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Theoretical and practical dimension of the bicycle policy in the light sustainable development

Anita Nowakowska

Faculty of Management, Czestochowa University of Technology, Czestochowa, Poland

E-mail address: a_nowakowska@onet.eu

ABSTRACT

The article presents practical aspects of implementation of sustainable development assumptions in the city's cycling policy. Theoretical and practical dimension of selected innovative solutions was presented on the example of the city of Czestochowa. The aim of the article is to present a bicycle as an alternative means of transport in the city's logistics and to illustrate the challenges of cycling policy in contemporary cities.

Keywords: cycling policy, sustainable development, city logistics

1. INTRODUCTION

The concept of sustainable development should be identified with the continuous development of specific sectoral policies, in particular environmental, economic and social policy. The overriding segment of sustainable development is environmental protection, which is a superior value for economic and social development. In line with the principles of sustainable development, the policy of Polish cities puts a big focus on the development of public and alternative means of transport. An example of such a city is Czestochowa.

2. THE POLICY OF CONTEMPORARY CITIES IN THE LIGHT OF SUSTAINABLE DEVELOPMENT

At the regional level, sustainable development concerns environmental protection, rational use of natural resources, satisfying the needs of local communities, increasing the availability of employment, participation of the region's residents in the decision-making process and in development activities, availability of high quality services and creation of cultural heritage [1].

Both in the concept of sustainable development and in the assumptions of regional policy, it is assumed that the main goal is to improve the quality of life. However, in the first case - this improvement should be permanent and concern present and future generations and should not cause degradation of the natural environment, while in the second case - activities aimed at satisfying needs should include environmental protection as a condition of proper management. Currently, the concept of sustainable development is opposed to the traditionally interpretation of economic development. This is due to the fact that the emphasis from the increase in production shifts to structural and quality changes in the economy, which recognize the principle of preserving environmental capital and the interaction of economic and social factors in the development process [2]. The mechanism of functioning of the concept of sustainable development, also at the regional level, requires a systemic approach, which includes the simultaneous interaction of three basic components (spheres) [3]:

- a social component that amounts to meeting human needs and thus ensuring equal development opportunities;
- economic component, which results from the need to strive for economic growth, giving a real increase in prosperity, while avoiding activities negatively affecting the natural environment,
- an environmental component consisting in the rational use of natural resources and protecting the productivity of life support systems on Earth.

Sometimes we can also distinguish the spatial and institutional component of sustainable development. It results from the fact that every human activity must be set in some space, on some terrain, and the tasks are coordinated by a team of institutions.

These spheres form three dimensions, according to which sustainable development can be presented. The relations between them are shown in Figure 1.

In regional terms sustainable development concerns not only the balance of relations: society - the economy - the environment, but also the components constituting each of these three dimensions.

Both in terms of regional development and in the concept of sustainable development, the environment is treated as an element that determines the possibilities of economic development of the region. However, on the other hand the environment is an obstacle because it has limited potential, specific absorption and resource depletion.

Among the elements of the natural environment, we can mention its value (eg landscape) and resources (soils, water, plants and animals) and systems created by them (ecosystems) [4]. Currently, the greatest importance is attached to relations between ecosystems or between components of ecosystems. In the case of sustainable development, the environmental dimension concerns the preservation of biodiversity and balance in ecosystems. These elements affect the possibility of using the natural environment, which in turn determines the satisfaction

of human needs (their availability, quality), and in the final effect - the broadly understood quality of life.

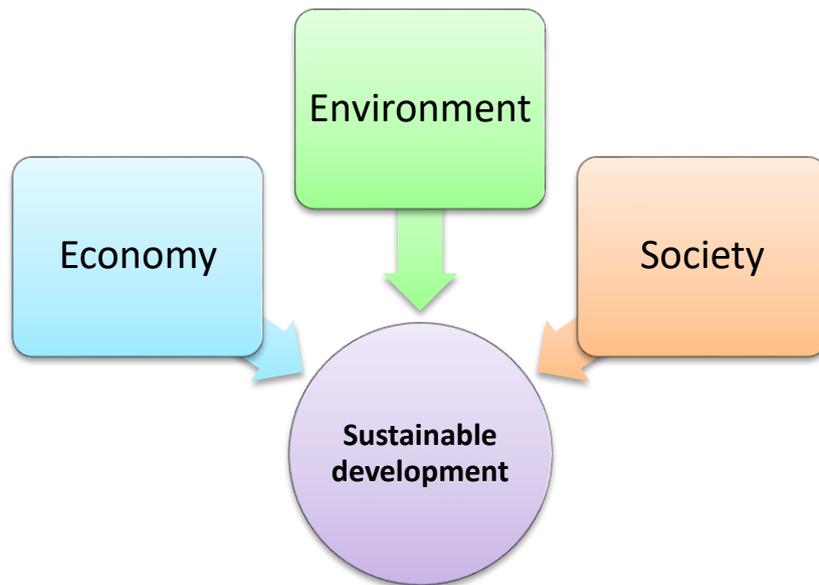


Figure 1. A model of three areas in sustainable development.
[Source: own elaboration]

The economic dimension of sustainable development at the regional level concerns the greening of activities, providing safe goods that meet the needs of consumers, which do not cause permanent damage to the environment and the interconnectedness of various forms of activity. Sustainable development manifests itself in a slightly different way in various sectors of the economy, but there are common elements that can be considered: popularisation of Corporate Social Responsibility (CSR), production of "environmentally friendly" products, high quality parameters, their eco-certification (eco-labeling), introduction and dissemination of ecological innovations (including environmental technologies and development of alternative energy sources), as well as dissemination of environmental management systems (EMSs) - enterprises use previously developed and well-known systems (ISO, EMAS) or implement their own proprietary solutions in this area [5].

Ecologization is a common concept of sustainable development. However, it is also important to remember about economization, where ecological goals should be achieved at the lowest social cost.

The social dimension is closely related to improving the quality of life - the main goal of sustainable development. Social development is about creating such conditions that economic growth is a means to achieve the main objective (to improve the quality of life) and to constantly increase the independence and responsibility of people in pursuit of well-being and improvement of social security.

This concept corresponds to the assumptions of sustainable development maintaining natural uniqueness [6].

Table 1. External and internal factors of sustainable development

Economic dimension	
Legislation on economic activity, central government policy, development assumptions and sectoral policies developed at supranational (EU) level, access to programs and aid funds	Multidirectional regional specialization, research and development activities related to ecological innovations and their implementation into economic practice, saving raw materials, activities undertaken within the framework of corporate social responsibility
Social dimension	
Education system (in the field of ecology), consumer movements, associations and non-governmental organizations, policy in the field of protection of cultural heritage at the national and supranational level, relations between the authorities and society	Formation and activity of local communities, activity of regional authorities in the field of stimulating economic activity, support of pro-ecological activities in the region, prevention of poverty and social exclusion, ensuring equal access to social services and shaping spatial order
Ecological dimension	
Legislation regarding environmental protection, environmental policy of the country and the European Union, creation and maintenance of a network of protected areas of various rank but spatially related to each other	Natural conditions, biodiversity and protected areas significantly influence the economic activity conducted in the region

[Source: own elaboration]

The quality of life in the region is affected by many external and internal factors (Table 1), as well as basic infrastructure (transport accessibility), living conditions, and environmental quality. All these elements make up the process of balancing regional development.

In order to make the concept of sustainable development a reality, one should undertake a number of activities that will allow achieving partial goals (in individual dimensions) and a general goal. Selected activities are presented in Table 2. In practice, it is difficult to attribute a given factor to only one dimension, as it may affect all of them, eg education (social dimension) influences the entrepreneurial and innovative potential (ecological dimension), while implementation of innovation in practice contributes, among others to reduce environmental pollution (ecological dimension).

Table 2. Components and objectives of individual dimensions of sustainable development

Dimension	Economic	Social	Ecological
Actions	Ecologization of activities, introduction of eco-innovation, environmental management systems and ecological certification, development of corporate social responsibility, production of goods based on local natural resources and labor, rational use of natural resources	Development of ecological education, building ecological awareness, participation of residents in public life, maintaining local traditions, creating and transferring knowledge	Determination of the absorptivity of the environment and the state of its resources (in terms of quantity and quality), introduction of a reliable, comprehensive assessment of the environment, skilful development of protected areas without damaging the life of its inhabitants
Partial Goals	Achieving long-term economic benefits, meeting human needs, increasing work efficiency while minimizing pollution and saving resources, development and promotion of regional products	Building a civil society, improving the well-being and satisfaction with life of the region's inhabitants, maintaining and developing the local heritage and cultural identity of the region	Preserving biodiversity and the most valuable natural areas, improving the condition of the environment, and thus the living conditions and health status of the population, maintaining the continuity of resource use and natural values

General goal	Permanent improvement of the quality of life of the inhabitants of the region in material and non-material terms without deterioration of the environment condition while maintaining biodiversity and cultural heritage
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[Source: own elaboration]

As presented in Table 2, in the case of balanced development of regions, the occurrence of resources such as human capital, natural or production capital is more important, but more difficult to quantify factors such as: social capital, environmental awareness, the ability to create eco-innovation and occurring between them interactions. The implementation of these goals is supported by local and regional authorities. Their main activities are: creating strategies and development plans, attracting investors, promoting the region. Their tasks also include care for infrastructure, providing services (health care, education) and caring for the environment through, among others, promoting cycling policy [7].

3. BICYCLE AS AN ALTERNATIVE MEANS OF TRANSPORT IN THE CITY'S LOGISTICS

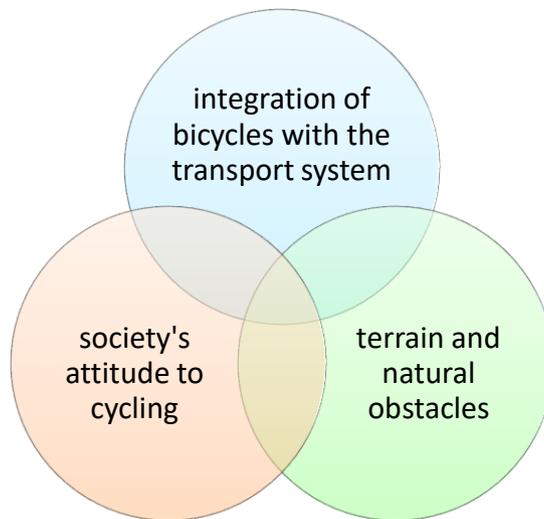


Figure 2. Barriers in the cycling policy of cities

[Source: own elaboration]

The concentration of industry, services, trade and people in urban areas causes an increase in demand for transport services and results in the demand for access to infrastructure. These phenomena result in difficulties in the processes of movement and cause that the policy of cities puts more and more emphasis on the development of public and alternative means of transport. One of the alternative means of urban transport is a bicycle, which is becoming more and more popular in Polish cities. The bike is both quiet and ecological. Due to low energy consumption

in the ratio of transported mass, it is the most advantageous means of transport [8]. The strategy of promoting city bikes is fully consistent with the policy of sustainable development. For urban transport to develop in a sustainable manner and to provide urban residents with the necessary mobility, local governments must take action to meet many challenges [9]. The most frequent barriers to the implementation of cycling policy were presented in Figure 2.

As can be seen from the figure above, the greatest difficulties in implementing the bicycle policy concern the integration of bicycles with the existing transport system, which is most often based on buses and trams, and also the development of a solution enabling an efficient and convenient change of one mode of transport to another. Another problem is the terrain and other natural obstacles that prevent or significantly hinder the construction of bicycle infrastructure. The last factor is the attitude of the society towards cycling and the difficulties associated with convincing residents to change the mode of transport. This requires conducting a promotional program for many years. Despite the fact that all the above-mentioned factors significantly impede the implementation of the municipal cycling policy, one should mention the benefits of using the bicycle as an innovative means of public transport. Good experience of European countries facilitates the organization of an effective bicycle transport system in Polish cities. This contributes to the improvement of the accessibility of travel destinations for users of the transport system, increases integration with the collective transport system, and reduces energy consumption in travel. The effect of this is the reduction of noise and pollution emissions in the city [10]. In addition, promoting large-scale cycling can result in increased physical activity in society and a positive impact on finances. The bike is not only an ecological but also an economical solution in the city's modern logistics [11].

4. CZESTOCHOWA'S ACTIVITIES IN THE DEVELOPMENT OF THE CITY'S CYCLING POLICY

Czestochowa is a city that offers good conditions for the development of traffic road. Every year, it allocates more and more funds for this purpose.

In 2018 MZDiT in Czestochowa decided to allocate almost three million zlotys for the expansion of the city bike system. The plan of Czestochowa assumed the establishment of 20 stations in which over 180 bicycles were to appear. It was assumed that each station should consist of 20 stands and a terminal. The Czestochowa tender concerned the delivery of components, installation and commissioning of the system, and finally it took place between two offers of companies: Nextbike and BikeU. Finally, Nextbike, which operates in nearly 30 cities in Poland, won the tender, and in November 2017 signed a contract with the Czestochowa city office.

In Czestochowa, docking stations quickly appeared, and in December 2017 system tests were started. 50 people took part in the tests. Those who were e-mailing a request received a reply message with all the data necessary to log into the system. Residents could not only test the system, but also had the opportunity to submit their comments on its operation. 90 bikes located throughout the city at 10 stations were prepared for testing. By registering once in the Nextbike system, users can also use bikes in other cities. In December 2017, the system of the company included more than 1,700 people from Czestochowa.

The strategy assumed that Nextbike will launch a special application for phones, which will allow easy use of the rental. The user, wanting to rent a bike, will have to scan only the QR

code that he finds on the selected bike. Of course, the company was to allow the use of two-wheelers also for people who do not have applications by creating terminals located at each station. According to the assumptions, the system was to start operating on April 1, 2018 at the latest.

As planned, after successful December tests, from March 30, 2018, residents of Czestochowa have the possibility of renting a city bike. The important thing is that up to 30 minutes bike is rented for free. At the beginning, after registering in the system, the user must top up his account with PLN 15. There is also the possibility of downloading a free application that also allows the use of a smartphone. The course of the bicycle rental process is extremely easy as evidenced by the scheme below.

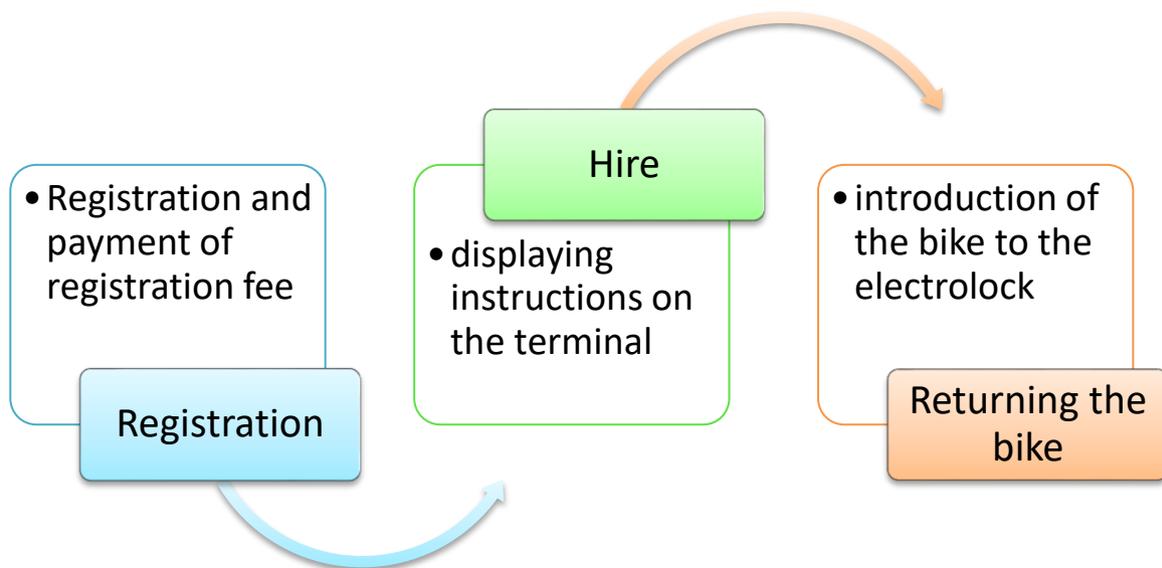


Figure 3. Stages of renting Czestochowa city bike
[Source: own elaboration]

According to the above scheme, the first stage of renting a bike is registration, which can be made via the website or by calling the hotline. Registration takes place via the mobile application or directly at the terminal. Then the user should follow the instructions using the terminal. Using the mobile application, the user should scan the QR code or directly enter the number of the bike, which will be automatically released. After finishing the ride, the resident must enter the bike into the electric lock. The correct return of the bike is confirmed by an acoustic signal. If there is no space available at the station, it is necessary to attach a single-track to a selected stand or other bicycle. The table below shows the current price list that applies throughout the city.

In the first week of use, residents rented bikes up to 5234 times, and the system registered over 3,700 people. Green bikes and city system users can search the map on the internet and in the most frequented points of Czestochowa.

The number of stations and bikes in the city is constantly growing. According to the above drawing, in May 2018 Czestochowa had 20 stations and 300 stands. The table below shows the exact location of each station.

Table 3. Price list of city bikes in Czestochowa.

TIME OF RENT	PRICE
FROM 1- 30 MINUES	0 zloty
FROM 30- 60 MINUTES	2 zloty
SECOND HOUR	6 zloty
THIRD HOUR	10 zloty
FOURTH AND EACH ANOTHER	14 zloty

[Source: own elaboration]

Table 4. Location of the Czestochowa city bike station.

Localization	Rack numbers
Wyzwolenia/Fieldorfa Nila	15
Norwida	15
Promenada/Kiedrzyńska	15
Promenada/Amfiteatr	15
Okulickiego/Łódzka	15
Dekabrystów/Armii Krajowej	15
Jadwigi/Park Wypoczynkowy	15
Pasaż Bareły/Jasna Góra	15
III Aleja NMP	15
Plac Biegańskiego	15
Pasaż Opolczyka/Urząd Miasta	15
Piłsudskiego/PKP	15
Plac Daszyńskiego	15

Żużłowa/Hala Sportowa	15
Boh. Monte Cassino/Korczaka	15
Niepodległości/Basen	15
Rondo Jerzego Kuleja	15
Orkana/Szkoła	15
Jagiellońska/Estakada	15
Jesienna/Szkoła	15

[Source: own elaboration]

The city, in accordance with the assumptions of sustainable development, strives to promote a healthy lifestyle among residents and encourages the use of city bikes. On the "Rowerowa Czestochowa" website, users can find current information on cycling policy, find bike paths and repair stations. The other tabs contain current legal regulations, advice related to road safety and information on bicycle trips.

On Sunday, April 8, 2018 began the cycle of Czestochowa MTB marathons and will last until September 23, 2018, when the Czestochowa MTB Finals will take place. Attractive routes, prizes and sport and bicycle emotions await the participants. The main organizer of the MTB cycle is the Jura Bicycle Foundation, cooperating with companies from the bicycle industry and the Czestochowa City Hall. Czestochowa is the first city in Poland introducing such a series of MTB events, which is based on cooperation with the cyclists and well-known companies and bicycle brands.

Through such events the Municipal Office wants to encourage even more to tourist and sport cycling and to visit the Jurassic areas of the Czestochowa region. The city supports such activities because they are necessary to create conditions for intensive recreation and cycling for the inhabitants, and they are also an element of the implementation of the program "Direction Friendly - Active Czestochowa".

5. CONCLUSIONS

Sustainable development has become a determinant for conducting government activities in the field of environmental protection. Also at the regional level, these concepts have influenced the comprehensive perception of environmental issues. Czestochowa is a city that undertakes a number of activities to achieve ecological and environmental safety. One of such activities is the promotion of cycling policy on an increasing scale. The recently created city bike project in the city of Czestochowa turned out to be a great idea that is becoming more and more popular among local residents.

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