EUROPEAN
SCIENTIFIC
e-JOURNAL

ISSUE 4 (19)   MAY 15, 2022

ACTUAL ISSUES OF
MODERN SCIENCE

EUROPEAN SCIENTIFIC E-JOURNAL

ISSUE 4 (19)

ACTUAL ISSUES OF MODERN SCIENCE

2

IDS
INTERNATIONAL
DESIGN SCHOOL

Table of Contents

Vishwanatha, M.A., PhD in Kannada, Professor, Kannada Chair, Centre of Indian Languages, School of Language Literature and Culture Studies, Jawaharlal Nehru University. New Delhi, India.

Agenda Ahead for Classical Languages in the Context of National Education Policy – 2020

Abstract: The term classical is also liberally used in the sense of excellence in quality along with antiquity, universality, idealism, clarity/reason, and humanitarian outlook. As Sheldon Pollock points out, "These books [classical texts] are not just for rasikas or lovers of poetry or the professional historian. If you look at the definition of 'classical' in the Western tradition, they use the phrase 'perpetualcontemporaneity'. The classical is always what is already familiar to us. It's as if you go to the classical because you want to rediscover yourself." The present paper examines the challenges and opportunities in the field of classical Kannada literature in the light of National Education Policy 2020. The author concludes that according to new reports, as a part of the process to implement the new National Education Policy, the government has asked the National Council for Education Research and Training (NCERT) to come up with National Curriculum Frameworks (NCFs) for school, early-childhood, teacher and adult education. University Grants Commission (UGC) had sought suggestions to the revised draft National Curriculum Framework on the guidelines of "fostering social responsibility and community engagement in higher education institutions in India".

Keywords: Classical Kannada literature, halagannada, classical literature, texts, translations, NEP 2020.

---

urdhvordhavam aruhya yad arta-tattvam
dhih pashyati srantim avedayanti
phalam tad adyaih parikalpitanaam
viveka-sopaana-paramparanaam
Abhinava-gupta (*Abhinava*-bharati, 6.31)

The mind perceives the ultimate
By tirelessly ascending higher and higher
It is the fruition of a flight of stairs
Fashioned by the ancients

Introduction

What is the definition of "classical literature" that forms the basis for a language to be termed classical? The term "classical literature" is used for the literature of any language in a period notable for the excellence and enduring quality of its writers' works. In ancient Greece such a period extending from about 500 to 320 BCE. The Golden Age of Rome ran from about 70 BCE to 18 CE. French literature of the second half of the 17th century is considered classical, as is English literature of 1660-1714. In Japanese language, the literature of the period from 794 A.D. to 1185 A.D. is considered to be classical. In the Indian context, classical literature is also characterized by the element of timelessness and continuing relevance and a large part of it is space and time neutral.

The term classical is also liberally used in the sense of excellence in quality along with antiquity, universality, idealism, clarity/reason, and humanitarian outlook. As Sheldon Pollock points out, "These books [classical texts] are not just for rasikas or lovers of poetry or the professional historian. If you look at the definition of 'classical' in the Western tradition, they use the phrase 'perpetualcontemporaneity'. The classical is always what is already familiar to us. It's as if you go to the classical because you want to rediscover yourself."

The study purpose is to examine the challenges and opportunities in the field of classical Kannada literature in the light of National Education Policy 2020.

According to the purpose, there were fellow study tasks:

– analyse history of classical language status in India;

– describe important issues of the topic;

– conclude examining the challenges and opportunities in the field of classical Kannada literature in the light of National Education Policy 2020.

In the course of the study, the works of K.D. Kurtukoti, R.S. Mugali, Sh. Pollock, T.R.S. Sharma, M. Spotti, O. Garcia, N. Flores, H. Tipperudraswamy, A.R. Venkatachapathy, B.A. Vivek Rai, and C.N. Ramachandran were studied and applied. The authors used National Education Policy 2020, too.

Brief history of classical language status in India

The Tamil people were the first to make a call for classical language status. The then government considered the demand, consulted the Central Sahitya Akademi and constituted an expert committee to lay norms/guidelines to accord the status of Classical Languages. The Sahitya Akademi's expert committee mentioned four criteria for a classical language, which was accepted by the Government.

The four criteria are:

1. High antiquity of its early texts/recorded history over a period of 1500-2000 years
2. A body of ancient literature/texts, which is considered a valuable heritage by generations of speakers.
3. The literary tradition to be original and not borrowed from another speech community
4. The classical language and literature being distinct from modern, there may also be a discontinuity between the classical language and its later forms or its offshoots.

After a language is notified as a Classical Language, the following benefits are provided by the Ministry of Education:

1. A Centre of Excellence for studies in Classical Languages will be set up.
2. The University Grants Commission (UGC) is requested to create, to start with at least in the Central Universities, a certain number of Professional Chairs for the Classical Languages so declared.
3. Two major annual international awards for scholars of eminence in classical Indian languages.

As on date, six Indian languages Tamil (2004), Sanskrit (2005), Telugu (2008), Kannada (2008), Malayalam (2013), and Odia (2014) have been accorded the Classical Language status till now.

For Classical Kannada the Education Ministry has established a Centre of Excellence in the Central Institute of Indian Languages (CIIL), Mysore. In addition to this, University Grants Commission (UGC)has approved Centre for Classical Languages in Kannada in Central University of Karnataka, Gulbarga.

In November 2021, the Union Government constituted a 'high-powered' committee to explore and recommend pathways for the promotion and growth of Indian languages as envisaged in the National Education Policy (NEP) 2020.

Important issues

Throughout the talk I will be giving examples from Kannada, my mother tongue and the language it each, as it gives me a sense of authenticity. I beg the audience not to mistaken it as chauvinism. However, I am sure the examples will be relatable. One often hears that soon there will be no one studying the classical texts in Karnataka. One can also witness the dearth of students for classical studies in literature. Hence, the point is what is the use of giving "classical" status if there is hardly anyone to study/read it? Decades ago, every university in Karnataka, and I am sure across the country, had a department of Indian classical studies. However, we are hardly left with any now. With the advent of modern technology and globalization, it has become difficult even for departments of philosophy, science and literature to survive. This being the case, subjects like Halagannada becomes unpopular with students rather early. The best of students generally goes to engineering, medicine and management. What we are left with is a disinterested bunch.

This should change. Every challenge provides with new opportunities. We have shown that we are capable of achieving eminence in a lot of things. Let us take the examples of Indian Institute of Technologies (IITs), Indian Institute of Managements (IIMs), National Law Schools (NLSs). Why should we not think of an institute or a set of institutions dedicated to the cultivation of classical knowledge with the same kind of funding and seriousness as the IITs and IIMs.

For example: Karnataka has 25,000 to 30,000 inscriptions. Epigraphica Indica, the first volume of which was edited by James Burgess in 1888 is the most comprehensive. The later editions are just photographs of these inscriptions with no critical analysis. This gap can and should be filled.

As mentioned earlier, in the Indian context, classical literature is also characterized by the element of timelessness and continuing relevance, as ours is largely a living tradition. NEP should encourage education system to resonate within its pages the eternal spirit of the Vachanakaras to the poetic genius of Pampa, Ponna and Ranna, the historical pre-eminence of Halmidi inscription, Srivijaya, Vidyaranya to the new dimensions in classical music, dance, folk and other art forms related to classical Kannada literature explored by contemporaries. In other words, the content should be *space-and-time neutral.*

The NEP states that, "In addition to Sanskrit, other classical languages and literatures of India, including Tamil, Telugu, Kannada, Malayalam, Odia, Pali, Persian, and Prakrit, will also be widely available in schools as options for students, possibly as online modules, through experiential and innovative approaches, to ensure that these languages and literature stay alive and vibrant."

Classical languages of India contain vast treasures of mathematics, philosophy, grammar, music, politics, medicine, architecture, metallurgy, drama, poetry, storytelling, and more. They are written by people from all walks of life and a wide range of socio-economic backgrounds over thousands of years. It is imperative that this classical part of the literature be taught in ways that are interesting, experiential as well as contemporarily relevant and make its study truly enjoyable.

It is here that interdisciplinary and multidisciplinary approaches should be taken. I should cite the example of the BGL Swamy, an eminent Kannada writer and an outstanding botanist who was trained at Harvard. BGL Swamy worked on areas such as plants mentioned in ancient Kannada inscriptions and ancient Kannada works. This, BGL Swamy says, helped a lot to gain unique perspectives for his studies and research in Botany. He even tried to locate the time and space of such works in the background of botany. Hence, for the enrichment of the children along with the preservation of classical languages students should have the option of learning/studying classical language with an emphasis on classical literature its associated disciplines with integration of technology.

This will not only relate to the students of literature but to the students of history, sociology and epigraphy as well. As the famous adage from the Bible goes, "…the harvest is plentiful but the laborers are few."

With quickly changing employment landscape and global ecosystem, it is evident that children not only learn, but learn how to learn, how to think critically and solve problems, how to be creative and multidisciplinary, and how to innovate, adapt, and absorb new material in novel and changing fields. In this regard, the NEP aims to make the education pedagogy more "experiential, holistic, integrated, inquiry-driven, discovery-oriented, learner-centred, discussion-based, flexible, and, of course, enjoyable."

How will these be achieved as far as the classical literature is concerned is not given in detail in NEP.

As far as I have observed, projects under the classical language status have largely been by and for academia and academic scholarship. However, there are interest groups across the state of Karnatakawho are interested in Halagannada and are working towards, for example, bringing back the glory ofwell-structured poetry, i.e., prosody. One such example is a group called "Padyapaana" in Bengaluru.

Tens of members, young and old and from various professional backgrounds, from the "Padyapaana" circle are adept in composting poetry set to classical meters. Some of them are extempore poets as well. It is high time that we take the classical studies to the common people, like it was a millennium ago and during the medieval periods. Technology and crowdsourcing, with extensive participation ofthe people, will play a crucial role in these efforts.

The Classical period in Kannada literature marks one of the highest peaks of achievement in the history of Kannada literature. The era was marked by gifted poets and thinkers, who were also social critics, such as Srivijaya, Shivakotyacharya, Pampa, Ranna, Nagavarma, Nagachandra, Kumaravyasa and the whole galaxy of Vachanakaras from Basava to Allama to Akka Mahadevi. However, ironically, such a distinguished and rich body of literature has largely remained inaccessible to the non-Kannada readers. This is mainly because our universities and education institutions have not made a systematic and sustained attempt to make available to non-Kannada

readers. On the other hand, while it is important to draw the attention of the non-Kannada readers to classical Kannada literature, it is inevitable that Kannadigas, however one defines the term, need to be sensitized about their own literature. This lacuna should be filled with earnestness. On the one hand, major Kannada works should be translated into English and on the other hand they need to be translated into other Indian languages as well, especially classical languages. However, this exercise should be done with a genuine aim of making students and the general public want to read them in the original. Till now, whatever work has happened in this regard as been minimal.

NEP can focus on the following areas to achieve this objective:

1. Publish research of scholars in subjects related to cultural heritage of Kannada literature, with a special focus on classical Kannada literature.
2. Produce lucid English translations and translations into other Indian languages of valuable literature in these areas.
3. Identify, curate, and make available in the public domain primary texts related to various aspects of Kannada antiquity and build an online archive.
4. Go beyond just publishing books in conventional way and produce, for example, renderings and audio books and use other forms of arts including theatre, music and dance.

Discussion

Ralph Waldo Emerson famously asked Henry David Thoreau because he quit Harvard, because, after all, Harvard taught all the branches of knowledge. Thoreau replied: "Yes, all the branches and none of the roots." I was reminded of this brilliant anecdote while preparing this talk on the agenda ahead for classical languages in the context of National Education Policy-2020 (NEP) as much of these discussions are about strengthening of roots and expanding of branches of our classical languages.

Conclusion

According to new reports, as a part of the process to implement the new National Education Policy, the government has asked the National Council for Education Research and Training (NCERT) to come up with National Curriculum Frameworks (NCFs) for school, early-childhood, teacher and adult education. University Grants Commission (UGC) had sought suggestions to the revised draft National Curriculum Framework on the guidelines of "fostering social responsibility and community engagement in higher education institutions in India".

The national curriculum framework serves as a guideline for syllabus, textbooks, teaching and learning practices in the country. India is currently following its fourth national curriculum framework that was published by the NCERT in 2005. Officials at the education ministry said the timeline for the development of new framework is three years.

Earlier, in September 2021, the Union education ministry constituted a 12-member national steering committee to develop the new national curriculum framework (NCF), which serves as a guideline for syllabus, textbooks, teaching and learning practices in the country. The committee has been constituted to develop NCF in line with the NEP 2020.

We will have to wait and watch how the NEP is implemented.

References:

Classical Kannada: A Road Map. Gulbarga: Central University of Karnataka.

Kurtukoti, K.D. (2005). *Kannada Sahitya Sangathi*. Kannada University.

Mugali, R.S. (2018). *Kannada Sahitya Charitre*. Geetha Book House.

National Education Policy 2020. Ministry of Education. Government of India.

Pollock,Sh. (2011). Crisis in the Classics. *Social Research*, *1* (78), 21-48. Spring.

Sharma,T.R.S. (2000). *Ancient Indian Literature*. New Delhi: Sahitya Akademi.

Spotti, M., García, O., & Flores, N. (2017). *The Oxford Handbook of Language and Society*. Oxford University Press.

Tipperudraswamy, H. (1980). *Karnataka Samskruti Samikshe*. MysoreUniversity.

Venkatachapathy, A.R. (2009). The 'Classical' Language Issue. *Economic and Political Weekly*, *2*(44), 13-15.

Vishwanatha (2016). *Kannadasahithyamattuyedegalameemamashe*. Mysure: Devi Prakasha.

Vivek Rai, B.A., & Ramachandran, C.N. (2015). *Classical Kannada Poetry and Prose: A Reader*. Karnataka: Kannada University.

Nina N. Gontar, Associate Professor, Candidate of Sciences in Jurisprudence (PhD), Department of Public and Municipal Administration, Northwestern Institute of Management, Russian Academy of National Economy and Public Administration, Russian State University of Justice, St Petersburg, Russia.

Maria S. Polustrueva, Master's Student, Northwestern Institute of Management, Russian Academy of National Economy and Public Administration, St Petersburg, Russia.

The role of the State Duma of the Russian Federation in Russia's Fiscal Policy

Abstract: The level of state development and its citizens' welfare largely depends on fiscal policy. It guarantees the main activities of the country: maintaining public order and security, free health care and education, providing social security to the population, reducing poverty, improving the quality of citizens life, creating conditions for economic development. The competence of the State Duma of the Russian Federation includes appointing and dismissing the Chairman of the Central Bank of the Russian Federation. In this case, the State Duma exercises its authority alone without any influence from other bodies. The study purpose is to determine the role of the State Duma of the Russian Federation in Russia's fiscal policy. To achieve the study purpose, comparative, logical and historical methods, which contributed to the disclosure of the topic, were used. The study used materials of federal laws of the Russian Federation, the Budget Code of the Russian Federation, the official website of the State Duma of the Russian Federation and articles by experts in the research. The authors indicate the great importance of the State Duma of the Russian Federation in the fiscal policy of Russia since it is the representative body, which in its essence expresses the will and interests of citizens, should have such broad powers affecting the entire fiscal system of the country.

Keywords: State Duma, Russian Federation, fiscal policy, Budget Code of the Russian Federation, Central Bank of the Russian Federation.

Нина Николаевна Гонтарь, доцент, кандидат юридических наук, кафедра государственного и муниципального управления, Северо-Западный институт управления, Российская Академия народного хозяйства и государственной службы, Российский государственный университет правосудия, Санкт-Петербург, Россия.

Мария Полуструева, магистрант, Северо-Западный институт управления, Российская Академия народного хозяйства и государственной службы, Санкт-Петербург, Россия.

Роль Государственной Думы Российской Федерации в финансовой политике России

Аннотация: Уровень развития государства и благосостояние его граждан во многом зависит от финансовой политики. Она гарантирует обеспечение основных направлений деятельности страны: поддержание общественного порядка и безопасности, бесплатное здравоохранение и образование, предоставление социального обеспечения населению, снижение бедности, улучшение качества жизни граждан, создание условий для развития экономики. В компетенцию Государственной Думы РФ входит назначать на должность и освобождать от должности Председателя Центрального Банка РФ. В данном случае Госдума осуществляет свое правомочие единолично без какого-либо влияния со стороны других органов. Целью исследования является определить роль Государственной Думы российской федерации в финансовой политике России. Для достижения цели исследования использовались сравнительный, логический и исторический

методы, способствовавшие раскрытию темы. В ходе исследования использовались материалы федеральных законов Российской Федерации, Бюджетный Кодекс Российской Федерации, официальный сайт Государственной Думы Российской Федерации и статьи специалистов в данной области исследования. Авторы обозначают большое значение Государственной Думы РФ в финансовой политике России, поскольку именно представительный орган, который по своей сути выражает волю и интересы граждан, должен обладать такими широкими полномочиями, затрагивающими всю финансовую систему страны.

Ключевые слова: Государственная Дума, Российская Федерация, финансовая политика, Бюджетный Кодекс Российской Федерации, Центральный Банк Российской Федерации.

Introduction

The level of state development and the welfare of its citizens largely depends on financial policy. It guarantees the main activities of the country: maintaining public order and security, free health care and education, providing social security to the population, reducing poverty, improving the quality of life of citizens, creating conditions for economic development.

The Concept of Financial Policy is understood as a set of measures for the accumulation of financial resources, their distribution and use for the implementation of state functions. Financial policy determines the direction and methods of financial activity. "The financial activity of the state is a form of public administration through which centralized funds of funds are formed, distributed and used to ensure the performance of its constitutional functions." (*Zemlin, 2021*). In turn, it implements financial policy.

Among the bodies engaged in financial activities, there is a representative (legislative) body of the state, i.e., the Parliament. His competence in this area is mainly expressed in the performance of financial control, consideration and approval of the state budget, the establishment of taxes and fees, the adoption of legislation and the implementation of other functions. The principle, which the establishment of public funds' taxes and the expenditure was not allowed without the consent and approval of a representative body, was the first legislated by the Bill of Rights of 1689. In 1787, the U.S. Constitution enshrined a provision according to which the right to establish and collect taxes belongs exclusively to Congress, i.e., the highest legislative and representative body. And monetary disbursements cannot be made without appointments established by law.

The subject of this study is the authorised component of the State Duma of the Russian Federation.

The purpose of the study is to determine the role of the State Duma of the Russian Federation in the financial policy of Russia.

Based on the purpose of the study, the following tasks were identified:

– conduct a comparative characterisation of the structure of the State Duma;

– determine the competence of the State Duma in the financial policy of Russia;

– actualise the role of the State Duma in the financial policy of modern Russia.

Comparative, logical and historical methods, which contributed to the topic disclosure, were used to achieve the study purpose.

The research used materials of federal laws of the Russian Federation, the Budget Code of the Russian Federation, the official website of the State Duma of the Russian Federation and articles by experts in the research.

Comparative structural characteristics of the State Duma

In most foreign countries, the legislature has been granted quite significant powers in finance at present days, e.g., the supreme legislative body, the National People's Congress, is authorized to check and approve the country's state budget, like the social and economic development plan in China. The Seimas of Finland exercises control over the expenditure of public funds in connection with the submission of an annual government report on the state of the treasury. In Germany, the Parliament exercises state financial control with the help of the Federal Accounting Chamber and the accounting chambers of the lands that have the status of a structural subdivision of a representative body. In France, the competence of the Chambers of Parliament includes the approval of the state budget, the establishment of the limit of public debt, etc. Accordingly, it seems the general powers of the highest legislative bodies are approximately similar in the countries, allowing them to significantly influence the state financial system (*Dolginina, 2018*).

The Russian Federation is no exception. Its legislative body is also endowed with important financial functions. The Parliament in Russia, namely the Federal Assembly of the Russian Federation, consists of two chambers – the Federation Council and the State Duma. The State Duma of the Russian Federation is elected for five years and includes 450 deputies. The Lower House has a wide range of powers, including in the field of finance. From the point of theory view, the State Duma of the Russian Federation can be attributed to the bodies of general financial control, since for it, the financial activities implementation is not the only and main activity. Despite this, it is provided with significant areas of regulation in fiscal policy.

For the effective activity of the State Duma, committees and commissions are formed in it from among the deputies. Among them are the following committees and commissions, the subject of which are financial issues: the Committee on budget and taxes, the committee on the financial market, the committee on economic policy, industry, innovative development and entrepreneurship, the commission for the review of federal budget expenditures aimed at ensuring national defence, national security and law enforcement, the commission for the support of small and medium-sized businesses, etc.

Competence of the State Duma in the fiscal policy of Russia

Since the State Duma of the Russian Federation is a law-making body, it is worth starting with its competence in this matter. Thus, it adopts laws on the federal budget, federal taxes and fees, financial, currency, credit, customs regulation, monetary emission, which are subject to mandatory consideration by the Federation Council. Examples of such legislative acts include the Federal Law No. 86-FZ "On the Central Bank of the Russian Federation (Bank of Russia)" dated July 10, 2002, Federal Law No. 395-1 "On Banks and Banking Activities" dated December 2, 1990, Federal Law No. 173-FZ "On Currency Regulation and Currency Control" dated December 10, 2003, etc. The State Duma creates the legal basis for the work of financial

institutions and governing bodies implementing fiscal policy, the legal core for the successful functioning of the economy.

It separately is worth mentioning the budget adoption in the federal law form by the State Duma of the Russian Federation. This process begins with the submission of the federal budget for the next fiscal year and the planning period by the Government of the Russian Federation to the State Duma to consider the draft federal law. Already at this stage, the State Duma has the right to return the draft law for revision if the submitted materials and documents do not comply with the law. Draft consideration is approved by the State Duma in three readings within 60 days. The first reading discusses the concept of the draft law, the forecast of social and economic development of Russia, including the projected volume of gross domestic product and inflation, the main directions of the budget, tax and customs tariff policy of the Russian Federation. The State Duma has the authority in the first reading not only to reject the draft and return it to the Government but also, in case of rejection of the bill, raise the question of confidence in the Government of the Russian Federation. At the second reading, the draft law articles are considered directly, budget allocations are distributed. At the third reading, an appendix containing the departmental structure of federal budget expenditures is approved. The adopted federal law on the federal budget for the next financial year and the planning period is sent within five days for consideration by the Federation Council. However, the scope of the State Duma's actions does not end there, since it subsequently monitors the execution of the budget in the form of consideration and approval of reports on the execution of the federal budget and budgets of state extra-budgetary funds of the Russian Federation. Thus, we see that the representative body determines the financial base of the social and economic development of Russia and its regions, the content of the general element of the system of the distribution mechanism of funds.

Together with the Federation Council, the competence of the State Duma of the Russian Federation includes the appointment and dismissal of the Deputy Chairman of the Accounts Chamber and half of all the auditors on the proposal of the President of the Russian Federation. The Accounting Chamber is a permanent supreme body of external state audit (control), which performs control and audit, expert-analytical and information functions. In addition, it is accountable to Parliament. That is, we can say that the State Duma, through its constitutional powers, directly determines the nature of the body's activities by appointing or dismissing its head (*Krylova, 2012*).

It also applies to the possibility of the State Duma to appoint and dismiss the Chairman of the Central Bank of the Russian Federation. It is worth noting that in this case, the State Duma exercises its authority alone without any influence from other bodies. And since the Central Bank of the Russian Federation is the most important bank of Russia, which provides money issuance, protection and stability of the Russian currency, stability and development of the national payment system, financial market, strengthening of the banking system of the Russian Federation, in other words, is responsible for the efficiency of the entire financial system of the country, it can be concluded that the high positive performance of the Central Bank of the Russian Federation, and, accordingly, the welfare of the Russian economy as a whole and foreign economic activity depends on the lower house of Parliament. In addition, the State Duma hears

the annual reports of the Central Bank of the Russian Federation, that is, it constantly monitors its work (*Falshina, 2016*).

The authority of the State Duma of the Russian Federation to hear the annual reports of the Government of the Russian Federation on the results of its activities, including on issues raised by it in economics, also talks about the chamber right to control the executive body activities, in particular financial.

Speaking about the role of the lower house of Parliament in Russia's fiscal policy today, it is impossible to ignore the change in the factions' ratio in the State Duma after the elections in September 17-19, 2021. Since it directly affects the general directions of the state's fiscal policy and the functioning of the financial system as a whole. So, according to the results of the vote (*fig. 1*), it seems there will be no radical changes in the main course of the State Duma's work in finance in the future. That is, the stability of the financial activity of the state is assumed and, accordingly, the predictability of concrete actions for the implementation of fiscal policy is quite easy.

Discussion

At the present stage of the development of Russian society, it is extremely significant to determine the place of the State Duma of the Russian Federation in the state financial system. How big the role of the Duma should be in this system is an urgent issue of the state system. Therefore, further research should determine the efficient level of influence of the State Duma on the transformation of the financial system and the main directions of domestic and foreign fiscal policy.

Conclusion

Thus, summing up, it can be asserted the great importance of the State Duma of the Russian Federation in Russia's fiscal policy. This conclusion is very obvious since it is the representative body, which in its essence expresses the citizens' will and interests, that should have such broad powers affecting the entire state financial system. The list of powers of the State Duma is mainly aimed at creating a solid foundation for the perfect functioning and development of the Russian economy.

References:

Dolginina, D. O. (2018). Organization of budget control in foreign countries. *Ogarev-Online*, *12* (117), 6. (in Russian)

Falshina, N.A. (2016). Parliamentary control in the financial and tax sphere. *Bulletin of the Faculty of Law of the Southern Federal University*, *2-3*, 36-39. (in Russian)

Federal Law N 41-FZ "On the Accounts Chamber of the Russian Federation" dated April 5, 2013. (in Russian)

Federal Law N 86-FZ "On the Central Bank of the Russian Federation (Bank of Russia)" dated July 10, 2002. (in Russian)

Krylova, N.S. (2012). Budgetary and financial powers of the Parliament. *Proceedings of the Institute of State and Law of the Russian Academy of Sciences*, *1*, 157-184. (in Russian)

Official website of the State Duma of the Russian Federation. Retrieved November 10, 2021 from http://duma.gov.ru/(in Russian)

Omonova F., Zikrillayeva N. (2013). The adoption of the country's state budget is an important form of parliamentary control. *Economics and Finance*, *3*. Uzbekistan. (in Russian)

The Budget Code of the Russian Federation No. 145-FZ dated July 31, 1998 (edition of July 1, 2021, as amended on July 15, 2021). (in Russian)

The Constitution of the Russian Federation (adopted by popular vote on December 12, 1993 with amendments approved during the all-Russian vote on July 1, 2020). (in Russian)

Zemlin, A. I. (2021). *Financial Law of the Russian Federation: textbook for universities*. 2nd ed. Moscow: Yurayt Publishing House. (in Russian)
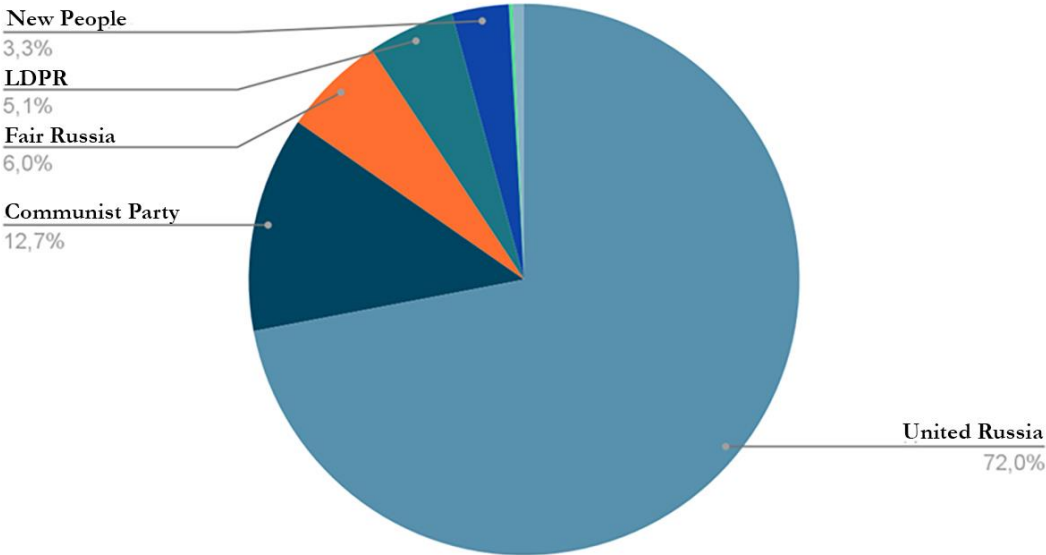
Appendix

New People
3,3%

LDPR
5,1%

Fair Russia
6,0%

Communist Party
12,7%

United Russia
72,0%

Figure 1. Factions of the State Duma of the Russian Federation after the vote in 2021

Nina N. Gontar, Associate Professor, Candidate of Sciences in Jurisprudence (PhD), Department of Public and Municipal Administration, Northwestern Institute of Management, Russian Academy of National Economy and Public Administration, Russian State University of Justice, St Petersburg, Russia.
Anastasia Y. Galina, Master's Student, Northwestern Institute of Management, Russian Academy of National Economy and Public Administration, St Petersburg, Russia.

Traceability as an element of the system of state control over the goods turnover

Abstract: The priority areas of the state's activities include ensuring the national security of the Russian Federation and controlling the turnover of illegal products. National security, including food security, is conditioned by many factors. One of them is the possibility of traceability of the goods movement at all stages of their turnover and control over the safety of such goods. Documentary traceability is not transparent. There is no possibility to track the goods movement in real-time. Also, paper accompanying documents are easily forged, which allows you to enter the market of illegal (counterfeit and falsified) products. The purpose of the study is to analyse the features of the Concept of creating and functioning in the Russian Federation of a system of labelling goods using identification and traceability of the movement of goods. Analytical, logical, and historical methods were used to achieve the purpose and solve the research tasks. In the study course, materials of state and international documents were used: federal laws, resolutions and orders of the Government of the Russian Federation, the National Marking System "Honest MARK". The authors conclude that the traceability development is extremely significant for the management of commodity flows, tax deductions, and product quality since despite the sufficiently debugged and digitized goods' labelling system on the Russian Federation territory and its compatibility with labelling control systems in other countries, there are still some elements of the system that allow bypassing it.

Keywords: traceability, turnover of goods, labeling of goods, consumer, federal law, decree of the Government of the Russian Federation.

Нина Николаевна Гонтарь, доцент, кандидат юридических наук, кафедра государственного и муниципального управления, Северо-Западный институт управления, Российская Академия народного хозяйства и государственной службы, Российский Государственный университет правосудия, Санкт-Петербург, Россия.
Анастасия Юрьевна Галина, магистрант, Северо-Западный институт управления, Российская Академия народного хозяйства и государственной службы, Санкт-Петербург, Россия.

Прослеживаемость как элемент системы государственного контроля за оборотом товаров

Аннотация: В число приоритетных направлений деятельности государства входит обеспечение национальной безопасности Российской Федерации и контроль за оборотом нелегальной продукции. Национальная безопасность, в том числе продовольственная, обуславливается рядом факторов, одним из которых выступает возможность прослеживаемости движения товаров на всех этапах их оборота и контроль за безопасностью таких товаров. Документальная прослеживаемость не является прозрачной, отсутствует возможность в реальном времени отследить перемещение товара. Также бумажные сопроводительные документы легко подделываются, что позволяет проникать на рынок нелегальной (контрафактной и

фальсифицированной) продукции. Целью исследования является анализ особенностей Концепции создания и функционирования в Российской Федерации системы маркировки товаров средствами идентификации и прослеживаемости движения товаров. Для достижения цели и решения задач исследования применялись аналитический, логический и исторический методы. В ходе исследования использовались материалы государственных и международных документов: федеральные законы, постановления и распоряжения Правительства Российской Федерации, Национальная система маркировки «Честный ЗНАК». Авторы делают заключение, что развитие прослеживаемости является крайне важным для управления товарными потоками, налоговыми отчислениями и качеством продукции, так как несмотря на достаточно отлаженную и оцифрованную систему маркировки товаров на территории Российской Федерации и её совместимость с системами контроля маркировки в иных странах, до сих пор существуют некоторые элементы системы, которые позволяют обходить её.

Introduction

The priority areas of the state's activities include ensuring the national security of the Russian Federation and controlling the turnover of illegal products. National security, including food security, is conditioned by many factors. One of them is the possibility to trace the goods movement at all stages of their turnover and control over the safety of such goods (*Decree of the President of the Russian Federation No. 683*).

At this moment, in the Russian Federation, the traceability of the goods is implemented in documentary and digital form, depending on the group of goods. The introduction of mandatory labelling in Russia began in 2015 when it was decided to create a unified information system for monitoring goods. The creation of a new system and conducting experiments were entrusted to the Federal Tax Service of the Russian Federation. Later, the Center for the Development of Advanced Technologies (CRPT) became the national operator of the Honest MARK accounting system. According to the developed plan, the Honest MARK accounting system should cover all categories of goods by 2024.

Documentary traceability is not transparent. There is no possibility to track the movement of goods in real-time. Also, paper accompanying documents are easily forged, which allows you to enter the market of illegal (counterfeit and falsified) products.

To date, traceability of the using digital technologies is the most effective element of the system of state control over the goods turnover.

The study subject is traceability as an element of the system of state control over the goods turnover.

The study purpose is to analyse the features of the Concept of Creating and Functioning of Labelling Goods System Using Identification and Traceability of the Goods Movement in the Russian Federation.

Based on the study purpose, the following tasks were:

– give a general description of the marking system;
– analyse the Concept of Creating and Functioning of Labelling Goods System Using Identification and Traceability of the Goods Movement in the Russian Federation;

– determine the preferential characteristics of goods labelling in the Russian Federation.

Analytical, logical, and historical methods were used to achieve the goal and solve the research tasks.

In the study course, materials of state and international documents were used: federal laws, resolutions and orders of the Government of the Russian Federation, the National Marking System "Honest MARK".

General characteristics of the marking system

Tracking tools using information and communication technologies include:

- identification;
- means of electronic identification (seals, tags, markers), which allow, based on machine-readable identifiers, to record, store or transmit data in electronic form;
- tracking tools that allow you to record changes in the parameters of the object (e.g., location);
- data registers, digital descriptions of objects;
- electronic documents (electronic accompanying documents, electronic reporting, declaration), transaction data (payment, customs operations) (*Shklyaruk, 2019*).

Various state information systems of traceability have been introduced and are functioning in the Russian Federation. As part of this study, we will consider the most ambitious – a system of digital labelling and traceability of goods. This system is one of the "trends" of the digitalization of the Russian economy.

The system of goods marking and traceability represents the interrelation of elements of information technology of organizational and regulatory nature, ensuring the achievement of purposes and tasks of traceability.

The elements of the marking and traceability system of goods are:

- state information system for labelling goods;
- interaction of government bodies, producers, subjects of the commodity distribution chain and consumers;
- regulatory legal framework in the field of labelling of goods;
- monitoring the turnover of goods subject to labelling.

Concept of Creating and Functioning the Labelling Goods System Using Identification and Traceability of the Goods Movement in the Russian Federation

In 2018, Russia approved the Concept of Creating and Functioning the Labelling Goods System Using Identification and Traceability of the Goods Movement in the Russian Federation (*Order of the Government of the Russian Federation No. 2963-r*). The concept was developed following the Agreement on Goods Labeling Using Identification in the Eurasian Economic Union (Agreement on Goods Labeling Using Identification in the Eurasian Economic Union; Agreement on the Goods Marking Using Identification in the Eurasian Economic Union) and the Strategy for Combating Illicit Trafficking in Industrial Products in the Russian Federation for the Period up to 2020 and the Planning Period up to 2025 (*Order of the Government of the*

Russian Federation No. 2592-r). The concept defines the system purposes and tasks, its main parameters and requirements for it.

The stages of product turnover using the digital marking and traceability system are:

1. Application of a digital code by the manufacturer to the product. The labelling operator of CRPT LLC (Center for the Development of Advanced Technologies LLC) ensures that each product is assigned a unique code to be placed on the packaging of the goods by the manufacturer or importer.

2. Fixing the "path" of products in the distribution chain. The marking code cannot be lost or forged. It allows the control system to trace the reliable path of products at all stages of their turnover.

3. Scanning the product marking code in the store.

4. Sale of goods - withdrawal of the corresponding code from circulation. When selling at the checkout, the labelling system will not allow enterprises to sell counterfeit products.

5. The ability to view product information through the Honest Sign mobile application.

In Russia, the state information system for monitoring the goods turnover is subject to mandatory labelling using an identification (GIS MT) (*Federal Law No. 381-FZ*), as well as the federal state information system for monitoring the movement of medicines for medical use (GIS MDLP) (*Federal Law No. 61-FZ*; *Order of the Government of the Russian Federation No. 899-r*) are established and operate based on a public-private partnership agreement. In recent years, projects implemented through public-private partnerships to create digital economy infrastructure have become increasingly widespread.

In this case, the Ministry of Industry and Trade of the Russian Federation is the coordinator of the digital marking and traceability system. One of its functions in the framework of the labelling project is the definition of commodity groups that are subject to mandatory labelling, as well as regulatory regulation of related processes.

The operator of both GIS MT and FGIS MDLP is defined by CRPT LLC (*Order of the Government of the Russian Federation No. 620-r*; *Order of the Government of the Russian Federation No. 2828-r*). The creation and development of GIS MT and FGIS MDLP are provided at the expense of a private partner, an Operator, within the framework of a corresponding PPP project.

Before the entry into force of the requirements for mandatory labelling to a certain product group, an experiment, which provides for testing the mechanisms of functioning the traceability system of the turnover of this group, is realised. The experiment is voluntary and allows the participants of the turnover to prepare in advance for the entry into force of mandatory labelling requirements.

In part legally significant time mandatory labelling using identification and commitment to make information about all stages (without exception) supply chain in GIS MT and FGIS MDLP occur for:

- dairy products (with June 1, 2021, for cheese and ice cream, with September 1, 2021, for products with a short shelf life up to 40 days, with December 1, 2021, for products with a long shelf life of more than 40 days);

- tobacco products, fur coats, footwear products, cameras, flashlights and flash lamps – from July 1, 2020;

- perfumes and toilet water – from October 1, 2020;
- new pneumatic rubber tires and tires – from November 1, 2020;
- certain light industry goods – from January 1, 2021;
- medicines of the List of Vital and Essential Medicines for Medical Usage – from October 1, 2019;
- other medicines for medical use – from July 1, 2020.
  Since 2022, the list of goods required for labelling has been supplemented with new items:
- bicycles and bicycle frames, packaged water (drinking and carbonated, with sugar, sweeteners and flavourings) – from March 1;
- beer and low-alcohol drinks, dietary supplements, antiseptics – from September 1;
- dairy products from suppliers-peasant farms – from December 1.

The Decree of the Government of the Russian Federation No 792-r of 28.04.2018 (ed. 05.10.2021) "On Approval of the List of Individual Goods Subjecting to Mandatory Labelling Using an Identification" establishes specific requirements for which goods are subject to labelling in 2022, the list of mandatory products contains not only the name and type of goods but also additional identification codes:

- code according to the All-Russian Product Classifier OK 034-2014, approved by Rosstandart Order No. 14-st dated January 31, 2014;
- code for the Trade Nomenclature of the Eurasian Economic Union for Foreign Economic Activity, published by the decision on behalf of the Council of the Eurasian Economic Commission dated July 16, 2012, No. 54.

In addition, the order specifies specific calendar dates from which the labelling of this type of product (product) becomes mandatory for all participants in the trade turnover in the Russian Federation.

Administrative responsibility has been established for late entry of data into the GIS MT, or the entry of false data into it (*Federal Law No. 58-FZ*).

Preferential characteristics of goods labelling in the Russian Federation

The goods marking and traceability system reduces the administrative and regulatory burden on bona fide participants in the goods turnover by collecting and storing the necessary information about the turnover of goods for the authorised bodies to carry out appropriate control measures.

On the other hand, the goods labelling and traceability system allows bona fide participants in the goods turnover to increase productivity, optimise logistics costs and business processes, increase their market share and increase their income, in particular, the following contributes to this:

- increase in market share and revenue due to the withdrawal of unscrupulous manufacturers from the market. According to the HSE research (August 2020), by reducing the share of illegal trafficking, bona fide business entities will be able to increase market share and production by 5-50%. The cost price will decrease, and the retail price of products will be reduced by 5-10%;

- in logistics, conditions will be created for savings in building logistics (at least 20%), as well as errors related to the human factor in the preparation of accompanying documents will be reduced up to 90-95%;
- control of price changes of labelled goods at all stages of its life cycle, a tool for identifying links in the commodity chain in which high margins arise, and timely response of control and supervisory authorities to take appropriate measures.

Thus, according to the study results conducted by the Federal Antimonopoly Service of Russia (*Letter of the FAS of Russia N RP/85112/18*), the introduction of labelling will not have a tangible impact on the goods price subjecting to labelling, which will be significantly lower than the average annual inflation rate.

In turn, the system will allow end-users to:

- check the legality and quality of the marked goods;
- realise non-governmental control using the Honest MARK mobile application;
- protect life and health by excluding illegal goods from circulation.

It should also note the advantages for the state from the introduction of labelling, in particular:

- understanding the market and control of the turnover of finished products in the country (in real-time);
- excluding expenses of the Russian Federation budget system for the introduction and development of a system of labelling and traceability of goods;
- stimulating the "whitewashing" of commodity markets;
- ensuring the legal turnover of products;
- ensuring the traceability of a specific unit of goods;
- increasing the collection of customs and tax, including excise payments;
- saving budget costs for the control of commodity markets;
- statistics on a country-wide scale in real-time;
- improving the efficiency of control and supervisory activities, including through automation of control and supervisory procedures;
- improving the effectiveness of public control through the use of the application "Honest Know";
- the ability to identify the dominant position of market participants and the suppression of cartel collusion;
- the possibility of obtaining analytical and statistical reports on various product groups from the labelling and traceability system;
- identification of the level of mark-up on goods at all stages of the supply chain;
- collusion detection in public procurement by comparing purchase prices with current market prices;
- promotion of quality control of products sold, prevention of actions misleading consumers;
- the possibility of unambiguous identification of goods illegally in circulation, its belonging to a specific batch of products and the production site of an unscrupulous participant in the goods turnover;

- the possibility of "blocking" the goods movement in the supply chain in the event of an incident or detection of a violation to this product;
- getting access to the register of permits for goods through the functionality of the goods marking and traceability system;
- the possibility of integration with other state information systems of federal executive authorities and obtaining the necessary information from them.

Discussion

Despite the well-established and digitized labelling system of goods on the territory of the Russian Federation and its compatibility with labelling control systems in other countries, there are still some elements of the system that allow bypassing it, although this fact is becoming increasingly rare.

In this regard, it seems necessary to further study the features of the Concept of Creating and Functioning of Labelling Goods System Using Identification and Traceability of the Goods Movement in the Russian Federation to debug it and prevent violations and counterfeiting, as well as minimize the variations of the system circumvention.

The authors propose to expand the groups of goods for which legally significant terms of mandatory labelling using identification and obligations to enter information about all stages of the commodity distribution chain in GIS MT and FGIS MDLP are valid.

Conclusion

Traceability as an element of the system of state control over the turnover of goods is extremely significant for the management of commodity flows, tax deductions and product quality. Goods labelling makes it possible to solve not only economic issues of the state but also social ones. Due to mandatory labelling, counterfeit manufacturers are leaving the market. It becomes easier for legal companies to compete with each other. Sellers avoid fines for selling low-quality products and refunds from dissatisfied consumers. Business revenues are growing.

The state needs to control the functioning of the market and fight the shadow sector. The mandatory labelling system allows the state to control the turnover of goods and prevent fakes and counterfeit goods from entering the market. As a result, the budget receives more taxes, since the number of companies that operate illegally is decreasing.

References:

Agreement on the Goods Marking Using an Identification in the Eurasian Economic Union dated February 2, 2018. (in Russian)

Agreement on Goods Marking Using an Identification in the Eurasian Economic Union dated February 2, 2018. (in Russian)

Decree of the President of the Russian Federation No. 683 "On the National Security Strategy of the Russian Federation" dated December 31, 2015. (in Russian)

Decree of the Government of the Russian Federation No. 836 "On Conducting an Experiment on Labelling Using an Identification of Certain Types of Dairy Products on the Territory of the Russian Federation" dated June 29, 2019. (in Russian)

Decree of the Government of the Russian Federation No. 1028 "On Conducting an Experiment in the Territory of the Russian Federation on Marking Wheelchair Identification Devices Related to Medical Devices and Monitoring Their Turnover" dated August 7, 2019. (in Russian)

Decree of the Government of the Russian Federation No. 1183 "On Conducting an Experiment on Marking Bicycles and Bicycle Frames Using an Identification and Monitoring the Turnover of These Products" dated September 11, 2019. (in Russian)

Decree of the Government of the Russian Federation No. 348 "On Conducting an Experiment on Labelling Using an Identification of Packaged Water on the Territory of the Russian Federation" dated March 27, 2020. (in Russian)

Federal Law No. 58-FZ "On Amendments to the Code of Administrative Offences of the Russian Federation" dated April 15, 2019. (in Russian)

Federal Law No. 61-FZ "On Circulation of medicines" dated April 12, 2010. (in Russian)

Federal Law No. 381-FZ "On the Fundamentals of State Regulation of Trade Activities in the Russian Federation" dated December 28, 2009. (in Russian)

Letter of the FAS of Russia N RP/85112/18 dated October 22, 2018. (in Russian)

National Marking System "Honest MARK". Official website of the national digital marking system "Honest MARK". Retrieved November 10, 2021 form https://xn--80ajghhoc2aj1c8b.xn--p1ai/o-chestnom-znake/nacionalnaya-sistema-markirovki/ (in Russian)

Order of the Government of the Russian Federation No. 2963-r "On Approval of the Concept of Creation and Functioning of a System for Marking Goods Using an Identification and Traceability of the Goods movement in the Russian Federation" dated December 28, 2018. (in Russian)

Order of the Government of the Russian Federation No. 792-r "On Approval of the List of Individual Goods Subjecting to Mandatory Labelling Using an Identification" dated April 28, 2018. (in Russian)

Order of the Government of the Russian Federation No. 899-r "On Approval of the Essential Terms of the Public-Private Partnership Agreement Concluded for the Purpose of Creating, Operating, and Maintaining an Object Designed to Ensure the Marking and Traceability of Certain Types of Goods" dated May 8, 2019. (in Russian)

Order of the Government of the Russian Federation No. 620-r "On the Operator of the State Information System for Monitoring the Goods Turnover of Subject to Mandatory Labelling Using an Identification" dated April 3, 2019. (in Russian)

Order of the Government of the Russian Federation No. 2828-r "On the determination of Operator-CRPT LLC as Authorized to Perform the Functions of an Operator of a System for Monitoring the Medicines Movement for Medical Usage" dated December 18, 2018. (in Russian)

Order of the Government of the Russian Federation No. 2592-r "On the Strategy for Combating Illegal Trafficking of Industrial Products in the Russian Federation for the Period up to 2020 and the Planning Period up to 2025" dated December 5, 2016. (in Russian)

Shklyaruk, M.S. (Ed.) (2019). *The state as a platform: People and Technologies*. Moscow: Russian Academy of National Economy and Public Administration. (in Russian)

Appendix

The usage of timely and reliable information about the goods movement at all stages of their turnover

Reducing the volume of illegal products

Ensuring safety, as well as protecting people's life and health

Increasing the collection of tax revenues

Ensuring competition in the market

Ensuring the development of high-tech solutions for the processing of mandatory data to create new services and business models based on the use of data

The purpose of the implementation and operation of the goods marking and traceability system
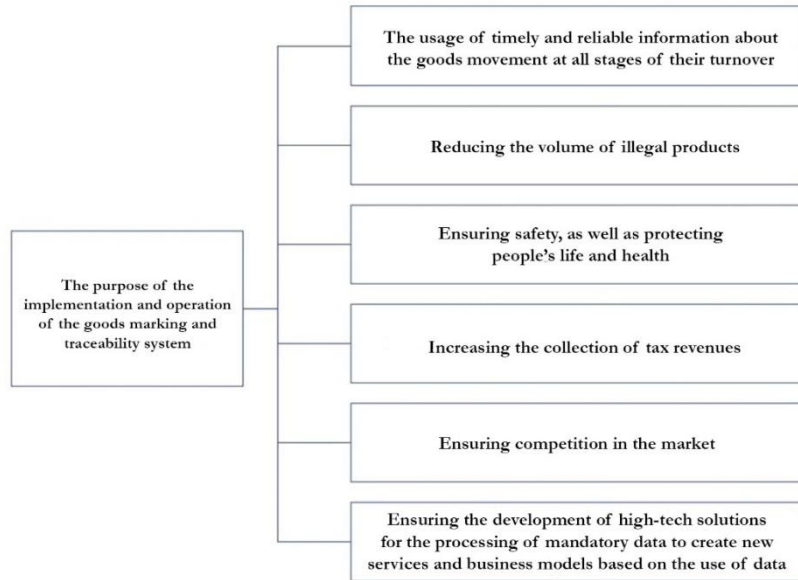
Figure 2. Purposes of the implementation of the goods marking and traceability system (*Order of the Government of the Russian Federation No. 2963-r*)
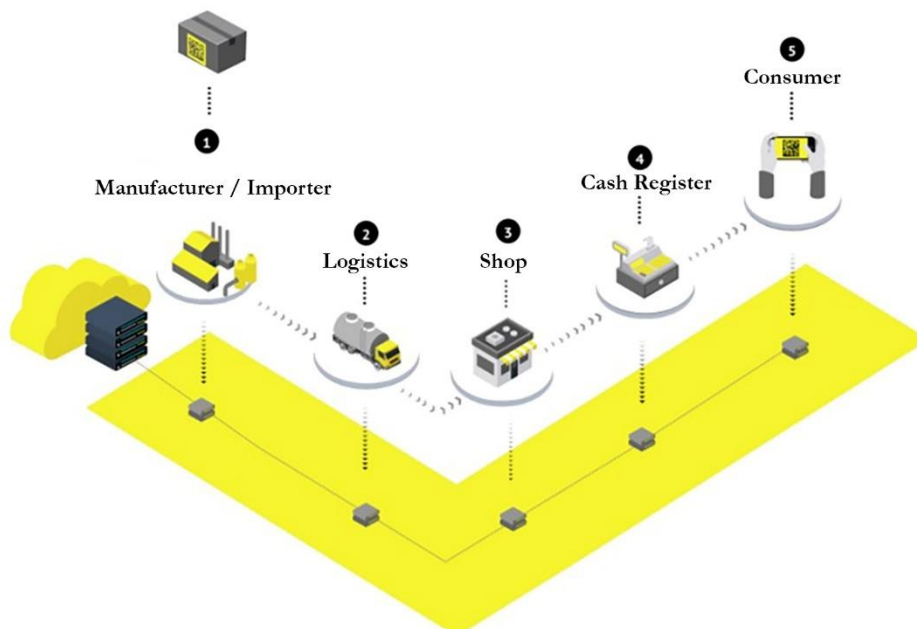

Figure 3. Stages of product turnover using the digital marking and traceability system (*National Marking System "Honest MARK"*)

Marking	Experiment
Dairy products	Packed water
Medicines	Dietary supplements
Tobacco	Beer and beer drinks
Light industry goods	Bicycles
Footwear	Wheelchairs
Fur coats	
Perfume and eau de toilette	
Tires and tires	
Cameras and flash lamps	

Figure 4. Commodity groups subjecting to mandatory labeling, and in respect of which a labelling experiment is being conducted (*Order of the Government of the Russian Federation No. 792-r*; *Decree of the Government of the Russian Federation No. 836*; *Decree of the Government of the Russian Federation No. 1028*; *Decree of the Government of the Russian Federation No. 1183*; *Decree of the Government of the Russian Federation No. 348*)

Alyona A. Bokareva, Researcher in the field of electronic documentary, undergraduate, ITMO University, St Petersburg, Russia. ORCID: 0000-0003-1174-3574.

Elizaveta A. Tagiltseva, Researcher in the field of electronic documentary, Undergraduate ITMO University, St Petersburg, Russia. ORCID: 0000-0002-6954-1644.

Creation of architecture and development of a mobile application Unified Personal Medical Card

Abstract: The article is devoted to the development of the architecture and creation of the mobile application Unified Personal Medical Card, which allows you to completely replace the paper version of standardized cards of medical institutions, provide the user with the opportunity to have access to their medical data at any time, simplify the work of emergency medical services and reduce the costs of compulsory medical insurance funds. The article reflects aspects of access protection and the possibility of combining with a single electronic document of a citizen, which in the future will allow switching to an electronic format of interaction with any government agencies within the framework of working with one application. Social surveys were used as methods for determining social significance and the current market of mobile applications was studied to identify analogues and their shortcomings in functioning. MySql, Figma and UML diagrams were used to form the architecture. The research existing proposals and opportunities reflected in the list of sources of information.

Keywords: mobile application, development, personal data, electronic document, identification, authentication, medical data.

Алёна Александровна Бокарева, исследователь в области электронной документации, магистрант, Университет ИТМО, Санкт-Петербург, Россия.

Елизавета Анатольевна Тагильцева, исследователь в области электронной документации, магистрант, Университет ИТМО, Санкт-Петербург, Россия.

Создание архитектуры и разработка мобильного приложения Единая Персональная Медицинская Карта

Аннотация: Статья посвящена разработке архитектуры и созданию мобильного приложения Единая Персональная Медицинская Карта, позволяющему полностью заменить бумажный вариант стандартизированных карт медицинских учреждений, предоставить пользователю возможность иметь доступ к своим медицинским данным в любой необходимый момент, упростить работу экстренных медицинских служб и сократить расходы фондов обязательного медицинского страхования. В статье отражены аспекты защиты доступа и возможности объединения с единым электронным документом гражданина, что в будущем позволит перейти на электронный формат взаимодействия с любыми государственными структурами в рамках работы с одним приложением. В качестве методов определения социальной значимости были использованы социальные опросы и изучен текущий рынок мобильных приложений на предмет выявления аналогов и их недостатков функционирования. Для формирования архитектуры были использованы MySql, Figma и UML диаграммы. В ходе исследования были изучены существующие предложения и возможности, отраженные в списке источников информации.

Ключевые слова: мобильное приложение, разработка, персональные данные, электронный документ, идентификации, аутентификация, медицинские данные.

Вступление

В условиях перехода на электронный документооборот, высокой скорости общего ритма жизни и повышения мобильности возрастает необходимость в предоставлении актуальной информации о состоянии здоровья с сохранением истории проведенных обследований и их результатов для пользователя в максимально удобном и доступном формате. Данное направление является приоритетным для развития социального программного обеспечения и дает возможность для сокращения затрат государства на обеспечение здравоохранения.

Каждый имеет право получить в доступной для него форме имеющуюся в медицинской организации информацию о состоянии своего здоровья, в том числе сведения о результатах медицинского обследования, наличии заболевания, об установленном диагнозе и о прогнозе развития заболевания, методах оказания медицинской помощи, связанном с ними риске, возможных видах медицинского вмешательства, его последствиях и результатах оказания медицинской помощи (*Федеральный закон № 317-ФЗ*).

Исходя из описанной проблематики была выявлена потребность в создании универсального мобильного приложения для работы с персональной медицинской информацией в условиях распределенных серверов первоначального ее хранения и обеспечения безопасности работы за счет использования дополнительных функций защиты доступа.

Целью данного исследования является определение основных параметров приложения для работы с персональной медицинской информацией и определение методов обеспечения конфиденциальности при работе с ней.

Детальное рассмотрение целей позволяет сформулировать задачи для данного исследования. Основными задачами будут являться: корректная обработка информации, полученной с распределенных серверов лечебно-профилактических учреждений, имеющая различный формат и тип данных; защита персональной медицинской информации и предотвращение несанкционированного доступа и потери данных. Необходимо определить потенциальных пользователей, их социальный и возрастной статус, провести анализ конкурентоспособности и жизнеспособности приложения, а также его востребованность на рынке. Разработка интуитивно понятного интерфейса для работы с приложением исходя из выделенной социальной и возрастной группы пользователей является одной из немаловажных задач.

Методы, использованные в исследовании

На текущий момент первые шаги в рамках предоставления оперативного доступа к персональной медицинской информации осуществляются путем введения на портале ГосУслуг для жителей Москвы и Санкт-Петербурга (например, Электронный ресурс «Здоровье Петербуржца»), где отражены основные данные по совершенным визитам к

специалистам, назначениям и диагнозам в рамках данных визитов и результаты различных лабораторных и инструментальных исследований. Однако все приведенные сведения касаются только территории прикрепления полиса ОМС, что не позволяет получить полную картину для проведения какого-либо статистического или аналитического анализа.

В рамках работы по созданию данного мобильного приложения были определены стадии и необходимые шаги по реализации и внедрению данной разработки в рамках города и страны. С учётом Федеральных законов о защите персональных данных и децентрализованности серверов различных лечебно-профилактических учреждений даже в пределах одной территории для полноценной реализации и внедрения данного продукта даже на этапе тестирования и создания минимально жизнеспособного приложения (MVP) необходима поддержка и заинтересованность со стороны Правительства и Министерства Здравоохранения, что существенно снижает скорость разработки приложения. Однако коммерческая ценность продукта и оптимизированный переход на электронные документы позволяют сделать вывод о реализуемости и значимости данной разработки на сегодняшний день.

Конкурентные приложения не имеют алгоритмов для сбора данных с различных распределённых ресурсов и алгоритмов обработки данных разного формата для приведения их в единую форму для анализа и восприятия, что позволяет говорить о низком уровне конкуренции на текущий момент.

Оптимальным вариантом выбора для разрешения задачи эффективного доступа к медицинским данным является создание мобильного приложения, позволяющего автоматически загружать с распределенных серверов медицинских учреждений всю хранящуюся там информацию о владельце данного приложения с использованием систем идентификации и аутентификации, в том числе и с возможностью использования биометрических систем. Использование биометрических параметров в качестве и ключа и метода криптографической защиты является оптимальным вариантом для решения поставленной задачи. Если представить считанные биометрические данные в виде координатной сетки, то сам процесс верификации документа и аутентификации личности может быть организован через некоторую предопределенную функцию изменения характеристик (цифрового кода) точки, определенный координатной сеткой биометрических параметров (в дальнейшем – карта изменения). Соответственно, при считывании биометрических параметров мы получаем: карту изменений (координаты точек, которые должны быть модифицированы для верификации и аутентификации), ключ к самому алгоритму изменения точек и низкую вероятность отказов 1 и 2 типа (*Bokareva, 2020a*). Данный алгоритм может быть использован как основной для аутентификации и идентификации пользователя в условиях доступа к данным приложения без использования передачи данных, что позволяет работать и в условиях отсутствия доступа в сеть Интернет.

В результате создания мобильного приложения Единая Персональная Медицинская Карта (далее – ЕПМК) пользователь сможет оперативно получить информацию о проведенных медицинских манипуляциях в любой точке мира, что позволит: проводить плановые и экстренные мероприятия по оказанию медицинской помощи, основываясь

на истории болезни человека в любом медицинском учреждении и стационаре без дополнительных затрат ресурсов (в том числе и временных) на сбор анамнеза; сократить количество ошибок, полученных за счет искажения при сборе информации и результата прошлых обследований от пациента; сократить затраты на обращение в медицинские учреждения за результатами анализов; получить возможность консультаций в других медицинских учреждениях на основании ранее сделанных обследований состояния здоровья; проводить анализ основных показателей и оповещать о необходимости посещения врача; оповещать население о чрезвычайных ситуациях и изменениях санитарных и профилактических мер с использованием функций всплывающих окон; проводить научные и медицинские исследования на основании масштабной базы данных, при наличии согласия пользователя к использованию деперсонализированной информации о проведенных исследованиях и перенесенных заболеваниях.

Для реализации приложения ЕПМК необходимо создание архитектуры программного обеспечения и разработка дизайна, отвечающего современным стандартам и требованиям со стороны пользователя. Основная сложность в работе с получаемыми медицинскими данными состоит в разнородности информации и огромному количеству форматов даже внутри одного территориального звена или медицинского учреждения. Работа по приведению к единому стандарту и анализу получаемой информации должна проводиться в самом приложении и использовать быстро действенные алгоритмы. Для формирования данных алгоритмов и проверки их эффективности была использована тестовая база данных из реальных пакетов данных об исследованиях разработчиков проекта. В ходе проведения анализа получаемых данных было установлено, что основная часть приходит в едином формате и различаются лишь незначительная часть документов, чаще всего в значениях референсных норм и единиц измерения. Создание оптимального алгоритма свелось к стандартной задаче, что существенно упростило работу по построению внутренней архитектуры приложения. Также необходимо построение аналитических кривых по основным показателям (например, анализа крови), выведение результата и рекомендаций.

В процессе создания архитектуры ЕПМК возникла необходимость добавить в функционал возможность получения назначений и отслеживания графика приема лекарственных средств, что, в свою очередь, так же является необходимой информацией не только для пользователя в формате удобства, но и для медицинских работников, в частности служб экстренной помощи, при необходимости принятия решения в короткие сроки и понимания возможных последствий, в том числе от взаимодействия лекарственных средств между собой.

Была разработана и построена база данных, оперирующая основными данными о пользователе. В качестве основного определяющего параметра был выбран страховой номер индивидуального лицевого счёта (СНИЛС). СНИЛС – страховой номер индивидуального лицевого счёта – уникальный номер индивидуального лицевого счета, используемый для обработки сведений о физическом лице в системе индивидуального (персонифицированного) учета, а также для идентификации и аутентификации сведений о физическом лице при предоставлении государственных и муниципальных услуг и исполнении государственных и муниципальных функций (*Федеральный закон № 27-*

ФЗ). На индивидуальный лицевой счёт заносятся все данные о начисленных и уплаченных работодателем страховых взносах в течение всей трудовой деятельности гражданина, которые впоследствии учитываются при назначении или перерасчёте пенсии. Присвоение страхового номера носит технологический характер и осуществляется в целях упрощения порядка и ускорения процедуры назначения трудовых пенсий застрахованным лицам.

СНИЛС есть у всех работающих граждан – большинство россиян (за исключением военнослужащих) получают его на первом месте работы, однако, возможно и его самостоятельное оформление на себя или на своего несовершеннолетнего ребёнка.

Формат СНИЛС: «XXX-XXX-XXX YY», где X, Y – цифры, причём первые девять цифр 'X' – это любые цифры, а последние две 'Y' фактически являются контрольной суммой, вычисляемой по особому алгоритму из последовательности первых 9 цифр (*Федеральный закон № 27-ФЗ*). СНИЛС является одним из немногих документов для граждан России, идентификационные данные которого не меняются в течение всей жизни индивида и наиболее точно подходит под требования идентификации пользователя в распределенных базах данных медицинских учреждений, поскольку имеет привязку ко всем анализам и обследованиям гражданина. С 2012 года СНИЛС выдается также не гражданам России, приехавшим по рабочей визе, что расширяет возможности использования приложения не только гражданами.

При разработке также было решено отказаться от идентификатора «врач», который создавал избыточность в таблице, не внося существенно важных значений. Использование идентификатора медицинского учреждения как основного для документации и поиска нужной информации о постановке диагноза или назначении препарата является достаточным в данном решении.

В качестве протокола передачи данных должен использоваться HTTPS (HyperText Transfer Protocol Secure), являющийся на данный момент стандартом передачи произвольных данных. Вся информация, может быть зашифрована, что необходимо при работе с медицинскими данными, являющимися персональными данными. В качестве метода шифрования в разработке архитектуры ЕПМК был выбран победитель конкурса AES, наиболее стойкий и быстрый алгоритм блочного шифрования Rijndael, позже взявший название конкурса. Размер ключа однозначно должен быть 128 бит, так как это максимально допустимый размер для ассиметричный методов шифрования на территории Российской Федерации (*Алгоритмы шифрования*).

В медицинской сфере достоверность переданных и полученных данных является крайне важным критерием, даже незначительные ошибки могут привести к потере здоровья или снижению качества жизни. Выбранный HTTPS протокол с проверкой сертификата и надежным механизмом шифрования полностью гарантирует защиту и целостность доставленных пакетов. В случае обнаружения поврежденного пакета запрос будет передан повторно.

При разработке приложения ЕПМК для комфортного использования со стороны пользователя были определены следующие характеристики: простая и пошаговая регистрация; создание красивого и понятного пользовательского интерфейса; проработка удобного и понятного для любого пользователя функционала приложения;

простая взаимосвязь и обмен информации между пользователем и медицинским учреждением; возможность использовать приложение на ходу (используя мобильный трафик); добавление определений ко всем терминам, упомянутых в приложении.

При условии сочетания разработанного мобильного приложения и систем идентификации и аутентификации с использованием биометрических параметров можно получить безопасный (с точки зрения доступа и хранения персональных данных) инструмент для оказания экстренной и плановой помощи населению.

Экономические расчеты показали, что снижение затрат при подключении к использованию ЕПМК составляют от 47% до 68% по истечению 5 лет использования, что, в масштабах выделяемых средств на фонды обязательного медицинского страхования дает принципиально новые возможности для развития текущей системы здравоохранения, замены оборудования и построения новых медицинских учреждений. Процентный показатель варьируется исходя из понимания минимального и максимального количества возможных подключений, зависящий как от территориальных показателей (для России характерно неравномерное распределение населения и ресурсов, в том числе технических), так и от активной возрастной группы.

В дальнейшем данное приложение имеет возможность подключиться к Единого Электронного Документа Гражданина (далее – ЕЭДГ), что позволит окончательно завершить цифровую революцию перехода с бумажных носителей на электронные.

Единый Электронный Документ Гражданина – это документ, идентифицирующий личность предъявителя должен обладать исчерпывающими, но не перенасыщенными по содержанию данными о персоне. На сегодняшний день подобными данными являются фамилия, имя, отчество (при наличии), дата рождения и уникальный номер, присвоенный какому-либо документу (не персоне), удостоверяющему личность и при выдаче нового документа (или нового типа документа, например, водительское удостоверение) присваивается новый номер, что в свою очередь приводит к прогрессирующим объемам хранимой информации о каждом идентифицируемом человеке. При переходе на электронный документооборот целесообразна замена всех имеющихся идентификаторов (номеров документов) на единый уникальный номер, присваиваемый персоне, а не конкретному документу. А всеобщий массив данных (паспорт, водительское удостоверение, СНИЛС, полис и т.д.) в свою очередь необходимо и достаточно заменить единым электронным документом с прописанными и полностью объединенными в общую базу данных социально-юридические характеристики конкретного человека (идентифицируемой персоны). Данная система позволит одновременно сохранить всю значимую информацию в одном «файле», будет препятствовать размножению различных форм и количества документов (и их идентифицирующих номеров, нуждающихся в последующем хранении), увеличивающих риск потери и искажения. Так же данная система обеспечит удобство использования и комфорт, как для пользователя, так и для различных государственных и иных заинтересованных структур, за счет возможности использования вне зон устойчивой связи, без ношения дополнительных устройств и бланков (для пользователя), высокая степень надежности и быстродействия, обеспечивающая минимальные отказы по первому и второму типу ошибок (*Алгоритмы шифрования*; *Абрамова, 2020*). Согласно

требованию законодательства Российской Федерации допустимо использование средств защиты информации, прошедших процедуру оценки соответствия требованиям законодательства Российской Федерации в области обеспечения безопасности информации, в случае, когда применение таких средств необходимо для нейтрализации актуальных угроз (*Постановление Правительства РФ № 1119*; *Емельянов и Носова, 2019*), что приводит к необходимости провести тестирование и последующую оценку разработанного алгоритма (*Железняк и др., 2018*).

Использование ЕЭДГ в совокупности с разрабатываемым мобильным приложением ЕПМК позволяет убрать избыточные хранимые данные за счёт уже пройденной идентификации и аутентификации при входе в само приложение, соотносить персональные данные человека с его медицинской информацией, оказывать медицинские услуги на месте, без необходимости установки личности. Однако, при использовании биометрических данных в качестве основной системы безопасности возникают риски, в которых пациент может не получить необходимую помощь ввиду отсутствия возможности «предъявить» биометрические параметры пользователя. Данный аспект требует дополнительной проработки и создания безопасной системы альтернативного входа для сотрудников экстренных служб медицинской помощи. Его реализация должна гарантировать отсутствие несанкционированного доступа к данным в любой штатной ситуации и предотвратить утечку информации, представляющей собой медицинскую тайну (*Саушкин, 2020*).

На текущий момент разработка интерфейса мобильного приложения ЕПМК полностью реализована, тестирование завершено и по окончании доработки баз данных приложение может быть выпущено на рынок, как полноценная замена существующих бумажных медицинских карт.

Дискуссия

В рамках дальнейшей работы необходима детальная разработка и оценка эффективности предложенного метода аутентификации и идентификации для доступа к персональной медицинской информацией и соответствие его текущим требованиям законодательства в отношении защиты и обработки персональных данных (в частности – медицинских данных). Отказоустойчивость приложения, выбранный метод хранения и обработки данных требуют тщательного тестирования во избежание утери и повреждения персональных данных с учетом специфики работы данного приложения (в рамках оказания экстренной медицинской помощи). Немаловажным аспектом разработки является создание дополнительного канала доступа к данным в условиях чрезвычайных ситуаций, не позволяющих реализовать вход с использованием биометрических параметров владельца для экстренных служб согласно протоколу разрешенного доступа к информации (сотрудники службы скорой медицинской помощи, спасатели и иные лица, имеющие законодательное разрешение к доступу к персональным медицинским данным).

Заключение

Таким образом, необходимо отметить, что разрабатываемое мобильное приложение

имеет важное стратегическое, социальное и экономическое значения не только для отдельных пользователей, но и для всей системы здравоохранения в целом. Объединение мобильного приложения ЕПМК и документа ЕЭДГ позволит создать абсолютно независимую систему аутентификации и идентификации пользователя и способна заменить все существующие бумажные документы пользователя, сделав коммуникацию с государственными институтами простой, доступной и прозрачной, а затраты государства на выпуск, хранение и сбор данных о гражданах свести к минимальному обслуживанию серверов и баз данных.

Несмотря на очевидность эффективности практического применения данных методов и разработок в современном цифровом государстве, необходимо оценить экономические аспекты внедрения, перспективы использования среди различных групп населения (в том числе, людей старшего возраста), риски утери или искажения данных и резервные варианты доступа к персональным данным, в том числе алгоритмы получения разрешения и динамический ключ доступа.

Список источников информации:

Абрамова, А.Г. (2020). Современные проблемы осуществления защиты персональных данных в сети: основополагающие принципы защиты персональных данных. *Регион и мир*, *4*(11), 21-25.

Алгоритмы шифрования. Финалисты конкурса AES. Часть 2. Обращение 10 декабря 2021 года к https://www.ixbt.com/soft/alg-encryption-aes-2.shtml

Емельянов, Е.Г., Носова, Ж.Е. (2019). Методика сбора персональных данных пользователя в мобильных приложениях в соответствии с федеральным законом «О персональных данных». *Сборник материалов 3-й Всероссийской конференции, посвященной 55-летию ЮЗГУ. Программная инженерия: современные тенденции развития и применения*, 289-292.

Железняк, В.П., Ряполов, К.Я., Вялых, С.А., Чапурин, Е.Ю. (2018). Определение актуальных угроз безопасности персональных данных в информационных системах персональных данных. *Сборник материалов Всероссийской научно-практической конференции. Актуальные проблемы деятельности подразделений УИС*, 88-91.

Петров, М.И. (2007). *Комментарий к федеральному закону «О персональных данных» от 27 июля 2006 г. № 152-ФЗ: (постатейный)*. Серия «Библиотека журнала «Право и экономика». Москва: Юстицинформ.

Постановление Правительства РФ № 1119 от 01.11.2012 «Об утверждении требований к защите персональных данных при их обработке в информационных системах персональных данных». Обращение 10 декабря 2021 года к http://www.consultant.ru/document/cons_doc_LAW_137356/8c86cf6357879e861790a8a7ca8bea4227d56c72/

Саушкин, С.О. (2020). Понятие института защиты персональных данных при автоматизированной обработке персональных данных. *Научный электронный журнал Меридиан*, *7*(41), 216-218.

Федеральный закон №27-ФЗ от 01.04.1996 «Об индивидуальном

(персонифицированном) учете в системе обязательного пенсионного страхования» (последняя редакция). Обращение 1 декабря 2021 года к http://www.consultant.ru/document/cons_doc_LAW_9839/#dst100406

Федеральный закон № 317-ФЗ, ст. 22. от 25.11.2013 «О внесении изменений в отдельные законодательные акты Российской Федерации и признании утратившими силу отдельных положений законодательных актов Российской Федерации по вопросам охраны здоровья граждан в Российской Федерации» Обращение 10 декабря 2021 года к http://www.consultant.ru/document/cons_doc_LAW_154744/

Bokareva, A.A. (2020a). Model of a document protection algorithm for a person based on biometric parameters. *Actual Issues of Modern Science. European Scientific e-Journal*, *6* (6), 1, 12-19. Hlučín-Bobrovníky: "Anisiia Tomanek" OSVČ. (англ.) DOI: 10.47451/inn2020-09-002.

Bokareva, A.A. (2020b). Personal authentication using verified electronic document. *Actual Issues of Modern Science. European Scientific e-Journal*, *6* (6), 1, 5-11. Hlučín-Bobrovníky: "Anisiia Tomanek" OSVČ. (англ.) DOI: 10.47451/inn2020-09-001.

Daria-Petruta Bratu, PhD Student, Simion Mehedinţi Doctoral School "Nature and Sustainable Development", Bucharest, Romania.

Smart city ideas for a medieval fortress – Sighisoara

Abstract: A smart city represents a caring urban area that uses different types of sensors to collect an electronic data in order to provide information that is used to efficiently manage its resources. The smart city concept comprises six major areas: smart environment, smart mobility, smart government, smart people, smart living and smart economy. This paper aims to present aspects of the urban development of Sighisoara that can be classified in the smart city category. Although it is a small municipality, with a population of 24,447 inhabitants, according to INSEE on January 1, 2020, and has its hearth located on one of the oldest historical localities in Romania, being at the same time a UNESCO site, it has been experiencing in recent years an application of smart projects in the field of urbanism. Without going into contradiction with the medieval vestiges of the municipality, in Sighisoara we try to intertwine the historical environment with the new technologies of the 21th century based on digitalization. The Internet of Things (IoT) is already present in the city by implementing programs in transport, infrastructure and parking. Projects are underway on the construction of smart residential complexes and the transition of digitalization to industry and agriculture. The new global challenge of SARS-COV-2 virus requires a more alert development of smart systems that help to comply with the rules imposed by the authorities without creating discomfort to citizens. The smart citizen is the most important tool in the fight against the pandemic. A citizen who learns to communicate with public authorities and institutions with the help of the internet, who pays his taxes and taxes online is one of the answers of technology to the problems raised by the COVID-19 pandemic. At present, more than 7 billion euros of European funds are available at EU level for the smart development of communities. Sighisoara is among the cities that have seen this development opportunity.

Keywords: digitalization, economy, innovation, smart city, Sighisoara, Romania.

Daria-Petruţa Bratu, Doctorand, Şcoala Doctorală „Simion Mehedinţi – Natură şi Dezvoltare Durabilă", Bucureşti, România.

Idei de smart-city pentru o cetate medievală – Sighişoara

Abstract: Un oraş inteligent -*smart city*-, reprezintă o zonă urbană care utilizează diferite tipuri de senzori de colectare a datelor electronice pentru a furniza informaţii care sunt utilizate pentru a gestiona eficient resursele acestuia. Conceptul de smart city cuprinde şase mari domenii: smart environment, smart mobility, smart government, smart people, smart living şi smart economy. Lucrarea de faţă îşi propune să prezinte aspecte ale dezvoltării urbane a municipiului Sighişoara ce pot fi încadrate în categoria *smart city*. Deşi este un municipiu mic, cu o populaţie de 24.447 locuitori, conform INSEE la data de 1 ianuarie 2020, şi are vatra aşezată pe una dintre cele mai vechi localităţi istorice din România, fiind în acelaşi timp un sit UNESCO, acesta cunoaşte în ultimii ani o aplicare a proiectelor de tip *smart* în domeniul urbanismului. Fără a intra în contradicţie cu vestigiile medievale ale municipiului, în Sighişoara se încearcă împletirea ambientului de tip istoric cu noile tehnologii ale secolului XXl bazate pe digitalizare. *Internetul Lucrurilor (IoT)* este deja prezent în oraş prin implementarea programelor în transporturi, infrastructură şi parking. Sunt în curs proiecte privind construcţia de ansambluri rezidenţiale *smart* şi trecerea digitalizării în industrie şi agricultură. Noua provocare apărută la nivel global dată virusul SARS-COV-2 impune o dezvoltare mai alertă a sistemelor de tip smart care ajută la respectarea normelor impuse de autorităţi

fără a crea un disconfort cetăţenilor. Cetăţeanul inteligent este cel mai important instrument în lupta împotriva pandemiei. Un cetăţean care învaţă să comunice cu autorităţile şi instituţiile publice cu ajutorul internetului, care îşi plăteşte taxele şi impozitele online este unul dintre răspunsurile tehnologiei la problemele ridicate de pandemia COVID-19. La ora actuală, la nivelul UE sunt disponibile peste 7 miliarde de euro, fonduri europene pentru dezvoltarea smart a comunităţilor. Sighişoara se află în topul oraşelor care au văzut această oportunitate de dezvoltare.

Cuvinte cheie: digitalizare, economie, inovaţie, oraş inteligent, Sighişoara, România.

Introduction

The concept of Smart City can be defined as a more efficient usage of digital and telecommunications technologies based on traditional internet services for the benefit of the inhabitants of an urban settlement and the economic activities that take place in that area. Another feature of smart cities is the use of communication technologies and IT programs for the best use of resources and the reduction of emissions. It can be applied for urban transport network, improving the water management arrangements, and making the power sources and heat systems for buildings more efficient. The European Union has also introduced in the Smart City concept the digitization of urban area management, increasing safety in public space and improving living conditions for the elderly.

In Romania, the implementation of the Smart City concept has been attempted since 2010. The first project, unfinished however, was in Târgu Mureş, by trying to implement a visa card for citizens to pay for all facilities. But the first cities that benefited from the strategy of implementing the Smart City concept were Alba Iulia, Timişoara, Cluj-Napoca and Oradea since 2016.

A city can be defined as smart when investments in human and social capital and traditional (transport) and modern (ICT) infrastructure foster sustainable economic development and a high quality of life, with wise management of natural resources, through participatory actions and commitment. (*Caragliu et al., 2009*)

Another definition states that a Smart City is an urban area that creates sustainable economic development and a high quality of life par excellence in many key areas such as economy, mobility, environment, people, life and government. Excellence in these key areas can be achieved through strong human capital, social capital and / or ICT infrastructure (*Business Dictionary for Entrepreneurs, 2020*).

A Smart City represents a caring urban area that uses different types of sensors to collect an electronic data to provide information that is used to efficiently manage its resources. The concept of Smart City encompasses six major areas: smart environment, smart mobility, smart government, smart people, smart living, smart economy (*Giffinger & Suitner, 2015*).

The aim of the paper is to bring an image on the development of the Smart City concept in Romania by presenting cases of use of information technology for this purpose in a medium-sized urban locality. For this, the municipality of Sighişoara was chosen, an urban locality with a population of 24,447 inhabitants (*INSEE data, January 1, 2020*).

The methods section describes how the information regarding the implementation stage of the Smart City concept in Sighişoara was obtained, as well as the expectations of the citizens of

the municipality and tourists who visited the area recently. In the section III, Results, we present the analysis of the material obtained from the on-site research and surveys on people's complaints. The section dedicated to the conclusions centralizes the results and draws lines for future research of the development of the Smart City idea in Sighișoara.

Methods

The concept of Smart City came to the attention of researchers from various fields such as Economics, Territorial Planning and Environment in 1995, in the U.S., with the start of the program San Diego: City for the New Millenium (*Kotkin, 2017*).

Smart City initiatives have been unified in a model that wants cities to become a more pleasant place to live in them. Proceeding from this idea, three conceptual levels were highlighted (*Lom, Pribyl, Svitek, 2016*). First of all, smart services appear, which means user-friendliness in the relationship between residents and authorities, providers of hospitals and public institutions. Secondly, the concept of Smart City is related to the directions strategically eluted by the urban planning service, and thirdly, in the context of technological development, Smart City is related to A. I., I.O.T and machine learning.

In the case studied, since 2013, in the municipality of Sighișoara, a locality that has as a pivot at present the tourist activity related to the former medieval fortress, programs belonging to the concept of Smart City have been implemented.

Applying the observation method, a number of elements belonging to this concept have been identified at the 2020 level. These relate to the fields:

- smart mobility, in which we can highlight the traffic light system, the T-PARK application for car payments, the Railway Bridge Târnava-Sighișoara;
- smart living, where we have the video surveillance system, smart street lighting and the redevelopment of SIGMA market-lower City Center;
- smart people, in which we can discuss the WIFI4EU program;
- smart environment, where it is discussed about tourist routes for bicycles around the city for visiting other sights in the area of influence of the municipality.
- smart economy for tourism where there is the program Sm@rt Expo, a program to valorize the cultural heritage of the locality in the virtual environment.

In addition to those identified on the ground, in order to create an overview of the degree of implementation of the Smart City concept in Sighișoara, we also carried out a quantitative analysis using the questionnaire method. The questionnaire was addressed to both residents and tourists who visited the municipality in the last period of time (1-2 years).

The questionnaire had a set of 16 questions regarding the way and frequency of use of Smart City systems installed in the municipality as well as the degree of satisfaction of the beneficiaries. Out of the 16 questions, 15 were closed questions related to the above matter at hand and at the end of the questionnaire we introduced an open question on the respondents' desires for the urban development and other systems that fall into the Smart City category.

The online questionnaire was opened from 20 May to 1 June and was accessed by 103 people with a Google account.

Through the responses sent, the study participants provided a relevant picture of how the concept of Smart City is understood and viewed and the possibilities of its expansion in other areas compared to the current ones.

Results

The field observation was carried out for several years, through successive visits, starting from 2017 and consisted in the pursuit of the introduction of smart systems in the area of Sighișoara municipality. It was followed what type of systems developed in these years, as well as the effects of those installed before this period (2017-2020).

The first smart system was from the sphere of smart mobility and consisted of the T-PARK System, the smart application for car payments.

Parking payment by SMS is the fastest, easiest and most convenient way to pay the parking fee. Drivers need to send an SMS to a short number according to the city with the text code no. License plate. The short number and parking payment code can be found on the city's parking Billboards. The T-PARK System was adopted in Sighișoara to facilitate access to parking for tourists who want to visit the fortress, starting from November 1, 2013.

Through the T-PARK app, in addition to paying parking in the areas rounded up by the city hall, you can also find the payment of rovinieta, the payment of parking fines and other car taxes.

In the same sphere, in September 2019, a traffic light system with synchronous operation was implemented in the radius of Sighișoara municipality, on the DN13 E60 road, to provide the green light for cars crossing the city. Thus, an intelligent traffic light system appeared for 13 pedestrian crossings and intersections in the city starting from the entrance to the city (CESIRO factory) to the exit from the city (Cornești Church). Following an analysis in September 2020 it was shown that the green light system is beneficial justifying the efficiency of the investment since during this period there were no road accidents with victims causing non-priority to pedestrians when crossing the public road (Sighișoara City Hall, 2020).

According to the data of the Sighișoara City Hall from the report on the green light traffic light system, from august 2020, "since the implementation and so far there have been no road accidents with victims on pedestrian crossings in the municipality".

Another smart mobility project related to the municipality of Sighișoara that has been implemented is the one related to the construction of the new railway bridge over Târnava. At the SMART CITY Industry AWARDS 2019, in the SMART MOBILITY category, the SMART INFRASCTRUCTURE subcategory winner was declared the Târnava Sighișoara Bridge Project-railway arch bridge, pan-European Corridor 4.

The technical data of the bridge are: opening – 125 m, length – 134.6 m. The bridge is located on the 300 railway bus Arad – Brasov – Bucharest, the pan-European corridor lV.

In the smart living category, the public lighting system stands out. In 2014, through the Regional Operational Program Priority axis 3-Supporting the Transition to a Low-Carbon Economy, the project on the modernization and expansion of the lighting system in Sighișoara municipality was approved. The project is ongoing and has completion date 28.02.2023. It provides for the modernization of 111 streets and the expansion of the public lighting system on 3 others. At the end of the project there will be 2453 light points equipped with lighting

apparatus with led sources. Each led lighting device will have a remote control module and all will be managed from a workstation (Regio-ADRCENTRE). They are designed in such a way as to fit into the architecture of the municipality.

In the same category falls the video surveillance system. The purpose of the system is to ensure the security of people on the public domain in Sighişoara. In September 2020, the work on the investment objective rehabilitation and expansion of Sighişoara video surveillance system was completed. It comprises 55 high-quality surveillance cameras, monitors the entrances and exits of the city with special cameras, intersections, parks, tourist areas inside the fortress, being a monitoring system comprising a data transmission network of an image capture system and a dispatching system for processing and storing information.

Also, in the field of smart living stands out a project for the modernization of the city center submitted by the Sighişoara City Hall for European funding. It is about the urban regeneration project of the historic center of Sighişoara, UNESCO World Heritage site that provides for the rehabilitation and redevelopment of the SIGMA area in the lower City in order to transform it into a pedestrian area, a green space for socializing and organizing outdoor events (Sighişoara City Hall, 2020).

In the smart government category, the WIFI4EU project-promoting internet connectivity in local communities stands out. In May 2020, the WIFI4EU project-promoting internet connectivity in local communities was launched. According to a press release from Sighişoara City Hall, the contract provides for the installation of a wireless network with free access in 26 points in Sighişoara municipality, but the costs will be borne from the voucher accessed from the European Commission platform.

Through the 26 wireless access routers of which 14 located in the fortress area and 12 located inside the administrative and state institutions, thousands of people will have free internet access in public spaces.

The representatives of the City Hall of the Municipality of Sighişoara sent on Monday, September 18, by means of a press release to the media, and the fact that as of this week, it has become a functional system that is implemented in the framework of the project, WiFi4EU the Promotion of internet connectivity in local communities", which provided for the installation of a wireless network to access, free of charge, in 26 points in the city of Sighişoara, the costs of the funds made available to the City of Sighişoara, on the platform of the European Commission.

In the field of smart environment there is the initiative cycling in Transylvania, a program that promotes an environmentally friendly alternative for visiting the surroundings of the municipality.

In the plateau of Târnavelor and Hârtibaciului there is a large territory of Saxon villages, fortified monasteries, traditional dishesand a patriarchal lifestyle that is difficult to find in the world.

For this purpose more than 200 km were arranged. of marked roads connecting the villages of săşesti.

A route that leaves from Sighişoara is to Malancrav which crosses the Breite plateau (31 km). Another route is Sighişoara-Aurel Vlaicu-Viscri (47 km) For both routes you can rent bikes in Sighişoara.

And last but not least, at the smart-economy cateoria for the promotion of tourist attractions in Sighişoara fortress, on July 31, 2013, at the Sighişoara History Museum, the collection of medieval weapons was launched the SM@RT EXPO project. This is a program to valorize the national cultural heritage in the virtual environment. This implies that visitors will access much faster the information for the tourist objective to visit (virtual tour of the exhibition). Also, the museum added additions to the permanent exhibition of images and texts that can be accessed by visitors through smart phones by placing Quick Response Codes.

Establishment of a National Tourist Information and Promotion Centre co-financed by the European Fund for regional development through the Regional Operational Programme 2007-2013 inaugurated in 2014. By establishing this center, Romanian and foreign tourists can discover the historical elements of the architecture of the fortress, hiking trails, bike paths for the surroundings of the municipality.

The center offers tourists who cross its threshold detailed maps of the fortress, tourist and advertising leaflets as well as the info app for smartphone Sighişoara City APP for free download and use.

All the materials that they offer to tourists are free of charge, the financing is from the local budget.

Quantitative analysis on the implementation of the Smart City concept took the form of a questionnaire. The questionnaire was addressed to both the resident population of the municipality and the tourists who visited Sighişoara in the last two years. The questions in the questionnaire were grouped into three categories. In the first category there were questions about the degree of satisfaction of the interviewees for the Smart City measures already implemented. The second type of questions referred to the perception of the interviewees about future Smart City projects. A third category was given by the open question addressed to the interviewees on suggestions of feasible projects for the studied area in the immediate temporal proximity.

The interview was online, on the Google Forms platform and was conducted between May 20 and June 1 and was accessed by 103 people. According to their statements, 45.6% is resident population and the difference, 54.4%, belongs to tourists who have visited Sighişoara in the last two years.

Of the total respondents, 58 were men and 45 were women.

The structure of respondents by age is shown in the graph above. It is noted that there is a balance between age categories. The least represented age group is over 60 years, which is 7.8%, a phenomenon explained by the lack of access to modern means of communication for older people.

Regarding the degree of education, according to the graph below on the last school graduated, 31 of the respondents declared high school, 5 post-secondary studies, 36 university studies (Bachelor's degree), 14 university studies (Master's degree) and 11 doctoral and post-doctoral studies. Six people said they had completed less than 12 classes.

The questions were about the already implemented Smart City systems (such as the T-PARK app, the traffic light system with synchronous operation to ensure the green light on the portion of the National Road E60 that crosses the municipality, WIFI4EU program, the QR codes and the bicycle rental system for visiting) and about the systems under implementation

or the ones who are in need of being completed in the immediate period (such as the expansion of intelligent public lighting and the video surveillance system of public places, as well as the rehabilitation and redevelopment of the SIGMA area in the lower City). Also, there were questions regarding new Smart City systems such as the installation of the air quality monitoring system in real time, the use of VR technology in events related to the medieval fortress. The last question was an open one, about what other Smart City elements could be introduced in the municipality of Sighişoara. The replies received are centralized in a short version in Table 1.

The purpose of the first question was to categorize the interviewees from the point of view of location. Following the centralization of responses, a balanced distribution was found between the number of residents and the number of tourists. Thus, 45.6% declared themselves residents of the municipality of Sighişoara, 43.7% said that they visited Sighişoara in the last year, and for 10.7% the response was more than one year.

The second question concerned the degree of satisfaction regarding how Sighişoara municipality is perceived as an intelligent city. Data centralization is shown in the Appendix section.

The graph shows a good perception of the interviewees on the Smart City concept and the degree of implementation of the systems in Sighişoara. Thus, it is observed that the majority of respondents (61%) have an average to slightly dissatisfied degree of satisfaction, while only 33% declare themselves satisfied or very satisfied. This indicates that the respondents are aware of the concept of Smart City and what it implies, they are aware of the progress made by the authorities in this regard, but they want a greater openness towards this concept and on other areas compared to those already addressed.

The following questions focused on finding out how respondents are satisfied with the degree of implementation of smart systems in the municipality of Sighişoara. The questions concerned T-PARK systems, smart traffic lights on the E60 section that crosses the municipality, the implementation of smart street lighting, QR codes for historical monuments and the WIFI4EU program. The data are presented in the table from the Appendix section.

This table shows the degree of understanding of the above smart systems on a scale from 1 to 5. After calculating the mean, dispersion and standard deviation it is observed that there is no large difference in perception between these systems, the standard deviations being less than 20% from the average of the responses.

The degree of satisfied or very satisfied, being on average 43% shows that these systems require improvements to thank those who use them or who benefit from them.

Next, in the questionnaire, the respondents' desire for the introduction of new Smart City systems was tested. For these there were three questions about the advisability of installing an air quality monitoring system, the expansion of the SIGMA Square pedestrian area as well as the use of VR technology in events related to the medieval fortress. All three proposals were well regarded by respondents, so for each question, 94.2% said they agreed.

Regarding the concept of smart environment, in the questionnaire there was a question about smart tourism involving the use of bicycles to visit the surroundings. 44.7% of respondents said they used rented bicycles, and 30% said they planned to use these means of transport instead of the classic (car).

When we addressed in the interview what measures could still be implemented on the Smart City line, 59 proposals were received, out of a total of 103 questionnaires sent. These responses have been summarized in the table from the Appendix section.

Conclusions

The concept of Smart City is a new paradigm in urban development. They require complex interaction between legislative authorities, administrative authorities, municipal utility and transport companies, and citizens.

Currently, there is support from the European Union, including through non-reimbursable funds that can be accessed by local governments for Smart City development.

Sighişoara is one of the municipalities where the implementation of these concepts has been experienced since 2013. This study was intended to be an image of the current state of implementation of Smart City concepts in Sighişoara and how it is perceived by both residents and those who visit the city.

In quantitative questions regarding the use of different Smart City systems by respondents, the percentage of their use was from 70% for the T-PARK application (in conditions where there were also minors who do not have the right to drive) to 88.3% for those who agree to the expansion of the video surveillance system for public places. Also, on the proposals for the installation of an air quality monitoring system, the redevelopment of the SIGMA area, or the use of VR technology at events in the fortress, the percentage of those who agree was over 94%. Also, to the open question on proposals for other elements that can be installed in the municipality of Sighişoara, of the 59 responses recorded only three mentioned that Sighişoara is a medieval fortress and Smart City implementations do not fit into the profile of the municipality. Another answer that comes out of the acceptance patterns of the new Smart City technology is related to the question about the use of rented bicycles for the list of surroundings. The percentage of those who used the service is only 44%. Great is the fact that along with them 30% have expressed their intention to use this service provided by the City Hall of Sighişoara.

It should also mention that the open question was answered with a high degree of understanding of Smart City systems such as Siri/Sam applications, interactive panels, iBeacons, which demonstrates that the public is interested in new trends in the development of the city.

References:

Business dictionary for entrepreneurs. BDC.Ca. (2020, November 2,) Retrieved June 16, 2021, from https://www.bdc.ca/en/articles-tools/entrepreneur-toolkit/templates-business-guides/glossary

Caragliu, A., Del Bo, C., & Nijkamp, P. (2011). Smart Cities in Europe. *Journal of Urban Technology, 18*(2), 65-82. Retrieved June 16, 2021, from https://doi.org/10.1080/10630732.2011.601117

Forumul Metrou Uşor – Lucrarile pe tronsonul Sighisoara – Coslariu – Ştiri şi articole din presă. (n.d.). MetrouUsor. Retrieved January 2, 2022, from https://forum.metrouusor.com/ViewTopic?TopicId=2499&PageNum=2 (in Romanian)

Giffinger, R. & Suitner, J. (2014). Polycentric Metropolitan Development: From Structural Assessment to Processual Dimensions. *European Planning Studies, 23*(6), 1169-1186. https://doi.org/10.1080/09654313.2014.905007

Insee − Institut national de la statistique et des études économiques | Insee. (2020, January 1). The National Institute of Statistics and Economic Studies. Retrieved January 2, 2022, from https://www.insee.fr/en/accueil (in French)

Kotkin, J. (2017). *The Human City: Urbanism for the Rest of Us* (Reprint ed.). Agate B2.

Municipiul Sighişoara. (2020, September 3). Municipiul Sighişoara. Retrieved January 2, 2022, from https://primariasighisoara.ro/ (in Romanian)

Mureş: Proiect pentru regenerarea centrului istoric al Sighişoarei, depus pentru finanţare europeană (2020, September 7). Retrieved January 2, 2022, from https://www.agerpres.ro/administratie/2020/09/07/mures-proiect-pentru-regenerarea-centrului-istoric-al-sighisoarei-depus-pentru-finantare-europeana--568583 (in Romanian)

Primul traseu de mountain-bike din Romania, Sighisoara-Viscri, benefic pentru producatorii traditionali si micile afaceri #TurismMures (2017, March 13). Retrieved January 12, 2022, from https://ardealnews.ro/2017/03/07/primul-traseu-de-mountain-bike-din-romania-sighisoara-viscri-benefic-pentru-producatorii-traditionali-si-micile-afaceri-turismmures/ (in Romanian)

Referat de aprobare (34.345/06.12.2019). (2019, December). Raport de aprobare. Retrieved January 2, 2022, from https://primariasighisoara.ro/portal/mures/sighisoara/2019/hotarari.nsf/Hotarari/FA9C72F926C99A77C22584CF0052B859/$FILE/7%20Ph%20privind%20aprobarea%20proiectului%20WiFi4EU.pdf (in Romanian)

Sighisoara CityApp (2017, September 9). Retrieved January 2, 2022, from https://apps.apple.com/ro/app/sighisoara-cityapp/id1277572919

Sm@rt-Expo a fost lansat astăzi la Muzeul de Istorie de la Sighişoara (2013, July 31). Retrieved January 2, 2022, from https://www.radiomures.ro/stiri/sm_rt_expo_a_fost_lansat_astazi_la_muzeul_de_istorie_de_la_sighi_oara.html (in Romanian)

Sande, Luiza. Tirgu Mures vrea sa devina un oras inteligent (2013, September 13). Retrieved January 2, 2022, from http://www.marketwatch.ro/articol/12515/Tirgu_Mures_vrea_sa_devina_un_oras_inteligent/

Trak. Plata parcării prin SMS la Sighişoara. (2013, October 31). Retrieved January 2, 2022, from https://tpark.io/noutati/plata-parcarii-prin-sms-la-sighisoara/

Appendix

Figure 1. The size of the Smart City concept. Illustration: Bratu, D.-P., Adobe InDesign

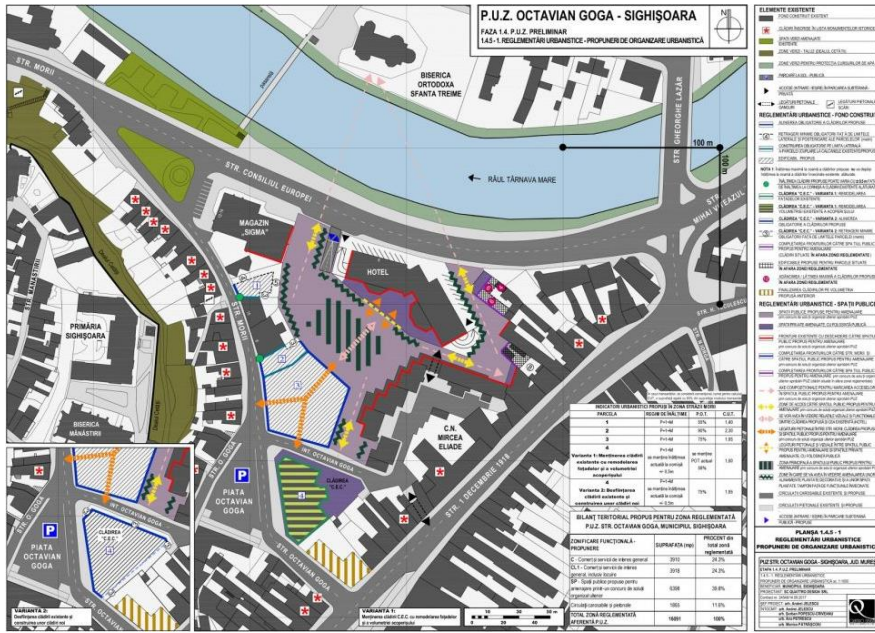Figure 2. Smart lighting system. Photo: Bratu, D.-P, 2017, 2019, 2020

Figure 3. P.U.Z. Sighişoara City Hall

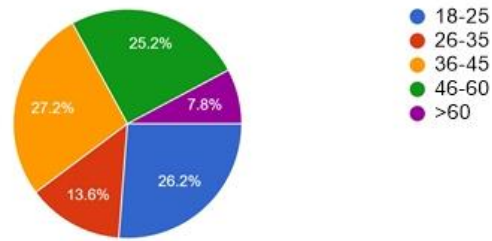Figure 4. QR code, Sighişoara Fortress. Photo: Bratu D.-P. 2020.
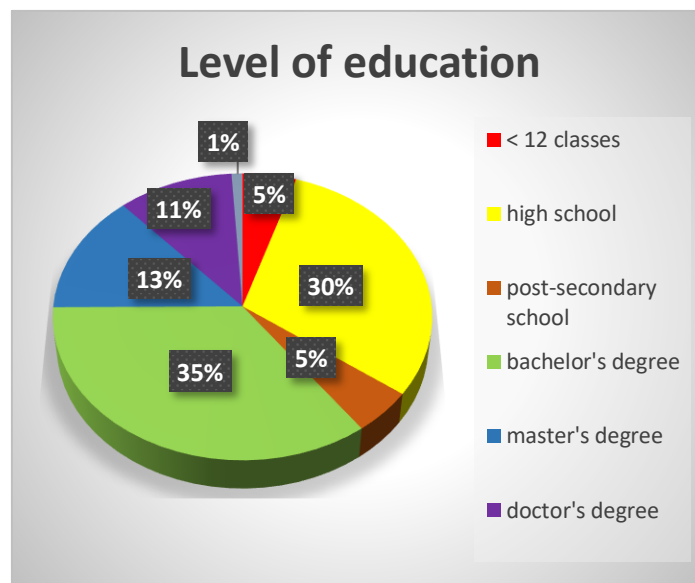
Figure 5. Age of interviewees, Google Forms

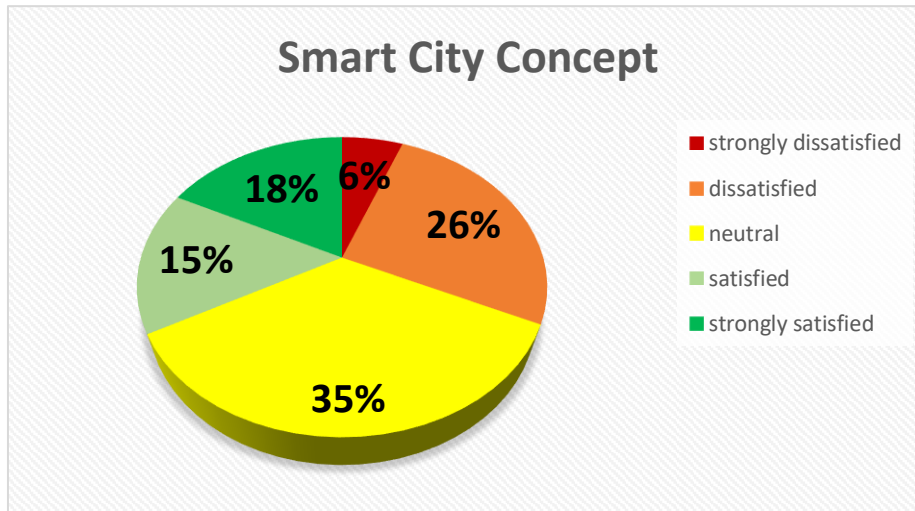Figure 6. Level of Education. Diagramme: Bratu, D.-P., Microsoft Excel

Figure 7. Degree of satisfaction regarding the implementation of Smart City concept in Sighisoare. Diagramme: Bratu, D.-P., Microsoft Excel

Table 1. Satisfaction degree. Bratu, D.-P.

	Satisfaction degree				
	1	2	3	4	5
T-PARK	6.7	30.6	24	18.7	20
TRAFFIC LIGHT SYSTEM	6.8	21.4	26.1	24.3	21.4
INTELLIGENT PUBLIC LIGHTING	6.8	22.3	28.2	18.4	24.3
WIFI4EU	5	18.8	31.2	25	20
QR CODES	7.1	24.7	25.8	21.2	21.2
ARITHMETIC MEAN	6.48	23.56	27.06	21.52	21.38
DISPERSION	0.6	16.0	6.1	7.5	2.5
STANDARD DEVIATION	0.75	3.99	2.46	2.74	1.57
STANDARD DEVIATION, %	12	17	9	13	7

Table 2. Smart City domains and proposals. Bratu, D.-P.

Smart City domain	Proposals
smart-living	digitization and transparency in local education
	expansion of the video monitoring system
	application to measure water flow in the main points of the city
	touch-screens around the city
smart-environment	initiatives on the introduction of mandatory weekend pedestrian zones for certain historic areas of the city
	campaign to restore and expand where possible the existing green structures in the municipality
	application that allows users to adopt certain elements of the city (trees, trash containers) for awareness of keeping cleanliness in the city
	installation of solar panels or gardens on the roofs of administrative institutions
smart-government	digitization in administration
	facilitating access to administrative documents by improving the Town Hall website
	interactive panels for citizens' opinion polls on official initiatives
	chat application to facilitate the connection with the City Hall
	application for reporting city infrastructure issues to local government
smart-mobility	application on the management of the bicycle park provided by the City Hall of Sighişoara for trips in the surroundings
	application for signaling traffic accidents or traffic jams within the radius of the municipality
smart-economy	extending QR codes for HORECA units
smart people	introduction of iBeacon technology for transmitting relevant information about locations, products and events
	updating the SighişoaraCityApp app
	Siri / Sam-like application that provides real-time information for tourists about their location and surroundings
NO Smart City	Sighişoara must remain medieval.

European Scientific e-Journal

EU, Czech Republic, Ostrava

54