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# MEASURING SOCIO-ECONOMIC WELFARE AND SUSTAINABLE TRANSPORT – SELECTED DILEMMAS

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ABSTRACT: The aim of this paper is to present and elaborate relations between the understanding and main indicators of socio-economic welfare, including indicators of sustainable development, and the measurement methods of sustainable transport. The focus is on the role that transport basically plays for nearly all dimensions of living conditions and the quality of life. First, the definition of socio-economic welfare and different views on measuring welfare are presented. Then, the meaning of transport for improving socio-economic aspects of life, as well as the need for sustainable transport are underlined. In the last part of the article developed indicators of sustainable transport are discussed in terms of the complex and multi-faceted influence of transport activities on building welfare and sustainable development.

KEY WORDS: socio-economic welfare, well-being, indicators, transport, sustainable transport

## Introduction

Striving for socio-economic development, for better living conditions or simply saying "for a better life" seem to be an inseparable part of human activities. Socio-economic welfare is considered an end in itself for the majority of states, nations and societies. On one hand, humanity has achieved an enormous progress in improving various material and non-material aspects of life since the beginnings of its evolution. On the other hand, the pressure on having and doing more and more has multiple consequences, both positive and negative in terms of the contribution to the socio-economic welfare. Complexity and multidimensionality of the impact of human undertakings to push the development processes forward and forward on various aspects of the socio-economic welfare find their reflection in developing new and more and more advanced methods of measuring welfare. These problems relate to transport activities as well, since transport is a key factor enabling moving in space and in this way performing different production, distribution and consumption activities, which determine improvements in welfare. All the efforts to make the transportation of goods and persons easier and cheaper gave new possibilities to improve the quality of life and to satisfy people's needs in numerous fields in a better way, but at the same time led to various adverse effects of transport for both the environment and human health and life.

The aim of this paper is to present and elaborate the relations between the understanding and main indicators of socio-economic welfare, including indicators of sustainable development, and the measurement methods of sustainable transport. The focus is on the role that transport basically plays for nearly all dimensions of living conditions and the quality of life. First, the definition of socio-economic welfare and different views on measuring welfare are presented. Then, the meaning of transport for improving socio-economic aspects of life, as well as the need for sustainable transport are underlined. In the last part of the paper some thoughts and conclusion are presented regarding contradictions and shortcomings in developed indicators of welfare and sustainable transport in the context of requirements of sustainable development.

## Definition and meaning of socio-economic welfare

According to one of the simplest definitions, welfare means a "state when material and non-material needs of individuals and societies are completely satisfied" (Encyklopedia PWN). There is a difference between understanding

of social and economic aspects of welfare, resulting from the fact that welfare is an interdisciplinary concept, discussed and studied in many scientific areas – in sociology, philosophy, ethics, economics etc. Moreover, the approach to explaining welfare has changed along with development of scientific theory and decoupling economic growth and (socio-)economic development. In economics, the distinction between wealth and welfare was stressed by Alfred Marshall (1890). Economic welfare, which can be described as "the overall level of financial satisfaction and prosperity experienced by participants in an economic system" (Business Dictionary) is something different than social welfare, considered to be "the well-being of the entire society. Social welfare is not the same as standard of living but is more concerned with the quality of life that includes factors such as the quality of the environment (air, soil, water), level of crime, extent of drug abuse, availability of essential social services, as well as religious and spiritual aspects of life." (Business Dictionary). Thus, what needs to be stressed is that nowadays such aspects as income or consumption levels are not the only dimensions of socio-economic welfare. Non-material aspects are of great importance as well, because they determine well-being of individuals and societies (see e.g. Sen, 2008). Additionally, following the essence of economics as a science, people's needs are rather unlimited, while resources used to satisfy these needs are finite. This refers both to the quantity and quality of different types of capital, with focus on the environmental capacity to cope with a continuous pressure on consuming and producing more and more in the name of improving welfare of humans. For these reasons, the concept of socio-economic welfare is more and more often associated and discussed with regard to sustainable development, that assumes – saying it in very simple words – building and sustaining welfare for current and future generations (see e.g. World Commission on Environment and Development, 1987).

## Evolution of indicators of socio-economic welfare

The shift in approaches from wealth to welfare and from welfare to well-being, including the idea of sustainable development, is reflected in developing different indicators used to measure economic growth, economic development and socio-economic welfare. Gross Domestic Product (GDP) and Gross National Product (GNP), focused on measuring the value of all products and services produced in an economy within a period of time, faced significant critique due to too many significant (mostly qualitative) aspects that are not taken into consideration in calculations (e.g. the value of free time, environmental quality, equity and equality etc.), as well as too many

negative issues that are socially and economically adverse, but they create material values leading to higher GDP and GNP (e.g. manufacturing weapon, demerit goods etc.) (see e.g. R. Costanza et al., 2009). Attempts to reduce or eliminate weaknesses and failures of "traditional" and the most common indicators led to the development of new tools for measuring welfare, such as Geneva Method, Measure of Economic Welfare – MEW, Net National Welfare – NNW, Economic Aspects of Welfare – EAW, Green GDP and GNP, Index of Sustainable Economic Welfare – ISEW and Genuine Progress Indicator – GPI and others (see e.g. Cieślik, 2008; Costanza et al., 2009; Roos, 1973; Jacobs, Šlaus, 2010). Apart from the detailed construction and components of each of these indicators, the main idea was to include non-material aspects of the quality of life, as well negative, mostly environmental impacts of production and consumption activities. Although some shortcomings appear while collecting data and calculating most of indicators mentioned above, they can be considered more complex tools for measuring socio-economic welfare, especially in terms of some aspects of sustainable development. However, these shortcomings caused that other indicators have been developed, focusing more on some selected social issues related to welfare, such as Human Development Index – HDI, prepared and used in the United Nations Development Programme, as well as Human Poverty Index – HPI, Gender-Related Development Index – GDI) and Gender Empowerment Measure – GEM (see: Cieślik, 2008). Finally, there are different indicators of sustainable development developed, that play a crucial role in terms of measuring the level of welfare from social, economic, environmental, institutional spheres etc., and in terms of the possibilities to sustain development processes (see e.g. United Nations, 2007; EUROSTAT a; Mannis; Borys, 2005; Borys, 1999). Examples of such sets of indicators are inter alia Sustainable Development Indicators (SDI), developed and used by the European Union to monitor the realisation of the EU Sustainable Development Strategy (Commission Communication, 2001), Happy Planet Index (HPI) developed by the New Economics Foundation, extensive and detailed sets of general and in some cases sectoral indicators of sustainable development developed by Borys (1999, 2005) and others. GPI mentioned above is considered a tool for measurement of sustainable development as well. One can say that these indicators enable the most multiform and complex measurement of so called New Development Paradigm (Borys, 2014) and at the same time comprehensive assessment of socio-economic welfare.

## The meaning of transport for human welfare and well-being

Both material and non-material dimensions of welfare are built-up on transportation. All human activities are conducted in time and space, and nearly all of them require moving from one place to another. For this reason, effective and efficient transport systems are essential for developing socio-economic welfare. Extremely important role is played by so called positive and negative external effects of transport, which are widely discussed in literature (see e.g. Pawłowska, 2013; Ricardo-AEA, 2014; Preisner, Trela, 2013). The positive impact of efficient transport is conspicuous by the way of improved and more efficient functioning of markets, better access for consumers and business to multiple goods and services, improved and easier trade and integration at different levels, improved accessibility of public services, such as education, health care or police and fire service, increased attractiveness and competitiveness of regions, countries, cities etc. Saying it simply, the more efficient transport systems, the better socio-economic development and quality of life, as transport is a necessary (but not sufficient) condition for welfare. Moreover, the transport sector is a huge employer and investor all over the world, and it directly and significantly contributes to the GDP (e.g. in the EU its share accounts for 4.8% of GDP (European Union)). On the other hand, transport contributes to deterioration of socio-economic welfare, because it generates negative external effects. The adverse influence of transport is visible mostly in air, water and soil pollution, congestion (simultaneously being a sign of lack of efficiency caused by overuse of road transportation), accidents, noise, overuse of non-renewable resources and space etc. The most significant consequences of negative transport externalities are health problems and premature deaths, deteriorated life conditions and quality of life, as well as degradation of environment which is the foundation for living beings, including humans.

The incontrovertible importance of efficient transport systems for socio-economic life, as well as the contemporaneous deterioration of welfare resulting from adverse impacts of transport have led to the development of the concept of sustainable transport, which stems strictly from the idea of sustainable development. Numerous indicators of sustainable transport have been developed for recent decades to measure the progress towards more sustainable transport systems, that should strengthen the positive impacts while reducing negative externalities of transport. Some sets of indicators are briefly elaborated in the next section.

## Developing indicators of sustainable transport

Before presenting sets of indicators devoted strictly to sustainable transport, it is significant to stress that transport indicators are mostly included in sets of general indicators of sustainable development. For example, SDI consists of several groups of topics and in the group "Sustainable transport" there are special indicators provided to measure different aspects of transport effects on environment, society and economy (EUROSTAT b). Similarly, there are some transport indicators included in GPI (see e.g. Savelson et al., 2006), and some welfare indicators include some effects of transport activities in total effects of all activities (e.g. total emissions or simply GDP per capita). However, what was mentioned above, the intensification of negative transport externalities has led not only to increased efforts to make the transport systems more sustainable, but also to the development of indicators that would allow to monitor the effects of these efforts. Ones of the most popular and regularly measured are 40 indicators used in the *Transport and Environment Reporting Mechanism* (TERM), which are developed by the European Environment Agency and focus on many dimensions of positive and negative impacts of transportation (EEA, 2015). Other examples can be indicators developed by UNECE within the initiative called "Transport For Sustainable Development In The European Region", which are aimed at measuring selected aspects related to accessibility, affordability, safety, security and environment in three pillars of sustainable development (UNECE Transport Division, 2011), or "Regional Sustainable Transportation Principles and Indicators", which are based on sustainability principles, their goals and performance indicators delineated to each goal (Litman, 2016, p. 51). A detailed, extensive and comprehensive overview of different sets of sustainable transport indicators is provided by Litman (2016). A wide set of multiple indicators measuring both positive and negative aspects of sustainable transportation in Poland has been developed by Borys with suggestion for its further development (Borys, 2008).

Summarising, there are different sets of sustainable transport indicators, devoted more or less to numerous aspects of transport impacts. The most important and most commonly considered impacts relate to environmental effects (e.g. level of emissions) and climate change, transport behaviour (e.g. modal split), development of transport infrastructure (which is crucial in terms of accessibility), living conditions and quality of life etc.[1]

[1] For example, an overview of key areas of transport impacts with suggestions of 272 indicators is given by Ramani et al. (2009).

## Key dilemmas in existing approaches to measuring sustainable transport in terms of building socio-economic welfare

There exist some premises that allow to deem that the core dilemma results from the pressure on strengthening positive external effects of transport systems, including effects contributing to material socio-economic welfare. Thus, a question is, if it is possible and in what way it is possible to develop better and better welfare through satisfying more and more material and non-material needs, based on the goals and principles of sustainable transport, i.e. reducing transport demand, reducing motorised transport and developing non-motorised transport means and modes, replacing private goods (e.g. cars) by public and common goods (e.g. public transport, car-sharing) etc.? For example, resigning from private cars or reducing road freight transport would lead to lower demand for vehicles, what in turn would lead inter alia to lower level of production in the car industry with many adverse socio-economic effects of such situation, such as lower demand for resources and components, workforce reductions etc. Moreover, interrelations between transport sector and many other sectors dependent on the level of production for road transport activities could even cause a recession. One can imagine, what effects could have a costless teleportation, that would be available for everyone without any involvement of third parties. In a short term, it would cause a huge crisis in industries involved in production of all transport means, there would be probably no demand for transport services, what would significantly deteriorate socio-economic welfare. On the other hand, some aspects of welfare would be improved, e.g. better accessibility of different places, goods and services, less pollution, no accidents etc. Similarly, replacing cars by other, more people- and environmentally friendly means of transport would directly lead to more required levels of sustainable transport indicators (e.g. lower emissions, better modal splits etc.), but in a short term there would be many adverse impacts on socio-economic welfare (e.g. unemployment and / or lower incomes due to lower demand for car products, gasoline etc.). These aspects seem to be reasons for following such directions of sustainable transport policies that are able to accept the domination of car vehicles in transport systems. In other words, there exists for example tendency to construct more and more quiet, energy- and resource-efficient cars with lower emissions levels what allows to keep the competitive position of automotive industries for economies, high level of employment in these industries, huge amount of investments that boost economies etc. (see: White Paper: Roadmap to…). Introducing a circular economy in the automotive industry can be example of this dilemma as well (European Commission). Another example may be the slow implementation (or in some cases lack of

implementation) of the "polluter-and-user-pay" principle in order to internalise negative externalities in transport. Higher costs of road transport, which dominates in transporting goods and persons, would lead to lower demand for and supply of the majority of goods and services, what would lead to deterioration of material welfare.

Other problems with measuring the socio-economic welfare and sustainable transportation refer issues of consumption. For example, if someone hardly uses his / her car but regularly buys sophisticated products that require transport of huge amounts of resources and goods to manufacture them and in this way lead to high negative externalities, what is the real impact in terms of welfare, sustainable development and transportation? And the other way round – how a person driving a car day by day, but buying mostly local and / or second hand products contributes to the socio-economic welfare and sustainable transport? What would be the impact, if both these persons would resign from their habits? These dilemmas are complicated, since developing sustainable transport is determined by consumer behavior in many areas, not only these which are strictly related to transport. Satisfying different material and non-material needs influences the possibilities of building sustainable transport systems, and this is not always included in indicators of welfare or of sustainable development.

## Conclusion

The key problem arising in the context of measuring the socio-economic welfare and sustainable transport is that there are indicators developed to measure many aspects and quantities that are mutually exclusive, i.e. they are positive in terms of welfare and negative in terms of sustainable transport, and the other way round. There are only few examples of such aspects mentioned above. Thus, as Borys argues (2014, p. 9), we first need to know what we want to measure, and then we should develop indicators. Developing welfare is determined by transport, and in many cases unsustainable transport leads to improved welfare. On the other hand, efforts aimed at sustainable transport may result in deteriorating the socio-economic welfare. Additionally, there are strong incentives to implement tools for sustainable transport on local and regional levels, however, there are poor incentives to achieve goals of sustainable transport on the global or international levels (except of the European Union), what results mostly from the need of international trade and its impact on improving welfare.

In the complex and systems approach, achieving and measuring sustainable transportation would require a re-definition of the concept of socio-eco-

nomic development and a real shift from welfare to well-being. Transport behavior must be changed in order to make transport systems more sustainable. Similarly, consumption and production behavior in many other socio-economic areas would need to be changed, as they are strictly determined by efficiency and sustainable development of transport systems. Moreover, comprehensive sets of indicators of sustainable transport would need to include all impacts in terms of building sustainable development and the socio-economic welfare that would meet the principles of sustainable development.

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