show a kind of sequentiality, i.e.: (a) they range from the universal political and economic changes to diverse social changes, which in turn determines urban and regional change; (b) the changes are a complex environment of causes and effects occurring in space; (c) some urban and regional spaces remain 'locked in' by the post-socialist legacy, while some are subject to rapid changes in space organization, infrastructure amenities, housing development and business investments, etc. [Sýkora, Bouzarovsky 2012, p. 53].

Research on the territorial approach of hybridization was also conducted by Smith and Timár [2010]. According to them, hybridization is defined as a highly uneven and controversial set of socio-economic and spatial changes characterized by discontinuity [Smith, Timár 2010, p. 116]. Smith and Timár consider the impact of neo-liberal capitalism along with market and globally oriented business models as the main determinant of hybrid growth. The hybridization of development in a territorial perspective refers to the situation where new business models emerging in one place (e.g. city, or region) have effects in another place of space (e.g. on another continent) unrelated so far to the place of manufacture of the solution (product, services). An example can be software created by Polish IT companies used to animate Walt Disney's television production in the US. Hybrid effects in space are determined by the ability and speed of entry into existing production chain (or create new one), and the integration of a product (service) into the global production chain. The speed of creating or integrating the production chain is facilitated by modern communication technologies which, by nature, are "non territorial" and thus less favor the selected locations.

In the industry, hybridization emerges in the context of globalization which occurs in two main approaches. According to the first approach, the globalization leads to a single, homogeneous system characterized by a high level of convergence and the presence of "universality" [Wallerstein 1990; Wang, Yueh-yu Yeh 2005]. The second approach emphasizes globalization as a system created from "details" characterized by distant relationships [Hannerz 1996; Wang, Yueh-yu Yeh 2005]. In this second approach, the concept of hybridization opens the "third space" [Bhabha 1994], where various elements and different systems are mutually transformed.

The sectorial hybridization can also be considered in the context of production chains or value chains [Drobniak 2017b, p. 75]. This approach means that hybrid products and services generate effects that both affect the chain of production and often have significant effects in other autonomous industries. For example, the introduction of miniature Bluetooth transmitters (*beckons*) in combination with smartphone applications makes ability to present the works of art in the museums in a different way. It also changes the retail model in shopping malls, as well as enters an interactive ways to explore cities in the tourism industry [Rożyński 2015, pp. 81-82]. Another example is the growing popularity of 3D printing technology, which has contributed not only to the development of the so-called 3D printers

industry, but also finds applications in many other industries of the economy by denying traditional methods of production of product models, molds for casting products, whole products or their parts. Today 3D printer products are used in electronics, medicine, construction industry, jewelry, and even in gastronomy.

The hybridization of the production chain at the level of inputs, products and effects, is particularly evident in the mobile application industry to the point that they are often referred to as “hybrid applications”. Applications of this kind are a combination of the so-called native application of a device with WEB technology. Native applications are binary software, installed and stored directly on a device, for example, purchased from Apple’s App Store, Android’s Marketplace, or BlackBerry’s App World [IBM 2012]. In a hybrid approach, this kind of software is combined with technologies, i.e., software available on the WEB (e.g. web pages, graphic files, instant messengers, social media). The native application uses the operating system of the device to create an internal HTML search engine, which is the bridge between the device and the technologies available on the WEB network. This creates a hybrid application that utilizes network resources and makes greater use of the capabilities of a mobile device, i.e. its functionality increases [IBM 2012].

3. Hybridization in green economy

Complex changes of the hybrid nature also appear in green sectors of the economy. For example, the popularization of renewable energy solutions and the use of passive materials in construction necessitate the need to reorient not only the way energy is supplied but also to rethink the needs of technical infrastructure.

Another example of the application of hybrid solutions in the green economy is the multiple annexation of electric engine technology in the segment of individual cars and collective transport vehicles, including their indirect form – hybrid vehicles. Hybrid vehicles combine two different technological solutions (now: combustion and electrical units) to partially compensate the weaknesses of diesel engine, optimize it by improving its efficiency and recovering energy surplus. An application of this technology entails the need for high capacity and resilient (lithium polymer) batteries, as well as the manufacturing of electronic control systems, which results in product changes in other industries [www1].

Further introduction of electric vehicles by automotive industry requires the development and deployment of a technical infrastructure for charging vehicles such as charging stations, wireless charging systems and IT, and organizational solutions (such as vehicle charging networks, RFID cards). This entails strong transformations in the automotive sector, the development of new industries and the arrival of new technology-savvy market players, as well as changes in space that will allow the use of fully electric vehicles in the future (after the technological shock phase).

Social changes, including those triggered by political factors, also trigger transformations on the input side. Adapting to the principles of sharing goods or renting them out involves changing the traditional way of financing them and reorganizing the legal framework. Urban bike systems or electric vehicle rentals generate the need for mobile applications and, in the case of bicycle stations, their rent and return [Dekoster, Schollaert 2000, p. 11]. The green economy solution for low carbon transport (zero emission), however, makes much of the further transformations of urban spaces reflected in the development of urban cycle paths, pedestrians zones, cyclists zones, urban traffic control systems, park & ride facilities, and the organization of public transport between them and city centers (use of various means of transport on daily journeys). The causes and effects of the described solutions change the way of thinking about cycling as a means of daily transport, as well as reorienting the social perception of space and environment. From the hybridization approach, it leads to the diversity of function and increase of their density in urban spaces.

The Seaholm district in Austin is an example of a comprehensive hybrid approach to creating eco-friendly area. It was selected as one of ten projects in the US in the pilot EcoDistricts Program¹, which includes: waste-free materials management, green infrastructure, water and air protection, energy conservation [www2]. Various actors in the project are involved, i.e. public, private and non-profit sectors. The 65 hectare area is an example of multifunctional use of new inputs and the use of existing post-industrial facilities for new functions. The district includes, among others, the area of the former Seaholm Power LLC, which houses now the Austin Central Library and accompanying functions [www2]. Among them there is a gift shop, where gifts are made of recycled materials used in the library. Proceeds from their sale fund the library budget [www3]. The activity of Trammell Crow is also worth noticing. It carries out a variety of multi-functional green economy projects in the city [www4]. The most important projects include: redevelopment of the former wastewater treatment plant for residential needs, offices, hotel and commercial space (The Green Water Treatment Plant) or Texas Clean Energy Park – the business park for next-generation clean technology companies [www5].

The elements of the hybridization concept are also found in the assumptions of the so-called ‘eco-cycle’ approach applied in the Stockholm district of Hammarby Sjöstad [www6]. In this cycle, apart from the use of energy produced on the basis of renewable energy sources, the use of mechanisms for re-use of energy from the processing of waste and sewage produced by households, including heating and individual and collective transport, was assumed. The system of domestic wastewater recovery permits (after re-cleaning) to reuse water in the industry and garden irrigation.

The presented mechanisms of the use of known forms of energy production or water recovery are examples of hybridization on the input and solution levels. They combine both the use of their diverse origins and different technologies of acquisition. This combination of different technologies and a flexible and broad approach to inputs are also typical for other eco-district and eco-city projects.

4. Hybridization in real estate sector

In the real estate sector hybridization is associated with the size of very different functions leading to breaking conventions [Palej 2010]. Introducing a variety of very different functions within a building or group of buildings leads to a reduction in the risk of investor on a market. A good example of this approach in today's urban fabric is office and shopping centers, where apart from offices and stores there are restaurants, clubs, specialized services, fitness centers, post offices, kindergartens, spa services, etc. This kind of multi-functionality – in terms of various and often very different possibilities of floor space adaptation – is also introduced into buildings that have lost their original function.

An interesting case of the hybridization of floor space adaptation in the real estate sector are the post-industrial facilities within which tourist, cultural, educational, gastronomy and hotel functions are located, embedded in the old fabric of buildings, which have lost their former industrial purposes. The examples of hybridization of the floor space adaptation of post-industrial buildings may include the following case studies:

- the set of buildings representing the heritage of the textile industry in Łódź, formerly the Poznański Factory [www7], which features a variety of functions including:
 - gastronomy – Polish, Italian, Asian, vegetarian cuisine, fast food, cafes,
 - tourism – museum area concerning the history of Łódź and the factory complex and art from the 20th and 21st centuries,
 - cultural – area used for theatre activities and cinema,
 - educational – workshops in the field of art, French language, dance, interactive technique,
 - entertainment – casino, bowling, billiards, fitness club, climbing walls, laser maze, children's playroom,
 - accommodation and conference facilities – nearly 300 hotel rooms and suites, spa center, swimming pool, conference area;
- the set of buildings representing the heritage of the brewery industry in Poznań, formerly the Hugger Brewery [www8], which features a variety of the following functions:
 - gastronomy – Polish, Italian, Asian cuisine, cafe, confectionery, chocolate pump house,
 - tourism – conditions which allow to visit the buildings,
 - cultural – exhibition of works of contemporary art, cinema,
 - educational – workshops for children and parents, including artistic activity,
 - recreational area – children's playground, outdoor cinema,
 - accommodation – hotel with over 20 rooms;
- the set of buildings representing the heritage of the distillery industry in Łódź, formerly Vodka Monopoly Plant [www9], which features a variety of the following functions:

- office space – over 20,000 m² of modern office space,
- gastronomy – such as restaurant, cafe, wine cellar,
- cultural – museum area dedicated to the local distillery industry, theater area, amphitheater, art gallery, cinema,
- educational – kindergarten, space for children's activities,
- recreational area – fitness club, swimming pool, cinema, playground;
- the set of buildings representing the heritage of the metal industry in Warsaw, formerly National Engineering Factory [www10], in which the following functions were located:
 - office space,
 - housing – five residential properties,
 - gastronomy – Polish, French, Mediterranean cuisine, cafe,
 - tourism – museum area addressed to the neon signs,
 - cultural – theater space with a separate repertoire dedicated to children and adults, including also concerts, exhibitions, performances, art workshops for children,
 - educational – cuisine courses,
 - recreational space – sports events, picnics, playgrounds;
- the set of buildings representing the heritage of the porcelain industry in Katowice, formerly Gische Factory [www11; Drobniak 2016], which features a variety of the following functions:
 - office space – for example, headquarters of fashion designer, location of IT firms,
 - gastronomy – Polish cuisine,
 - tourism – conditions for sightseeing, planned museum area for the porcelain industry,
 - cultural – art gallery, space for concerts, performances, conferences,
 - educational – modeling, cuisine workshops,
 - recreational area – seasonal fairs;
- the set of buildings representing the heritage of the distillery industry in Warsaw, formerly Vodka Factory [www12], which features a variety of the following functions:
 - office space – seven buildings with nearly 30,000 m² of modern offices space, car&bike infrastructure,
 - housing – three housing properties,
 - gastronomy – catering area with about 6,000 m² usable floor space, cafes, bars, restaurant,
 - tourism – museum area dedicated to vodka distillery industry,
 - exhibition – floor space for exhibitions and fairs,
 - accommodation – about 5,500 m² of hotel floor space with about 140 rooms.

These case studies taken from the real estate sector show the phenomenon of hybridization in terms of inputs and products. Presented solutions were applied in

buildings that lost their previous industrial function, and on their basis very different products were created with diverse functional character. The obtained significant functional diversity has undoubtedly served to minimize the market risk of the above mentioned projects. However, it also increases the buildings originality and it has allowed to increase their economic value. In addition, the functional hybridization of the described post-industrial sites (functional diversity) contributed to the formation of a new urban tissue in Łódź, Katowice, Poznań and Warsaw.

5. Conclusions

The issue of hybridization is becoming more and more frequently referred to the phenomenon of diversified, often discontinuous, and highly diverse development trends – not only in the context of territories but entire industries and sectors. Hybridization is about going beyond a stereotype, often by creating breakthrough solutions with higher adaptability to the environment. Connecting diverse and far-reaching knowledge, experiences, ideas, solutions in a globalized and digital world requires a different approach to analyze and to plan the processes of contemporary development in both territories and sectors.

Cognitively interesting examples of hybridization at the level of primarily inputs and products provide a preliminary review of case studies in the green economy and real estate. In this first sector we deal with the hybridization of new energy sources for vehicles in connection with conventional sources, which in turn force a vast range of adjustments in other industries and processes of planning urban mobility. Another example is the creation of eco-districts that link a variety of, often very different, technologies in terms of energy generation, materials processing, construction, greening and water management.

In the real estate sector, hybridization of development has been presented with regard to the implementation of new, very diverse functions in post-industrial facilities. The examples of the adaptation of post-industrial plants in Łódź, Poznań, Warsaw, Katowice showed on the one hand the way of introducing and combining various functions within buildings that have lost their previous function (industrial), and on the other one the new way of shaping service, office, housing, and other functions on areas which have been so far associated with the industrial legacy.

The hybridization of development at the level of inputs, products and effects can be seen as a response to today's challenges in the development of industries, sectors, cities and regions. Globally oriented business models are a subject to a variety of technological, social, economic, political and spatial pressures, which results in economic vulnerability of their local value chains to internal instability. Adapting to this kind of instability forces a great variety of functions and accompanying products, including frequent alignment and/or reorientation of the value chains, including the event of their re-localization or closure. This results in the hybrid patterns of specific socio-economic and spatial effects.

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