

# DIGITAL SINGLE MARKET INNOVATION

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## Keywords

*digital market, transparency, interoperability, companies, DSM*

## Abstract

*Based on the strategy for the Digital Single Market (DSM) adopted by the European Commission, having in mind also the European Parliament and the Council directive (EU) Regulation No. 910/2014 from 23 July 2014 regarding electronic identification and trust services for electronic transactions in the internal market, the European Commission emphasizes the need for development and understanding the digital single market's impact on the economy, market environment and society as a whole. The paper tries to examine how the development of standardization, interoperability, digital and data economy will affect changes in the level of market transparency, reduction the asymmetry of information, competition, pricing and benefits of products and services, the level of trust and entrepreneurship values in the digital market on performance characteristics of the market environment. The research will be based on data from the real environment.*

## 1. Introduction

The Europe 2020 Strategy represent the plan of EU to face the major challenges of the society. The EU has identified five key areas in which it wants to meet its targets by the end of this decade. These areas are employment, education, research and innovation, social inclusion, poverty reduction and climate / energy. Creation of the digital single market in EU, was set as the first pillar of the EU strategy and it was also recognized as the one of the top priorities of the Presidency of the SR. The development factors of digital single market in EU are intertwined with a number of flagship initiatives (Digital Agenda, Innovation Union, Integrated Industrial Policy and the Agenda for new skills). Specifics of the digital market should, according to the EC, contribute to the development of innovation, economic and inclusive growth and the general growth of trust in the economic environment and its bodies. Based on the Digital single market (DSM) strategy and the European Parliament and the Council directive (EU) No. 910 / 2014 from July 23rd 2014 on electronic identification and trusted services for electronic transactions in the internal market, European Commission stresses the needs of achievement and development of the following areas:

- Trust - Building trust is according to the EC a key to economic and social development and aims to strengthen the trust by achieving greater transparency in the online environment but also acknowledges the need of understanding the role of trust in e-environment and its impact on the economic environment and market stability.
- Development of digital services and the digital economy with long-term growth potential - ensured by the development of interoperability and standards for e-business and business systems.
- Developing and understanding of online platforms - creating new forms of market and bringing new multidisciplinary problems and challenges for economic and technical sciences.

- The development of "data economy" that is based on the development of data infrastructure of digital data (open data, big data, etc.) with an estimate of their share in 2020 to be up to 40% of all data. Their use could bring huge billion savings as well as it is estimated that relevant data analysis could strengthen the GDP growth of EU countries by up to 1.9%!
- Development of new skills in the context of the development of innovative environment of the digital market, linked with the growth of data and new knowledge generated in the "data economy" environment.

In order to make these recommendations of the European Commission applicable in an effective and sustainable manner it is necessary to understand the practical difficulties and opportunities for developing DSM. They includes research areas such as: impact of these priorities on transparency, changes in market structures, attitudes and perceptions of DSM elements by market participants, changes in inter-organizational activities, trust and market stability, the asymmetry of information, prices and benefits. Without appropriate understanding of these changes as well as their impact on behavior of participants, it is not possible to properly set the practical implementation of the DSM from the legislative, economic and technological point of view and to understand how this model is beneficial. It will be also very difficult to identify constraints and opportunities to control its evolution in order to obtain the maximum socio-economic benefits (Delina, 2012).

## **2. The issues and challenges of development of the DSM**

The main tasks when developing effective innovation to meet the needs of fulfillment of the EU strategy and action plan for the development of global supply chains and cooperation of market operators concern:

- Identification of real deployable DSM innovations for the market environment - it is necessary to examine transdisciplinary questions of DSM and create a matrix of innovation for the development of digital business ecosystems on the principles of DSM,
- identify opportunities and strategies of effective deployment of elements of DSM in the market environment taking into account its specifics and the attitude of agents on the market towards the impact of these elements (standardization, interoperability, trust, data economy and the development of electronic trading platforms) with the possibility of more effective participation in global supply chains and market structures,
- change of transparency of the market environment by deploying new standards and interoperable electronic solutions and understanding its real impact on the economic environment - how to achieve effective and at the same time acceptable level of transparency for the market from a multi-dimensional perspective (transparency of prices and benefits to market vs the transparency of local supply chains within the negotiation and contracting phases),
- potential barriers and the EU "Data economy" concept, especially in the acceptance and perception of data sharing by the participants of the market, understanding its limitations, possibilities for their solution and economic impact,
- potential of socio-economic confidence in DSM - identified as a critical part of the DSM, while at present there is an absence of deeper research models of trust in the digital business ecosystems supporting DSM concepts and their practical applicability to promote effective cooperation,

- principles of creating ad-hoc or dynamic clusters, efficient / inefficient / natural monopolies and other network structures in the Digital Single Market,
- In general, despite various political statements, it is not clear what affect may introducing elements of DSM have concerning opportunistic behaviour of market participants, its economic stability and efficiency, and the very attitude and perception of market participants towards the real adoption of DSM elements and introduction of innovations in this area.

### **3. Literature review regarding pillars of DSM**

Network activities on the electronic market relate to interoperability, standardization and transparency. In this area, some scientific studies have examined the network effects and diffusion theory of innovation and impact on the group of market participants and their innovation absorption capacity. Weitzel (Weitzel et al, 2003) emphasizes that understanding the networking environment is highly important because without proper understanding of what happens, promoting networking can sometimes be dangerous. Modelling of network effects on products was already dealt by Schoder (1995), stressing that it is the diffuse (network) phenomenon that is critical for understanding the operation of socio-economic environment (Schoder 1995). The scientific literature in the field of network effects is based on neoclassical assumptions, where agents operating in an environment know the entire realistic model and the characteristics of other agents as well as their utility functions, which may lead to a unique and Pareto optimal Equilibrium, but only if the absence of network externalities and unsolvability. Market transparency also plays an important role in this model (Weitzel et al, 2003). Weitzel therefore proposed an interdisciplinary network theory also acceptable by economists and social scientists with acceptance of bounded rationality, incomplete information and social cohesion. Some specifics in this area are now starting to appear in world studies. E.g. Turnes, P. B. and Ernst, R. (2014) claim in their article that in the near future there will be a huge increase in standardized business processes that will be determined by the need for an enormous increase of interoperability between systems and reviewing of impact on the environment. Delina (2015) indicated the need to review the impact of these specifics on actual deployment, acceptance and changing of environmental parameters such as stability, transparency and monopolization. Regarding the impact of transparency, Henze, Schuett and Sluijs (2015) argue based on experimental research that transparency is an effective tool for the growth of well-being and consumer surplus. Under imperfect information producers keep prices above their marginal costs, and this allows them to "get rich" at the expense of buyers. Thanks to transparency the competition between retailers is better because they see the price and quality of competing products. Veldkamp (2006) argues that transparency is one of the most important factors for maintaining market stability. Reducing information asymmetries allows companies to reallocate resources more effectively in the case of an internal or external shock. Willmott (2003) considers transparency an important factor in building confidence. On the other hand, according to Kitchin (2003), confidence among consumers and companies is not influenced only by transparency but also by consumer expectations of how the company will manage activities that can't be made more transparent. Kang, K. and Hustvedt, G. (2013) confirmed that transparency is a strong factor that has a positive impact on confidence. According to other authors and studies (OECD 2012, Soh et al 2006; Zhu 2004 Ozcelik and Ozdemir, 2011; Gu and Hehenkamp, 2010 Delina 2012), increasing transparency may also have negative impacts, eg. unwillingness of certain companies to engage in a transparent process, problems of requiring anonymity / trade secrets, damage of market competition, the possibility of anti-competitive activities, reducing innovation capabilities, development of monopolization and others. Mares and Harstad (2003) in their work pointed out the different effect of public and private information being made available at the auctions, causing

more than just asymmetry of information. Various works in the field of game theory and experimental economics point to the fact that increasing the level of transparency can have a negative impact on the efficiency of the auction process. Among others, Gothelf (2010) came to the conclusion that disclosure of the auction participant may lead to reduced revenues from auctions for the auctioneer, and Feinberg and Tennenholtz (2005) have shown in their research that anonymity of auction participants may lead to higher expected returns. The opposite conclusion has been reached by Mikoucheva and Sonin (2004), Anufriev et al. (2011) or Gershkov (2009) as an example, demonstrating the positive impact of transparency and accessibility of information on the effectiveness of auctions, although in some cases only under specific circumstances. This diversity of views, along with works suggestive of a wide range of other variables affecting the level of trust and efficiency of auction systems (for example, Milgrom et al 1982, Lorentziadis 2015, Dass et al 2014, Milgrom and Weber 1982, Gróf et al 2012 and Gazda et al 2012) leads us to conclude that a detailed examination of the specifics offered by the DSM, and estimation of changes in the behaviour of market participants as well as indicators of stability / growth of the market and identifying strategies for deploying components of the DSM is necessary to ensure the effective transition of the market environment to a new form of productivity, fairness and credibility based market. Understanding the impact of IT and technological solutions on various changes in the transparency of processes, services and data in the digital society and understanding of the impact of these changes on the stability and evolution of the market as a whole is one of the most sensitive and most critical factors of development of the digital society. It is necessary to fully understand the behavioural aspects of the deployment of specific innovation, adoption of which can significantly alter patterns of behaviour of market participants, their preferences for the implementation of these innovations and the actual impact on individual subjects as well as the market as a whole. Even on the basis of our preliminary research, which is discussed below, it has been identified that transparency is a much more complex phenomenon on the real market than the simplified models in a purely experimental studies without connection to real technological innovation allowing changes in various levels of transparency. At the same time EK authorities when evaluating the FP6 Seamless and FP7 eBEST projects (coordinator: assoc.prof. Delina) supported deeper research into the socio-economic trust in the digital environment as a critical factor in the development of the digital single market. Deployment of innovation according to the principles of DSM can be the first in history to help the market in a major way to converge to information symmetry and perfect competition but with a number of constraints that were identified when deploying these innovations. Societal impact of DSM was identified by EC as one of the crucial priorities also for annual conference of EC - WIRE2017 within the project H2020 CSA where EC have chosen assoc.prof. Delina for coordinator. Therefore, given the high priority and support of the European Commission as well as the SK within the SK presidency in 2016, addressing these issues is highly critical and timely.

At present there is a lack of theoretical view on the changes in the economic system caused by increasing transparency in the digital environment through information and communication technologies, the development of standards, interoperability of systems and the like. Also, there is a lack of basic research (where behavioural and experimental economy is the key) exploring the impact of this problem on the stability and performance of the economic environment in the view of the complexity of the issue of transparency in the digital environment.

Research in this area is also absent because of the lack of data needed to understand this issue due to the short time some of the implemented innovative solutions have been used, the absence of a properly developed data infrastructure following the implemented technology solutions and thus the lack of experience in the effective use of these technologies for business processes and the overall development of information technologies for digital ecosystems.

The current partial findings highlight the complexity of the problem of deployment of standardization technologies, streamlining electronic business processes and improving data transparency of these processes and their connection to behavioural economy. Although information technologies allow for the possibility to introduce transparency, businesses normally refuse it (our previous interviews among providers of ERP solutions show that companies do not want to reveal their prices and market solutions, nor historical nor current, even though they demand such transparency in the market). At the same time, our internal preliminary studies on partial data of electronic reverse auctions in the commercial sector demonstrate the ineffectiveness of increased transparency on the final procurement price in certain cases.

To understanding changes in the behaviour of economic agents in a particular digital environment and the possibilities of positive influence of these changes for the benefit of the market and society as a whole and positive evolution of the digital market it is necessary to consider a comprehensive approach of combining methods of experimental and behavioural economic research on real data from the digital business environment (e.g. data from electronic solutions of procurement processes) and verification of already presented experimental studies in complex market situations.

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