

Developing innovations in retail trade in Russia

Desarrollando innovaciones en el comercio minorista en Rusia

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ABSTRACT:

The current policy of the Russian state and retail trade organizations operating in the Russian consumer market presume the development of innovations. The study is devoted to the development of innovations in retail trade in Russia based on patent analysis. Its findings indicate that the innovation-driven growth of Russian retail trade has been largely positive in recent years, as evidenced by the growth in the number of trade patents and their share in the total number of patents. However, the negative trend is the increasing technological dependence of the Russian trade, manifested in an increase in the share of patents granted to foreign entities. The main areas of innovative solution application in retail trade are vending, settlements with customers, e-commerce, non-stationary trade (except vending), merchandise display, shopping experience, data collection and processing, and safety. The level of innovation-driven growth of retail trade in Russia in general is lower than that in Western countries. On the one hand, the findings of the study describe the development of sectoral innovation in general, which is important given the current policy of the Russian state, but on the other hand, they are of practical importance for particular trade entities in the process of managing innovations.

RESUMEN:

La política actual del estado ruso y las organizaciones de comercio minorista que operan en el mercado de consumo ruso presuponen el desarrollo de innovaciones. El estudio está dedicado al desarrollo de innovaciones en el comercio minorista en Rusia en base al análisis de patentes. Sus hallazgos indican que el crecimiento impulsado por la innovación del comercio minorista ruso ha sido en gran medida positivo en los últimos años, como lo demuestra el crecimiento en el número de patentes comerciales y su participación en el número total de patentes. Sin embargo, la tendencia negativa es la creciente dependencia tecnológica del comercio ruso, que se manifiesta en un aumento en la proporción de patentes otorgadas a entidades extranjeras. Las principales áreas de aplicación de soluciones innovadoras en el comercio minorista son la venta, los establecimientos con clientes, el comercio electrónico, el comercio no estacionario (excepto la distribución), la exhibición de mercadería, la experiencia de compra, la recopilación y el procesamiento de datos y la seguridad. El nivel de crecimiento impulsado por la innovación del comercio minorista en Rusia en general es más bajo que en los países occidentales. Por un lado, los hallazgos del estudio describen el desarrollo de la innovación sectorial en general, que es

Keywords: innovation, innovation-driven growth, retail trade, patent, patent analysis.

importante dada la política actual del estado ruso, pero, por otro lado, son de importancia práctica para determinadas entidades comerciales en el proceso de gestionar innovaciones

Palabras clave: innovación, crecimiento impulsado por la innovación, comercio minorista, patentes, análisis de patentes.

1. Introduction

Innovation is an important component of sustainable economic growth. Innovation policy plays a special role in emerging economies, where innovation is a tool for solving social problems and occupies key positions in development strategies and plans (Zaitseva et al., 2016). The concept of a long-term socioeconomic development of the Russian Federation through to 2020 (2008) presumes the creation of a competitive economy of knowledge and high technologies. The key goal of the Strategy developed on its basis (Strategy of innovation-driven growth of the Russian Federation, 2011) is to forward the Russian economy into an innovative way of development. The changes that occur have impact on various sectors of the Russian economy, including retail trade.

At present, trade is one of the most significant and intensively developing sectors of the Russian economy (Ivanov et al., 2016). According to the Federal State Statistics Service (Trade in Russia, 2015), trade is leading among all economic activities in terms of contribution to the gross domestic product and the number of employed population, while taking the third place after mining and processing industries by the amount of tax revenues to the state budget. More than one third of all economic entities operate in the trade sector. Trade also has a direct impact on the quality of life of the population, providing it with consumer goods, including items of prime necessity. As such, development of innovations in the trade sector is in line with the general guidelines for state development and can contribute to the fuller implementation of its social functions.

The main role of innovations for trade entities is to increase competitiveness, which is especially important in modern conditions, where competition from other trade organizations is the most significant factor limiting their activity (Advancing indicators by economic activities, 2017). Kutaeva et al. (2016) links the development of innovations in Russian trade with aspiration of trade organizations to take the leading positions in the market segment of the industry or region, aggravation of price competition, expansion of differentiation and customization of population needs, expansion of existing and development of new markets, resource support for innovations (including the ability to attract investment in new technologies), ability to use international integration (including combination of resources, use of preferential loans, creation of a unified marketing policy), ability to involve highly qualified specialists in implementing innovations, etc.

As such, the development of innovations in retail trade is in line with both the policy of the Russian state and the needs of the economic entities. In this regard, the study of the development of innovations in retail trade in Russia is urgent and of practical importance.

2. Theoretical background

Despite the great attention of Russian scientists to innovations in general, the research of innovations in the trade sector is limited and often theoretical. The works of Akmayeva (2013), Gorskaya (2014), Kutaeva (2016), Lvova and Semyonova (2015), Mikhaleva (2016), Rodik (2016), etc. can be noted, as they clarified the concept of innovation and its industry features, developed classification of innovations in retail trade, reviewed the functions of trade innovations and associated risks, analyzed the areas of innovation-driven growth of retail trade organizations, reviewed the mechanisms and outcomes of introducing innovations in retail trade structures, suggested methods for assessing the efficiency of managing innovations in trade.

The innovation process of an economic entity generally includes the following components:

determining the priorities for innovation-driven growth; search/generation, selection and development of solutions; formation or identification of demand for innovations; introduction of innovations (Karpenko, 2012). The stage of the search for innovations requires high awareness of technological changes in the industry. Patent analysis allows to describe technological changes and identify suitable innovative developments. A patent is a document certifying the priority, authorship and exclusive right to an industrial property object. Mandatory conditions for patentability of inventions and utility models are novelty and industrial applicability. The invention must also have an inventive level, i.e. not follow explicitly from the prior art. As such, patents are an important source of information on innovations.

Patent analysis in retail trade was previously conducted by Pantano et al. (2017). The authors used the data of the European Patent Office for 2010-2014, on the basis of which the trends in the development of trade innovations were described and their distribution across typologies was estimated. In particular, it was revealed that patents related to shopping experience, payment system, info/product display and information search prevailed in the total number of trade patents. Patent analysis applied to retail trade in Russia was conducted by Shinkareva and Mayorova (2017). The authors confined themselves to data for a three-year period (2014-2016), but the results obtained can be considered the basis for further patent research in retail trade of Russia.

This study is devoted to assessing the development of innovations in retail trade in Russia based on patent analysis. Respectively, the article has the following structure. Statistical data describing the general patent activity of Russia in 2012-2016 are reviewed in the next part. Then the study methodology is described, including the patent data base, search queries, filters and restrictions. Then results of the patent analysis describing the dynamics of the number of trade patents, their shares in the total number of patents, structure of patents by various grounds and other indicators are presented. Then the discussion part follows, containing the evaluation of results and their comparison with the materials of other studies. The limitations of the conducted analysis are listed further. The conclusion completes the article, presenting the findings obtained on the basis of the results of the analysis.

3. Patent activity in Russia in 2012-2016

According to the World Intellectual Property Organization (WIPO, 2015), Russia ranks 8th in the world in terms of the number of patents and applications submitted for granting patents, and 6th in terms of the number of patents granted. The US is the leader in the number of valid patents, which is more than 12 times ahead of Russia, China is the leader in terms of the number of applications and patents granted, whose figures exceed Russia's 24 times and 10 times, respectively.

Analysis of the patent activity indicators (Table 1) allows to describe the development of innovations in Russia. According to Rospatent (2016), the total number of valid patents for inventions has steadily increased in 2012-2016 and reached 230.9 thousand by December 31, 2016. The number of submitted applications for inventions varied unevenly but decreased by 5.9% in total for the period under study. A significant decrease (by 8.6%) occurred in 2016 and was caused by a decrease in the number of domestic applications filed under the duty-free patent procedure, largely in the food industry. In the application structure, more than 50% are filed by Russian applicants. The number of patents for inventions granted to Russian applicants for the period under study decreased by 6.8%, while the number of those granted to foreign applicants significantly increased (by 20.4%).

Indicators describing the effect, submitting and granting the patents for utility models demonstrated growth in 2012-2014, but decreased in 2015-2016 due to the stricter requirements for applications and introduction of a verification examination of applications, which provided for an information search and verification of a utility model for compliance with the patentability requirements. The structure of applications was stably dominated by those submitted by Russian applicants, the coefficient of technological dependence was less than 0.1. In general, the number of patents for utility models granted to Russian applicants

increased by 1% over a five-year period, while the number of those granted to foreign applicants decreased by 35.1%.

Table 1
Key indicators of patent activity in Russia in 2012-2016*

Indicators	2012	2013	2014	2015	2016	2016/2012, %	2016/2015, %
Inventions							
Number of valid patents as of December 31	181515	194248	208320	218974	230870	127.2	105.4
Applications submitted, total of which:	44211	44914	40308	45517	41587	94.1	91.4
- by Russian applicants	28701	28765	24072	29269	26795	93.4	91.5
- by foreign applicants	15510	16149	16236	16248	14792	95.4	91.0
Coefficient of technological dependence	0.54	0.56	0.67	0.56	0.55	102.2	99.4
Patents granted, total of which:	32880	31638	33950	34706	33536	102.0	96.6
- to Russian applicants	22481	21378	23065	22560	21020	93.5	93.2
- to foreign applicants	10399	10260	10885	12146	12516	120.4	103.0
Utility models							
Number of valid patents as of December 31	50746	54420	58238	57448	53263	105.0	92.7
Applications submitted, total of which:	14069	14358	13952	11906	11112	79.0	93.3
- by Russian applicants	13479	13589	13000	11403	10643	79.0	93.3
- by foreign applicants	590	769	952	503	469	79.5	93.2
Coefficient of technological dependence	0.04	0.06	0.07	0.04	0.04	100.7	99.9
Patents granted, total of which:	11671	12653	13080	9008	8875	76.0	98.5
- to Russian applicants	11152	12154	12267	8390	8474	76.0	101.0
- to foreign applicants	519	499	813	618	401	77.3	64.9

The reviewed indicators of patent activity, their dynamics and structure allowed to draw up a general idea of the development of innovations in Russia in 2012-2016, which was necessary to better understand the trends and prospects for the development of innovations in Russian retail trade.

4. Methods

Patent analysis is widely used as a method of researching innovations largely due to the advantages of the source data. First, they have high relevance, since patent documents usually contain information published for the first time ever. For a certain period, the data on innovations are presented only in the patent and are not available in other scientific and technical information sources. Secondly, the source data are reliable, since applications for a patent are subject to state scientific and technical expertise, the results of which confirm the reliability of information contained in it, novelty and industrial applicability of the patented object. Thirdly, patent analysis allows to combine two approaches – quantitative and qualitative. Quantitative approach assumes collection and processing of statistical data (on the number of patents, rights holders, developers, etc.). Qualitative analysis is possible because the patent documentation contains a full description of the development that allows to understand its essence. Fourthly, patent data are universal. Patent analysis allows to explore innovation activities in any field of science and technology and to compare the data of different countries and periods. Patent information is published in all developed countries, the text of the patent document is structured and contains general binding elements.

According to the generally accepted technology of patent analysis, the study of innovations in retail trade in Russia included the following stages.

1. Selection of the patent database, definition of search queries and restrictions. The authors used Patentscope system administered by the World Intellectual Property Organization. The search was carried out in the fields "Russian name" or "Russian abstract" and the query "trad*" indicating the "Russian Federation" agency. The data coverage period was from early 2012 to June 30, 2017.
2. Data collection, exclusion of irrelevant documents (for example, those related to trade in financial products or with trademarks, trade names), primary sorting and systematization.
3. Statistical processing of patent data, qualitative analysis of particular descriptions, formulas and abstracts, visualization and interpretation of the obtained results.

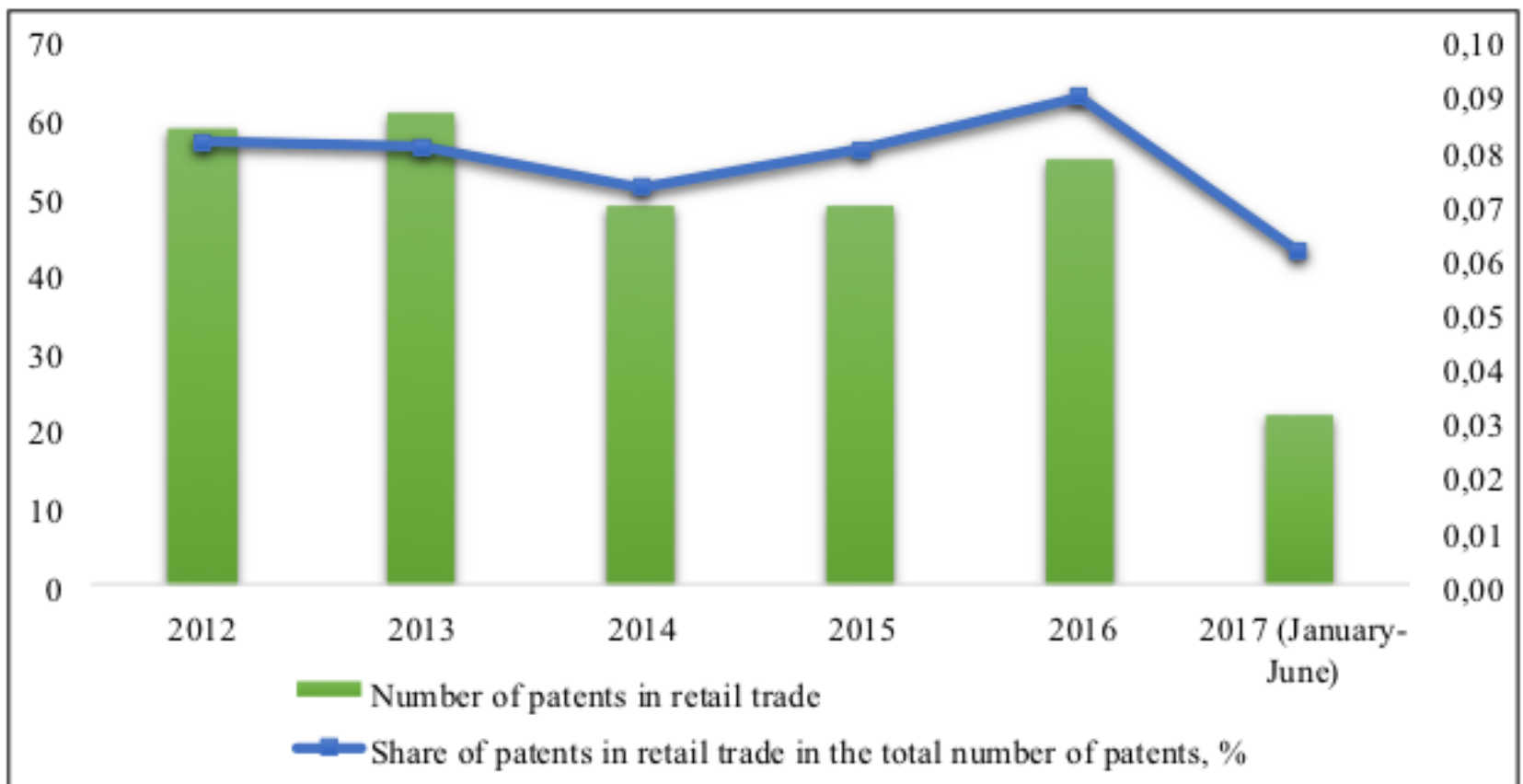
The following results were obtained based on this method, which described the development of innovations in retail trade in Russia.

5. Results

Patent search for the selected query brought up 532 results. Exclusion of irrelevant documents (mainly trade names for new products) allowed to identify 293 patents related to retail trade. After the drop in the number of patents granted in 2014, there has been a positive trend in 2014-2016. Despite the positive dynamics in recent years, the number of patents granted in 2016 failed to reach the level of 2012 and 2013. The share of patents for inventions and utility models intended for use in retail trade is consistently under 1% (Figure 1).

Figure 1

Patent activity in retail trade in Russia (Source: compiled by the authors using the data of Patentscope)



In 2012-2014, as well as in the first half of 2017, the structure of patents in retail trade was dominated by Russian applicants, in 2015-2016 it was dominated by those issued to foreign applicants. Meanwhile, there was a pronounced trend to increase Russia's technological dependence in the field of trade technologies in 2013-2016. This was evidenced by the corresponding coefficient found through the ratio of the number of patents obtained by foreign applicants and the number of patents obtained by Russian applicants (Figure 2). A large proportion of patents (45.8% in aggregate) granted at the request of foreigners falls on the US.

Figure 2

Dynamics of the number of patents in retail trade obtained by Russian and foreign applicants
(Source: compiled by the authors using the data of Patentscope)

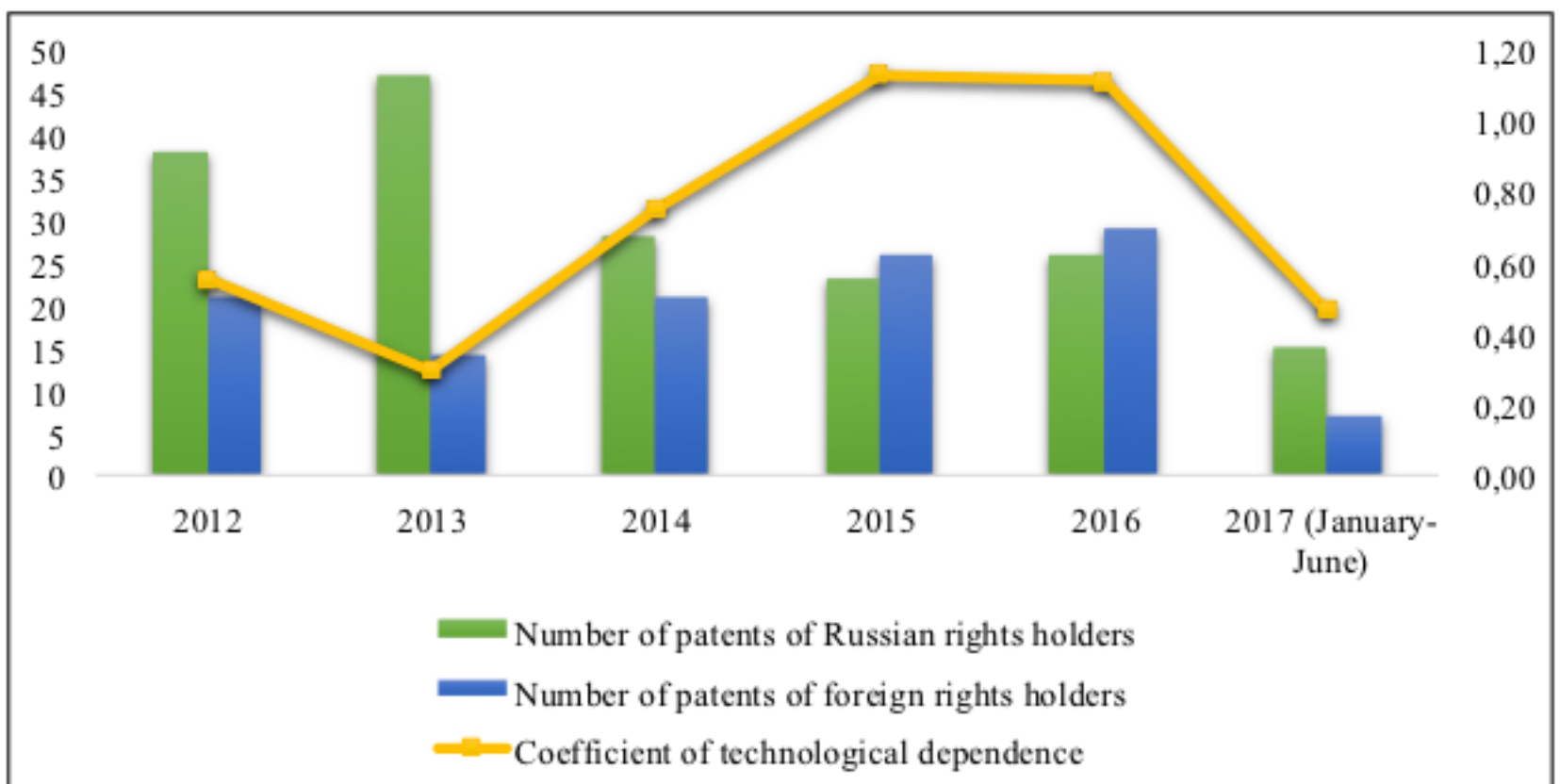
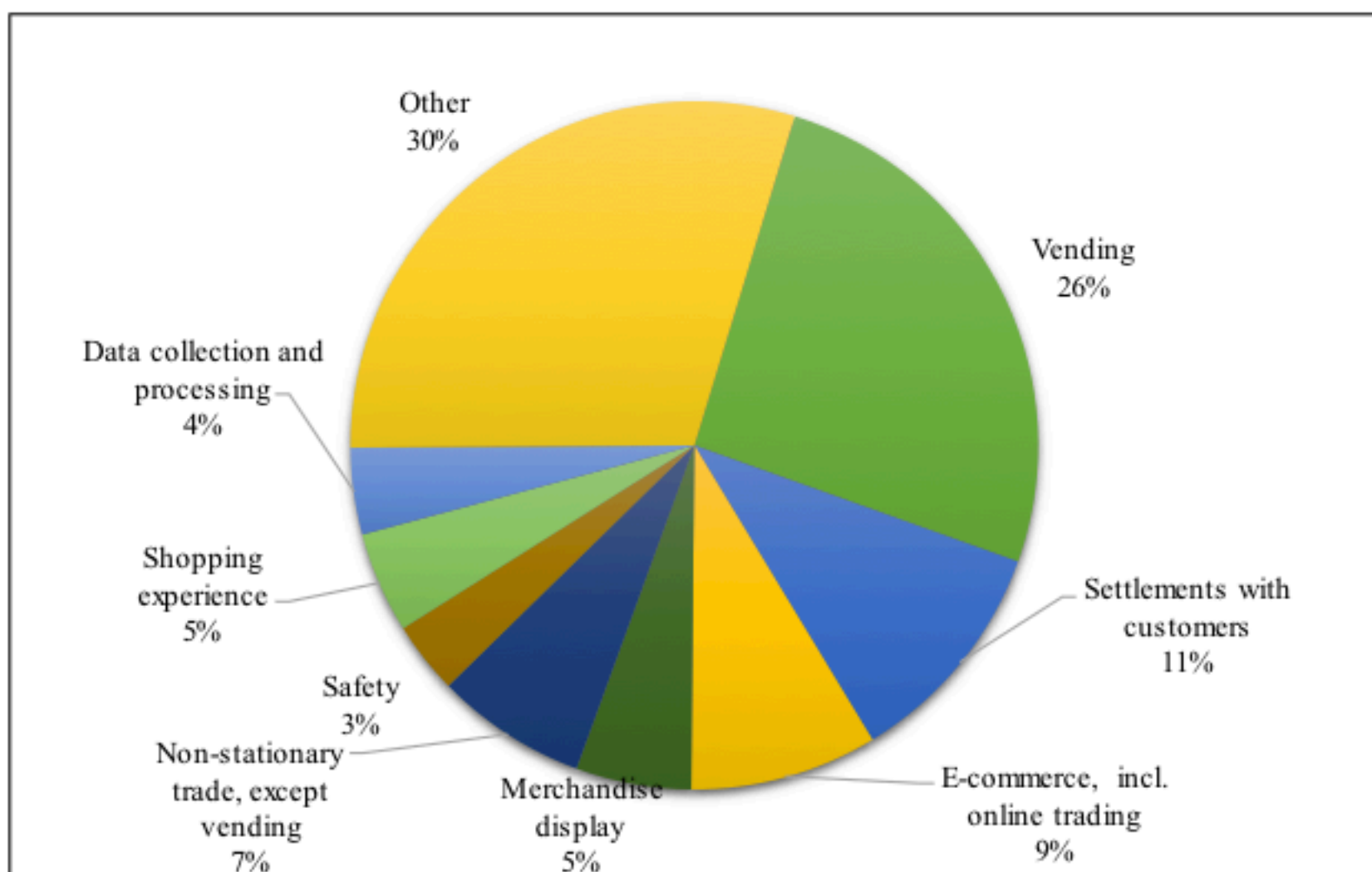


Figure 3 shows the structure of patents for inventions and utility models intended for use in retail trade in terms of their application (aggregate data for the period from early 2012 to June 2017). The largest share of patents (26%) is related to vending machines. These includes both new vending machines and their spare parts and mechanisms. Patents relating to settlements with customers rank second (11%). Among them, "Self-service cash operating unit" (patent RU 2531575) can be mentioned. 9% of patents have been granted

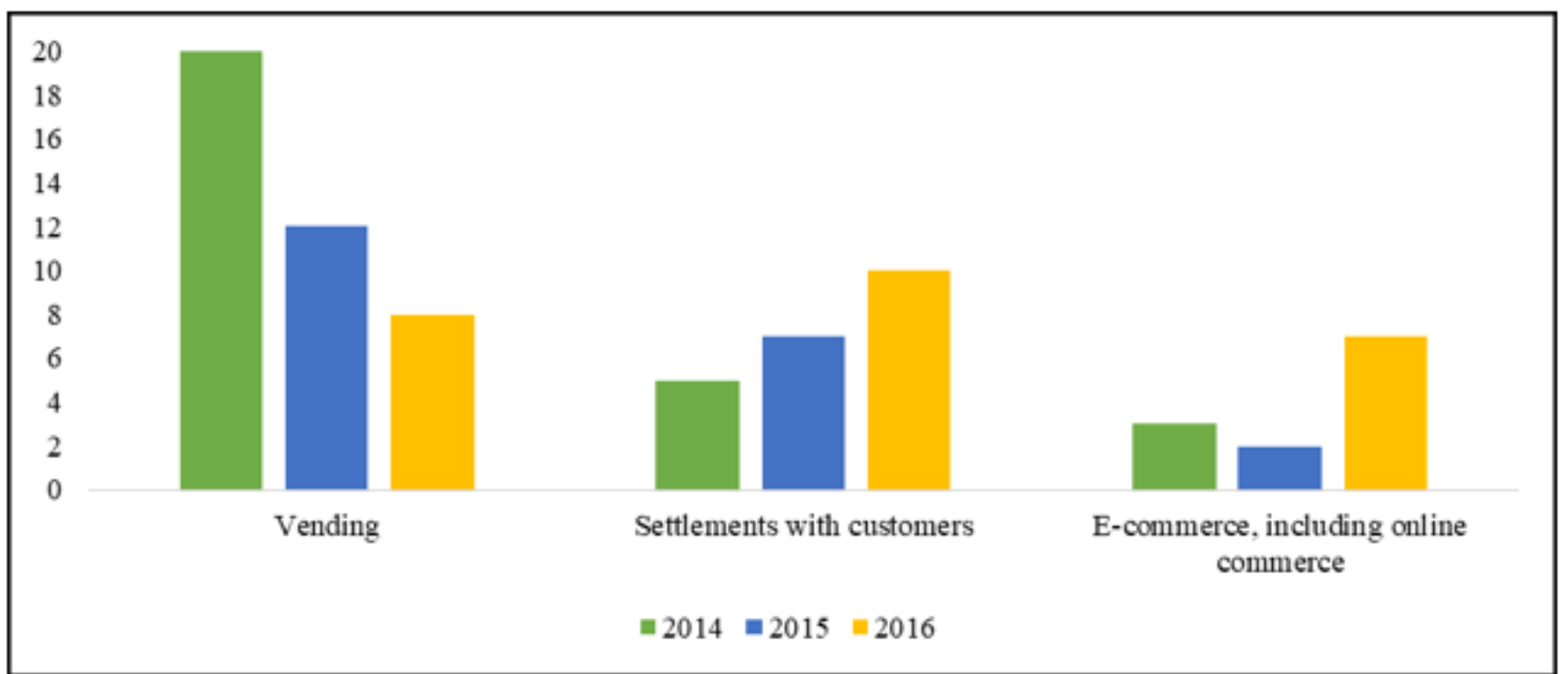
for inventions and utility models related to e-commerce, including through the Internet. 7% of patented developments are intended for arranging non-stationary trade, except vending. Merchandise display and shopping experience account for 5% of innovations each. The latter includes touchscreens, interactive fitting rooms, etc. Patents for inventions and utility models related to data collection and processing, as well as safety (anti-theft devices, security systems, etc.) have accounted for 4% and 3% of all the patents under study, respectively. The remaining 30% of patents are also intended for the trade sector (for example, other sales equipment, sales promotion methods, climate management trading system, etc.), but do not belong to any of the above groups and are denoted as "other" in Figure 3.

Figure 3
Structure of patents in retail trade in terms of application
(Source: compiled by the authors using the data of Patentscope)



As such, most patents for inventions and utility models intended for retail trade are related to vending, settlements with customers and e-commerce, including online commerce. In aggregate, they account for 46% of the considered patents. Figure 4 shows the dynamics of the number of these patents in 2014-2016. As shown in the figure, despite vending leading among other areas of application for patented developments, their number has been decreasing in recent years. On the contrary, the number of patents related to settlements with customers and e-commerce tends to grow.

Figure 4
Dynamics of trade patents by specific application
(Source: compiled by the authors using the data of Patentscope)



6. Discussion

The increase in the number of trade patents in recent years (2014-2016), as well as the gradual increase in the share of trade patents in their total number positively describe the development of innovations in retail trade in Russia in general. Nevertheless, the number of annually granted patents is lower in the last three years than in 2012-2013. The increase and subsequent prevalence (in 2015-2016) of patents granted to foreigners should also be evaluated negatively.

The aspects of retail trade organization's operation, for which new inventions and utility models are intended, can be considered the most promising from standpoint of innovations. Following the results of the patent analysis, they include vending, settlements with customers, e-commerce, non-stationary trade (except vending), shopping experience, data collection and processing, and security, which generally complies with the practice and materials of other research of innovations in retail trade in Russia. In particular, Gorskaya (2014) considers vending as one of the most promising areas of innovation-driven growth in Russian trade, supporting her point of view with statistical data (indicating that vending in Russia is significantly behind the world practice but has considerable potential), as well as advantages of vending business, which include minimum time costs for implementation, minimum investment, quick payback period, reduction of distribution costs, etc. Akmaeva (2013) points at the development of innovative technologies in settlement with customers. It can also be noted that self-service cash registers are increasingly being used in everyday operation of trade organizations, both Russian ("Magnit", etc.) and foreign ("Auchan", etc.). Mikhaleva (2016) calls information technology and e-commerce the basis for innovation-driven growth of retail chains, while placing special emphasis on mobile commerce. Khitskov et al. (2017) noted the development of Internet technology and its wide application in business. However, for objective reasons, the results obtained lack data on new formats, services, marketing and logistics innovations, which are considered by Lvova and Semenova (2015), for example.

Comparison of the results of the conducted analysis with the materials of foreign studies indicates the significant differences in the development of innovations in retail trade in Russia and other countries. Based on the data of the European Patent Office, Pantano et al. (2017) found that the number of trade patents and their share in the total number of patents tended to grow, the main areas of innovation (in decreasing number of patents) being shopping experience, payment system, info/product display and information search. The share of trade patents is 0.43% -0.73%. Similar trends have emerged in Russia in recent years, but the share of trade patents in the total number of patents remains lower (less than 0.1%), and vending is leading in terms of application of new developments. At the same time, patents related to shopping experience in Russia make up only 5% (against 24%). Vending has already become widespread in Europe, while it has just been unfolding in

the Russian market and has considerable potential. At the same time, innovative technology related to shopping experience, including interactive fitting and mirrors, advanced and virtual reality technology, etc., is now actively developing abroad but is nearly not used in the activities of Russian retail trade organizations. Based on the review of literature sources, Rodriguez et al. (2016) highlight the following emergent retail technologies: omni-channel, electronic retailing (e-tailing), mobile commerce (m-commerce), Facebook commerce (f-commerce), cloud computing, augmented reality, drones and internet of things. It is obvious that some technologies, including augmented reality and drones, which have already been developed abroad, are not yet applied in Russian retail trade.

7. Limitations

Patent analysis results have some limitations. Firstly, despite proven industrial applicability, the patented objects are not always efficiently implemented in practical economic activities. In Russia, the problem of institutional gaps is particularly acute, which is confirmed by the results of studies by Chertakova (2014), Galimulina et al. (2016, 2017), Vinogradova et al. (2016), etc. Secondly, patent analysis allows to explore only patented innovations. Patenting requires the disclosure of information about the development, including its full description, formula and drawings. The patent is valid for a limited period of time. In this regard, heads of commercial organizations choose another option of legal protection of innovation – know-how, or a production secret. Thirdly, data collection for patent analysis was carried out on a single basis (Patenscope) for a limited period of time (5.5 years). The use of additional data sources, an increase in the period under study, as well as further specification of patents classified as "other" would lead to more complete and reliable results. These features should be taken into account, as they limit the results of the study.

8. Conclusion

The results of patent analysis allow to draw the following conclusions about the development of innovations in retail trade in Russia. The innovation-driven growth of Russian retail trade in general has been positive in recent years, as evidenced by the growth in the number of trade patents and their share in the total number of patents. However, a negative trend is the increase in technological dependence of Russian trade, manifested in the increase in the share of patents granted to foreign entities (mainly US residents). Vending is the main area of application of new inventions and utility models, accounting for 26% of all trade patents granted from early 2012 to June 30, 2017. Patented innovative developments are also intended for use in settlements with customers, e-commerce (including Internet commerce), non-stationary trade (except vending), merchandise display, shopping experience, data collection and processing, and safety. These areas of trade activity can be considered the most promising in the context of developing innovations. Comparison of the obtained findings with the materials of foreign studies indicated that the level of innovation-driven growth of retail trade in Russia was generally lower than in foreign countries, including European countries. The results of the research, on the one hand, describe the overall development of sectoral innovations, which is important given the current policy of the Russian state, while on the other hand, they are of practical importance for certain trade entities in the process of managing innovations, including at the search stage.

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