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# Do Information and Communications Technologies influence transport demand? An exploratory study in the European Union

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## Abstract

ICT, as a General Purpose Technology, influences changes in global production, consumption and organizational models. Due to the fact that it improves competitiveness, enables process and product innovations and influences business processes along the entire value chain, promotion of ICT is one of the priorities of European Commission.

This paper aims at providing a broad empirical analysis of the use of ICT by individuals and in companies involved in passenger and freight transportation processes in the EU. There is a need to examine the potential relations between the wider distribution of ICT and changes in demand for transport services, in case of both individuals and enterprises. The aim of this study is also to examine some future directions of ICT implementation in the transportation area and its influence on the economy in general.

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## 1. Introduction

The development and uptake of ICT in the 1990s resulted in a wave of optimism and some unrealistic – from the perspective of time - expectations for revolutionizing all aspects of life and economic activity. Researchers in various disciplines pointed out the opportunities resulting from the application of ICT both in everyday life and business activity of enterprises. The Internet bubble burst in 2001 generated – to a large extent – a result contrary to the planned

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one, thus the expectations concerning the possible use of ICT and advantages they offer were mostly substantially limited. However, the decade that followed instituted the expected, more common application of ICT and improvement in many aspects of activity. In a way, one may say that the expectations, reduced after the crisis in 2001, began to find reflection in business and social reality (van Dijk, 2006).

Universal access to Internet, ever cheaper computers, mobile phones, and other mobile devices – connected with the development of e-commerce and e-services – influences changes in behaviour of both individuals and enterprises. Consumers use the possibilities provided by e-commerce increasingly often, in any time and place convenient for them. More and more enterprises offer the possibility of teleworking to their employees. Changes in consumer behaviour result in changes in demand for passenger and freight transport.

Most of the studies concerning the influence of ICT upon transport were conducted in a twofold manner. On the one hand, the studies examined how the utilization of ICT influences both passenger and freight transport, from the point of view of how the application of new technologies may change (usually enhance) the provision of transport services (in both passenger and freight transport) by companies, or how it changes (improves) travelling of individuals. On the other hand, studies which comprised a wider social and economic context have been conducted, trying to identify and present the influence of ICT application by individuals and enterprises, as regards changes in demand for transport services. The authors attempt to provide a synthesis of both types of influences of ICT in and upon transport.

This paper looks closely at the European Union, as the development of ICT and the ever increasing use of ICT in all branches of the economy has for many years been one of the main priorities of common policy of the European Union (EU). The European Union provides financial support for undertakings, within the framework of programmes it has established, it also monitors the achievement of targets set. The European Union is an interesting subject for studies, because its 28 member states demonstrate a great variety regarding the rate and level of economic development, dependence of their economies upon transport, and adoption of ICT in different sectors of the economy.

The methodology adopted in this study is based on literature review and the examination of statistical sources – mainly analyses from Eurostat, which is the statistical office of the European Union. An exploratory approach was taken, which means that the research is based on the analysis of how ICT solutions adopted by individuals and in companies influence the demand for transportation services. The results of exploratory study gives opportunities for further research.

## **2. The influence of ICT upon passenger and freight transport – study review**

Studies concerning the influence of ICT upon transport go back to 1990s, still they mostly dealt with some separated areas of the activities of transport and logistics companies. Perego, Perotti, Mangiaracina (2011), in their review of early studies concerning the use of ICT in companies from transport sector, indicated the fragmentary character of studies conducted so far, which referred to specific types of technologies and were limited to selected types of companies. To present the situation more clearly, one could indicate the typical research problems in the areas mentioned:

- the use of ICT in firms specializing in freight transport (Yoshimoto and Nemoto, 2005; Marchet et al. 2009; Crainic et al., 2009),
- the use of ICT in intermodal transport (Dotoli et al., 2010; Schilk and Seemann, 2012; Harris et al., 2015), as well as attempts to develop a model that describes the influence of ICT upon intermodal transport (Marchet et al., 2012),
- the possibility of tracking consignments and their contents (Wang and Potter, 2007; Meyer et al., 2014), as well as the utilization of RFID and GPS technologies in transport (Ferrer et al., 2010; Popovič and Habjan, 2012),
- managing of stock level and integration of supply chain (Helo and Szekely, 2005; Mongare and Nasidai, 2014),
- development and possible implementation of autonomous or self-driving vehicles, both for passenger and cargo transportation, are gaining more interest from both academic researches and business entities. (e.g. Cepolina, Farina, 2014; Rifkin, 2015; International Transport Forum - OECD, 2015; DHL Trend Research, 2014),
- the use of ICT in urban transport (Obogne and Lidasan, 2005; Dridi et al., 2005; Baptista et al., 2012; Fierek and Zak, 2012) and possible influence of ICT utilization upon environmental protection (Rolim et al., 2012, Wang et al., 2015).

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