The problems of innovative merchandise trade in the context of digital environment

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Abstract. Digitalization of economy contributes to activation of innovations. Consumers often evaluate a novelty product in the context of their previous experience of consumption of substitute goods. In case of a radical change of consumption model there appear difficulties with diffusion of innovation on the market. Digital environment provides conditions for designing consumer experience which precedes accepting the innovation. The reviewed case of diffusion of electromobiles as an innovative product has revealed the problems of communication in support of the innovation. The amount of informational support is insufficient and it does not take into account peculiarities of consumer experience. Two aspects of analysis – medium degree of involvement of consumers in the process of changing the model of behavior as well as rational perception of the value of innovation – allow pointing out two key problems of forming consumer experience regarding electromobiles: giving consumers exact criteria which allow comparing advantages of electromobiles with motor vehicles with combustion engine and the impossibility of testing the novelty.

1. Introduction

Digital economy significantly transforms consumer experience of shopping. The data of GlobalWebIndex for 2018 shows that 9 out of 10 Internet-users on B2C market visit an online shop at least once a month, 74% of them become buyers. 64% of purchases are made using mobile devices [1]. Worldwide trends in the field of distributing digital technologies are also developing in Russia. Especially noticeable are changes on consumer market.

The volume of Internet-trade market in 2017, according to AKIT data, has reached 1.04 trillion rubles. Based on the results of 2018, AKIT is expecting growth of Internet-trade market in Russia approximately by 20% [2]. According to the estimates of Morgan Stanley experts, the volume of Russian market will amount to 3.491 trillion rubles by 2023 [3]. Such noticeable growth is expected on the basis of wide penetration of the Internet and mobile devices. According to WCIOM data by September 2018, 81% of Russians at the ages from 18 and older use the Internet with certain periodicity [4].

For comparison, in 2017 world wide market of eCommerce amounted to 1.5 trillion dollars, approximately one third of the market is related to the Chinese sector – 497 bln dollars, the annual rate
of growth of 14% is expected in 2018. The volume of online trade in the USA amounted to 421 bln dollars in 2017, in Europe – 330 bln dollars; the annual rate of growth of 8–9% is expected in 2018 [5].

Digital technologies contribute to transferring many business-processes into digital environment. There are discussions on the priority of online trade over offline trade. However, most experts favor the cooperation and mutual complement of online and offline commerce. The main reason of that is providing the best consumer experience of shopping. Creating digital ecosystems is focused on integration of various services providing consumers with more simplicity, rapidity and convenience of choice, remuneration and delivery of goods.

Digital technologies of trade intensify the processes of introduction of new goods into the market. However, consumers' habituation to simplicity and convenience of online shopping contradicts with the necessity of making additional efforts for comparing, building preferences and choosing new goods.

Digital environment provides a lot of opportunities for seeking information. However, consumers do not always want to thoroughly study the advantages of a novelty product. In the absence of their own experience, the consumer prefers easy-to-read content: video, feedback from other users. Peculiarities of perception, having been formed under the influence of digital technologies, actualize research in the field of merchandising novelty products. Consumers need information on the novelty products in proportion to their consumer experience.

Radical innovation leads to significant change in the process of consuming goods and services that is consumer experience is being transformed. There appears disparity between current and future consumer experience and that obstructs the process of accepting innovations by consumers. In the present work the authors investigate peculiarities of the process of accepting innovative products by consumers and the role of consumer experience in this process, as exemplified by electromobiles.

2. Research methodology
The object of the present research is to define the necessity and main elements of developing consumer experience for promoting diffusion of novelty products in the context of digital economy.

Research methodology is based on system analysis and synthesis of separate concepts and theories of diffusion of innovations, behavior of consumers while choosing goods and services, applying the method of cases regarding subjects which promote electric vehicles on the Russian market, marketing investigation of consumer behavior carried out by the authors and other researchers.

The data obtained from group discussions of barriers for distribution of electromobiles is used in the research.

The investigation of specificity of distribution of innovative products was based on the works of E. Rogers [6, 7]. The process of diffusion begins from distributing information for potential consumers and starting the process of forming a decision by every independent consumer on accepting the innovation [6]. Forming a decision includes five stages: finding out, forming an opinion, basically making a decision, acquisition (practical experience), confirming the opinion. Among the factors which determine the process of accepting an innovation are: initial conditions, consumers' characteristics, characteristic features of an innovation being perceived, duration of adopting a decision. Diffusion of an innovation as a process includes the following elements: innovation itself, communications in support of the innovation, time and the social system [7].

Works in the field of trade have been investigated regarding the processes of network cooperation and managing consumer experience [8–11].

Exploring peculiarities of Russian consumers' behavior on the Internet was based on the analysis of the possibility of targeting Internet-buyers depending on their interests and other qualities [12] and also on the experience of applying digital technologies for impacting consumer behavior [13]. The results characterize the specificity of communication processes from the point of view of formal and informal channels of distributing information in the Russian Internet sector.
S. G. Bozhuk and N. A. Pletneva considered the attitude of Russian consumers toward ecological and social innovations of various organizations [14–16]. Results characterize the social system where acceptance of an innovative product related to ecological problem is being formed. Public opinion, in general, supports “useful” innovations; however, loyalty toward certain producers of electric vehicles is not being formed [14]. In this work [15] the specificity of electric vehicles as an innovative product and also main factors which form the opinion of consumers about this novelty product are being highlighted. An electric car is being considered as a dynamically uninterrupted innovation. However, the medium of using goods and traditions of social surrounding promote forming preferences towards substitute goods (automobiles with internal combustion engines) [16].

Influence of certain social or ecological innovations on preferences of consumers was also studied in the works [17–20]. In the work [17] stages of adopting a decision about buying an electric vehicle by consumers are being considered. In the work [18] results were obtained which characterize sensitivity of consumers to negative information. The intention to purchase an innovative product may fail to be realized in the case of negative communications and lack of approval from social neighborhood. In the work [19] perception of an electromobile as an innovative product is studied. The results characterize consumers' concept of an electromobile as an expensive and not very reliable “toy” not adapted for use in Russian environment.

3. Results obtained

Summarizing the results obtained in previous studies and the current information we can highlight the main factors which are significant for the present research:

- An electromobile as an innovative product is not related to breakthrough (radical) innovations. Its consumption doesn't require consumers to significantly change their patterns. That is the character of the novelty does not create a barrier for diffusion of the innovation.
- Digital environment provides fast distribution of information and free exchange of opinions. That is the medium of communication does not create barriers for diffusion of the innovation. However, there are very few communications connected with the use of electromobiles. Formal communications are performed on several Russian trade Internet sites. Until quite recently none of foreign producers sold electric vehicles in Russia through its official dealers. Only in 2018 a new position of a product range appeared on the official Renault site – “electromobiles” – in which two models are represented. Information about the electric version of PJSC “Avtovaz” never appeared on the official site of LADA. There are also not many informal communications. At that, there are no reviews which steadfastly refuse the innovation.
- The social system in which acceptance of an innovative product is formed neither supports not refuses electromobiles. The society lacks inclusive power represented by the government.
- The process of adopting the innovation requires significant amount of time. An automobile is not related to everyday goods. Therefore diffusion of the innovation cannot be fast. Consumers are inclined to change automobiles every 5-7 years.

It can be said that starting the diffusion of innovations related to electromobiles is encumbered by low activity of communications, lack of a remarkable leader who is able to consolidate public opinion regarding electromobiles. At the same time certain shifts in the direction of developing infrastructure with an aim of eliminating real barriers for diffusion. The number of charging stations increases (at the moment there are 29 charging stations in Saint Petersburg and around, a year ago there were only three of them). A mobile application has been developed which provides informing owners of electromobiles about the place where the closest stations are situated. In large metropolitan cities a series of decisions on tax privileges for electromobile-owners has been adopted. However, communications on this topic are obviously not enough.

A slow rate of growth of the number of charging stations can be explained by an insignificant quantity of electromobile owners. In comparison with European countries and China the number of electric car owners in Russia is very small. Analytics of “AVTOSTAT” agency notice that as of January 1, 2018, there were only 1.8 thousand electromobiles in our country. 415 electric vehicles are
registered in Primorski Krai, 404 – in Moscow and Moscow region, 163 – in Khabarovsk Krai, 125 – in Krasnodar Krai. Less than 100 electric cars accrue to other territorial entities of the RF [20]. The reasons of such state of electromobiles sales are determined by such key factors of consumers' behavior which produce barriers for diffusion.

– The perceived characteristics of electric cars – consumers consider electromobiles to be expensive means of transport, both at the moment of purchase and in the process of maintenance. A small quantity of charging points is also a barrier for purchasing. WCIOM studies [21] demonstrate that consumers consider two most important criteria when buying an automobile to be price availability (41% respondents) and economical fuel consumption (29%). The prevailing view in the society is that auto enthusiasts refuse frequent trips in personal cars principally because of high petrol prices (48%). Sensitivity of Russians to additional expenses leads to distorted perception of relative advantages of electric cars. Perception of an electromobile price (it is 2–2.5 times higher than that of a petrol engine automobile of similar characteristics) is transferred to the cost of everyday operation. While the cost of daily operation of electromobiles is 6–8 times lower than that of cars with internal combustion engines.

– Characteristic features of consumers – first of all low paying capacity is mentioned. For example, the average wage in Saint Petersburg in January–March, 2018, was 58 thousand rubles. But in comparison with the analogous period of the last year it was 15.1% higher [22]. According to WCIOM data the proportion of Russian people who own at least one automobile has increased from 48% in 2015 up to 67% in 2018. Every second person (50%) has one automobile, 17% of respondents have more than one car [21]. That is low paying capacity is not a barrier for purchasing and automobile with an internal combustion engine.

The problems of diffusion of such an innovative product as an electric car seem to be in underestimation of consumer experience factors. The experience which consumers have is determined by the practice of using cars with ICE. That is, consumers try to transfer the experience of consuming a product known to them to an innovative item of goods. This process is understandable from the point of view of consumers but it creates an additional barrier for diffusion of the innovation.

An objective criterion of perceiving the product novelty is the character of changing models of behavior of consumers (patterns). In case of the innovation characterized by a radical change of patterns, difficulties appear because of lack of consumers' experience and beliefs about the value in comparison with substitute goods. Continuous innovations do not radically change established behavioral patterns. In this case, on the basis of their experience and additional information, consumers are able to understand and evaluate received profits from consuming a new product and that speeds up the process of adopting the innovation. That is, analysis of the experience is performed in two dimensions – repeatability of habitual processes (as much as it is required to involve consumers into changing behavioral patterns) and transferring beliefs about the value of the innovation from well-known substitute goods. A matrix consisting of six combinations is composed for different variants of perceiving the value and necessary degree of involvement of consumers in the process of changing their consumption model (figure 1). Each combination includes a certain order of applying marketing stimuli in order to form positive consumer experience which facilitates adopting the innovation.

The experience of an individual consumer regarding reproduction of processes of consuming a personal automobile is constituted of components which characterize the choice, purchase (conclusion of a deal), operation (driving, fuelling, storing) and disposal. In the case of electric cars it is evident that the process of choosing is difficult for a consumer: too little information for making a reasonable choice in comparison with substitute goods. Transferring beliefs about the value of the innovation from well-known products at the choice step induces a consumer to use habitual criteria for comparison. A consumer does not notice the value of an electromobile as a more energy-efficient and ecologically-clean means of transport. Potential value of the low cost of daily maintenance of an electromobile may not overcome the price barrier because other functional advantages are not evident. The shopping experience can not be applied as well as most models are not available on the Russian market under usual conditions. Official dealers in Russia sell certain models by advanced order. A consumer can't
use a test-drive in order to estimate peculiarities and comfort of driving. It increases the consumer's risk and reduces his perception of the innovation value. Consumers have no experience of using electromobiles. A consumer estimates the process of exploitation from the point of view of using an automobile with an ICE. Therefore, first of all, he notices the inconvenience of charging and the short distance run to the next charging station. Profits connected with reducing expenses on charging, parking, transport tax, etc., are not evident for the consumer. The experience of using substitute goods presupposes such expenses; very few of consumers have full information on all potential privileges and profits for electromobile owners.

The nature of the perception of the value of innovation

| rational | emotional |
|----------|-----------|
| high | 1 Formation of criteria for evaluating innovation | 1 Emotional coloring of the upcoming experience |
| | 2 Emotional coloring of the upcoming experience | 2 Formation of criteria for evaluating innovation |
| | 3 Stimulation to try out the novelty | 3 Stimulation to try out the novelty |
| middle | 1 Formation of criteria for evaluating innovation | 1 Emotional coloring of the upcoming experience |
| | 2 Stimulation to try out the novelty | 2 Stimulation to try out the novelty |
| | 3 Emotional coloring of the upcoming experience | 3 Formation of criteria for evaluating innovation |
| required degree of consumer involvement in the process of behavior change | 1 Stimulation to try out the novelty | 1 Emotional coloring of the upcoming experience |
| | 2 Formation of criteria for evaluating innovation | 2 Emotional coloring of the upcoming experience |
| | 3 Emotional coloring of the upcoming experience | 3 Formation of criteria for evaluating innovation |
| low | 1 Stimulation to try out the novelty | 1 Emotional coloring of the upcoming experience |
| | 2 Emotional coloring of the upcoming experience | 2 Emotional coloring of the upcoming experience |
| | 3 Formation of criteria for evaluating innovation | 3 Formation of criteria for evaluating innovation |

Figure 1. A matrix of analysis of consumer experience for forming stimuli for diffusion of the novelty.

Evaluation of the received value depends on the ability of a consumer to independently estimate profits and potential expenses on the basis of any objective characteristics or any emotional stimuli. In the case of electromobiles the profit of daily exploitation can be realistically estimated after a long period of usage. That is why high starting expenses when buying a car become emotionally more important for a consumer than the postponed profit of everyday economy on maintenance expenses. The profit for environment is considered by consumers with distrust and doesn't arouse any emotional reaction.

4. Conclusions

Diffusion of electromobiles hasn't gained traction as the key aspect of starting the innovation on the market was broken – distribution of information for potential consumers. Without any doubt, many factors have created not very favorable conditions for development of the innovation; however, substitute goods are being sold in the same conditions. Refocusing consumers on the novelty requires forming new consumer experience. Two aspects of analysis – medium degree of involvement of consumers in the process of changing the model of behavior as well as rational perception of the value of innovation – allow pointing out two key problems of forming consumer experience regarding electromobiles: giving consumers exact criteria which allow comparing advantages of electromobiles with motor vehicles with combustion engine and the impossibility of testing the novelty. So far, no electric vehicle manufacturer has made enough effort to stimulate the diffusion of innovation.
References

[1] Globalwebindex 2018, https://www.globalwebindex.com/
[2] The official web page of Russian Association of Internet Trade Companies (AKIT), http://www.akit.ru/оборот-российского-рынка-интернет-п/
[3] The official web page of RBC, https://www.rbc.ru/technology_and_media/01/10/2018/5bae50449a794761830cd94b
[4] The official web page of WCIOM 2018 Press-release No. 3767 of 20.09.2018, https://wciom.ru/index.php?id=236&uid=9322
[5] World market of eCommerce based on the results of 2017 has amounted to $1.5 trillion, https://belretail.by/article/mirovoy-ryinok-ecommerce-po-itogam-goda-sostavil-trln
[6] Shon D and Rogers E M 2017 Models of diffusion of innovations, https://studopedia.ru/9_173386_modeli-diffuzii-innovatsiy-d-shon-rodzhers.html
[7] Rogers E 2010 Diffusion of Innovations (New York: Simon and Schuster)
[8] Krasyuk I A, Kirillova T V and Kozlova N A 2017 SHS Web Of Conferences 35 01055
[9] Krasyuk I A, Krymov S M, Medvedeva Y Y, Chernisheva A M and Lashko S I 2017 Int. J. of Applied Business and Economic Research 15 (12) 83–91
[10] Shkurkin D V, Krasyuk I A, Krymov S M, Kazantseva I G and Zakharenko G N 2017 Int. J. of Applied Business and Economic Research 15 (12) 203–213
[11] Klochkov Yu S, Klochkova E S, Krasyuk I A and Krymov S M 2017 6th Int. Conf. ICRITO “Reliability, infocom technologies and optimization (trends and future directions)” 135–143
[12] Bozhuk S G and Krasnov A S 2017 Proc. of the 2017 Int. Conference “Quality Management, Transport and Information Security, Information Technologies” 166–172
[13] Kozlova N A 2016 Materials of Scientific Conf. with International Participation “Week of Science SPbPU” (Saint Petersburg: Peter the Great St. Petersburg Polytechnic University)
[14] Bozhuk S G and Pletneva N A 2017 Practical marketing 2-1 (240) 11–18
[15] Pletneva N A and Bozhuk S G 2018 Proc. of Conf. “Fundamental and applied research in the field of management, economy and trade” 200–205
[16] Bozhuk S and Pletneva N 2018 Advances in Intelligent Systems and Computing (AISC) 692 1234–1242
[17] Bozhuk S G, Pletneva N A, Evdokimov K V 2017 Bulletin of Belgorod University of Cooperation, Economics and Law 3 (64) 96–109
[18] Sen Sankar and Bhattacharya C B 2001 J. of Marketing Research 38 (2) 225–243
[19] Zhgulev E, Bozhuk S, Evdokimov K, Pletneva N 2018 Engineering for rural development 17 2110–2117
[20] The official web page of AVTOSTAT 2018, https://www.autostat.ru/news/33405/
[21] The official web page of WCIOM 2018 Press-release No. 3774 of 28.09.2018, https://wciom.ru/index.php?id=236&uid=9336
[22] The official web page of Saint Petersburg City Administration, https://www.gov.spb.ru/static/writable/documents/2018/07/16/AC%20Уровень%20жизни%20населения%20Санкт-Петербурга%20в%20январе-марте%202018%20года.pdf