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BICYCLE TRANSPORT AS AN OBJECT OF ECOLOGICAL MARKETING AND INNOVATIONS IN URBAN TRANSPORTATIONS

The article analyses how the leading European countries pursue the policies of bike promotion as a priority type of transport, improve the bicycle infrastructure, establish and expand bike rental networks in big and in small (mostly, campuses) cities. It was proposed to consider bicycle transport as an object of ecological marketing and innovation activity of the individual transportation. This article has classified the obstacles of bike usage as a type of transport in Ukraine: low level of awareness, social prejudgment, miscomprehension of bikes use advantages. Necessity to attract students' to make surveys and communicational events for the bicycle transport implementation in Ukraine was proved.

Keywords: ecological transport, bicycle transport, transport infrastructure, youth transport, student transport, marketing of public transport, innovations in public transport.

Research problem. We live in the world of growing population, increasing environmental problems, lack of minerals and social-economic globalization when necessity of both individual and humanity survival is becoming extremely important. By next few years 80% of the world's population will live in the cities. This is the main reason which force us to think about usage of urban space and transport people in cities. Nowadays ecological pollution and increased costs on transport service highlight the importance of seeking alternative types of transport. The youth of many European countries prefer bikes as a main transport even in winter. Usage of bicycles in Europe is constantly growing due to European and local urban and mobility policies. Thus, we may consider an opportunity to promote bicycle transport in Ukraine, that requires complex investigation of this question.

Literature review. The idea of development and promotion of bicycle as alternative transport had a very long evolution. The need for alternative to a private car is considered in works of Ukrainian and foreign authors such as V. Vuchik [1], H. Holts [2], A. Halyshev,

Y. Trofymenko [3], L. Hasenko [4]. The bicycle infrastructure is actively studied by O. Berloh, E. Rejtsen [5], N. Khrystiuk. [6], O. Tokmilenko [7]; Danish scientists published "Collection of Cycle Concepts" digest [8]. Recommendations to establish cycling infrastructure are presented in "Bicycle Master Plan" works elaborated by set of American authors for different cities [9]. Nevertheless, nationwide strategy of implementing bicycle transport as a priority type of transport especially for students and youth is absent nowadays.

The purpose of the article is to define features and the ways of bicycle transport implementation in Ukrainian cities as a priority for youth; it includes the best world practices of bicycle transport implementation into urban space and searching for possible ways to apply the European experience in Ukraine.

Main material. Passenger transport comprises – street (tram, bus, trolleybus, taxis) and high-speed transport (metro, speed tram etc.) that carry passengers in accordance with specific routes in Ukraine. By ownership transport may be classified as public and private. In general, government is not satisfied with the quality of transporting services as well as citizens are not satisfied with short routes, long time of waiting, discomfort in the way. Bad image of public transport results in absence of demand for discounted tickets. Even though there are a few discounts on travelling around the city for young people who are the main users of public transport.

Modern Ukrainian students face a problem of big costs on public transport services. In order to get from apartment to university, student has to change few transport types what take a lot of time and money. The research made by Internet-platform Studway shows, that students spend the largest amount of money on transport because transporting costs are rising rapidly. Such result finds its explanation in fact that majority, because majority of students eat at home and parents buy their clothes. Eventually, we claim that Ukrainian students need a new solution for the transporting issue.

There are different systems of benefits in Europe. For example, in Poland students save on local transport from 30% to 50%. In Warsaw businessmen offer free bikes in exchange for monthly changing advertising on the bike and the minimum distance that a bike holder must ride per month is 120 km [3], but these discounts are only for students not older than 26 years. In Lithuania the discount on public transport is 80%. Students benefit from a reduced price on the route to the place of study in Czech Republic. In Netherlands students have the right to travel for free if they have excellent marks, in Portugal students can buy a ride on the subway with 50% discount of the cost, in Germany students buy a monthly travel pass on all types of transport, in the US city of California (a purely student city) Stanford University students go solely by bicycle– there are 15 thousand bicycles for 20,000 students [10]. Therefore, European experience of implementing cycling infrastructure as a support for students is applicable for Ukraine.

Another example of European way of students' encouragement to start using bikes is implementation and further development of the «EuroVelo» project. The main aim of this project is to create a European network of cycling trails. The initiative is aimed to develop 15 cycle paths all through Europe, the total length of which will be 60 thousand kilometres. The idea and initiative to implement belongs to European Federation of cyclists. It should be noted, that the routes are suitable both for cycling tourism and long-distance commuter. This is a complex of long existing and newly created routes, featured to a comfortable cycle routes. The initiative has its own website where you can check particular bike trails, details of commuter, etc. (Figure 1).

Amsterdam (Netherlands) is called the capital of cycling world because more than 40% of

city transport are the bicycles. Moreover, the Dutch government created the high-quality comfortable conditions for cyclists, tourists and visitors, who have an opportunity to enjoy 400 kilometres of bicycle paths equipped with special signs and traffic lights, well equipped parking places. Dutch population, which is around 16.8 million people, own more than 18 millions of bicycles, mostly produced in Netherlands. Bicycle paths across the country comprise 30 thousand kilometres. In addition, they constructed the bicycle paths that accumulate solar energy, part of which could be used for traffic lights, etc. There is also creation of heated bike routes to make cycling possible even in winter in plans.

About 30,000 residents of Barcelona use bicycles as alternative urban transport. Specially developed social program for citizens allows them to buy a card-ticket (30 euros per year) for renting a bike in the city. Infrastructure also provides more than 3 thousand parking places. There are even additional discounts for people on cycles – "tax free day", and the amount of such days is proportional to the price of the bike in Madrid. Thus, for example, if you buy a bike for 500 euros you will receive a 90 euros' discount (18% income tax). Belgian Government has created special vouchers for cyclists. For instance, if you use bike to go shopping, you will get a discount on goods [11].

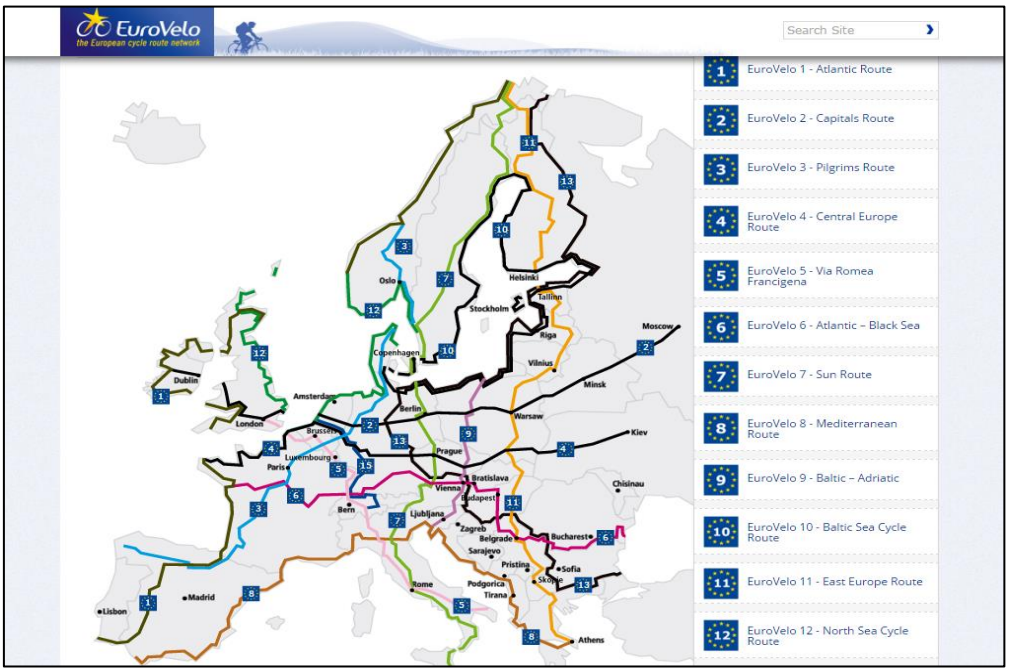

Figure 1 – **Web-page of the project EuroVelo**

According to Copenhagenize Design (company which studies and supports the cycling culture) research, the capital of Denmark – Copenhagen – is topped the rating of the best for cyclists city this year. Experts observed significant increase of cyclists in Copenhagen in two years. Only 36% of Danish inhabitants ride bicycle in 2012 but in 2014 number of cyclists has increased to 45%. Therefore, according to Andreas Hammershoya, an employee of the NGO Danish bicycle representation, "none of the residents of Copenhagen think of themselves as

about cyclists, they are people who go to work, shop, etc. by bike". Also, in Copenhagen there is even a separate car free cycling area [8].

Another European capital, Berlin, also promotes cycling, about 15% of all traffic. In order to promote cycling even officials ride bicycles on everyday bases. Special signs and traffic lights for cyclists – a guarantee of a secure travel – allows to cyclist with an average speed about 20 kilometres per hour to get "green light". Promotional devices that show how many cyclists rode near it during the day and year became very popular in Stockholm. This is the city where the idea of free bikes was firstly introduced. More than 500 kilometres of cycle paths are specially equipped and have special traffic signs in Vienna (Austria). Residents and visitors can rent a bike at one of the 60 stations operating all day long. Local authorities exhort to move around the city by bicycle from April to October. The city centre is equipped by bike enthusiasts centre where you can get useful information about bike maintenance.

Europeans also work on development of bike rental networks. Usually, there is an automatic system where user must register via his/her mobile or credit card number, pay certain amount of money or leave a security deposit and rent a bicycle.

In comparison with car or fixed-route taxi, the bike has a set of advantages: in some cases, there is the fastest type of transport because you do not need to spend time for lights, traffic etc.; the bike needs much less space and time for the parking than car; it is environmentally-friendly, produces neither noise nor pollution; the bicycle has positive effect for health (see Figure 2) [3].

The first attempts to apply European experience in Ukraine have already been made. Among Ukrainian cities the first system was implemented in Lviv. The project has been implemented by Veliki.ua company which won a German Government grant in December 2014 from NextBike. The company made a survey among citizens and guests of Lviv about the point of bike rental service (1758 respondents in total). The most votes were given to central places as beginning and finish of routes.

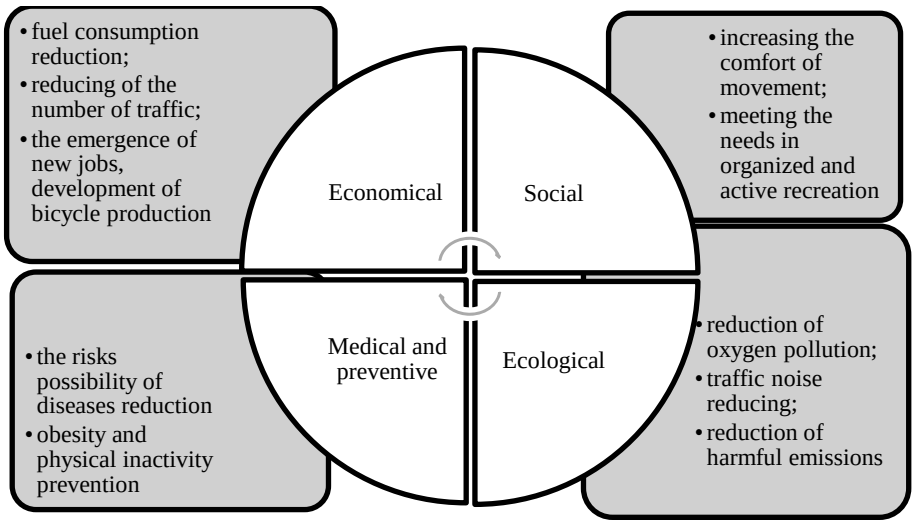

Figure 2 **– Factors that contribute to the cycling infrastructure development in the city**

The stations are equipped by security system that protects the bikes from stealing and vandalism. According to results of the survey, the company consider three types of payment: single ticket, monthly and annual fees.

Active development of bicycle infrastructure and various activities to promote cycling led to establishment of these systems. More often citizens of Lviv prefer bicycle to public transport and go to study or work by bike (see Figure 3, the respondent might choose no more than 3 answers). The drivers also change their cars on bikes little by little [12].

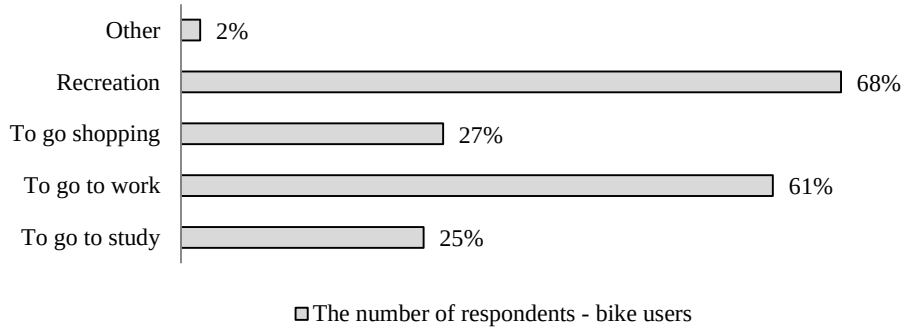

Figure 3 **– Results of the survey about placing the bicycle stations NextBike in Lviv**

A similar idea of "bike-sharing" system was supported by Ukrainian capital city Kyiv. In general, the coefficient of bike usage by women and men is the same in European Union. However, according to survey, there are much more bikers-men than women (90% and 10% in accordance) in Kyiv. The biggest segment of bike users consists of youngsters in age of 15-24 years (37%), about 20% are represented by older people in age of 25-39 and 40-54 years. The age group "55 and more" has 8% of the respondents [10]. The most acute problems that have influence on opportunity to use bicycle as everyday transport in European cities are presented in the Figure 4 (the respondents might choose no more than 3 answers).

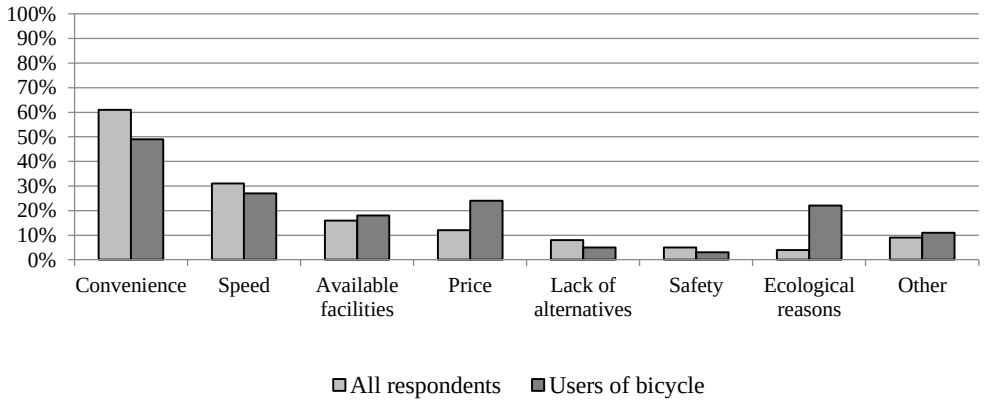

Figure 4 – **Factors of negative attitude towards the usage of bicycle transport**

The bicycle infrastructure creation, including a bike rental service, was marked as objects that need investments. A special scheme of bike trail which may connect the fares district with centre was created in Kyiv earlier. From our point of view, after some changes this idea may be either suitable for medium and small cities, such as Sumy with 268,000 citizens. It may help to decrease pressure on public transport.

Unlike Kyiv (with area about 848 km^2), area of Sumy is 96 km^2. An implementation of bike rental automatic system may be a good alternative to public transport.

Beside this, to our mind, the placing of bike rental points near the higher educational institutions is actual for the faster integration in a general city infrastructure [5]. The popularity and effectiveness of such system was proved in the small students' Polish cities. As we mentioned before, first 20 minutes of usage are free in this Polish rental system, or you may choose annual or monthly ticket. For instance, in Sumy the way from the city centre to HEI (average speed of biker is 15 km/hour) is: 16 minutes (4.1 km) to Sumy State University; 19 minutes (4.9 km) to Sumy Sate Pedagogical University; 18 minutes (4.5 km) to Sumy National Agrarian University. As we can see, it is less than 20 minutes, therefore it may be more suitable for students. Besides this, there is a set of advantages of usage a bike instead of e.g. trolleybus (Table 1).

Table 1 – **Comparison of bicycle and trolleybus operating indicator in urban infrastructure**

Criteria	Trolleybus	Bicycle
Average speed, km/hour	10-12	15-18
Capacity, passengers/hour	5000	3000
Noise, db	70	–
Comfort: - physical - psychological	 Low Low	 High High
Need in drivers, shift	2	–
Possibility of using, hour	19	24

Let's calculate the saving for students' transport costs because of usage a bike instead of public transport or fixed-route taxi in Sumy. An average student studies 23 days and may spend 138 hryvnas per month on fixed-route taxi (1380 hryvnas per year), 57.5 hryvnas per month on trolleybus (575 hryvnas per year) for two-way trip to University. If the number of movements between home and University increases, costs will also be higher. However, bike doesn't need such costs.

Basic problems of building cycling infrastructure in the urban space and their solutions are formulated in the article. Researches [6] define a feeling of discomfort for cyclists who have to use the same with cars as one of the main problems. The fact is, that infrastructure of most of modern cities designed so, that only take into account needs of car owners, not cyclists or pedestrians. In most cities there are no special biking paths. Modern experts say that it is important to plan urban development, giving priority role for cyclists and pedestrians, not cars today. Therefore, separate bicycle infrastructure which includes: bike paths and routes; markings and signs for cyclists; traffic lights for cyclists; different types of parking must be

created. The inclusion of cycling routes in city road network can include movement of cyclists by: sidewalks; separate lanes on sidewalks; specially constructed structures under and above the flow of vehicles; separate bicycle roads; on separate road lanes [1; 2; 4; 7].

Also, scientists note about construction of "green routes" (protected bicycle paths that are separated from highways by trees). According to Enrique Pelanoza, the ex-mayor of Bogota (Colombia), where this space was firstly created, these routes were not just "nice architectural whim", but successful demonstration that "citizen, who use bicycle by $30 is as important as a citizen, who uses car for 30 thousand".

"Days without cars" are organized in some cities in order to popularize cycling. To combat air pollution cars with certain numbers are banned in advance to appear on roads in certain days. For example, citizens held a so-called "World Day without cars", allowing movement of ambulances, firemen, taxis and electric cars only two months before the UN climate conference in Paris. Instead of cars, Parisians were offered to ride bicycle or hike. This how attention to the problem of air pollution, produced by cars, were drawn.

Another important element is safe parking zones [3]. It can be short-time parking (1-2 hours), metal construction in form of the letter "U", where bicycles are attached by special locks; for those who will leave the bike for a longer period (2-24 hours), students, workers, etc., who use a bicycle to cover every day long commute – it can be mechanized multi-level well-protected parking. Parking for bike permanent storage can be built separately for every individual bike, to access such room person is required to have a special permition (for example, month or year pass depending on user requirements). For example, there is multi-parking in Amsterdam, which fits around 6,000 bikes.

A set of mentioned events may be considered as a part of ecological marketing, which must be used by worried about environmental situation city halls. Thus, it will cause citizens to use bicycles. In general, the problem of city transport greening is totally corresponding to the concept of social and ethical marketing that more and more is studied by developed countries. European society prefer bicycle transport, residents of many European countries and USA even in winter prefer to use bike as a basic transport to go to university, shopping, have a rest. Considering the mass change cars to bicycles by European community we can assume implementing cycling in Ukrainian cities. The most interested in it are youth and students of big (e.g. Copenhagen, Vena, Amsterdam) and small (e.g., Opole, Chattanooga, Katowice) European cities, that prefer bike to other types of transport. The bicycle today is not only touristic and sportive way of entertainment or sub-culture.

There is a lot of already existed and new organizations (NGOs, students' self-government etc.) who promote the bicycle transport in Ukrainian cities. First of all, they must conduct marketing researches, using powerful modern communications. But it is not enough. Besides NGOs, in realization of the project of gradual teaching the young passengers how to use bikes such triad must be included: community → local governments → business structures. For instance, such managerial structure was recently created at the level of Sumy city hall.

Therefore, innovation development of passenger transport in Ukraine have to be addressed to the bicycle transport, that may become a youth transport in cities. Having quality organized bicycle infrastructure (bike trails, special signs and marking, bike rental network etc.) Ukrainian students will feel all the advantages of using a bike as everyday transport because of its environmental friendliness, economy, possible usage for training and recovery. That is why a conscious and effective informational policy is required.

Conclusions. The bike has to be classified as a potential students' transport of the future because of the huge advantages in its usage. Firstly, the bike is comparatively a chip type of transport that does not need big costs on its usage. Secondly, the bike is ecological and economical because it is fuel-free. Thirdly, the bike is chip in repairing in comparison with passenger car. Moreover, the usage of bicycle transport is a way of solving the problem with traffic, a public transport overload etc. it was shown that the bicycle transport is not as popular in Ukraine as in European cities. The bicycle movement needs well organized infrastructure, bike trails, parking places, sights as in European Union. When the local governments of Kyiv, Lviv and some other Ukrainian cities are working on the program of development the bicycle infrastructure, there is not any purposeful and centralized support from state.

Directions for the further researches should be directed to enlightenment of advantages of bicycle transport usage, foundation of its ecological, economical features and statistical proof of bicycle users' health improvements: prevention of cardiovascular and respiratory diseases, effective tool against stress, ability to improve mood and keep fit.

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Велосипедний транспорт як об'єкт екологічного маркетингу та інновацій у міських перевезеннях

У статті проаналізовано яким чином провідні європейські країни проводять політику популяризації велосипеду як пріоритетного транспортного засобу, удосконалюють велосипедну інфраструктуру, запроваджують та розширюють мережі прокату велосипеду як у великих, так і в малих (переважно університетських) містах. Запропоновано вважати велосипедний транспорт об'єктом екологічного маркетингу та інноваційної діяльності в індивідуальних перевезеннях. Класифіковано перешкоди у використанні велосипеду в Україні як виду

транспорту, зокрема це низька поінформованість, певна упередженість населення, нерозуміння переваг від використання велосипеду тощо. Обґрунтовано необхідність залучення студентської молоді до проведення відповідних досліджень та комунікаційних заходів з метою підвищення можливості впровадження велосипедного транспорту в Україні.

Ключові слова: екологічний транспорт, велосипедний транспорт, транспортна інфраструктура, молодіжний транспорт, студентський транспорт, маркетинг міського транспорту, інновації міського транспорту.

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Велосипедный транспорт как объект экологического маркетинга и инноваций в городских перевозках

В статье проанализировано, каким образом ведущие европейские страны проводят политику популяризации велосипеда как приоритетного транспортного средства, совершенствуют велосипедную инфраструктуру, внедряют и расширяют сети проката велосипедов как в больших, так и в малых (преимущественно университетских) городах. Предложено считать велосипедный транспорт объектом экологического маркетинга и инновационной деятельности в индивидуальных перевозках. Классифицированы препятствия в использовании велосипеда в Украине как вида транспорта, в частности – это низкая информированность, определённые предубеждения населения, непонимание преимуществ от использования велосипеда и т. п. Обоснована необходимость привлечения студенческой молодёжи к проведению соответствующих маркетинговых исследований и коммуникационных мероприятий с целью повышения возможностей внедрения велосипедного транспорта в Украине.

Ключевые слова: экологический транспорт, велосипедный транспорт, транспортная инфраструктура, молодёжный транспорт, студенческий транспорт, маркетинг городского пространства, инновации городского транспорта.

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