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## The concept of digital shadow economy: consumer's attitude

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### Abstract

The article covers a new topic in the sphere of digital shadow economy – consumers' attitudes towards this phenomenon. Increasing transfer of transactions to electronic space determines the growth of the number of illegal digital operators and promotes consumers' involvement in digital shadow trade. Scientific literature does not contain any universal definition of digital shadow economy. Hence, the variety of terms, interpretations and features relevant to this phenomenon is rather wide, which determines the necessity to define the precise concept of digital shadow economy from the point of view of consumers as active participants in this field. This article is aimed at definition of the concept of digital shadow economy from consumers' position and identification of the measures would discourage potential consumers from participation in digital shadow economy. To increase the size of the survey sample, the method of "snowball" was engaged. The results of the research have revealed that consumers are inclined to distinguish criminal activities (drugs, prostitution, credential steals, etc.) from illegal economic activities, which also violate established legal norms and regulations. The participants of the survey perceive that the activities of digital shadow economy are performed exceptionally in electronic space without official registration of business and evading tax payment. Participation in digital shadow economy is voluntary and mutually beneficial to both transaction parties (a trader and a consumer). With reference to the results of consumers' evaluation, definition of digital shadow activities as illegal ones, development of the efficient legal framework, containing clearly established criminal and/or administrative responsibility for a consumer as a party of digital shadow transaction, public announcement and availability of the information on illegal e-traders in e-space, availability of appropriate protection software, more intensive supervision and control, establishment of e-police department and assurance of the sufficient number of supervising officers can be considered the most efficient measures of digital shadow economy prevention.

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*Keywords:* digital shadow economy, consumers, shadow economy, snowball.

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## 1. Introduction

With reference to Petrovic – Lazarevic and Sohal (2004), e-business, which refers to the transactions conducted over computer networks, has been of considerable interest to practitioners and researchers primarily because of its influence on digital market participants. Removing numerous barriers (e.g. geographical, complex transaction, complicated payment, etc.) and ensuring the variety and availability of products and services on offer, an explosive growth of online business has provided a wealth of opportunities for consumers to become participants of digital shadow economy, i.e. obtain items and services from illegally operating online entrepreneurs (Dobson et al. 2015). Numerous social drivers such as the contrast between personal and corporate or low level of public self-consciousness determine social acceptability of online purchases without making sure whether a supplier operates with complete legality or even realising the offensive nature of the activities.

Thus far, the studies on the topic of digital shadow consumption have basically covered the analysis of the particular forms (e-fraud – Gregg, Scott, 2006; Blackledge, Coyle, 2010; Akintoye, Araoye, 2011; Vlachos et al. 2011; Amasiatu and Shah, 2014 and others; digital piracy – Hill, 2007; Higgins, 2007; Williams et al., 2010; Belleflamme, Peitz, 2010; Yoon, 2011; Camarero et al. 2014; Vida et al. 2012; Taylor, 2012; Yu et al., 2015 and others or social determinants (contrast between personal and corporate - Calluzzo, Cante, 2004; Shang et al., 2008; Williams et al., 2010; low level of public self-consciousness - Amasiatu, Shah, 2014; social bonding - Higgins et al. 2008; Yu et al., 2015; relativism - Arli et al., 2015) of this phenomenon. However, the concept of digital shadow economy from consumers' point of view has hardly been researched. The research of consumers' attitudes towards digital shadow economy is scientifically significant due to several reasons. Firstly, formulation of the concept of shadow economy would enable to define the gap between official and unofficial economies, perceiving which consumers would make a conscious decision on participation in or retraction from digital shadow activities. Secondly, definition of the concept of digital shadow economy from consumers' position, would contribute to the development of the measures aimed at management and control of this phenomenon. The general aim of this research is to define the concept of digital shadow economy from consumers' position and identify which measures would discourage potential consumers from participation in digital shadow economy. For the fulfilment of the defined aim, the following objectives have been raised: 1) to analyse the terms and interpretations of digital shadow activities available in the scientific literature; 2) to select and present the methodology of the research; 3) to introduce the results of the empirical research on the concept of digital shadow economy and the measures of digital shadow economy prevention from consumers' point of view. The methods of the research include scientific literature analysis and consumer survey, carried out engaging the method of "snowball" for data collection

## 2. Digital shadow activity related terms and interpretations

Diversity, volatility and fast advance of technologies have determined a variety of the terms, concepts and interpretations referring to different types of illegal digital activities, the literature on which has not still established a common terminology of digital shadow economy. The analysis of the scientific literature has enabled to systematise digital shadow activity related terms by distinguishing three basic term groups: the terms reflecting the nature of digital shadow activities; the terms reflecting the role of a supplier as the main agent; and the terms reflecting the role of a consumer as the main agent. The terms and concepts attributable to each of the groups mentioned above as well as their interpretations, proposed by different authors, have been introduced in Table 1.

Table 1. Digital shadow activity related terms

Terms	Interpretation	Author(s), year
Terms reflecting the nature of activities		
	Profit-driven offences committed exploiting networked technologies	Moore et al. (2009); Herley, Florencio (2010); Yip et al. (2012)
Digital illegal economy	Income generated by economic activities online, performed violating the defined legal regulations on commerce	Ahmad (2008); Arango, Baldwin-Edwards (2014)
Digital unreported economy	Unregistered economic activities online, performed evading tax contributions	Feige (2007); Feige (2012); Gaertner, Wenig (2012)
Digital unrecorded	Economic activities online, performed circumventing the	Karanfil (2008); Feige, Urban (2008)

economy	defined regulations on business reporting	
Terms reflecting the role of a supplier as the main agent		
Digital black marketing	Online trading of illegal physical products or fraudulent data	Zorz (2015)
Cybercrime	Internet-based crimes conducted remotely to illegally take wealth or resources from private and juridical entities as well as the public sector	Vlachos et al. (2011); Mello (2013); Smith (2015)
Terms reflecting the role of a consumer as the main agent		
E-fraud	Consumer's dishonest acting online, performed violating the contract terms with a view to earning profit from dishonesty	Gregg, Scott (2006); Blackledge, Coyle (2010); Akintoye, Araoye (2011); Ho, Weinberg (2011); Vlachos et al. (2011); Taylor (2012); Hjort, Lantz (2012); Amasiatu, Shah (2014)
Digital piracy (e-piracy)	A type of product piracy, emerging as producing, acquiring and/or consuming illegal copies of any authentic product	Hill (2006); Higgins (2007); Belleflamme, Peitz (2010); Yoon (2011); Ho, Weinberg (2011); Camarero et al.(2014); Arli et al. (2015)
Dysfunctional consumer behaviour online	Consumers' online actions, which violate the generally accepted norms of conduct	Harris, Reynolds (2003); Reynolds, Haris (2009); Harris, Daunt (2013); Amasiatu, Shah (2014)

In the group of the terms reflecting the nature of digital shadow activities, the term of digital underground economy refers to hidden profit-driven online trading (Moore et al., 2009; Herley, Florencio, 2010; Yip et al., 2012) or, in other words, unregistered profit-driven commerce online. It slightly differs from the term “illegal digital economy”, which emphasizes violation of the defined legal regulations on commerce rather than pursuit for profit (Ahmad, 2008; Arango, Baldwin-Edwards, 2014). The term “unreported digital economy” is focused on evasion of tax contributions (Feige, 2007, 2012; Gaertner, Wenig, 2012) whereas the concept of “digital unrecorded economy” highlights circumvention of the defined regulations on reporting any business activities (including operations online) (Karanfil (2008); Feige, Urban (2008)). In all the cases mentioned above, consumers do not act as major participants of digital shadow economies. At this point, the primary initiative of an online entrepreneur (supplier, service provider) is observable, which determines the parallel between the terms that reflect the nature of digital shadow activities and the ones that reflect the role of a supplier as the main agent. In the latter group of the terms, the concepts of digital black marketing and cybercrime might be distinguished. Both the term “digital black marketing”, referring to online trading of illegal physical products or fraudulent data, and the term “cybercrime”, standing for offences, committed exploiting networked technology (Yip et al. 2012) and causing threat to physical and juridical entities (Vlachos et al. 2011), in principle, mean fraudulent activities performed engaging IT for illegal business conduction. Considering the fact that criminal offences cannot be treated as generators of economy (including businesses online), the authors of this article stick to the opinion that they should be excluded from the concept of digital shadow economy.

In the group of the terms reflecting the role of a consumer as the main agent, the terms of e-fraud, digital piracy (e-piracy) and dysfunctional consumer behaviour online can be distinguished. The term “e-fraud” refers to the activity of obtaining money illegally using the Internet (McMillan Dictionary, 2015) or consumer's dishonest acting online, performed violating the contract terms with a view to earning profit from dishonesty (Ho, Weinberg, 2011; Taylor, 2012; Hjort, Lantz, 2012; Amasiatu, Shah, 2014; Arli et al., 2015). With reference to Vlachos et al. (2011), most of e-fraud cases involve consumers, seeking to purchase particular items (e.g. IT and communication technologies, garments, music and entertainment devices, etc.) at discount prices. The key aim of e-piracy is obtaining consumer benefits at the expense of the rightful owners of the authentic products/brands, who are deprived of potential revenues or profits. Finally, the term “dysfunctional consumer behaviour online” represents consumers' online actions, which violate the generally accepted norms of conduct (Harris, Reynolds, 2003; Reynolds, Haris, 2009; Harris, Daunt, 2013), for instance, purchasing of a product online and using it with the intention to return after use for reimbursement, making a fraudulent or illegitimate claim for financial gain, etc. (Amasiatu, Shah, 2014). In all cases, contrary to traditional shadow economy, the areas of digital shadow economy emergence exceed particular geographical locations and may cover a variety of the Internet websites and platforms such as online shops (Levi, Williams, 2013; Amasiatu, Shah, 2014), online social networks (Hafezieh, 2011; Yip et al., 2012; Levi, Williams, 2013), e-auction (Vlachos et al., 2011; Dion 2011), etc.

Summarising, it can be stated that digital shadow economy denotes illegal, unreported or unrecorded activities

online, driven by profit, tax evasion or circumvention of legal regulations on commerce and/or business reporting. It may also refer to criminal activities in the Internet, although in latter case it cannot be treated as a generator of economy, hence inclusion of cybercriminal activities into the concept of digital shadow economy would not be well-grounded. Digital shadow economy involves the same main agents (a supplier/service provider and a consumer) as traditional shadow economy, although its locales cover a variety of the Internet websites and platforms.

In order to establish the main aim of the research, in the empirical part of the research, the authors will verify whether consumers distinguish between legal and illegal digital activities, proposing for consumers' evaluation several possible concepts of digital shadow economy, defined with reference to the results of the scientific literature analysis and previous interviews with the digital shadow economy experts.

### 3. The methodology of the empirical research

Exceptional features of digital shadow economy, such as e-communication among digital market participants, e-transactions, digital money flows, etc., determine the difficulties in adjustment of taxation principles, applied for traditional economic activities. In fact, online trade may include sales of any kinds of products and services, i.e. material and non-material. Consideration of the single criterion of materiality is unreasonable, minding the variety of digital products and services on offer. Facing the soaring scopes of hardly defined digital shadow economies, countries are looking for the ways to fight with this form of illegal business. Consumers represent an important party of digital shadow economy, acting as demand generators. In many cases, they act without realising the illegal nature of online business and the magnitude of possible outcomes. Thus, definition of the concept of digital shadow economy from consumers' point of view would contribute to better perception of the possible consequences of their online activities, and at the same time would enable to develop the measures of digital shadow economy prevention. In order to define *the concept of digital shadow economy from consumers' position* and identify which measures would discourage potential consumers from participation in digital shadow economy, the empirical research, based on the method of questionnaire survey, was performed. The questionnaire for consumers' survey was composed of three basic parts: information on respondents' demographic characteristics, the concept of digital shadow economy (evaluation of the proposed concepts in Likert scale, where rank 1 stands for the lowest (I completely disagree), and rank 5 – for the highest (I completely agree) possible evaluation), and establishment of the most the most efficient possible measures of digital shadow economy prevention.

The sample of the survey involved 260 respondents. The survey was carried out during the period of August – November, 2015, engaging the tools of e-survey development and following the principles of “snowball” data collection method, which is recommended for surveying hidden population groups (Duncan et al., 2003; Verzhinina, Rodionova, 2011). Comparative analysis of traditional data sampling methods (Duncan et al., 2003; Verzhinina et al. 2009; Verzhinina, Rodionova, 2011) revealed that direct survey methods, including personal interviews, online and phone interviews, and (e-)mailing of questionnaires do not enable to ensure appropriate formation of the target sample since only the respondents, who are accessible to a researcher during the period of the research, are surveyed optimising the research costs. Nevertheless, these respondents not necessarily represent the ones disposing the most qualitative data on the researched phenomenon. “Snowball”, or chain-referral, data sampling method, first applied by Cohen (1989), was derived with a purpose to deal with the problems of sample access and to increase the sample size available to a researcher. The core of the method is asking known subjects (respondents) to nominate new subjects, who, in turn, nominate the other potential participants of the survey (Duncan et al., 2003; Verzhinina, Rodionova, 2011). This method is recommended for surveying hidden population groups due to high quality of the obtained data.

Estimating the size of the sample, it was presumed that overall population in Lithuania makes approximately 3 million people, and the number of the Internet users makes 3 million\*0,66~2 million people. In order to ensure 5 per cent error rate (estimated engaging Internet survey system calculator <http://www.surveysystem.com/sscalc.htm>), approximately 400 (384) respondents have to be surveyed. Considering the real number of 260 of the respondents, who were available for the survey, the error rate increased by 6.08 per cent.

### 4. The results of the empirical research

Increasing transfer of transactions to electronic space determines the growth of the number of illegal digital operators. Scientific literature does not contain any universal definition of digital shadow economy. Hence, the

variety of terms, interpretations and features relevant to this phenomenon is rather wide. The aim of this empirical research is to establish consumers' attitudes towards the proposed concepts of digital shadow economy, and identify the measures that would discourage potential consumers from participation in digital shadow activities.

Analysing demographic characteristics of respondents, it was established that the majority of consumers in e-trade is composed of young people, aged from 16 to 29 (77 per cent of the survey participants), students or jobless (60 per cent of the respondents), occupied as experts (13 per cent of the respondents), IT specialists (7 per cent of the respondents) or employees (6 per cent of the respondents). The amplitude of the respondents' income earned turned out to be relatively wide – from 0 to more than 1001 EUR per month.

*Cronbach alpha* coefficient, calculated for the evaluations of the proposed concepts of digital shadow economy, was equal to 0.603, which shows that the questions included in the survey reflect the researched dimension with appropriate accuracy. Special attention should be drawn to interpretation of *Cronbach alpha* coefficient in the scientific literature. Some scientists (Nunnally, Bernstein (1994)) indicate that *Cronbach alpha* coefficient must not be lower than 0.7 whereas others (Malhotra, Birks (2003)), note that 0.6 stands for the lowest critical value of questionnaire reliability. Hence, consideration of this value may lean upon the complexity and qualitative aspects of the particular research. The authors of this research select 0.6 to represent the lowest critical value of *Cronbach alpha* coefficient determined for this research.

*Kendall's coefficient of concordance* was estimated to be equal to 0.56, and value p equal to 0.000, which proposes that compatibility of the respondents' evaluations is medium strong and statistically significant (see Table 2).

Table 2. Mean ranks of the proposed concepts of digital shadow economy

No.	The proposed concepts of digital shadow economy	Mean rank
1.	Digital shadow economy is a part of shadow economy, when illegal profit-driven online trade or service provision is performed. The activities of digital shadow economy have the trend to be of repeated or non-repeated nature with or without changing IP addresses/computer networks.	3.44
2.	Digital shadow economy refers to global networks emerging in closed Internet forums and promoting chains of e-crimes, including bank attacks, payment card crimes, identity steals and other Internet intrusions.	3.18
3.	(Un)interrupted, financial gain driven provision of particular commodities or services in the remote space, performed without activity registration and causing damage to an officially registered subject, who provides similar commodities or services.	3.72
4.	Digital shadow economy is an illegal operation in the Internet space, which generates illegal money flows for commodity/service providers or purchasers, and deprives legal traders/service providers from the revenue that could be officially accounted, calculated and declared.	3.75
5.	Digital shadow economy refers to the trade in e-space, performed without paying any taxes to the state budget, excluding purely criminal activities such as drug trafficking, prostitution, etc.	3.52

The concepts of digital shadow economy, proposed for consumers' evaluation, with mean ranks equal to or higher than 3.5, are considered as acceptable and reflecting the nature of digital shadow economy. The proposed concepts with mean ranks equal to or lower 3.49 are treated as not reflecting the nature of digital shadow economy.

The data, presented in Table 2, shows that the highest mean rank (3.75) was estimated for the concept of digital shadow economy, proposing that *digital shadow economy is an illegal operation in the Internet space, which generates illegal money flows for commodity/service providers or purchasers, and deprives legal traders/service providers from the revenue that could be officially accounted, calculated and declared*. Such interpretation of the phenomenon of digital shadow economy highlights its negative effects on the state budget. Slightly lower mean rank (3.72) was estimated for the concept of digital shadow economy, proposing that *digital shadow economy refers to (un)interrupted, financial gain driven provision of particular commodities or services in the remote space, performed without activity registration and causing damage to an officially registered subject, who provides similar commodities or services*. The concept defining that *digital shadow economy refers to the trade in e-space, performed without paying any taxes to the state budget, excluding purely criminal activities such as drug trafficking, prostitution, etc.* was also acknowledged acceptable for consumers, with estimated mean rank equal to 3.52.

The other concepts of digital shadow economy, proposed for consumers' evaluation, can be treated as unacceptable with reference to the estimated mean ranks lower than 3.49. The results of the survey lead to the following conclusions: **consumers are inclined to distinguish criminal activities (drugs, prostitution, credential steals, etc.) from illegal economic activities, which also violate established legal norms and regulations. The participants of the survey perceive that the activities of digital shadow economy are performed exceptionally in electronic space without official registration of business and evading tax payment. Participation in digital**

**shadow economy is, undoubtedly, voluntary and mutually beneficial to both transaction parties (a trader and a consumer).**

In order to establish, which measures would enable an efficient prevention of the analysed phenomenon, the respondents were asked to evaluate the proposed measures of digital shadow economy prevention (see Table 3).

Table 3. Evaluation of the measures of digital shadow economy prevention (compiled by the authors with reference to the results of the empirical research)

No.	Measure
1.	Well-developed legal framework, criminal and administrative responsibility, increased fines /more severe sanctions for both parties of an illegal digital transaction
2.	Availability of appropriate protection software, more intensive supervision and control, establishment of e-police department, sufficient number of supervising officers
3.	Publicly announced and easily available information on illegal e-traders in e-space; public announcement on disclosure of illegal digital traders
4.	Improved system of public education
5.	Favourable / lower prices in legal markets
6.	Poor quality of a product/service
7.	Definition of digital shadow activities as illegal ones (currently, an official definition is not available)
8.	Negative responses of other consumers in the Internet

The data, presented in Table 3, reveals, with reference to consumers' evaluation, the following measures of digital shadow economy prevention can be considered the most efficient: **1) definition of digital shadow activities as illegal ones (since lack of a precise definition determines emergence of misinterpretations); 2) development of the efficient legal framework, which currently does not contain any established criminal and/or administrative responsibility for a consumer as a party of digital shadow transaction; 3) publicly announced and easily available information on illegal e-traders in e-space; public announcement on disclosure of illegal digital traders; 4) availability of appropriate protection software, more intensive supervision and control, establishment of e-police department, assurance of the sufficient number of supervising officers.** The other measures are linked to higher level of public consciousness, i.e. wider spread of the information in e-space on illegal traders and poor quality of products/services on offer.

The results of the empirical research propose that, first of all, consumers of the products and services, traded in e-space, acknowledge the lack of information on the phenomenon of digital shadow economy. Increased fines /more severe sanctions for both parties of an illegal digital transaction, imposed on the basis of the established criminal and administrative responsibility, would discourage consumers from participation in digital shadow economy. Imposition of the sanctions of this kind would, definitely, require significant changes in the legal framework of the country.

## 5. Conclusions

1. Summarising the results of the theoretical insights in the phenomenon of digital shadow economy, it can be stated that digital shadow economy denotes illegal, unreported or unrecorded activities online, driven by profit, tax evasion or circumvention of legal regulations on commerce and/or business reporting. It may also refer to criminal activities in the Internet, although in latter case it cannot be treated as a generator of economy, hence inclusion of cybercriminal activities into the concept of digital shadow economy would not be well-grounded.

2. The results of the empirical research, carried out following the principles of "snowball" data sampling method, propose that consumers are inclined to distinguish criminal activities (drugs, prostitution, credential steals, etc.) from illegal economic activities, which also violate established legal norms and regulations. The participants of the survey perceive that the activities of digital shadow economy are performed exceptionally in electronic space without official registration of business and evading tax payment.

3. With reference to the results of consumers' evaluation, definition of digital shadow activities as illegal ones, development of the efficient legal framework, containing clearly established criminal and/or administrative responsibility for a consumer as a party of digital shadow transaction, public announcement and availability of the information on illegal e-traders in e-space, availability of appropriate protection software, more intensive supervision and control, establishment of e-police department and assurance of the sufficient number of supervising officers can be considered the most efficient measures of digital shadow economy prevention.

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