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WEAK SIGNALS ON THE FUTURE OF MOBILE COMMERCE IN RUSSIA

In parallel to the developments in the Information and Communication Technologies (ICTs), mobile commerce (m-commerce) has become a large business and technology area with ever-growing market potentials. Comparable to the rest of the world, the m-commerce sector has been developing rapidly in Russia, which provides opportunities for domestic and international enterprises. There are a number of favorable conditions, such as major advancements in the software and smart devices industries, availability of a skilled workforce with a good educational base, a technology-prone society, and increasing public and corporate investments, which reinforce the development of m-commerce. The present study aims to explore the future trends and developments in the m-commerce sector, by focusing on the Weak Signals of emerging future developments in society, technology, economy, environment and policy. Using a combination of quantitative and qualitative techniques, the study reviews the evolution of the m-commerce in the world and in Russia, and then presents a set of 10 Weak Signals, which were generated using technology mining, patent analysis, literature review, interviews and consultations through expert workshops. The paper discusses future opportunities and threats concerning m-commerce along with critical technologies for Russia for the full exploitation of the potentials in the sector.

Keywords: Mobile commerce, Information and Communication Technologies, Weak Signals, Foresight, Russia

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1. Introduction

Recent years have witnessed major advancements in science, technology and society due to new global context suggesting increased financial, trade and investment flows leading to a more interconnected and interdependent world. This is accelerated by rapid technological progress in areas such as ICTs, biotechnologies, nanotechnologies, energy and fuels, medicine. Meanwhile, severe social and economic instability have been witnessed due to the economic recessions, availability of resources like water, food and energy supply, climate change, regional conflicts, and respective population movements. In such a rapidly changing complex environment, it becomes more and more crucial to identify Weak Signals of emerging changes in the future.

Weak Signals refer to "*the early signs of possible but not confirmed changes that may later become more significant indicators of critical forces for development, threats, business and technical innovation*" (Saritas & Smith, 2011). They represent the first signs of paradigm shifts, or future trends, drivers or discontinuities. In this respect, the study of Weak Signals aims at collecting and analyzing data for the purpose of providing early indications of potential developments in Science, Technology and Innovation (STI). The anticipatory intelligence gathered through the scanning of Weak Signals is used to provide stakeholders opportunities to develop early responses to capitalize on, protect against, or mitigate the impact of potential disruptions in the future.

Mobile commerce (m-commerce) is a large business and technology area with growing market potentials. It appears as a subset of electronic commerce (e-commerce) and represents any electronic transaction with monetary value done within a mobile network (Ngai & Gunasekaran, 2007) or from any wireless device. M-commerce has been developing since the ending of the 20th century. The main drivers of the development are information technology (IT) and telecommunication technologies (TCT) (Tiwari et al., 2006), as well as constantly growing popularity of online services, smartphones, mobile applications and social networks. Global retail electronic commerce is forecasted to reach approximately $4 trillion US dollars online worldwide sales in 2020 growing more than two times since 2016 (Statista, 2016). Newest mobile, wearable, banking and other ICT technologies, as well as wide distribution of mobile Internet and free Wi-Fi access in many cities of developed and developing countries in the world gives big possibilities for m-commerce to capture a big percentage of online retail market.

Russia is one of the countries, which has been experiencing a great deal of transformations in all areas of society, technology, economy and industry. Despite major pressure from economic sanctions, participation in anti-terrorist military operations in Syria and oil price's continuous fall, the country is still able to avoid major recession, concentrates on newest technologies in areas such as agriculture, ICT, energy and fuels and defense expecting economic growth in 2017 (Reuters, 2016). Undoubtedly, the natural resources sector has played a significant role in this achievement. However, economic growth based solely on the natural resources sector is neither sufficient nor sustainable. In the era of the global information society, knowledge is the core resource and mechanism of accelerated development. Alongside oil and gas, Russia's ICT is among key drivers of economic development (Gokhberg, Abdrakhmanova, Alekseeva et al., 2016).). Since 2000, this sector has developed four times faster than the average performance of the Russian economy. ICT has demonstrated rapid, steady and stable growth in all of its segments (National Research University Higher School of Economics, 2014). Furthermore, Russia's economic growth will also depend on the successful development of the innovative industries of the nation's economy, particularly innovative infrastructure. The Strategy for Innovative Development of the Russian Federation 2020 (Russian Ministry of Economic Development, 2011) approved by the Russian Government in 2011 considers innovation as a key source of sustainable economic growth. Actions are taken to form mechanisms of partnership between the society, state, businesses and research institutions as the key actors of innovation. Detailed scenario-based recommendations on innovation policy mix for Russia was provided in the strategy document entitled "Strategy – 2020" produced with

the involvement of Higher School of Economics (HSE) for the Government of the Russian Federation (Gokhberg & Kuznetsova, 2011).

The present paper focuses on the Weak Signals of mobile commerce development. M-commerce in Russia has outstanding potentials due to the widespread implementation of mobile and wearable technologies, as well as growing Internet (including free Wi-Fi in some public places) penetration throughout the country. In this domain, a particular emphasis will be given to the Weak Signals in B2C and C2C segments of the market, which will cover areas such as mobile payments, mobile sales, shopping as well as new technology and topics like data security and privacy.

Section 2 of the paper begins with a background on the developments of m-commerce with a particular focus on its drivers and barriers in Russia. Next, the methodology used for identifying Weak Signals will be presented in Section 3. The study undertaken and results generated are presented and discussed in Sections 4. Section 5 draws overall conclusions from the work done and discusses implications for Russia with future opportunities and threats for society, technology and policy.

2. Background

The first example of m-commerce was the use of mobile SMS-messages to pay for various services (Scharl et al., 2005) such as vending machines, banking (Jamil & Mousumi, 2008), downloadable ringtones (Fong & Lai, 2005), parking, theater and cinema tickets and other. Later, with the fast development of online retail services buying goods in the Internet became a major trend and a possibility to reduce products' price. Innovation in mobile technologies and introduction of various mobile applications allowed performing online operations with the help of any wireless device, such as smartphone or tablet PC. Since then, mobiles turned from being only the means of communication into personal assistants, tools to find new information, spend leisure time and, finally, pay for digital content, various services and order products. Online mobile banking and integration of various electronic wallet services and mobile applications increased the popularity of m-commerce and its convenience.

M-commerce consumers' base is constantly rising due to wide spread of mobile and wearable devices and rising percentage of people with access to Internet. Russia, despite accounting for the largest number of Internet users in Europe, scored only ninth top market of online sales in 2014 reaching $17.47 billion US dollars (calculations exclude travel websites and event tickets revenues). This amount represents approximately 2.2% of all retail sales (Bollinger, 2015). Reasons for low statistics are both social and infrastructural. Society attitude towards utilization of online services and m-commerce is highly dependent on age, income and level of education that leads to cash payments being the main way of monetary transactions. From the perspective of infrastructure and logistics (delivery of products), Russia still has major problems with road access to far residential areas around the country, while Internet penetration is assessed at nearly 59% (Ecommerce News, 2016). PwC research in the beginning of 2014 demonstrated that 43% of Russian population (approximately 61 million people) have mobile internet (PricewaterhouseCoopers Russia, 2014), which is still a rather low amount.

All described factors show major challenges for m-commerce development in Russia. However solving those challenges through innovation, societal adaptation, policy actions, Internet infrastructure and logistics improvements brings massive economic potential for the country and both national and international organizations that invest or work in this business. As such, solutions like higher level of access to cheap wireless devices with full functionality, as well as lower tariffs for mobile communication and the Internet are to attract more potential customers. Increasing involvement of the society in the online activities such as social networks and various mobile applications for personalized shopping creates many valuable information flows for the exchange between consumers and businesses to offer, rate, compare and commit mobile transactions. These and other Weak Signals described in the present

paper aim at exploring the future possibilities in m-commerce for all stakeholders in the area, as well as anticipating plausible future developments and opportunities which would allow them to develop to a bigger extent and at quicker pace.

3. Methodology

The process for the identification of Weak Signals on mobile commerce consisted of a combination of quantitative and qualitative methods, which range from technology mining, reviews and interviews to consultations through expert workshops. The methodology consisted of four main phases:

1. Weak Signal extraction
2. Weak Signal prioritisation
3. Weak Signal description
4. Weak Signal visualisation

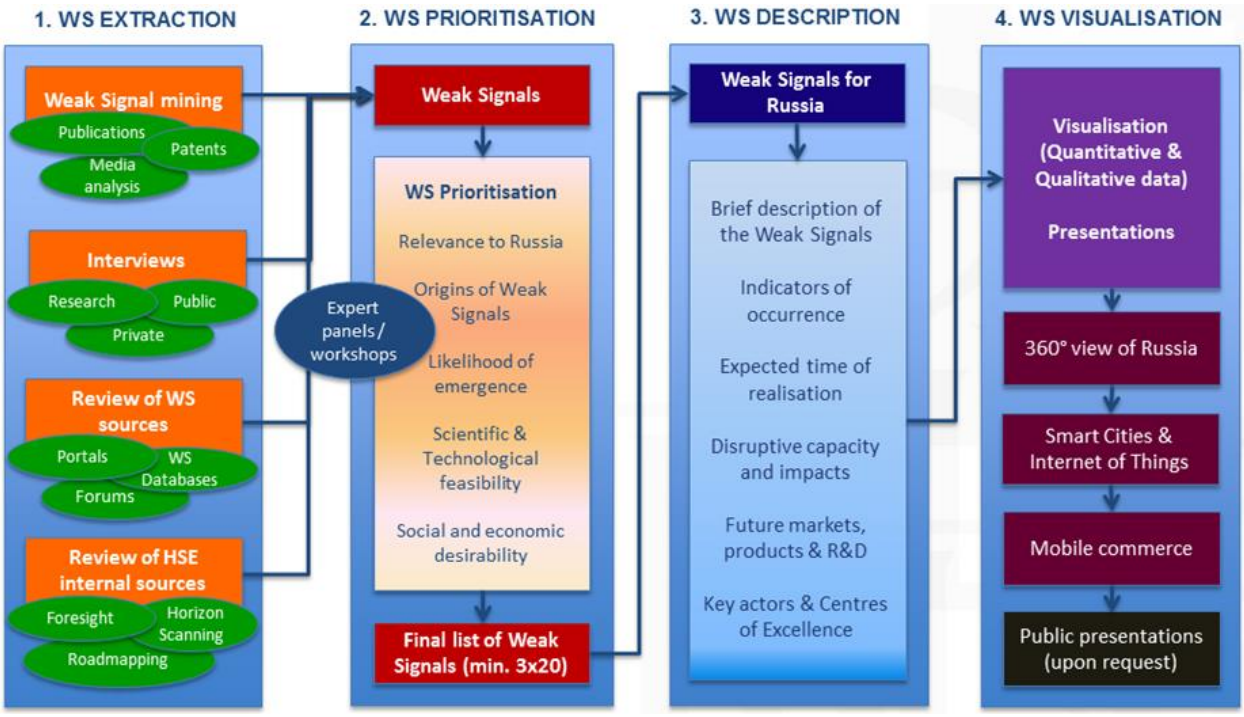

Figure 1: Methodology for identifying and describing Weak Signals

The first step was concerned with the extraction of Weak Signals from a wide variety of sources. The procedure was designed to identify Weak Signals stemming from large academic, scientific and media databases by using data mining techniques. Global databases such as Web of Science publications database, Derwent patent database and Factiva media database were scanned in order to identify Weak Signals related to the world and then assess their impact on Russia. Besides these, domestic reports, policy documents, websites and other available information were analyzed in order to capture Weak Signals originating from inside Russia. In addition, global and national Horizon Scanning and Weak Signal portals, databases and forums at the global level and in Russia were reviewed. Further Weak Signals were extracted through interviews with the representatives of the private and public sector as well as researchers and academics working on mobile commerce. Outputs of a recent Foresight exercise for Information and Communications Technologies and Mass Media in Russia were also used as supplementary material (Kachkaeva & Kiriya, 2012).

A long list of Weak Signals generated in the first phase were prioritized to identify the most important and relevant ones for Russia. For this purpose, a list of prioritization criteria was proposed, including:

1. Relevance to Russia
2. Origins of Weak Signals
3. Likelihood of emergence
4. Scientific and Technological feasibility
5. Desirability for Russia both socially and economically

The prioritization process helped to distinguish "genuine" Weak Signals and "hypes" and generated in total of 10 Weak Signals in area of mobile commerce. These were then described in detail in the third phase of the process.

Finally, descriptions were enriched with quantitative and qualitative data and indicators to understand the criticality of Weak Signals, their disruptive capacity, impacts on future markets, products and technologies within and outside Russia.

4. Findings

In total of 10 Weak Signals were identified. They were categorized as either society, technology, economy, environment or policy-related and were ordered accordingly.

- *Mobile as the main tool of payment and C2C commerce (society and technology-related)*

The evolution of B2C and C2C models for retail and other purposes has been strongly influenced by the mobile technologies aimed at making transaction process easy and secure. Mobile as the main tool of payment and commerce is a major weak signal supported both on technological and societal levels with outstanding potential to shift existing markets.

Portable devices have become particularly attractive when versatility, security and simplicity features of payment technologies are considered. Transactions can be made directly within an application that will bring together all means of payments and will be used as main identifier for bank account of people. The service enable customers to make contactless payments via mobile devices with a contactless reader or via text-based or personal identification-number-based (PIN-based) methods. The last set of available methods uses Near Field Communication (NFC) technology (Tan et al., 2014) that involves short distance communication between the consumer's device, the payment scheme operator, and the retail merchant at the storefront. Quantitative evidence is provided by recent trend in patenting activity showing rising interest of global NFC technology providers by protecting their intellectual property in Russia. Fig. 2 demonstrates the distribution of NFC patents over the last 10 years by the grant date in major patent offices around the world. Even though Russia is not the leader, nor the earliest player in the sphere of NFC, the indication of rapid implementation period can be detected, which advocates for potential big shifts in m-commerce market in the nearest future.

Figure 2: Distribution of NFC patents by first grant year and publication country

Source: calculations based on Questel Orbit data, 2016

Infrastructure wise, increase in channel capacity and speed, expansion of 3G, 4G and LTE (J'son & Partners Consulting, 2014) brings forth additional benefits of using mobile as the main instrument of payment and commerce even in the context of more traditional online transactions. The Economist (2014) demonstrates another interesting evidence of several developing countries, where people have registered more mobile-money accounts than traditional bank accounts.

- *Social commerce (society and technology-related)*

Social commerce is characterized by Social Experience Design (SXD) concept, user generated content and self-promoting products and services through Internet of Things (automated experience sharing).

The developing concept of SXD implies constant share of experience about purchased products and services with the help of mobile devices and social networks. Unification of various social mobile platforms for real-time knowledge exchange and growing amount of total users are to make SXD relevant not only to the long term planned purchases, but any transaction being committed at the very moment. Thus, social commerce exploits actively the user generated content. In the longer term, the future of m-commerce is expected to lie in the sphere of the content generated not only by users themselves, but also by goods/services, where the Internet of Things (IoT) will play a greater role.

Mobile devices will be used as major platforms to sell various goods (such as clothes, electronics, furniture) and services (like housing, car sharing, and equipment for special trips) between customers. Payment processes will be integrated into social networks, where demand and supply side are to find each other and suggest prices and terms of agreement to satisfy both sides. There is a good potential that consumers themselves will use crowdsourcing platforms for direct exchange and delivery of goods.

- *Use of consumer-oriented additive technologies in conjunction with mobile clients (society and technology-related)*

‘New craftsmanship’ trend is gaining its significance particularly due to availability of small-scale additive manufacturing technologies, such as 3D-printing. This strand of craftsmanship is nowadays well-formed institutionally (“do it yourself”, DIY movement) and fits well into mobile phone/ tablet functionality. One can design, review and produce handy artifacts (tools for repair and construction, toys, jewellery, etc) using mobile clients and cloud-based model repositories.

As related skills are acquired, new consumer markets and small/personal enterprises will emerge facilitating m-commerce startups. New materials will be required for additive technologies. Mobile apps, 3D printer device technologies and new materials research will merge to form new segment of IP market and other value-added businesses.

There is no strong market evidence or rising patenting activity in Russian for this weak signal, however the topic attracts big attention on government and private levels and is strongly considered by experts. Moreover, some Russian startups are working on the development of cheap 3D printers, which can highly influence further m-commerce development.

- *Predictive and personalized mobile commerce (technology-related)*

Machine learning of behaviors and habits (e.g. customized menus in restaurants), real time financial decision-making (i.e. crediting) and mobile marketing (e.g. when point of purchase/service is closer) and multi-dimensional context awareness is another weak signal for m-commerce in Russia.

Transactions, various queries and search done with the help of mobile devices generate a lotf valuable data about a customer. Collection of such data for various target groups helps to build models and behavioral patterns using algorithms of machine learning. Hence, mobile commerce transactions can be predicted with big focus given to various factors that affect customers’ choices. That allows for proactive services to be suggested in real-time. For instance, the users will be provided customized menus in restaurants and shops, where foods they do not like or have allergies with will be eliminated automatically. Ads will be targeted and served when people approach a point-of-purchase – walking by a store, browsing at a retailer or watching movies (Iacovone, 2013). Finally, some crediting options might be dynamically suggested along with personalized choice of products based on the history of previous transactions and credibility of a customer. Predictive m-commerce has a potential to make almost all mobile services personalized.

Predictive and personalized m-commerce is also associated with the growth of geo-dependence of mobile users. Location-based Services (LBS) mobile applications that take the user’s location into account in order to deliver a service are becoming widespread. For example, smart sensors integrated into vehicles detect other drivers’ behaviors, suggest locations of nearby restaurants, petrol stations, hotels, barbershops and other places of interest relevant to a user at a particular moment. Another category is proximity services. These services inform users when they are within a certain distance to other people, businesses, or other things. There are numerous ways to exploit location to provide more relevant information or derive new services. It can be particularly powerful when combined with other user profile information to offer personalized and location sensitive suggestions and responses to customers.

From technological point, predictive big data analytics is a well-established sphere, where mobile commerce with its formal way of exchanging information does not present much difficulty towards its analysis. In other words, products and customers along with transactions made are matched with a wide range of factors that are used to assess people’s preferences (Ning & Yang, 2008; Lu et al., 2012). The ever-growing data warehouses with history of all transactions helps to identify major behavioral patterns and suggest each customer personal options that would suit his or her pattern.

Russian companies take an active position in developing predictive analytics solutions. Yandex contributed $4.1 million US dollars capital injection in SalesPredict, a SaaS technology provider of analytical services for B2B companies (East-West Digital News, 2014b), which was later acquired by Ebay to boost their machine learning technologies (VentureBeat, 2016).

One of the barriers seen by experts is the issue of privacy, where some customers would not like all their actions to be recorded and distributed between suppliers of various products. However, in this sense PricewaterhouseCoopers Russia (2014) survey demonstrated tendency of the majority of customers towards personalized shopping over the security of personal data. The era of social networks and trend to share some details of personal life in digital format with the wide audience strongly supports the emergence of the described weak signal.

- *Mobile commerce integration with wearable devices and wireless sensor networks (technology-related)*

Advanced monitoring and sensing technologies, growing popularity of healthy life styles through Personal Health Systems and new trend for management of 'things' and services through Smart Infrastructures (e.g. Smart Houses, services for active citizens) along with Cloud-to-Mobile (C2M) solutions create a new highly technological direction of m-commerce services.

Mobile, wearable devices and wireless sensor networks (WSN) are to be more connected to each other and used as monitors to manage the everyday's life activities. Many commercial services are expected to appear, such as predictive, preventive and personalized medicine, house monitoring ("smart house") and others. The assistance can be provided either in a routine mode or as a rapid response (e.g. in a case of incidents or risk factors/patterns), both for individual customers and to business units. Mobile payment systems are expected to be integrated with wearable devices to allow for more efficient and secure transactions.

Integration of community services based on 'cloud (remotely located group of servers and software networks that provide online access to computer services and resources) to mobile, C2M' technological solutions, is one of the key driver of change for social life. Social networks as part of C2M have already become big part of life for the society and changed the traditional mindset of interaction and connectivity. Mobile-based information services are elaborating from being only instruments of communication to cover new areas. For example, labor market and employment dynamics will undergo increasing transformation. Job seekers and employers will directly exchange varied and timely data on vacancies and contract services available through C2M services. Public safety will rely on information sent by mobile devices (e.g. photos and videos made by witnesses of road accidents, crimes and other emergencies in real time). Personalized health monitoring and marketing services based on C2M solutions will affect family life traits and key buying preferences. This in turn will transform personal insurance institutional models. Learner-centered education C2M infrastructures will continue to emerge (possibility to form own higher education program based on personal needs and interests).

In Russia this weak signal is supported by Internet and mobile government services to track and pay for taxes and bills, purchase services connected with healthcare, education, etc.

- *Use of robotics for improved m-commerce logistics (technology-related)*

The development of robotics will change the model of delivery of material goods from traditional shipment systems towards robot based logistics system. The goal of the new system is to decrease the delivery time by using unmanned aerial vehicles (e.g. Amazon Prime Air). The twenty-first century is seeing a rapid proliferation of unmanned aerial vehicles (UAV) that do not have a human controller on board. The capabilities of small drones have greatly increased, and their manufacturing costs have

reduced. Hence, small drones become more sophisticated, bring better functionality at the same level of cost and attract more investment for their further development. The usage of UAV for mobile commerce especially in delivery segment is a main priority of non-military application areas. However, regulations for such deliveries are still to be developed. For example, US Congress required the Federal Aviation Administration (FAA) to create rules allowing civilian drones to take flight by 2015.

Russian private organizations are becoming quite familiar with drone technology and seek ways to exploit its benefits. For example, on June 21 of 2014, the Russian pizzeria chain Dodo Pizza and the Copter Express company used drone to deliver pizza in Sytyvkar, the Republic of Komi. However, local authorities accused companies of violating rules on the use of airspace (East-West Digital News, 2014a)

Quantitative evidence is provided by a rather dominating trend in patenting activity of drone technologies in Russian office. Fig. 3 demonstrates the distribution of drone patents over the last 10 years by the grant date in major patent offices around the world. Russia's share is actively growing taking the leading position.

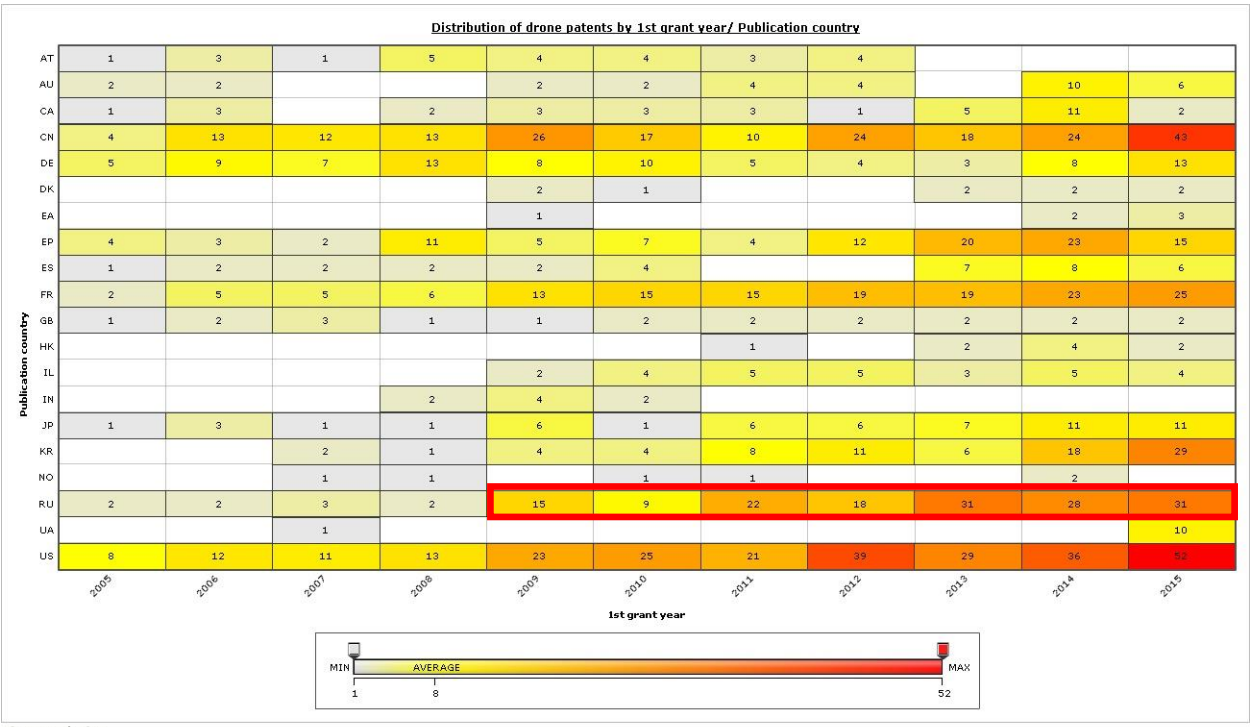

Figure 3: Distribution of drone patents by first grant year and publication country

Source: calculations based on Questel Orbit data, 2016

- *Decentralized financial systems and currencies (technology, economy and policy-related)*

Another weak signal is related to new type of decentralized financial systems, topic of crypto-currencies and universal independent electronic payment methods.

Development of m-commerce will lead to the creation of universal electronic virtual currencies independent from states national financial systems. Federal and state regulators have generally proposed defining virtual currency as a digital representation of value that is not a government-issued legal tender. Such currencies could be used for global mobile commerce using mobile devices. A lot of companies and venture funds made the investments to creating the Future of Money in the high growth, emerging technology fields of Mobile Payments, Digital Currency, and Mobile and Digital Security. Emergence of new forms and relations in m-commerce area leads to establishment of a very new ecosystem for m-commerce support. Main element of such system is new financial system adapted to m-commerce

specific. In such environment, major players could instantiate other type of money-issuing entities (e-money, crypto-currency etc). Mobile money includes any financial service delivered over a Mobile Phone. Includes Mobile wallet, P2P (person-to-person), G2P (government-to-person) and B2P (business-to-person) transfers and remittances, payments (including airtime), savings, credit, insurance, etc.

Russian banks in general seem to be strongly against any digital currency as it reduces the amount of control over money flows. Russian government sees digital currencies as a threat and a way to support illegal activities and terrorism. Bitcoins, for example, are banned on the territory of Russian Federation (Andrianova, 2016).

However, the technology behind Bitcoins and other similar digital currencies attract a lot of attention from banks. The blockchain is a distributed financial technology that suggests every user of the network to have access to the data about all transactions made throughout the whole history between all users. In other words, every node sends, receives and stores information about the activity of all other nodes turning the network into self-validated self-operated secure system.

Various Russian companies and initiatives in general support the development of decentralized financial systems and currencies (e.g. blockchain technology) for Russian banks through various policy actions, including national technology initiative FinNet (ASI, 2016), however the main idea is to developed faster and more secure technologies for bank operations rather than creating new currency.

- *Evolving of retail practices and green commerce (technology and environment-related)*

Evolving of commerce and concentration on eco-friendly solutions lead to new retail store layouts with reduced space, purely electronic payment checks, use of augmented reality in shops with virtual browsing of shelves and increased diversity of selection and customization.

Part of retail business is likely to become mobile subscription-based with personalized choice of desired goods delivered periodically. Fewer products are to be physically stored in local shops. Augmented reality built in mobile and wearable devices will help customers get additional information about physical goods and allow them to virtually browse more alternatives that could be ordered. Mobile personalized shopping applications are to suggest products based on consumer's payment history, preferences, health conditions and other factors relevant to a specific person bringing high diversity of selection and customization of all goods and services.

The sensitivity of people towards "green" technologies will drive the usage of new retail practices for mobile commerce. M-commerce will be progressively used as more environmentally friendly way of commerce, which implicates less pollution of territories, by constructed storage capacities and less amount of physical stores. Printing of checks will be replaced by sending receipt online, without having any shops or show rooms but using virtual show rooms and shops via mobile applications on mobile devices etc. Mobile commerce with the use mobile applications (for digital media) helps to reduce number of CDs and DVDs, which should be produced for digital media distribution (music, movies, books etc.).

There is no strong evidence for wide distribution of augmented reality devices (e.g. smart glasses), however citizens of central cities of Russia tend to follow major trends related to gadgets such as smart watch and would most likely join the idea in the form of advanced online markets with a possibility to view products in 3D.

- *Data security on technology and policy levels (technology and policy-related)*

Data security becomes one of the most important topic for m-commerce on both technological and policy levels, especially when dealing in C2C business models with the involvement of social networks and personalization of commerce.

Contactless payments, remote payments, mobile points of sale – all rely on encryption, authentication and authorization services. Elliptic curve cryptography (ECC), digital certificates and digital signature wireless LAN (WLAN) security are well established technologies and are used for data transmission and monetary transactions, including m-commerce (Ning & Yang, 2008; Urien & Piramuthu, 2013). Homomorphic encryption brings a new level of security by allowing separate packages of data to be transmitted from sending node to receiving node, allowing packages to then be integrated without being decrypted. Use cases for healthcare were described by (Wang & Zhang, 2015). The use of the same technology for m-commerce, while considering a very big amount of customers' personal data to be constantly processed and passed, is highly anticipated.

Moving from technological aspects to society and policy related, m-commerce, Internet of Things (IoT), enhancement of services will open doors for automation of services use without consulting the consumer. Widespread development of mobile commerce will induce governments and international regulatory bodies to limit the personal data collection via mobile devices. A serious violation in security would hinder the growth of mobile commerce, as well as increase the cost of related operations. Privacy and security of information and payment details (e.g. credit card details) will be misused, identity theft, contract, and, whether there is one or not, what laws and legal jurisdiction apply – these are privacy and security issues which would make strong influence on service development and policy development as well. There are also risks related to quality of product or service and mobile commerce legislation, transparency and characteristics of safety and security an online vendor offers. All these risks create big mistrust to m-commerce services within the society. Solution to these problems comes from strict legislation. There are many evidences about transnational regulations development which would have strong influence on e-commerce and mobile commerce as well.

On the other hand, changes of purpose might be associated with smaller risks if the data is anonymized or pseudonymized. Regulators should consider setting up incentives for data controllers to remove identifiers from data sets. In this sense, Russian legislation was adjusted to keep all personal data about Russian citizens at the data storages in Russia (State Duma, 2014).

- *Possible isolation of Russia from international money and shipment transactions (policy-related)*

The ongoing political and economic crisis (e.g. sanctions) could cause selective isolation of Russia from global money transfer services, which could hinder m-commerce development in the Russian market. Some of sanctions already affect Russian huge banks, such as Sberbank and VTB.

Russian companies have developed national payment systems to ensure that banks can continue their work in case of isolation. New secure national electronic payment systems continue to appear and develop, such as PRO100 (Russian "ПРО100"), Yandex.Money and others.

Another evidence of potential isolation is the fact that Russian banks were not considered partners for developing unified blockchain technology standard on the worldwide level called R3 forcing Russian companies to work separately in the consortium organized by QIWI (Izvestia, 2016).

5. Conclusions and discussion

Mobile commerce (m-commerce) is a very important business and technology area for Russia with very high market potentials due to its large population and vast size across Eurasia. Advancements in information, communication, financial, security, wearable, drone, additive and other technologies, social trends towards data sharing and personalization, as well as infrastructural and logistics changes in the country drive the development of m-commerce. The present study explored the future trends and developments in the m-commerce sector in the form of 10 major Weak Signals concentrating on society, technology, economy, environment and policy aspects along with future opportunities and threats concerning m-commerce in Russia.

Mobile will be seen as the main tool of payment and C2C commerce and employ technologies like Near-Field-Communication (NFC), 3G, 4G and LTE and other payment and data transferring technologies. The problem of security and data privacy will be solved using homomorphic encryption, elliptic curve cryptography (ECC), anonymization of data used by commerce companies for analytics along with traditional security methods, as well as new data policies induced by governments. M-commerce will become more social exploring Social Experience Design (SXD) concept through exchanging consumers' opinions and suggesting direct trades in social networks. Big data predictive analytics will allow analyzing consumer behaviors and suggesting personalized product and service offers to each customer depending on his or her preferences and transaction history. Mobile commerce will be highly integrated with wearable devices, wireless sensor networks (WSN), Smart Infrastructures, Personal Health Systems and other tax, bill and education related services improving each person's quality of life. Decentralized financial systems and currencies might adjust existing bank system making it more transparent and secure, or even replacing it with international independent currencies with no direct control over the money flows. Robotics such as drones will be used for quick delivery of goods regardless of logistics. New green retail practices might be introduced exploiting augmented and virtual reality to replace physical storage of goods with 3D objects and possibility to get fully detailed personalized information about each product or service. Possible isolation of Russia from international money and shipment transactions might hinder connection of Russia with global m-commerce market, but instead lead to a very strong national market. Finally, "new craftsmanship" trend leads to "do it yourself" (DIY) movement that implies using consumer-oriented additive technologies (e.g. 3D printing) in conjunction with mobile clients and services, such as purchasing 3D models of desired products with particular properties.

Development of m-commerce and respective technologies brings various opportunities for the country. New business models developed around mobile services will stimulate Russian economy opening new areas for companies to participate. Automation and digitalization of different business processes create more competitive retailing environment that leads to better and more customized services for consumers. Use of drones for m-commerce, for example, might also help to solve long distance problems in Russia. Since there are still many regions with difficult road access, delivery of goods using flying robots can be more efficient. National electronic payments systems help to reduce reliance on the world's banking system, global currencies and political instabilities leading to more sustainable business relationships for both national and foreign companies working in the country. Changes to legislation about "personal data" help to develop unified national security standards. Vast integration of governmental social services and business operations into m-commerce leads to advanced data analytics for each sphere (transaction logs, consumer preferences, etc). This in turn helps both government and business to identify and predict customer needs based on "big data" paradigm.

Further development of m-commerce in Russia also means better access to global products and services. For example, international and national higher education systems will include distance learning and compete globally bringing better quality of services and less dependency on geographical location of customers. Changes in business models will also mean labor market transformations. M-commerce may

empower SMEs in Russia, which are playing relatively smaller role in the economy compared to other economies in Europe. The demand for new hi-tech competences will occur at much quicker pace.

Finally, mobile digitalization of all services (government and business) will also lead to new solutions for the monitoring of natural resources across the country. That in turn will help to control the environmental situation in Russia and make proactive decisions based on indicators and online reports by both smart devices (sensors) and the society (mobile phones, wearable devices).

Although development of m-commerce and respective technologies in Russia, as well as adjustments made by Russian government and business organizations to secure payment systems and personal data of citizens, there are several threats that arise for the country:

- First, m-commerce strongly depends on trust of customers and willingness to share some of the personal information. Cultural differences, habits to use traditional methods of payment, concerns for the safety of electronic money and security of data and transactions can be a serious barrier for m-commerce in Russia.
- Second, big dependence on m-commerce transactions might be risky from the security perspective. There might be many hacker attempts to steal and abuse personal data, get a remote control of mobile devices in order to steal money during data transmission and other. Solution to security issues might be the involvement of third party services for transactions, which in turn will increase the price of goods and services.

Strict regulation about personal data protection might lead to loss of foreign companies from Russia's m-commerce market. Concentration on national payment and banking systems might help to deal with political instabilities, however may also lead to the total isolation of Russian e-commerce from the rest of the world.

Current political and economic context may hinder m-commerce. It does not stop m-commerce from growing, however switches the focus to more country-specific solutions (i.e. payment systems, domestic currency, data use and security)

C2C business model within m-commerce market will bring many new opportunities for consumers to trade goods and services between each other without the involvement of third parties. However, there are many threats concerning violation of transaction regulations and intellectual rights, lack of quality assessment and uncontrolled delivery of prohibited goods (for example, with the help of drones).

Finally, with the development of Russian m-commerce and its integration into the world's global market there is a threat that international goods and services will be chosen over Russian leading to some economic problems.

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