Volume 8, Issue 2, 2022

ISSN 2957-4013
eISSN 2957-4021

FARABI JOURNAL OF SOCIAL SCIENCES

Al-Farabi Kazakh National University

Farabi Journal of Social Sciences *is a peer-reviewed academic journal covering all branches of social areas: economics and management, sociology, political science, public administration, management in education, world economy, international relations and law.*

The editors aim to maintain the publication of results of research faculty, doctoral and postgraduate students of Al-Farabi Kazakh National University, as well as scholars from various domestic and foreign universities and research institutes.

Proprietor of the Edition: Al-Farabi Kazakh National University

Certificate №15155-Ж Registered on March 12th, 2015 in the Ministry of Cultural and Information of the Republic of Kazakhstan

ҚАЗАҚ УНИВЕРСИТЕТІ БАСПА ҮЙІ

DIGITAL OBJECT IDENTIFIER

РОССИЙСКИЙ ИНДЕКС НАУЧНОГО ЦИТИРОВАНИЯ Science Index

Crossref Content Registration

Национальный центр государственной научно-технической экспертизы

EBSCO

ІВ №1

Signed to publishing 26.12. 2022. Format 60x84/8. Offset paper.
Digital printing. Volume 6,58 printer's sheet. Edition: 300. Order No 17148.
Publishing house «Kazakh University»
www.read.kz Telephone: +7 (727) 3773330, fax: +7 (727) 3773344
Al-Farabi Kazakh National University KazNU, 71 Al-Farabi, 050040, Almaty
Printed in the printing office of the Publishing house «Kazakh University».

EDUCATION

IRSTI 06.81.23 https://doi.org/10.26577/FJSS.2022.v8.i2.01

HIGHER EDUCATION IN KAZAKHSTAN: GLOBAL TRENDS AND STATE POLICY

B. Rakhimbekova* , **R. Seisebayeva** , **G. Abdigaliyeva**

Al-Farabi Kazakh National University, Almaty, Kazakhstan
*e-mail: rahimbekovabakyt@gmail.com

Abstract. Modern global trends in socio-economic processes, manifested in the progress of the "economy of knowledge, technology and information", have put on the agenda the issues of professional and personal growth and the need for investment in "human capital". Globalization and internationalization of education mean the gradual transformation of national educational systems into a global one while maintaining differences due to tradition and culture. This article analyzes the fundamental objectives of the state policy of reforming higher education in the Republic of Kazakhstan in the scope of global tendencies in education.

The object of the study is the system of higher education of Kazakhstan. The authors set the task to define the quality of conformance of higher hducation of Kazakhstan with such global trends in the field of university education as internationalization, digitalization and "education through life". To this end, official documents of the Ministry of Science and Higher Education, analytical reports, statistical materials, as well as foreign and domestic studies on the problem were studied. Comparative and system-functional research methods have revealed the efficiency of the implementation of the core global trends in education in the state policy of reforming university education.

Keywords: higher education, Kazakhstan, state policy, global trends, digitalization, long-life learning.

Introduction

Nowadays, global changes are taking place so rapidly that it is difficult to predict what knowledge, skills and competencies the modern generation of young people will need to possess. Education is the most important factor influencing social processes because it affects the assimilation of advanced technologies and forms a system of value orientations. The value of education increases in all aspects of life. Education in the era of globalization is the sphere where an emerging specialist is introduced to global values and expands their horizons and knowledge regarding not only professional competencies but also working conditions that can be provided to them in various countries of the world. All over the world, they are striving to improve and modernize the education system so that it meets the requirements of today as best as possible.

In different states, transformations are carried out in different ways, considering the specifics of the needs, the level of development of the country, national traditions, and education. But the main tendencies that are noticeable all over the world are 1) the democratization of education; 2) the increasing of the fundamental nature of education; 3) the humanization and humanitarianization of education. Higher schools in foreign countries have been formed for many years. Several countries have carried out reforms in the field of education at the initiative of the Governments of these States considering the requirements of the current level of development of the world community and the breakthrough on science and technology to improve the quality of the education system in recent decades. Higher education abroad is assigned the role of accumulation, development and dissemination of knowledge, cultural and educational mission.

Kazakhstan fulfils its social obligations to ensure equal access to higher education. The issue of ensuring access to quality education is raised at the level of the country's leadership, which assigns education the mission of the national idea of security. Ensuring access and equality in higher education is a top priority for the next five years of the country's strategic development. This task is included in the National Development Plan until 2025, which is aimed at "levelling the aftermath of the COVID-19 pandemic and developing factors to accelerate economic growth for a more sustainable and inclusive economy." At the higher education level, this task includes 1) support for socially vulnerable categories of citizens and young people from low-income

families; 2) life-long education (introduction of alternative options for non-formal education, "silver universities", etc.) One of the problems of reforming the system of modern education is its inclusion in a single global educational space to preserve society and national culture based on dialogue.

Materials and Methods

The source base of the study is represented by official sources of information on the implementation of the state educational policy in the field of higher education in the Republic of Kazakhstan (state programs, national reports, national and foreign accreditation agencies, etc.), as well as analytical reports of the OECD. For example, the practice of preparing and publishing an annual National report on the state and development of the education system of the Republic of Kazakhstan was highly appreciated by OECD experts as evidence of transparency in the management of the education system in the country (Education Policy Outlook Kazakhstan, 2018).

Statistical data of the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan were analyzed to identify quantitative and qualitative indicators of Kazakhstan's higher education system. The available data allowed us to determine the number of Kazakhstani universities by status and form of ownership, the number of students in gender and age sections, the number of educational grants, etc. The official websites of the Ministry of Science and Higher Education and the Government of the Republic of Kazakhstan contain valuable information. Thus, USMHE (Unified system of management Higher Education) has accumulated information on more than 8000 educational programs of higher and postgraduate education (Unified Higher Education Management System, 2022).

Literature review

The Higher Education system operates in a system of interconnected global and national levels. Researchers note at least three general global trends: the growth of higher education systems with a high level of participation, primarily due to social rather than economic factors; the spread of research potential and "World-class universities" (WCU) within the framework of a unified world scientific system; and quasi-business organization (Marginson, S., 2016). The manifestation of these trends varies due to national and regional special aspects of the development of the political system and socio-cultural space.

Researchers from the Institute of Educational Technologies of the Open University (UK) and the Laboratory of Artificial Intelligence and Human Languages of the Institute of Online Education (China) have prepared a report on educational trends shaping the global educational environment in 2021 (Global trends in education in the Russian context, 2022).

Kazakhstani scholars note in their research the specifics of global trends in the Kazakh system, for example, Svyatov S., Skiba M, Sadyhanova G.A., Zhakypova F., Sagyntaeva A., Sarsenbayeva A. and other authors (Svyatov S., Skiba M., 2019). In the studies of foreign academicians on the problems of global trends in education, such aspects as lifelong learning for sustainable development are considered, an aspect that is rarely explored in great detail. An important global trend in education is the commercialization of education through the expansion of private universities. This problem is also the subject of research on the problems faced by governments in financing higher education and as well as various aspects of the problem of lifelong learning (Walter Leal Filho, Mark Mifsud, Paul Pace, 2018).

Results and Discussion

After 1991, the state policy of Kazakhstan in the field of education was carried out in the direction of reforming the legislative framework, the system of management and the financing of education in the context of the task of qualitative transformation of the education system. The reform of higher education in the Republic has been carried out most intensively since 1995. The basic principles of Kazakhstan's educational policy are defined by the Constitution of the Republic of Kazakhstan, the Law of the Republic of Kazakhstan "On Education", the Strategy "Kazakhstan-2050: a new political course of the established state" 2012. In the system of state strategic planning, the main document was the newly adopted State Program for the Development of Education and Science for 2020-2025.

The following basic principles of the state policy in the field of education in the Republic of Kazakhstan are listed as follows:

- equality of the rights of all to receive a quality education;
- priority of the development of the education system;

- accessibility of education at all levels for the population, taking into account the intellectual development, psychophysiological and individual characteristics of each person;
- secular, humanistic and developmental nature of education, the priority of civic and national values, human life and health, and free personal development;
- respect for human rights and freedoms;
- stimulating the education of the individual and the development of giftedness;
- continuity of the education process, ensuring continuity of its levels;
- unity of education, upbringing and development;
- democratic nature
- of education management, transparency of the education system;
- diversity of educational organizations.

The State Program for the Development of Education and Science for 2020-2025 is based on five main directions and 11 key tasks: from ensuring the high status of the teaching profession to improving the effectiveness of scientific research and ensuring integration into the world scientific space. The program is designed to ensure the development of the education and science system to increase its competitiveness and bring it closer to the best practices of the OECD countries.

In modern conditions of globalization and internationalization, universities not only provide high-quality education that responds to the needs of the market and the demands of employers but is also called upon to become centers of scientific research and innovation. By 2022, 7 universities have already been transformed into research universities

As of 2022, there are only 128 higher educational institutions in Kazakhstan after the reduction carried out in 2020. The share of national universities is 8.59%, international – 3.13%, state universities – 3.13%; autonomous universities – 6.25%, non-citizen universities – 3.12%. According to the forms of ownership, 35.94% are joint-stock universities, and 39.84% are private. Most of the universities in Kazakhstan are private (Fig.1) (Global trends in education in the Russian context, 2022). At the same time, the number of private universities shows a downward trend. The reduction in the number of universities in Kazakhstan is not an end in itself, but rather the result of the work of the Ministry of Science and Higher Education to improve the quality of higher education. These measures will help to avoid devaluation and discredit of the higher education system.

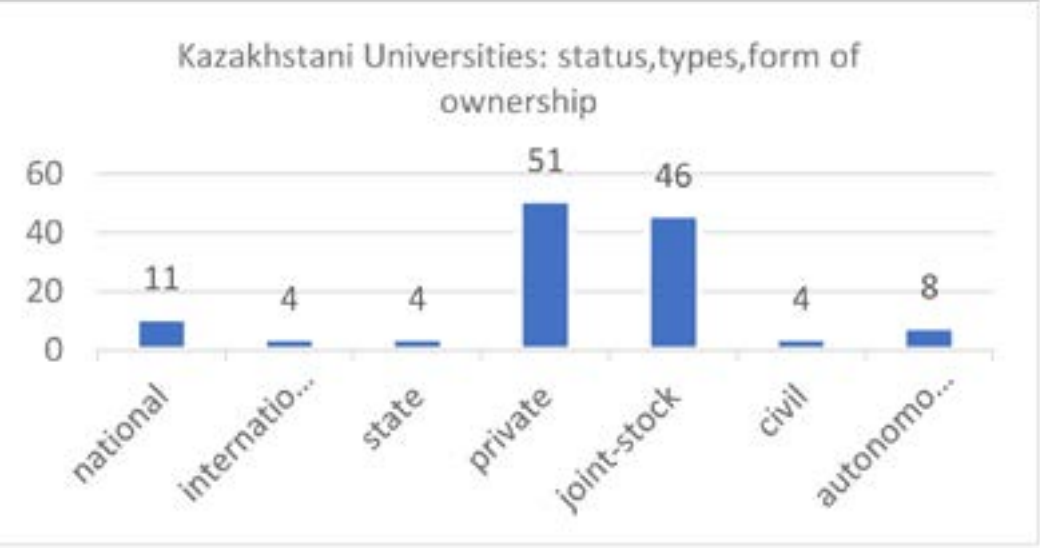


Figure 1 – Distribution of universities by status, types and form of ownership
Source: Unified system of management of Higher Education (MSHE)

In the territorial context, the distribution of universities is as follows:

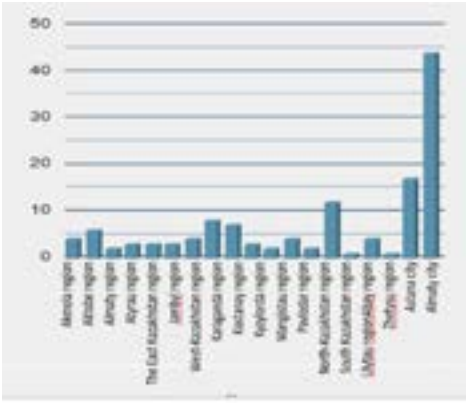


Figure 2 – Distribution higher education organizations by location
Source: MSHE

According to the World Bank, the coverage of higher education in Kazakhstan is quite significant and amounts to 62% (World Bank, 2022). This indicator is comparable with such countries as Georgia (64%), Italy (64%), Poland (69%), Portugal (66%), and is inferior to Russia (85%), Hong Kong (81%), Germany (70%) and other states (Fig. 3). The relatively high rate of higher education coverage provides the country with the first place in the indicator "Coverage of 25-34-year-olds with higher education" by the "Knowledge" factor in the IMD rating of competitiveness in the digital environment.

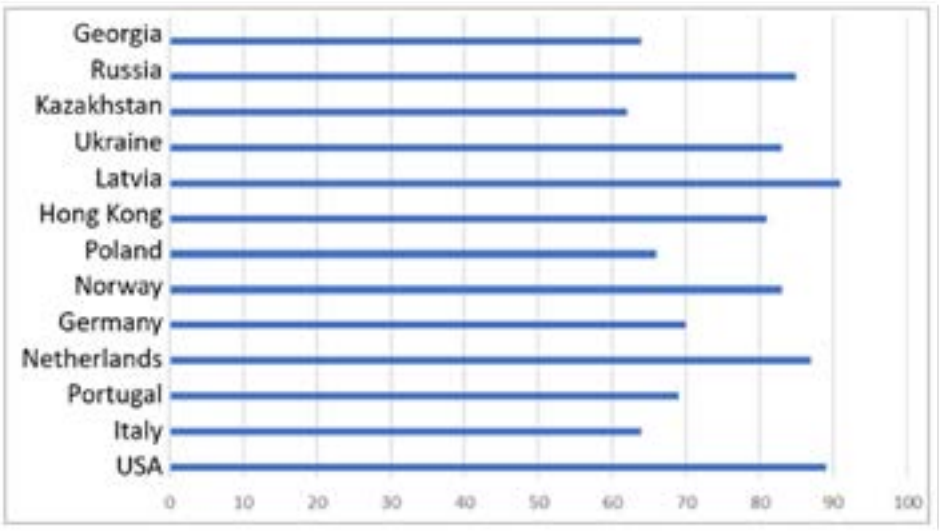


Figure 3 – Coverage of the population with higher education in Kazakhstan
Source: World Bank

Kazakhstan's higher education has transformed from elite to mass. This was facilitated by the segregation of the UNT for admission to universities, an annual increase in the state educational order, an increase in the number of scholarships, etc. The diversification of the student body was the result of expanding access to higher education. The global trend in expanding access and equality of higher and

higher education is the involvement of people with low socio-economic status to receive it. Higher education contributes to the socialization of the individual, helping him to contribute to the social, cultural and environmental development of society.

Significant measures are being taken in Kazakhstan to expand the participation of all population groups in higher education, including applicants from families with low socio-economic status, rural areas, migrants, etc. Socially vulnerable students studying under the quota make up 11.5% of the total number of students. Rural youth is the most represented in the structure of socially vulnerable students studying under the quota (88.8%). Among other socially vulnerable categories studying under the quota, the contingent of students is represented by students of Kazakh nationality who are not citizens of the Republic of Kazakhstan (3275), students who are orphans and left without parental care (2761), disabled people (1349).

The creation of conditions for inclusive education remains a priority direction of the State Educational Program for 2020-2025 at all levels of education. In 2020, the share of civil universities that created conditions for inclusive education amounted to 15%, and in total, the state educational order for training personnel in universities for the 2020–2021 academic year amounted to more than 68 thousand grants.

Another global trend is observed in the higher education system of Kazakhstan — gender equality. 53.2% of girls and 46.8% of young people study at universities. At the same time, in the context of training areas, feminization is observed in the following areas of training: "Social Sciences, journalism and information" — 79.1%, "Pedagogical Sciences" — 69.8%, "Natural Sciences, Mathematics and Statistics" — 68.1%, "Healthcare" — 63.4%. On the contrary, the predominance of male representatives is typical for educational programs on national security and military affairs (80.5%), engineering, manufacturing and construction industries (71.3%), and information and communication technologies (70%). Gender equality is observed in the areas of training "Business and Management", "Services", and "Agriculture and bioresources" (National report on the state and development of the education system of the Republic of Kazakhstan, retrieved from 2022) (Table 1):

Table 1 – The number of students in Kazakhstan by gender, 2020, people Source: Bureau of National Statistics ASPIR

Groups of educational programs	Total students	Female students
Pedagogical Sciences	92468	64556
Arts and Humanities	17251	12243
Social Sciences, journalism and information	10021	7930
Business, management and law	62424	29958
Natural sciences, mathematics and statistics	11381	7750
Information and communication technologies	26324	7880
Engineering, manufacturing industries	56571	16240
Agriculture and bioresources	4211	2084
Veterinary	2529	1079
Services	16380	8271
Healthcare	16239	10290
National security and military affairs	2404	468
Total population	576557	306799

Informatization and digitalization became especially relevant global trends in education during the pandemic. The COVID-19 pandemic gave a powerful impetus to the development of education with digital content, namely the emergence and updating of a huge number of educational programs and online courses. The experience of distance education around the world has generated new educational trends. In Kazakhstan's higher education during the pandemic, 84% of students remained on distance learning, and 12% had the opportunity to study full-time and/or combined. The full-time format was available for medical students, and the combined was available for first-year students: 70% of classes, industrial training and practice were offline, and 30% — were remote (National report on the state and development of the education system of the Republic of Kazakhstan). According to the degree of efficiency and effectiveness of the transition to the distance format, international experts classified Ka-

zakhstan as a country with educational content and resources but not actively using them in the daily learning process. It means that the country initially had the potential to introduce distance learning. At the same time, Kazakhstan, along with some other countries of the world, had to urgently develop additional online training content, introduce online tools and train teachers and students to interact remotely.

The online courses should be an additional opportunity to replenish the professional piggy bank or a new (parallel) individual's development. This trend partially relates to continuous learning and digitalization.

Digitalization of the educational services sector in the Republic of Kazakhstan began in 1997 with attempts to automate the field of education, including through the dissemination of online learning. However, for a long time, there was an urgent need to define the role tasks and responsibilities of the involved participants in the process of digitalization in the spheres of public life. Considering this circumstance and due to the great importance of digitalization, the State Program "Digital Kazakhstan" was approved on December 12, 2017, for the competitiveness of the country. According to it, digitalization is intended to become the infrastructural and technological basis for optimizing and accelerating educational policy.

Blended learning is used ("Extended learning") is an educational process based on the integration of various forms of learning (online training, off-line training, and face-to-face training) aimed at developing and improving the professional competencies of the listener.

The main objectives of blended learning in the professional development system:

- development and implementation of relevant educational programs for advanced training that meet the modern requirements of educational policy, and innovative processes in education;

− introduction of distance learning technologies in the process of professional development of teaching staff;

− provision of high-quality educational services in the programs of additional education of teaching staff;

− creating favorable conditions for the training of students and increasing the resource efficiency of the educational process.

In the process of informatization and "digitalization" of education, there are also difficulties in the Republic of Kazakhstan. One of the main obstacles is the insufficient equipment of teachers and students with computers and laptops. The second obstacle is access to the Internet and coverage of the necessary information and educational resources: blended learning also has disadvantages faced by all parts of the education system interested in the introduction and use of modern technologies. "According to IQAA research, in addition to interruptions in the operation of platforms, there are also problems such as the lack of necessary technical equipment for teaching staff and students, as well as their insufficient knowledge of PCs." (Zainiyeva L., Abzhapparova A., 2022). These are uneven IT literacy, dependence on technology, broadband Internet, stability of online mode and unlimited tariffs, insufficient level of technology ownership, etc.

As the experience of the teaching staff of Al-Farabi Kazakh National University shows during the transition to distance learning in the conditions of a pandemic, educational and scientific activities did not stop, since the university had previously used distance education technologies. Classes were held in a remote format using the "Univer", and "Moodle" systems with MOOC integration. The key problems faced by the university include:

1) Psychological difficulties. Despite the high professionalism in the offline format, it was difficult for some teachers to reorganize and conduct online classes.

2) Digital content and teaching methodology turned out to be unsuitable for distance learning. After the pandemic, it is necessary to reconsider the approach to the full-time education format in favour of blended learning, so that the training IT elements are organically integrated into different educational programs.

One of the main trends of modern education is life-long learning, or continuous learning, which provides the opportunity to realize the right to education throughout life. The fundamental principles of the concept were formulated in the United Nations 2030 Agenda for Sustainable Development. The UN Program calls on countries to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (United Nations Framework Programmes for Development Cooperation).

Even though the concept of "continuing education" was first formulated in 1968 in the materials of the UNESCO General Conference, the active development of framework documents in the European Union began in 2000-2018. Several documents have been adopted and approved, such as the Memorandum of Continuing Education of the European

Union, the Qualifications Framework of the European Higher Education Area, the Paris Communique of 2018, etc.

In the post-Soviet space, the Republic of Kazakhstan is one of the leaders in the field of higher education reform and has a national qualification framework that covers all qualifications of higher and vocational education.

Following the Decree of the Government of the Republic of Kazakhstan dated July 8, 2021, No. 471 "On the approval of the Concept of lifelong learning, a system of independent assessment and recognition of qualifications is being actively developed, which is the most important indicator of the effectiveness of continuing education. Resolution of the Government of the Republic of Kazakhstan dated July 8, 2021 No. 471 "On approval of the Concept of lifelong learning (continuing education)".

The need for continuing education forms from the demands of adapting a modern person to the conditions of a rapidly changing world and a developing labour market, goods and services. Along with the market, the requirements for knowledge, competencies, and forms of communication of a modern person, the development of such properties as mobility, rapid adaptation, purposefulness, responsibility, result orientation, independence, diligence and self-development are also changing.

The implementation of the state policy of lifelong education or lifelong learning is designed to provide modern people with competencies that allow them to respond painlessly to any changes of a socio-economic nature, helping to build an algorithm of actions taking into account the changed situation, be ready to acquire new skills and master new knowledge. This approach is designed to provide a person with reliable competencies that allow him to remain in demand throughout his active life and not join the ranks of socially vulnerable categories of the population.

The modern world of high technologies and digitalization has significantly changed the traditional understanding of the qualification of personnel as specialists in a certain field of activity. Specialists were trained by universities, and the qualifications obtained in the process of special vocational training did not require additional confirmation. Currently, the qualifications of personnel are subject to complex requirements, including not only professional education, but also the possession of soft skills that help to solve life problems and work in a team. Emotional intelligence, sociability, empathy, creativity, analytical thinking, personal effectiveness, self-development, striving for new knowledge, easy learning, etc. become qualities of higher priority for employers.

The traditional understanding of qualifications as special knowledge and special skills to perform a certain job remained a requirement of yesterday. Currently, multifunctionality, the ability to re-profile, and readiness for new complex responsibilities is the main requirement, which caused the need for lifelong learning. It is possible to study independently or develop such qualities, but it will take more time and effort. For these purposes, national models of lifelong learning or lifelong learning, the idea of professional development and personal growth are being developed.

The presence of many interpretations of the concept of "permanent education" in the scientific literature is a consequence of the functioning of various models of higher education and the infrastructural features of their implementation. Therefore, more than 20 different definitions of permanent education are used, such as "continuing education", "lifelong education", "permanent education", "recurrent education", "adult education", "further education", "postgraduate education" (post-graduate education), compensatory training (remedial education), etc. In total, here were about twenty of them in total (United Nations Framework Programmes for Development Cooperation). However, the presence of variable definitions and approaches in the implementation of the concept of permanent education does not contradict its main goal and the results of its achievement. All over the world, the program is aimed at solving the problem of adaptation to the conditions of market competition and integration into the global space.

Improving the education system, taking into account the quality of international policy, is also a strategic goal in the field of education of the Republic of Kazakhstan. The requirements for the competence and qualification of specialists are increasing from year to year, as close as possible to the world with a high quality of education. The concept of continuous education in the Republic of Kazakhstan is aimed at the implementation of world standards for the quality of education. Therefore, "changes in technological processes and the emergence of new occupations require absolutely new skills and qualifications of the workforce, which, accordingly, dictates the need, in addition to improving the system of training young personnel, the development of continuing education to improve the skills of the current workforce" (On the approval of the Concept of Lifelong learning (continuing education)").

The site "enbek.kz" of the Ministry of Labor and Social Protection of the Population of the Republic of Kazakhstan provides information and data on the experience of implementing a lifelong learning program. In 2021, short-term online courses were launched on the portal of the Center for Human Resource Development. The courses had the main goal of forming the so-called "soft skills", teaching new skills that are in demand in the modern labor market. The resource integrated the adult population aged 16-65, and covered the participation of both the younger generation, for whom there were courses to improve the level of education, professional skills, career opportunities, as well as the elderly population.

According to the PIAAC survey, the participation rate of the adult population (16-65 years old) in non-formal education was 17%. At the same time, the participation rate for women was 20%, and for men – 13.85% (OECD, 2022).

The Silver Universities program is implemented within the framework of the Lifelong Education Concept, being an obligatory part of its implementation.

According to statistics, the generation of the "silver age", generation 60 plus, makes up 13.17% of the 7.6 billion world population, which is growing rapidly year by year. In Kazakhstan, the elderly population makes up 11% of 19,666,840 people (OECD, 2022). The trend of increasing the number of the elderly population in the world inevitably raises the question of the integration of this part of the population into an active sociopolitical process, and the inclusion of the social asset of society.

In the "State Program for the Development of Education and Science of the Republic of Kazakhstan for 2020-2025" and on its basis, the developed "Roadmap for the Development of Continuous Education in the Republic of Kazakhstan until 2025", for the first time, the need to create silver universities was indicated. Universities of the "third age" is an international movement called U3A (from English). As a first experience, 72 universities of the Republic of Kazakhstan are developing a draft program "Silver University". Organizational structures have been created to regulate the learning process of older people. University named after L.N. Gumilev implements educational programs "Silver University" for the elderly on the basis of the Institute for Advanced Studies and Additional Education. The program includes language courses for communication and travel, law, history, cultural studies and art history, health programs, developing new directions. Another university that has actively launched the program is the IT University, where Silver IT University courses are offered free of charge. With the support of the state program "Digital Kazakhstan", a comprehensive program is being implemented – "Digital Technologies i-Evolutions", which includes four areas, one of which is the "Silver IT" University, an educational program for the elderly. The program aims to increase the digital literacy of the population and is implemented by the Faculty of Information Technology of the University.

The Silver University project in Kazakhstan is not yet large-scale and comprehensive. The urban population is actively involved in the process. The countryside is lagging far behind, although the demand for them will increase.

Conclusion

Thus, the modernization of higher education in Kazakhstan is aimed at the entry of universities of the Republic of Kazakhstan into the global educational space. Global challenges are objectively changing the education system of our country. The state policy in the field of education of the Republic of Kazakhstan is aimed at the qualitative modernization of education at all levels. Kazakhstan adheres to world standards in the implementation of quality education. The availability of education for the entire population, the continuity of levels, the introduction of advanced educational technologies, the provision of academic freedom to educational institutions, the expansion of the scope of educational services, the improvement of educational and research programs have become the fundamental principles of higher education in Kazakhstan.

As recommendations for further improvement of the higher education system of the Republic of Kazakhstan, the following can be indicated:

- compliance with the cost of the quality of educational services provided in universities
- develop Kazakhstan's opportunities in the world market of educational services to attract new foreign students, become competitive in the world market of educational services
- increasing the training of polyvalent specialists who quickly adapt to market fluctuations and are ready to solve various tasks within the framework of their activities
- improving the infrastructure of individual universities – providing free access to the Internet,

computerization, creation of Internet platforms, respectively, the widespread use of mass online courses, digital interactive training programs, etc.

- stimulation and promotion of the English language as a way of integration into the global educational community.
- introduction of effective foreign models of integration of science and education, giving consideration to the national uniqueness of the country
- modernize approaches to the educational process in universities to improve positions in international rankings.

References

Bureau of National Statistics Strategic Planning Agencies planning and reforms of the Republic of Kazakhstan. Retrieved from https://stat.gov.kz/faces/NavAbout?_adf.ctrl-state=9eon2ok_4&lang=ru

Education and science State Development Program for 2020-2025. Retrieved from https://adilet.zan.kz/rus/docs/P1900000988

Education Policy Outlook Kazakhstan. Retrieved from https://www.oecd.org/education/Education-Policy-Outlook-Country-Profile-Kazakhstan-2018.pdf

Education: Development news, research, data. Retrieved from https://www.worldbank.org/en/topic/education

Global trends in education in the Russian context — 2022. Retrieved from https://ioe.hse.ru/edu_global_trends/

Marginson, S. (2016). The Global Construction of Higher Education Reform. In The Handbook of Global Education Policy (eds K. Mundy, A. Green, B. Lingard and A. Verger). Retrieved from https://doi.org/10.1002/9781118468005.ch16;

Portnoi, L.M. and Bagley, S.S. (2014). A Critical Analysis of Global Competition in Higher Education: Synthesizing Themes. New Directions for Higher Education. 2014. pp. 97-100. Retrieved from https://doi.org/10.1002/he.20116;

Molina-Ray. C. (2010). Higher education in the global knowledge economy // Leadership Studies. (4). p.71. Retrieved from https://doi.org/10.1002/jls.20155; Haigh. M. 2014. Internationalization to Global Citizenship. Higher Education Quarterly, 68: 6-27. Retrieved from https://doi.org/10.1111/hequ.12032

Ministry of Science and Higher Education. Retrieved from https://www.gov.kz/memleket/entities/sc?lang=ru

National report on the state and development of the education system of the Republic of Kazakhstan. Retrieved from https://www.gov.kz/ memleket/entities/edu/documents/details/ 141963? lang=ru

On the approval of the Concept of Lifelong learning (continuing education)". Retrieved from https://adilet.zan.kz

Program for the International Assessment of Adult Competencies (PIAAC). Retrieved from https://www.oecd.org/

Svyatov S., Skiba M. Higher education: global trends and Kazakhstan case// *Society and Economics*. 2017 (9). pp.84-99;

Sadyhanova G.A. (2019). Kazakhstan High Education market services analysis of competitive environment. // *Central Asian Economic Review*. 2019; (3):22-37. (In Russian.); Eurasian Higher education leaders forum. – Astana, IndigoPrint Llp., 2013, 114 p.

Sarsenbayeva A. Globalisation influence on higher education in Kazakhstan and Russia (on the example of Engineering University). http://dx.doi.org/10.1051/e3sconf/202021022010;

Unified Higher Education Management System. Retrieved from http://esuvo.platonus.kz/#/

United Nations Framework Programmes for Development Cooperation. Retrieved from https://unsdg.un.org/ru/2030-agenda/ramochnye-programmy-po-sotrudnichestvu

Walter Leal Filho, Mark Mifsud, Paul Pace (2018) Handbook of Lifelong Learning for Sustainable Development. / URL:DOI: 10.1007/978-3-319-63534-7;

Pedro Teixeira, Sunwoong Kim, Pablo Landoni, Zulfiqar Gilani. (2017). Rethinking the Public-Private Mix in Higher Education: Global Trends and National Policy Challenges, Sense Publishers/ URL:DOI:10.1007/ 978-94-6300-911-9

Zainiyeva L., Abzhapparova A. (2022). Distance Education at Universities during the COVID-19 Pandemic (on the Example of the Republic of Kazakhstan). *In 2022 3rd International Conference on Education Development and Studies (ICEDS'22), March 09–11, 2022*, Hilo, HI, USA. ACM, New York, NY, USA, 6 pages. https://doi.org/10.1145/3528137.3528140Ai

ECONOMICS AND MANAGEMENT

IRSTI 06.01.05 https://doi.org/10.26577/FJSS.2022.v8.i2.02

INSTITUTIONAL QUALITY, FINANCIAL INCLUSION AND SHADOW ECONOMY IN NIGERIA (1991-2020): AN ARDL APPROACH

T.S. Akintunde[1]*, A. Aribatise[2]
[1] Osun State University, Oshogbo, Nigeria
[2] Wesley University, Ondo, Nigeria
*e-mail: temitope.akintunde@uniosun.edu.ng

Abstract. The study examined the dynamic link between institutional quality, financial inclusion and the informal economy in Nigeria. These were with the view to examining the institutional influence of financial inclusion on the development of informal economy. Annual data covering the period 1991 to 2020 were used for the study. The study made use of Autoregressive Distributed Lag (ARDL) as the technique of estimation.

The study found a long run association between the variables and also reveal that financial inclusion and institutional quality directly has a negative but significant effect on shadow economy in Nigeria. This reveals that the development of financial sector as well as quality institutions aids formal sector participation as against the informal sector thus a decrease in shadow economy size in Nigeria. The effect of the interaction of financial inclusion and quality of institution on shadow economy is also found to be positive and significant meaning that weak institution quality has its toll effect on financial inclusion and which result to growth in informal economy in Nigeria. The study concludes that quality of institution in Nigeria is weak and must be improved to favorably promote financial inclusion and successfully mitigate the effect of shadow economy in Nigeria. Therefore, reforms and policies that are required to improve transparency and accountability at all levels of governance as well as improvement in financial system are hereby recommended for policy makers.

Keywords: ARDL, Institutional quality, financial inclusion, shadow economy.

Introduction

There are various degrees of economic activities in an economy whose magnitude is best described by Gross Domestic Product (GDP). But in reality, GDP statistics do not track and record all economic activity. Due to this circumstances, a country's economic performance as measured and viewed through GDP seem bias. However, these economic activities not recorded in GDP are called shadow economy.

Shadow economy (SE) otherwise known as underground, informal, or parallel economy is the part of any economy that is untaxed and unregulated. Though this sector accounts for a sizable component of the GDP of developing nations, Nigeria inclusive. It is occasionally viewed as problematic and unthinkable. However, since 1960s, the shadow economy has been quickly growing and offers important economic prospects for the impoverished (Chem, 2001). Consequently, the financial and monetary impact of the informal sector in emerging economies is of first-rate challenge. Often times due to the contribution of the sector to a country's economic growth, "it is generally assumed that the authorities have nothing to lose, in the meantime it goes past the reputedly financial benefits, however presents an avenue whereby the authorities have to suffer financial losses through unavoidable and inherent tax evasions" (Cordellia, 2019).

Furthermore, various obstacles can limit the operations and expansion of businesses in the shadow economy among which include but not limited to public infrastructure (water, power and land); weak institutions (legal protection, property rights and corruption) or inclusive finance (credit availability, technological advancement, and increased public awareness of businesses (IFC, 2010). Therefore, overcoming these varying challenges is considered important, and one of the possible ways mentioned in the literature is inclusive financing.

Financial inclusion (FI) is seen as efforts to render financial products and services handy and low-priced to all persons and businesses, regardless of their private net worth or organisation size. Financial inclusion strives to cast off the obstacles that cut out people from taking part in the financial

activities and the use of these services to enhance their lives. Therefore, "financial inclusion is seen as a core pillar of development policy in the financial system" (Affandi, 2020). But despite financial inclusion being the pillar of development policy, the formality and complexity of the system and of course policies make it difficult for firms and individuals to access the advantages related with participation in the formal economy (CGAP, 2010). As a result, informal sector arises where these policies (both structural and fiscal) emerge as too onerous particularly policies that increase tax obligations for corporations and individual (Mathias *et al., 2015*). The shadow economy thus, "gives firms the chance to get around government rules and access to low-cost labour, supplies and human right abuse and all sorts of social menace and economic sabotage" (Goel *et al.,* 2017). Furthermore, aside tax burdens (high taxation incidence), and rigid laws which deter businesses, most developing countries' shoddy institutions also contribute to the growth of the shadow economy (Benjamin et al., 2012; Nguyem, 2019). However, if the rule of law is preserved, property rights protected, contracts right law-based and employment merit-based, investors are encouraged to formalize their businesses which in turn boost involvement of both individuals and institutions in the formal sector.

However, one major challenge is integrating the informal sector into the formal sector, hence the need for strong institutional quality as well as financial inclusion in this economy in order to integrate and revamp the economy.

The main objective of this study is to investigate the existence of short-run or long-run relationship among financial inclusion, institutional quality and shadow economy. In addition, the study examines the effect of institutional quality-financial inclusion nexus on shadow economy in Nigeria.

Material and methodology

The primary goal of this research is to determine the link between institutions, financial inclusion and shadow economy in Nigeria as well as to investigate the moderating role quality of institution plays on financial inclusion on the advancement of shadow economy in Nigeria over the period 1991-2020. The study relies on Law and finance theory which is premised on the institutional school of thought which state the importance of legal institution in financial market and emphasizes that in an economy where private property rights and private contractual arrangement are supported by strong institutions, businesses are formalized and consequently, formal sector participation as against the informal sector participation is encouraged, thus a reduction in shadow economy size of the nation. In essence this theory includes institutions and financial inclusion as impacting the shadow economy. Following this line of thought, and the literatures and supporting empirical evidence in line with Maulida & Darwanto (2018); Dada & Ajide (2021); and Affand& Malik (2019), the study specify of shadow economy size as a function of financial inclusion and institutional quality.

$$SE_t = f(FI_t, INS_{t,} Z_t) \quad (1)$$

Where *SE* measures the size of shadow economy; *FI* is financial inclusion indicator; *INS* represent quality of institution indicator and *Z* the control variable. Control variable incorporated is inflation rate. The functional specification of the model is as follows:

$$SE_t = \beta_0 + \beta_1 FI_t + \beta_2 INS_t + \beta_3 \mathrm{INF}_t + \mu_t \quad (2)$$

where INF and μ are inflation rate and disturbance term respectively. However, to capture the mediating role of institutions on financial inclusion on the shadow economy, financial inclusion and institutions have been included as interactive term to equation (2).

$$SE_t = \beta_0 + \beta_1 FI_t + \\ + \beta_2 INS_t + \beta_3 (FI_t * INS_t) + \beta_4 \mathrm{INF}_t + \mu_t \quad (3)$$

where $FI_t * INS_t$r epresents the interactive term between financial inclusion and quality of institutional and coefficients $\beta_1, \beta_2, \beta_3,$ and β_4 denote the parameters to be estimated.

Estimation techniques

In achieving the objectives, this study employed auto regressive distributed lag model of technique (ARDL). However, the technique works regardless of the order in which the variables are integrated as long as the variables are not more than one [I (1)]. ARDL also has the ability to produce short term and long-term unbiased estimates in a dynamic setting. In line with work of Pesaran *et al.,* (2001), equation (3) is re-specified as follows:

$$\Delta SE_t = \beta_0 + \sum_{j=1}^{n} \partial_j \Delta SE_{t-j} + \sum_{j=1}^{o} \alpha_j \Delta FI_{t-j} + \\ + \sum_{j=1}^{p} \varphi_j \Delta INS_{t-j} + \sum_{j=1}^{p} \Phi_j \Delta (FI_t * INS_t) + \\ + \sum_{j=1}^{r} \theta_j \Delta INF_{t-j} + \beta_1 SE_{t-1} + \beta_2 FI_{t-1} + \\ + \beta_3 INS_{t-1} + \beta_4 (FI_t * INS_t) + \beta_5 INF_{t-1} + \mu_t \quad (4)$$

Equation (4) is the ARDL model which comprised both short-run and long-run association between the variables. With an assumption that there exist long run relationship between them, equation (3) reflects the impact of financial inclusion and institutional quality on the advancement of shadow economy both in the short-run and long-run. From the model, Δ is differencing operator, $\partial_j, \alpha_j, \varphi_j, \theta_j$ and Φ_j are the coefficient of speed of convergence in the short run from long run equilibrium path while $\beta_1, \beta_2, \beta_3, \beta_4$ and β_5 represents the long run relationship between the variables; μ_t is the disturbance term at time *t*.

Measurement, description and sources of data

This study employed data covering 1991-2018 to analytically produce empirical evidence on the relationship between the variables. The choice of scope of this study is as a result of transformation in governance i.e., the roadmaps, the various approaches, change in leadership structure in the 1990s and the bank consolidation program of the 2000s.

For the **Shadow Economy Size (SE)** in Nigeria, Schneider and Medina (2018) data set was adopted in this study. They estimated shadow economy sizes of 158 countries spanning from 1999 to 2015 using MIMIC approach. The MIMIC approach is a principle-based approach that takes into consideration the causal effect of some exogenous variables on shadow economy.

For **Financial inclusion (FI) indexes** in Nigeria, using Principal component analysis (PCA), the study employ (1) Number of commercial bank's branches per 100,000 adults' proxy for accessibility and utilization of financial services depicting financial services availability and (2) Private credit by deposit money banks as a percentage of GDP indicating the depth of financial services.

And lastly, **Institutional quality (INS) indexes** as constructed by Kaufmann *et al.,* (2004). However, Law *et al.* (2018) and Gazdar & Cherif (2015) measured the overall institutional quality by five (5) Indicators or indexes, namely: democratic accountability, political stability, bureaucracy, law and order and control of corruption. Higher values when ranged imply a better institutional quality while lower values denote a weak institution. In order to generate institutional quality index for this study, three indicators employed are averaged which are in line with the work of Kose *et al.,* (2011) and Agbloyor *et al.,* (2016).

This study however adopts inflation rate as a control variable. The study takes this because the decision to engage in business activities in the informal economy is also influenced by economic conditions and institutional factors (Keneck *et al.,* (2019). However, "economic instability (i.e. inflation rate) including the opportunities it creates may attract economic agents to informal sector" (Goel and Nelson, 2016).

Literature review

Overview of Shadow Economy in Nigeria

Nigerian shadow economy is extremely large and diverse and Its range of operations includes trading, transportation, building, agriculture, raising cattle, producing food, providing loans, doing mechanical and electrical work, making clothes, information technology and communication, distilleries, and mining for gold and silver e t c. Businesses in this industry often have low income, one-man business with self-employed owners operating below the regulatory radar and not paying taxes. Entry hurdles into our official sector have been blamed for Nigeria's vast informal sector's prevalence.

Many have been discouraged from starting their own businesses because of the costs involved, including company registration. Significantly, due to its enormous size, it is very challenging to get accurate information on their membership and operations. Although taxes from the formal sector are used to pay for public services, it is claimed that informal producers evade taxes and only sometimes use public services due to their illegal status. As a result, their ability to acquire money or insurance from established financial services markets is limited, and their ability to grow is also constrained. However, many unregistered enterprises are victims of illegal money-extortion by dishonest members of society and may be forced to pay official taxes if they are straightforward, certain, and equitable. However, tax authorities find it very challenging to evaluate these enterprises due to the absence of information and paperwork on informal economic activity. Additionally, the normal noncompliance of these companies' forces tax authorities to invest

enormous resources, raising concerns about the opportunity cost of anticipated tax returns.

Over the last three decades in many studies, estimates of shadow economy sizes in Nigeria was between 52% and over 60% of gross domestic product with about 67% in 2018. One important conclusion from studies is that, from 1999 to 2018, the shadow economy in Nigeria appeared to be growing. For example, Shadow economy in Nigeria in 1990 was 52.13 % of the GDP, 56.21 % in 2000 and 60.7 percent in 2010. This rose to 61.68 percent of GDP in 2015 and 67.65 in 2018. According to a report from 2018, the informal sector in Nigeria generated nearly 90% of all new jobs in the nation, 80% of all non-agricultural employment, and 60% of all new jobs in metropolitan areas, earning it the moniker «the backbone of the formal sector.» Despite these percentages, records show that it only makes a small tax contribution to the country's overall revenue. Furthermore, according to the Micro Small and Medium Enterprises (MSMEs) report issued July 2019, total MSMEs were projected to about 41.5 million in Nigeria. As of December 2017, the MSMEs, which account for 48 percent of Nigeria's GDP, had created over 59 million jobs, with 2.9 million of those positions coming primarily from businesses in the education sector. However, the continuous rise in shadow economy in Nigeria requires continuous attention and continuous efforts from policymakers.

The theoretical and empirical literature

This basic tenet of this study is drawn from Law and finance theory which is premised on the institutional school of thought as put up by La Porta *et al.,* (1998). The theory stressed the significance of legal institutions in financial markets. It emphasizes that sound institutions facilitate the development of financial sector by ensuring efficient financial intermediation and easy access to financial services (financial inclusion). In essence, law and finance theory argued that institution is a precursor to financial development, particularly those protecting private property rights of investors in explaining regional differences in growth of financial sector. It explains that in an economy where private property rights and private contractual arrangement are supported by strong institutions, investors' confidence is built up which will aid their active participation in financial systemin the formal sector as opposed informal sector which is evidenced on their financial transactions.

Empirically, estimating the size of shadow economy for 162 developed and developing countries from 1999 to 2007, Schneider *et al.,* (2010) found a clear negative trend in the shadow economy size of about 38.4% as the weighted average size of the shadow economy as a % of GDP in Sub-Saharan Africa and 36.5 % in Europe and Central Asia (mostly transition countries), with 13.5% in OECD countries. Similarly, Using Error Correction Model to determine the speed of adjustment to long-run equilibrium with the employment of currency demand approach to estimate the size of the underground economy. Ariyo and Bekoe (2012) found out that the relationship between tax rate, magnitude of tax evasion and size of underground economy is positive. Furthermore, the study established shadow economy sizes that ranges between 42.54% –79.32% and 2.09% – 6.75% of GDP respectively. Also, Elgin and Birinci (2015) made an attempt to analyze the effect of the informal economies has on growth of economy for 161 countries from 1950-2010. They found out that shadow economy (small and large sizes) had association with little growth in per capita GDP while higher levels of growth in per capita GDP is associated with the medium sizes of informal economy. Furthermore, in a sample of 150 countries and for a period from 1999-2007, Kireenko and Nevzorova (2015) examined the impact of informal economy on life level and quality. They found that there exists an interrelationship between informal economy and quality of life, that informal economy positively affect life quality.

In a further attempt to analyze the impact of shadow economy on growth of an economy, Yelwa and Adam (2017) using a data set from 1980 to 2014 for Nigeria found a positive impact of shadow economy on GDP. Using two models and China's economic background from 1978 to 2016, Chen and Schneider (2018) revealed an increase in shadow economy size from 18.44% to 32.16% in 1978 and 1989 respectively before decreasing to 4.27% in 2016. However, further findings showed that in the primary sector, the statistical impact of employment and regulation in the long run are strong and significant. In the same vein, to determine the average shadow economy size of 158 countries covering 1991 to 2015, Medina and Schneider (2018) found 31.9 percent as the average size of informal economy in those countries.

Using a different approach but obtained similar results, also a study by Omodero (2019) explored the impact of shadow economy from 1991-2018. The study employed Ordinary least squares (OLS)

technique to examine the impact of earned and lost tax revenue on Nigeria's GDP. The finding revealed a positive and significant effect of earned tax revenue on the growth of the economy, and a negative and significant impact of the tax revenue loss on economic growth. Another study by Anoop *et al.,* (2012) analyzed the determinants of the underground economy, taking into consideration the role of institutions and the rule of law. The study found out that when businesses are faced with corruption, inconsistent enforcement and onerous regulation, they tend to hide their activities in the underground economy.

Analysis from the literature suggests that institutional framework plays a larger role in determining shadow economy size than taxes do. Using panel data set for more than 80 countries from 1999-2007, Andreas and Mohammad (2013) investigate the marginal influence of education on the informal economy while taking institutional quality into consideration. They found out that in an environment with weak institutions, higher educational level fuels the informal economy. Still addressing the connection between institutions and shadow economy, estimating seven developing economies of ASEAN using MIMIC approach for the period between 2007 and 2016, Maulida and Darwanto (2018) revealed that the relationship between shadow economy and institutions is negative. Also study by Dreher *et al.,* (2009) recorded a similar result by applying three-stage least square (3SLS) for a sample of 78-135 countries from various continents. They found that the mediating effect of institutions on corruption and shadow economy is significantly negative, meaning that the amount of the shadow economy and the corruption practices will be reduced as quality of institution improves.

In a closely related study and obtaining similar results also, Torgler and Schneider (2007) examined the interrelationship between institutional quality and tax morale and shadow economy. Their study found a significant but negative association between the variables. This shows that shadow economy activity and institutional quality are substitutes i.e., quality institution helps to reduce the sizes of shadow economy. In determining the threshold level of institutional quality's effect on shadow economy and the resulting effect on environmental pollution between 1984 and 2018 using a data set from Nigeria, Dada & Ajide (2021) revealed that both in the short and long run, the effect of shadow economy on environmental pollution is significantly positive. This reveals that shadow economy degrades environmental quality while institutional quality reduces environmental pollution.

A further look into the interrelation between financial inclusion and shadow economy is also given consideration in this study. Using the nonlinear ARDL (i.e., NARDL) to investigate the impact of the shadow economy on financial inclusion for a sample of 18 selected merging economies from 1980 to 2013. Hajilee *et al.,* (2017) revealed a significant effects of shadow economy on the financial inclusion. Similarly, from a sample of 20 emerging economies from 2004-2014 using a two-stage linear panel regression (2SLS) to analyze the relationship between financial stability, financial inclusion and shadow economy, Elsherif (2019) found an insignificant effect of financial inclusion on shadow economy (SE) size; however, the level of financial instability can be increased by both inclusion and SE.

Another contribution was made by Affand and Malik (2019) to the extant literatures to investigate the linkage between shadow economy and financial institutions and the resulting effect on financial inclusion for the year 2006-2017. The study revealed that shadow economy and financial institutions significantly impacted on financial inclusion. Also, investigating the link between shadow economy and financial in selected African countries, Ajide (2021) found that financial inclusion negatively affects shadow economy. The causality results also revealed a unidirectional causal relationship which means that financial inclusion better predict shadow economy. The findings also show that through financial inclusion, country with lower degree of corruption and higher economic growth tend to gain more from the reduction in the size of shadow economy.

In summary, there appears to be a lack of clear-cut direction on the interaction among shadow economy, financial inclusion and quality of institution in the literature. Despite the numerous studies on SE-FI, SE-INS and FI-INS nexus across the globe, little attention has been given to the interaction among the variables simultaneously. However, the institutional influence on financial inclusion on the development of shadow in Nigeria has not been accorded enough attention in the literature, hence this study.

Table 1 – Measurement of variables and sources

Variable	Symbol	Description	Sources	Measurement
Financial Inclusion	FI	Number of commercial bank branches per 100,000 adults Private credit by deposit money banks as a % of GDP	World development indicator, 2020	Index
Institutional Quality	INS	Democratic Accountability Corruption control Law and order	International Country Risk Guide (ICRG) assembled by the Political Risk Services (PRS) group.	Index
Shadow economy	SE	Size of shadow economy as a percentage of GDP	World development indicator, 2020	% GDP
Inflation rate	INF	Consumer Price Index (CPI), annual variation in %	CBN statistical Bulletin, 2020	CPI, annual variation in %

Source: Authors' Compilation, 2022

Result and discussion

Descriptive statistics

Descriptive statistics are conducted to highlight the features and nature of data, as well as the behaviour of the variables within the study period. The descriptive statistics result is therefore presented in Table 1.

Table 2 – Descriptive Statistics

	SE	FI	INS	INF
Mean	60.87117	1.07E-15	2.291667	18.45445
Median	60.69500	0.521915	2.333333	12.71577
Maximum	67.65000	1.448110	2.833333	72.83550
Minimum	51.95000	-2.181778	1.638889	5.388008
Std. Dev	3.993564	1.149458	0.284029	16.79690
Skewness	-0.016910	-0.446029	-0.709493	2.085270
Kurtosis	2.346646	1.807810	3.219481	6.194997
Observations	30	30	30	30

Source: Authors' computation, 2022

An important finding is that the mean and the median shows exceptional consistency as their values fall between the minimum and maximum (see Table 2). The mean value of SE is 60.87 with 67.65 and 51.95 (% of GDP) as maximum and minimum value respectively. The coefficients of the standard deviation significantly spread out from their mean; this shows that the variables are volatile.

Also, on average, mean values for FI and INS are 1.07% and 2.29% with 2.18% and 1.63% ,1.44%. and 2.8333% as minimum and maximum value of respectively. The descriptive analysis results also reveal that SE, FI and INS skewed negatively, while INF skewed positively. Also, Kurtosis which measure the level of peakness of the variables revealed that SE and FI platykurtic while INS and INF are leptokurtic.

Table 3 – Correlation Matrix

	SE	FI	INS	INF
SHADOW	1.000000			
FII	0.410900	1.000000		
INS	0.426704	0.308839	1.000000	
INF	0.099757	-0.377080	0.188659	1.000000

Source: Authors' computation, 2022

Table 3 showed the correlation matrix result which demonstrated the nature, degree and direction of the correlation between the variables. Notably, the coefficients of the correlation ranged from -0.377 to 0.426, which indicate absence of multicollinearity. However, since all correlation coefficients are less than the benchmark (0.8), this demonstrates no multicollinearity between the variables. The results also showed that SE had a positive correlation with FI, INS and INF.

Preliminary test

In empirical analysis, time series data that are non-stationarity has been viewed as been problematic. Consequently, regression on series that are non-stationary may lead to spurious results. Therefore, this study employed (ADF) and (PP) tests for the unit root.

Unit root test

Table 4 – ADF and PP unit root Test

Variable	Augmented Dickey Fuller (ADF)Test				Phillip-Perron (PP) Test			
	@Level	@1st Diff	5% CV	Remarks	@Level	@1st Diff	5% CV	Remarks
SE	-2.023313	-7.162559	-2.971853	I(1)	-1.880571	-7.662592	-2.971853	I(1)
FI	-2.201198	-7.133395	-2.971853	I(1)	-2.236149	-7.133395	-2.971853	I(1)
INS	-3.280621	-4.660995	-2.967767	I(0)	-3.434647	-9.106944	-2.967767	I(0)
INF	-1.991441	-4.251095	-2.976263	I(1)	-2.230861	-5.909278	-2.976263	I(1)

Source: Authors' computation, 2022

Table 4 revealed that SE, FI and INF are stationary at first difference and INS at levels i.e. this shows a mixed "order of integration" among them.

Selection of Lag Order

The lag length for the model is presented in Table 5. The AIC, HQ and FPE revealed three (3) lag length. This study chose AIC because it could handle the risk of over fitting and under fitting while FPE information criterion is appropriate when the number of observations is small or less than 60.

Autoregressive Distributed Lag (ARDL)

Since the Unit root test revealed a mixed result, and more importantly, then "using autoregressive distributed lag (ARDL) as the estimation technique is appropriate" (Fabiyi and Dada, 2017).

Table 5 – Optimal lag length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-75.76760	NA	17.26438	5.686489	5.734483	5.700760
1	-67.49191	15.32534	10.07386	5.147549	5.243537*	5.176091
2	-66.95568	0.953304*	10.43271	5.181902	5.325884	5.224715
3	-66.93602	0.033496	11.23282*	5.254520*	5.446496	5.311604*

Source: Authors' computation, 2022

* Indicates selected lag order

From Table 5, the F statistic value is 5.344569 and the lower and upper bound test result at 5% level of significance are 2.72 and 3.77 respectively. Since the F-Bound test statistic value of 5.344569 is greater than the lower and upper bound result, we the reject the hypothesis of no long-run relationship and accept that there exists a long-run relationship between them.

Table 6 – ARDL bound test

Model	Test statistic	Value	K
	F-statistic	5.344569	3
Critical Value Bounds Significance	I(0)	I(1)	
10%	2.72	3.77	
5%	3.23	4.35	
2.5%	3.69	4.89	
1%	4.29	5.61	

Source: Authors' computation, 2022

In Table 6, the short run dynamic impacts of financial inclusion, institutional quality, and inflation on shadow economy is significant at 5% level and negatively signed. ECM is also significant and correctly signed with an estimated value of -0.73 with probability value of 0.0022. This means that approximately 73% of the discrepancy of the previous year is adjusted for by the current year.

In the long run, the coefficient of financial inclusion is negative and significant and insignificant in the short run and also higher in the long run when compared with the short. This implies that financial inclusion reduces shadow economy in Nigeria which is quite evident in the long run i.e., both in the short and long run, a unit increase in financial inclusion would on average decrease the shadow economy by 6.56 and 29.3% respectively in Nigeria. This is in line with the submission of Bittencourt *et al.,* (2014), Hajilee *et al.,* (2017) and Ajide (2021). They document that the move to make financial services affordable and accessible to firms and individuals reduces shadow economy in Nigeria.

Table 7 – Impact of institutional quality on financial inclusion on the advancement of shadow economy

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Short run				
D(SE(-1))	-0.403570	0.198952	-2.028483	0.0674
D(FI)	-6.562286	6.498392	-1.009832	0.3343
D(FI(-1))	2.585579	1.146573	2.255049	0.0455
D(FI(-2))	-1.776754	0.717785	-2.475329	0.0308
D(INS)	-3.382798	3.085710	-1.096279	0.2964
D(INS(-1))	-5.697865	3.163581	-1.801081	0.0991
D(INF)	0.140491	0.083995	1.672620	0.1226
D(INF)	0.186436	0.114313	1.630933	0.1312
D(INF)	-0.103715	0.078092	-1.328100	0.2110
D(FI * INS)	3.036531	2.976352	1.020219	0.3295
CointEq(-1)	-0.731013	0.184144	-3.969801	0.0022
Long run				
FI	-29.395303	12.882146	-2.281864	0.0434
INS	12.050156	4.877474	2.470573	0.0311
INF	0.168665	0.079242	2.128495	0.0567
FI*INS	14.007110	5.725793	2.446318	0.0325
C	29.556355	10.931746	2.703718	0.0205

Source: Authors' computation, 2022

Also, in Table 7, institutional quality (INS) has a negative non-significant effect on shadow economy and positive and also significant in the short and long run respectively. This implies that INS has the potential to reduce shadow economy size.i.e., a reduction in shadow economy size is associated with an improvement in institutional quality in Nigeria. This result corroborated the empirical work of Maulida & Darwanto (2018), Dreher *et al.,* (2009) and Torgler and Schneider (2007) which posits that strong institutional framework is required to reduce shadow economy activity in an economy. In addition, inflation coefficient is insignificant in the short run while in the long run, it is positive and significant. This means that inflation aide the development and rise of shadow economy in Nigeria which the impact is felt more over a long period than the short while. This supports the empirical work of Mazhar and Méon (2017) which emphasize positive relation between inflation and shadow economy which are in line with their model's prediction.

Furthermore, the coefficient of (FI * INS) showed a positive and significant impact on shadow economy in the long run and an insignificant impact in the short run. Meaning that institutions and financial inclusion aids the advancement of informal economy in Nigeria. This finding suggests that feeble institutional quality which is characterized by governance and regulatory deficiencies, high degree of corruption etc. recorded in the country hinders firms and individuals' access and usage to financial services which in turn result to a rise in informal economy. Consequently, a rise in informal economy however provides avenue whereby government suffers financial loss resulting in a reduction in national revenue due to tax evasion.

Conclusion

This study is aimed at evaluating the dynamic link between financial inclusion, institutional quality and shadow economy as well as examining the moderating role quality of institutional plays on nexus between financial inclusion and shadow economy in Nigeria for a period of 1991-2020. ARDL technique was employed by the study to investigate relationships among the variables. Bound test results show the existence of long-run relationship among shadow economy, financial inclusion and quality of institution. The study also revealed that financial inclusion negatively and significantly affects shadow economy both in the short and long run. By implication, inclusive financing is indeed one of the primary factors influencing shadow economy in Nigeria. It becomes necessary for Nigerian governments to continue to place priority on revamping the financial sector by ensuring financial intermediation thus easy access to various financial services. Furthermore, the study also reveals that the effect of institutional quality on shadow economy in Nigeria is significantly negative. By implication, quality of institutions also plays a role in decreasing size of informal economy in Nigeria. In the same vein, Inflation also positively and significantly impacted on shadow economy in Nigeria. This shows that inflation is another factor that positively and significantly affects shadow economy in Nigeria. By implication, "a larger informal economy gives governments an impetus to switch its source of revenue from taxes to inflation, this erodes the tax base and decreases tax revenues, forcing governments to find alternative sources finance their expenditures" (Mazhar and Meon, 2017).

Furthermore, the interaction of financial inclusion and quality of institution on shadow economy in Nigeria is significantly positive. This means that the effect of institutions on financial inclusion aid the growth in shadow economy size in Nigeria. Similarly, weak institutional quality has its ripple effect on financial development which not only disrupts financial intermediation, but also undermines the effectiveness of monetary policy, thus discouraging formal sector participation in Nigeria. To this end, the study suggests that key reforms and policies that are needed to improve transparency and accountability at all levels of governance should be given a priority. In turn, this would ensure improvement in financial institutions and thus reduces shadow economy size in Nigeria.

References

Affandi, H & Malik Q. A (2020). Shadow Economy, outreach of financial institutions and financial inclusion: a study of Balkan countries. *International transaction journal of engineering, management applied sciences technologies*. 11(1)

Anoop S., Jain-Chandra S., &Adil M. (2012). Inclusive Growth, Institutions, and the Underground Economy. IMF Working Paper, WP/12/47

Ariyo, A. & Bekoe, W. (2012), "Currency demand, the underground economy and tax evasion: case of Journal of Nigeria", *Monetary and Economic Integration*, 2(2), 130-157.

Benjamin, N., Beegle, K., Recanatini, F., &Santini, M. (2014). Informal economy and the World Bank. Policy Research Working Paper.

Benjamin, N., Mbaye, A. A., Diop, I. T., Golub, S. S., Haughton, D., &Niang, B. B. (2012). The informal sector in Francophone Africa Firm size, productivity, and institutions. Geneva: The World Bank.

Berdiev, A. N., & Saunoris, J. W. (2016). Financial development and the SE: A panel VAR analysis. *Economic Modelling*, 57, 197-207

Bittencourt, M., Gupta, R. & Stander, L. (2014). Tax evasion, financial development and inflation: theory and empirical evidence, Journal of Banking and Finance, 41,194-208

Buehn, A., & Schneider, F. (2012). Shadow Economies around the World: Novel insights, accepted knowledge, and new estimates. International Tax and Public Finance, 19, 139– 171.

CGAP, (2010). Digital Finance Interoperability & Financial Inclusion, 2016 http://www.cgap.org/publications/digitalfinance-

Chen, H. & Schneider, F. (2018). Size and causes of shadow economy in China over 1978-2016: Based on the currency demand method. Retrieved on Aril 6, 2019

Chen, M (2001). Women in the informal sector: a global picture, the global movementt.» SAIS Review 21(1).

Cordelia O.O (2019). The Financial and Economic Implications of Underground Economy: The Nigerian Perspective. Academic Journal of Interdisciplinary Studies, 8(2), 2281-3993

Dreher, A., Christos K. & McCorriston D.S. (2009). How do Institutions Affect Corruption and the Shadow Economy? Int Tax Public Finance. 773-796.

Elgin, C. & Birinci, S. (2015). Growth and informality: A comprehensive panel data analysis. Journal of Applied Economics, 19(2), 271-292.

Elsherif, N. (2019). Financial inclusion, shadow economy and financial stability: Evidence from emerging economies [Master's Thesis, the American University in Cairo]. AUC Knowledge Fountain.

Fabiyi, R.O. & Dada, J.T. (2017), Fiscal deficit and sectoral output in Nigeria, American Journal of Social Sciences, 5(6), 41-46.

Goel R. K. and Nelson M. A. (2016). Robust Determinants of the Shadow Economy: An International Comparison CESifo Working Paper Series No. 5873, https://ssrn.com/abstract=2780865

Hagilee M, Stringer D.Y & Metghalchi M. (2017). Financial market inclusion, shadow economy and economic growth: New evidence from emerging economies. Quarterly review of economics and finance. 66, 149-158

IFC (2010). The SME Banking Knowledge Guide. IFC, Washington, DC Women and Men in the Informal E*conomy(PDF). International Labour Organization.*

Kaufmann, D. and A. Kaliberda (1996). Integrating the unofficial economy into the dynamics of post socialist economies: a framework of analyses and evidence, in: Economic Transition *in Russia and the New States of Eurasia*, 81–120.

Keneck M.J.*&* NoahA., *(*2019*).* Shadow economy and educational systems in Africa. Economics Bulletin, 39(2).

Kireenko, A. & Nevzorova, E. (2015). Impact of shadow economy on quality of life: Indicators and model selection. *Procedia Economics and Finance, 25(2015), 559-568.* DOI: 10.1016/52212-5671(15)00770-4.

Kose, M.A., Prasad, E.S. & Taylor, A.D. (2011). Thresholds in the process of financial integration, *Journal of International Money and Finance*, 30, 147-149.

Maulida, R., & Darwanto, D. (2018). Analysis of Institutional Quality Influence on Shadow Economy Development. JEJAK: *JurnalEkonomidanKebijakan,* 11(1), 49-61.

Medina, L. & Schneider, F. (2018). Shadow economies around the world: what did we learn over the last 20 years*? International Monetary Fund (IMF) working paper*, WP118/17.

Micro, Small, and Medium Enterprises (Msme) National Survey 2017 Report. National Bureau of Statistic

Morgan, P.J. & Pontines, V. (2014). Financial Stability and Financial Inclusion. Asian Development Bank Institute (ADBI), ADBI Working Paper Series no. 488. Retrieved from http://www20.iadb.org/intal/catalogo/PE/2014/14477.

Nguimkeu, P.E. (2014). A structural econometric analysis of the informal sector heterogeneity. *Journal of Development Economics,* 107, 175 – 191.

Nguyem, T. H. (2019). How large is Vietnam's informal economy? *Economic Affairs*, 39(1), 81–100.

Oduh, M. (2008). Measurement and explanation of informal sector of the Nigerian economy. AIAE Research Paper 3, 1-64.

Omodero C.O. (2019). The financial and economic implications of underground economy: The Nigerian Perspective. *Academic Journal of Interdisciplinary Studies. 8(2).*

Schneider F. and Ernst D. (1999). Shadow Economies around the world – size, causes and consequences, Working Paper No 196, CESifo,

Schneider, Buehn, & Montenegro. (2010). Informal economies all over the world: New estimates for 162 countries from 1999 to 2007. Policy Research Working Paper 5356. Washington, DC: World Bank.

Schneider, F., &Buehn, A. (2016). Estimating the size of the shadow economy: Methods, problems, and open questions. Germany: IZA DP No. 9820.

Torgler, B., & Schneider, F. (2007). The Impact of Tax Morale and Institutional Quality on the Shadow Economy. Journal of Economic Psychology, 228-245.

Ummad M. & Pierre-Guillaume M. (2017). Taxing the unobservable: The impact of the shadow economy on inflation and taxation, World Development, Elsevier, 90(C), 89-103.

Yelwa, M. & Adam, A.J. (2017). Informality and economic growth in Nigeria: 1980-2014. Journal of Economics and Public Finance, 3(3), 405-417. DOI: 10.22158/jepf.v3n3405.

IRSTI 87.01.05 https://doi.org/10.26577/FJSS.2022.v8.i2.03

CORPORATE SOCIAL RESPONSIBILITY IN THE CONTEXT OF ESG: DEVELOPMENT AND TRENDS

A.B. Serikakhmetova*, A.A. Adambekova
Al-Farabi Kazakh National University, Almaty, Kazakhstan
*e-mail: aiym.serikakhmetova@gmail.com

Abstract. The unexpected and complex situation facing global society as a result of COVID-19 pandemic has highlighted the importance of companies' commitment to social responsibility. For this reason, scholars have called for a more comprehensive picture of corporate social responsibility (CSR) research. Each country is trying to introduce and practice different approaches and methods to develop this concept. This article analyzes CSR trends in five countries, such as the USA, China, India, Russia and Kazakhstan. The purpose of this article is to identify the most important trends that are used in all countries by comparing the current methods used in the mentioned countries, as well as proving that the trends can differ depending on the main problems in the countries. In this paper, an analysis of scientific papers on the topic of CSR, the selection of articles and the analysis of selected articles were carried out. A content analysis of publications on the topic "corporate social responsibility" was carried out for all time and for the last 5 years. An information on CSR trends was collected from news publications of each country to compare them. The article proved the current relevance of 'S' in ESG by analyzing scientific publications on this topic. The analysis showed an active growth of publications on the development of CSR over the past 5 years, especially the period from 2020 to the present day.

Keywords: corporate social responsibility, ESG, sustainable development, SDGs.

Introduction

Nowadays, the key principles of CSR are usually included in the concept of sustainable development of companies – balanced development in three aspects: environmental, social and governance (ESG). CSR is closely related to sustainable development and is often included in companies' ESG strategies. ESG practices can be used to evaluate how well a company is adhering to the sustainable development and corporate responsibility goals they set (Khediri, 2021). Compliance with the principle of sustainability leads to increase of share prices and investment attractiveness of company, which can increase likelihood of getting loans from banks (Wu and Huang, 2022).

Globalized markets, along with increasingly unstable economic environments and changes, impose on companies the need to adopt strategies that, in addition to give them a competitive advantage over other organizations, promote their sustainability (Khediri, 2021). Business tries to adhere to the ESG principles of sustainable development, it means to take care and prevent damage to the environment or create good social conditions for employees or conduct competent management activities (Chaffee, 2017).

Despite the fact that companies are undeniably trying to adhere to these principles, there are problems in implementation corporate social responsibility into business practices due to lack of knowledge of trends. This is a consequence of the lack of necessary information, as well as the insufficiency of scientific works that include a comparative analysis of CSR trends.

This article reviews the literature on the development of ESG and CSR. In addition, this study is devoted to the analysis of the relevance of CSR based on existing literature and a comparison of the development of CSR trends from news publications in the USA, China, India, Russia and Kazakhstan and their current state. Based on the analysis, similar trends that are applied in all selected countries were identified, as well as distinctive ones that have arisen depending on the problems of countries and the requirements of society.

Literature review

Development of ESG concept

Each letter of the word "ESG" refers to one component:

1. E – environmental criteria. It includes corporate climate policies, energy use, waste, pollution, natural resource conservation and treatment of animals (S&P Global).
2. S – social criteria or CSR (corporate social responsibility). This aspect looks at the company's relationships with internal and external stakeholders (Harvard Law School Forum). It's taking into account the society interests by being responsible for the impact of their business.
3. G – governance. This criteria is responsible for the high quality of corporate governance (Friede et al., 2015).

Modern ESG principles first appeared as a solution to environmental problems – like global warming, climate change. Climate change had become a major issue by 1989 that led to the first considerations of social principles in 1990. On the other hand, E.C. Chaffee claims that social components already began to form in ancient Rome, where they had shelters, homes, hospitals for the poor and old people in the 16th century (Chaffee, 2017). These their actions can be considered as social responsibility in early days.

At the end of the 19th century and at the beginning of the 20th century, actions similar to modern ESG principles began to appear. For Carroll their examples are protection and retention of employees and actions aimed at improving the lives of employees (Carroll, 2008). For Heald – donations of US companies to the orphanage and the construction of a settlement in order to improve the quality of life of employees (Heald, 1970). In the middle of the 20th century, managers began to take responsibility for maximizing profits, which led to the social and economic responsibility of organizations (Carroll, 2018). M. Friedman in this honor said that ESG has an analytical looseness and lack of precision. He argued how business can have "responsibility". He also claimed that some companies use the CSR as a mask for actions that are justified by other motives than the real reason for these actions (Friedman, 1970). Taking into account that Friedman expressed this idea 50 years ago, it should be noted that at the present time, there are also studies and expert statements that share his opinion. All of the above draws the attention of researchers to the fact that despite the seemingly widespread opinion about social responsibility as a need for sharing responsibility, the study of research results shows a differentiation of opinions, both 50 years ago and at the present time.

Returning to our days, modern ESG principles was first formulated in 2006 by Ex-General-Secretary of UN Kofi Annan. He suggested that the managers of large global companies have to include these principles in their strategies, primarily to combat climate change. Next organization that made contribution is the EC (European Commission). They adopted a declaration against social exclusion in order to work with unemployment (CSR Europe n.d.)

The agreement and the adoption of the seventeen Sustainable Development Goals (SDGs) took place in 2015. The SDGs cover a wide range of areas, such as climate change, eradicating poverty and hunger, promoting innovation and sustainable consumption.

If we consider each criteria of ESG, environmental criteria is probably the most developing now, but since this criteria requires high expenses, social criteria comes on the top.

Development of CSR

T. Johnson classified the historical evolution of the CSR into four different periods that are shown in figure 1.

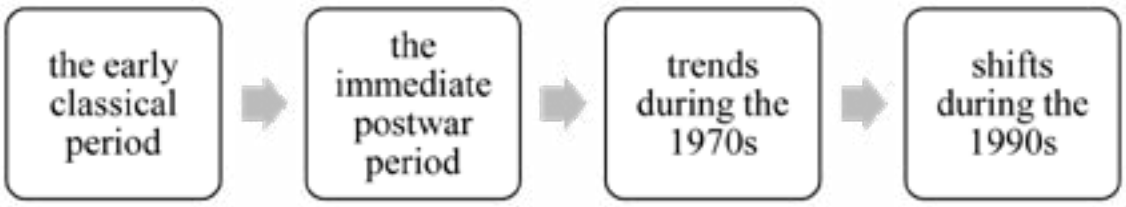


Figure 1 – History of CSR (Johnson, 2010)

The early classical period

As the origin of the emergence of CSR concept can be considered the beginning of the 19th century when the protection of the workers right was begun. One of the founders was the British industrialist Robert Owen, who developed a plan to improve the living conditions of workers and tried to implement it in one of the factories in Scotland. Although his attempts failed, his ideas helped workers to realize their own rights and importance. After that, in the 1920s and 1930s, the managers of the organizations had already begun to take responsibility for their workers (Clark,1939).

The immediate postwar period

Social responsibility became even more popular after the Second World War. Carroll (2008) notes the rise in the manifestation of the CSR issue in the post-war period. He claims that companies begun to be seen as institutions with social responsibilities. Corporate charity was already a trend of normal life. The foundations of CSR were the principles of stewardship and charity (Johnson, 2010).

Trends during the 1970s

Only at this period the exact definition of the term "social responsibility" was considered correctly. For that reason this period was considered to be the beginning of modern CSR. It was not until the 1970s that practical significance was given to CSR (Lee, 2008).

Shifts during the 1990s

The 1970s trends are followed by the shifts that existed during the 1990s (Matten and Moon, 2005). At this stage, a special place is occupied by the UN Conference on environmental protection and sustainable development. Its result was the global recognition of the sustainable development and ESG importance. In fact, at this stage, everything was finally formulated: the ideology, direction, setting tasks and goals.

A new wave of interest in CSR arose in the first decade of the 20th century, this is about the institutionalization of CSR, which is a process of transplantation, formation and consolidation of relevant norms and restrictions. A number of interesting publications about this process have been published in the works of R. Ackerman, J. Moon, M. Kitzmüeller, J. Campbell and others. The study of this process considered the main factors in the formation of the CSR institution, its main characteristics, features and functions. The process of institutionalization of CSR is considered to be still incomplete and emerging.

Today, the impact of CSR on markets, the economy and society is of particular relevance. Recently, more and more attention is paid to the impact of CSR on the economy and market (Kitzmüeller, 2010).

This article examines 2022 CSR trends.

Methodology

In this paper an analysis of scientific papers on the topic "ESG" and "corporate social responsibility" was carried out.

First step was selection of papers from database Scopus and other resources. This step included identifying key words, finding scientific papers and choosing necessary ones.

Next step was analysis of selected articles. Papers were reviewed and studied in depth. Their aims, statements and conclusions were analyzed. Research gaps were highlighted for further research.

A content analysis of publications on the database Scopus on the topic "corporate social responsibility" was carried out for all time and for the last 5 years using different filters and graphs were built based on this analysis. An analysis of publications on the CSR topic and CSR trends in five different countries were conducted. These countries included the USA, China, India, Russia and Kazakhstan.

An information on CSR trends was collected from news publications of each country. Based on the collected information, a table was constructed indicating the relevant ones for each country. In conclusion, a comparative analysis of the CSR trends of the selected countries was carried out, identifying common and distinctive trends.

Results

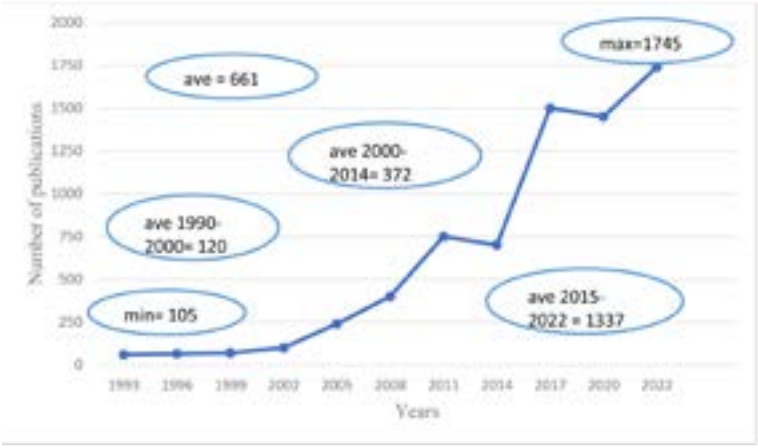
Descriptive results

A comparative analysis of publications on the database Scopus on the topic "corporate social responsibility" was carried out for all time and for the last 5 years using different filters. It should be noted that the first publications on the CSR topic were published in 1957, while the UN Sustainable Development Goals were adopted much later as global guidelines for the implementation of approaches to the social responsibility of business. The results are shown in Table 1. Using these results, two graphs were built in different periods, which are shown in Graph 1 and Graph 2.

Table 1 – Number of publications in the database Scopus from 1957 to recent times

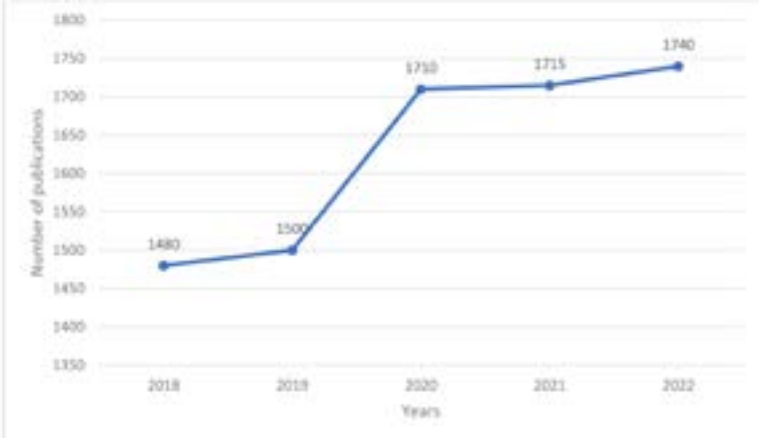
Applied filters	Total number of publications from 1957	Number of publications in the last 5 years
Term "corporate social responsibility"	29 626	13 767
Branch "Business, Management and Accounting"	18 247	8 138

From this table it can be concluded that more publications were published in last 5 years on the CSR topic than from 1957 to 2017. This is justified by the relevance of this topic now than then.



Graph 1 – Number of publications from 1990 to present times

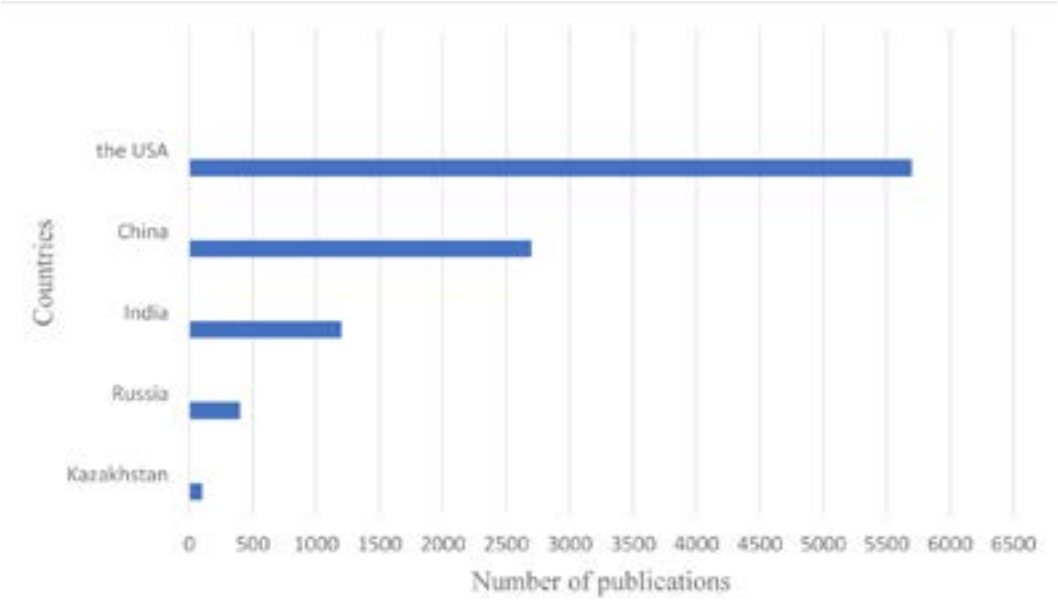
Since the appearance of the term CSR, publications on this topic have been published since 1957. But this graph shows data from 1990 due to the low number of publications before that time. According to this graph, it can be concluded that in the period from 1990 to 2002, the development of the relevance of the CSR topic was rather passive. Stable dynamic growth of development originates from 2002 and is actively growing to this day, which explains the important role of CSR in society at the present time. Also the minimum and maximum number of publications, the overall average and the average for the periods are shown.



Graph 2 – Number of publications from 2018 to present times

The relevance development over the past 5 years has remained stable and is still growing. The reason of a peak in 2020 is the influence of Covid-19 pandemic, since the society has unwittingly begun to demand the social responsibility of everyone.

An analysis of publications on the CSR topic and CSR trends in five different countries were conducted. These countries included the USA, China, India, Russia and Kazakhstan.



Graph 3 – Number of publications by countries from 1957

This graph shows that in the first three countries there is an active study of the topic of CSR, while in Russia and Kazakhstan there are few publications on this topic. A small number of studies and publications proves that Russia and Kazakhstan haven't occupied a worthy position in the ratings for the dissemination of CSR norms yet. This fact can be explained by the fact that in these countries there are many obstacles to business development. It is possible to highlight the barrier that almost all companies face when implementing CSR – the lack of commitment and interest of the company's management and the lack of interests of its partners.

Content analysis results

Analyzing the trends, Table 2 was compiled listing them in the countries listed below.

The study identified trends that are relevant in all countries and play a priority role in the implementation of CSR in organizations. These trends include implementation of charitable programs that are highlighted with purple, implementation of social packages at the enterprise that are highlighted with green and improvement of working conditions for employees, staff development and training that are highlighted with orange and corporate volunteering that are highlighted with blue.

From the highlights it can be easily seen that India is the least highlighted one, which shows that their trends are less similar to others. This can be justified by the fact that India, to be precise, their problems are very different from the selected countries. Problems such as air pollution in towns and country sides of India, demographic problems, inequality of people, hunger and many other important problems have reached frightening levels in India. All of the mentioned problems are influencing and taking into account in the formation of CSR trends.

Table 2 – 2022 year trends of selected countries

Selected countries	Trends
The USA	– necessity of equity and diversity – employee training – measuring CSR impact – development of corporate volunteering – green technology – providing opportunities for employees – full supply chain accountability – close focus on SDGs – charity –focus on sustainability
China	– reduction of greenhouse gas emissions – controlling energy consumption – waste reduction – employee training – social packages – providing the opportunity to work remotely – implementation of charitable programs
India	– eradicating extreme hunger and poverty – promotion of education, gender equality and empowering women – charitable programs – combating HIV-AIDS and other diseases – ensuring environmental sustainability – contribution to the PM's National Relief Fund or any other fund set up by the Central Government for socio-economic development and relief – volunteering programs
Russia	– employee's health – development of corporate volunteering – charity – reducing employees' stress – regional development – solving environmental problems
Kazakhstan	– implementation of social packages at the enterprise and improvement of working conditions for employees – corporate volunteering – charitable help to society – staff development and training – regional development programs

The essence of the trend "implementation of charitable programs" is the systematic work of companies with charitable foundations, public organizations in such areas as culture and art, science and education, the social sphere, ecology and sports. The basis in this area is the concept of a charitable program – a set of measures aimed at solving problems and meeting the needs of society. At the same time the analysis showed that CSR trends in different countries may differ depending on the existing problems in the state and on the culture and requirements of society.

One of the important internal CSR trends in companies of all countries is "implementation of social packages at the enterprise and improvement of working conditions for employees". Engaging employees and improving the quality of their work has a direct impact on increasing the profits of the organization. This concept includes the creation of such conditions as the flexible work schedule, timely payment of wages in the appropriate amount, a flexible system of bonuses, pension and medical insurance, social packages, including parking, food, and the provision of the necessary gadgets.

Today, the external and internal conditions of the organization functioning are changing very quickly, which sets the task of developing the trend "training personnel for work in new conditions" before companies. Employers must pay much more attention to having competent and highly qualified employees. Modern methods include coaching, mentoring, buddying, shadowing, councelling, rotation, distance learning, etc. The enterprises should stimulate and support innovation, respectively, actively involve

its employees in innovation activities, which will increase professionalism. For such purposes, companies can create conditions by providing opportunities such as paying for a second higher education, stimulating innovators, introducing new technologies, and stimulating a healthy lifestyle.

The next key CSR trend, which is relevant in all countries, is corporate volunteering. The way to implement this trend is the cooperation of management and staff in the implementation of CSR. This practice is already carried out in many companies in different countries. For the correct implementation of this trend, employees need to convey that such an investment in CSR is not capable of giving a quick return and sometimes can only bring moral satisfaction. The essence of this trend is not to receive financial profit, employees are involved as volunteers in various places like hospitals, orphanages, nursing homes, etc.

Since there are many indicators that can affect the impact of a business, it can sometimes be unclear which ones have the most direct impact. For this reason, the United States has placed emphasis on measuring CSR impacts such as employee engagement, social return on investment, customer growth and retention, and continuously monitoring these metrics will help to ensure CSR success.

While the USA is one of the first countries to implement CSR, in China the concept of CSR is relatively new. Afterwards of natural disasters and numerous destructions, the Chinese public needed the assistance of business in the recovery process. Starting from 2008, companies began to promptly provide assistance in support of society, which later let social responsibility to become an integral part of doing business.

Studying the trends in China, it is easy to understand that the environmental aspect is in focus in this country. This is due to the fact that China is the most populated country in the world, which directly affects the ecological state. China has significant environmental problems associated with industrial development and is the world leader in greenhouse gas emissions (Tolokonnikova, 2014). For this reason, reduction of greenhouse gas emissions and waste reduction are China's top CSR trends.

The development of CSR strategies in India is different. The analysis revealed a paucity of research and data on the development of CSR in India and revealed the old-fashioned nature of CSR trends. Looking at trends, we can notice the lack of CSR trend upgrades since 2013.

Eradicating extreme hunger and poverty is the most important CSR trend in India because of the country's global poverty. The British Indologist G. F. Papanek believes that the main causes of poverty are the traditional low growth rates in agriculture, the stagnation of salaries and low demand for labor in the industrial sector (S. Dreze et al., 1989).

One of the consequences of poverty is the impossibility of obtaining quality medical services. For this reason, India has a very high incidence, which leads to the importance of "combating HIV-AIDS and other diseases" trend.

Discussion

Comparing the trends of different countries, it can be concluded that in order to introduce CSR methods and trends, countries can implement similar trends of all countries, but they should not forget about the trends that will depend only on their countries' global problems. During the analysis it was determined that India's CSR strategies are very different for this reason, while the strategies of Kazakhstan and Russia are similar. China pays more attention to environmental aspects in the formation of CSR strategies.

America was one of the first countries to show anxiety about environmental degradation (Danshina, 2017). The study shows that a sustainable CSR culture has already been formed in the United States, which implies following all its principles and trends by all organizations. The most important trend in the United States is the need for equity and diversity, since the territory of the United States historically unites representatives of different nationalities and conflicts often arise on national and religious grounds.

As a result of the analysis, the similarity of the CSR trends in Kazakhstan and Russia was revealed. In both cases, special attention is paid to the "development in regions" trend.

The current positively influencing trends in the development of CSR in Kazakhstan include the support of the president, the adoption of the national standard ISO 26000, and the promotion of CSR as a business tool. The results of the review showed that helping people in need and other charity ranked first, while projects aimed at developing society and consumer rights ranked second and third. Projects aimed at improving and protecting the environment and improving labor practices were even rarer.

Recently, Russian society has begun to understand that corporate social responsibility is not just charity or, on the contrary, profit optimization (Ab-

lander and Curbach, 2017). Now they could understand that corporate social responsibility can be characterized as a win-win strategy for a company. Internal corporate social responsibility is more popular in Russia, which includes improving the working conditions of organizations' employees.

Conclusion

ESG principles have been the main trend in the development of the entire global business community over the past few years. The article provided a literature review of the development of the ESG and CSR in the context of the ESG, indicating important periods of development.

The article revealed the essence and origin of CSR through the study of scientific researches, reflecting the conclusions of researchers on this issue. The analysis showed an active growth in the development of CSR over the past 5 years, especially the period from 2020 to the present day, which was a consequence of the pandemic, which changed the understanding and development trends of CSR. The situation that has developed in the context of a pandemic has led to emergency actions on the part of organizations.

It was concluded that in the USA, China and India, the term CSR is been actively studying and mentioning, while in Russia and Kazakhstan there is a small number of published scientific works on this topic. This is justified by the insufficient level of CSR development in these countries.

This work also includes a comparative analysis of CSR trends of five countries: the USA, China, India, Russia and Kazakhstan. CSR trends, such as implementation of charitable programs, implementation of social packages at the enterprise, improvement of working conditions for employees, staff development and training and corporate volunteering are relevant in all selected countries. There are also distinctive trends that are applied only in certain countries that have arisen depending on the existing problems of countries and the requirements of society. For example, the most important CSR trend in the United States is the need for equity and diversity, in China environmental aspect is in focus. For this reason, reduction of greenhouse gas emissions and waste reduction are China's top CSR trends. Eradicating extreme hunger and poverty is the most important CSR trend in India because of the country's global poverty.

The similarity of the CSR trends in Russia and Kazakhstan was revealed. In both cases, special attention is paid to the "development in regions" trend.

The correct application of important and CSR trends has a positive effect on the development of the company, strengthening the company's influence on the market, increasing the loyalty of employees and customers, and thereby increasing the company's profit. The most important result of applying CSR in a company is participation in social and economic changes. Companies by taking on this responsibility are making a significant contribution to improving the quality of life of people around the world.

References

Ablander M. S., Curbach J. (2017). Corporate social responsibility evolution. Business and Society, 56(4).

Carroll, A. B. (2008). A history of corporate social responsibility: concepts and practices. In A. M. Andrew Crane, D. Matten, J. Moon, & D. Siegel (Eds.), The Oxford handbook of corporate social responsibility (pp. 19–46). New York: Oxford University Press.

Chaffee E. C. (2017). The origins of corporate social responsibility. University of Cincinnati Law Review, 85, 347-373.

Clark J. M. (1939). Social control of business. USA: Augustus M Kelley Pubs.

CSR Europe. (n.d.). CSR Europe – 20 years of business-policy interaction driving the CSR movement. https://www.csreurope.org/history.Accessed 19 Mar 2018

Danshina V. V. (2017). Foreign experience in implementing social responsibility of business. Bulletin of Tomsk State University, Economy, 2017, 40.

Dreze S., Dreze J. (1989). Indian Development: Selected Regional Perspectives. Oxford University Press, USA, pp 199-448.

Friede G., Busch T., Bassen A. (2015). ESG and financial performance: aggregated evidence from more than 2000 empirical studies. J. Sustain. Finance Investment, 5 (4), pp. 210-233.

Friedman M. (1970). The social responsibility of a business is to increase its profits. New York Times Magazine.

Harvard Law School Forum on Corporate Governance. Time to rethink 'S' in ESG. https://corpgov.law.harvard.edu/2020/06/28/time-to-rethink-the-s-in-esg.

Heald M. (1970). The social responsibilities of business: company and community 1900–1960. United States of America: Pr. of Case Western Reserve Univ.

Johnson T. (2010). A critical examination of Firestone's Operations in Liberia: A Case Study Approach. Authorhouse USA, p 28-33.

Kheidiri K. B. (2021). CSR and investment efficiency in Western European countries. Corpor. Soc. Reponsib. Environ. Manage. 28,1769-1784.

Kitzmueller M. (2010). Economics and Corporate Social Responsibility. 21st Century Economics: A Reference Handbook. Vol. 2, 788 p.

Lee M. (2018). A review of the theories of corporate social responsibility: its evolutionary path and the road ahead. International Journal of Management Reviews, 10(1), 53-73.

Matten D., Moon J. (2005). A conceptual framework for understanding CSR. Springer Berlin.

Su S., Zhu F. (2022). A Systematic Literature Review on Ownership and Corporate Social Responsibility in Family Firms. Sustainability (Switzerland) 14(13), 7817.

S&P Global. Understanding the 'E' in ESG. https://www.spglobal.com/en/research-insights/articles/understanding-the-e-in-esg.

Tolokonnikova E. V. (2014). Ecological problems of China. Bulletin of University.

Wu Y., Huang S. (2022). The effects of digital finance and financial constraint on financial performance: firm-level evidence from China's new energy enterprises. Energy Econ., Article 106158.

INTERNATIONAL RELATIONS

IRSTI 06.51.01 https://doi.org/10.26577/FJSS.2022.v8.i2.04

MULTILATERAL MIGRATION COOPERATION IN CENTRAL ASIA THROUGH THE PRISM OF INTERNATIONAL EXTRA-REGIONAL STRUCTURES: BRIEF OVERVIEW

L.F. Delovarova
Al-Farabi Kazakh National University, Almaty, Kazakhstan
e-mail: Leila.delovarova@kaznu.kz

Abstract. This article examines aspects of multilateral migration cooperation in Central Asia through the prism of international structures with a specific focus on Kazakhstan. International migration has been a global phenomenon for several decades of the 20th century. The intensification of migration in all regions of the world and the increasing influence of the various effects of migration at all levels calls for a more coordinated migration. Modern Central Asia, represented by Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan for a third of a century, has already been part of the global migration process, has its own specifics and experiences various influences of mobility both within the region and at the extra-regional level. Within the region, a separate organization or platform has not yet been formed that would cover exclusively migration cooperation. Along with this, there are organizations on the basis of which a solid foundation has been formed for the effective coordination of labor migration processes, the prevention of forced and irregular migration. To clarify the effectiveness and potential of migration coordination, this article will consider the activities in the field of migration of the Commonwealth of Independent States, the Eurasian Economic Union, the Shanghai Cooperation Organization and the Almaty Process.

Keywords: *international migration, Kazakhstan, migration cooperation, Central Asia, Almaty process, SCO, EEU.*

Introduction

Modern migration processes are part of the transformation of international relations and are of a complex, mixed nature. Global and regional mobility today is an indicator of the stability and stability of the system of international relations. This increases the need to strengthen the negotiation processes, promote and improve the effectiveness of multilateral cooperation in existing multilateral forums and platforms, and cooperation within the framework of international regional organizations. The regulation of migration processes at the present stage is one of the key issues on the agenda due to the constant increase in the number of international migrants and the need for such an approach to migration processes that will not leave anyone behind and will meet the interests of all participants. According to the data, there were 281 million international migrants in 2020, representing 3.6% of the population (IOM, 2021). Central Asia (CA) plays an increasingly important role in modern migration processes; in this study, the region is represented by Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

The ongoing transformation of the region over the past thirty years has influenced and diversified migration within and outside of Central Asia. The effects of regional migration significantly affect the development of the entire region and its security. Kazakhstan at the present stage has a diversified migration status and is a country of main, alternative and transit destination in the Central Asia. Labor, educational and transit migrants from Kyrgyzstan, Tajikistan and Uzbekistan arrive in the country, and there is a migration exchange with Turkmenistan. Despite the dynamics of migration processes in the region and outside the region, a single migration agreement or structure for coordinating migration processes has not been formed between the countries.

The key question of this study is to access the potential of existing organizations and platforms functioning both at the regional and interregional level with the participation of the countries themselves. To this end, it seems necessary to consider such organizations and structures as the Commonwealth of Independent States, the Eurasian Economic Union, the Shanghai Cooperation Organization and the Almaty Process. It also seems important to touch on the Global compact for safe, orderly and

legal migration (IOM, 2018) which is the relevant global frame on migration.

Methodology

The article is based on desk research and covers the statutory documents of the presented structures. This is a developing result of a larger and broader IOM study "Contribution of existing bilateral and regional migration agreements to migration cooperation in the Almaty process region", prepared by the author and presented at the Technical Expert Group Meeting of the Almaty Process held on 05 Sep 2022. The topic of multilateral migration cooperation is seen as even more significant in the context of global and interregional turbulence and instability.

An assessment of the potential of organizations and structures will identify the most significant foundations for further cooperation in the field of migration in the Central Asia region and will subsequently make useful recommendations for Kazakhstan and other countries of the region.

Results and Discussion

International migration by its all trend from economic to forced, plays an important role both within the Central Asia and at the wider space.

Issues of cooperation in the field of migration are primarily addressed at the national level and then at the bilateral level. In this regard, bilateral agreements with countries with which the most intensive migration exchange is carried out, including border countries, are important. Bilateral agreements and agreements on readmission between the countries of Central Asia are today the key mechanism for regulating migration. There is a visa-free regime between all countries of the region, with the exception of Turkmenistan.

In modern conditions, it is very important to develop multilateral migration cooperation, due to the fact that most of the issues go beyond national and bilateral cooperation. In Central Asia today there is not a single association that would set as its goal the settlement of migration issues. Along with this, it is very important to consider the activities of such structures and organizations as the Commonwealth of Independent States (CIS), the Shanghai Cooperation Organization (SCO), the Eurasian Economic Union (EEU) and the Almaty Process (AP).

Kazakhstan is an active participant in all these platforms. All of these organizations have the potential to increase migration interaction, but also many challenges on the way to improving cooperation. And although none of the structures is a migration organization, with the exception of the Almaty process, in each of them the migration component is quite serious both in the economic and political context.

Agreements within the Commonwealth of Independent States (CIS)

The foundations of cooperation at the international and regional levels have been laid within the framework of the CIS activities since the countries of the Central Asian region gained independence. Within the framework of this organization, the following acts relating to the regulation of migration have been developed and are functioning: Agreement on issues related to the restoration of the rights of deported persons, national minorities and peoples of October 9, 1992; Agreement on cooperation of the CIS member states in matters of the return of minors to their states of permanent residence of October 7, 2002; Declaration on the coordinated migration policy of the CIS member states (2007); Agreement on Cooperation between the Member States of the Commonwealth of Independent States in the fight against illegal migration dated August 1, 2003 (CIS internet portal, 2021).

The most pressing issues at the CIS level are the issues of forced migration and regulation of the status of refugees and internally displaced persons. Optimization of the legal regulation of labor migration and combating illegal migration is also considered within the framework of the organization. The current relevant agreement ratified by Kazakhstan is the Agreement on Cooperation in the Field of Employment Promotion of the Population of the States Members of the Commonwealth of Independent States (Ministry of Labour and social protection of Population of Kazakhstan, 2022).

The CIS is important in terms of the geography of the participants, the experience of the countries in developing and regulating migration processes, considering historical, socio-cultural, economic, legal and political aspects. It seems as an international platform in the context of migration cooperation covering CA states and framing key relevant migration aspects at the space.

Experience of the EEU in the field of regulation of labor migration

The beginning of the Eurasian Economic Union (EEU) in January 2015 in accordance with the Agreement of May 29, 2014 (Treaty on the Eurasian Eco-

nomic Union, 2014) (Belarus, Kazakhstan, Russian Federation, Armenia, Kyrgyzstan) ensured the freedom of movement of goods, services, capital and labor, the conduct of a coordinated, coherent or unified policy in the sectors of the economy. The Union is an international organization for regional economic integration with international legal personality. According to Section 26 of the agreement (Articles 96-98), favorable conditions have been created within the Union for the labor activity of migrants, the possibility of moving in the common economic space (Treaty on the Eurasian Economic Union, 2014). For example, after Kyrgyzstan joined the EEU, workers received a number of preferences when working in Kazakhstan and Russia, such as: a worker and members of his family can stay without registration for up to 30 days; registration is carried out for the duration of the labor or civil law contract; - it is not required to obtain work permits (patent) and pass the exam; when hiring a worker, an employment or civil law contract is concluded.

The Treaty specifically highlights the rights and obligations of labor migrants. In particular, they are granted the right to engage in professional activities in accordance with the specialty and qualifications specified in the documents on education, documents on awarding an academic degree and (or) conferring an academic title. They are also granted the right to own, use and dispose of their property, to protect property and to freely transfer funds. The social rights of labor migrants are especially emphasized. Migrants and their family members are provided with social insurance, health care, the right to education, to join trade unions and to access information. It is important to note that today the EEU is one of the most progressive platforms in terms of migration in the Eurasian space. The Treaty on the EEU today covers only Kazakhstan, Kyrgyzstan and Russia, but it is important to note that Tajikistan and Uzbekistan are observers and potential members of the Union.

It is important to note several aspects according to the EEU that show the benefits and clear regulation of citizens-members of the EEU in Kazakhstan (Treaty on the Eurasian Economic Union, 2014).

• The procedure for employment of citizens of the EEU countries in Kazakhstan is regulated by the Agreement dated May 29, 2014.

• Attraction of foreign specialists is carried out without taking into account quotas and restrictions on the protection of the local labor market.

• The labor activity of a foreign worker is carried out on the basis of an employment or civil law contract without obtaining a work permit and visas.

• The period of temporary stay of a foreign worker and members of his family is determined by the term of the employment or civil law contract. The host party (employer) must issue a temporary residence permit (TRP) to a foreign worker and members of his family.

• Income of a foreign worker in the Republic of Kazakhstan is taxed on a par with citizens of Kazakhstan.

• Social security (social insurance) of a foreign worker is carried out in accordance with the legislation of the Republic of Kazakhstan.

• The procedure for assigning, paying and exporting pensions in the EAEU countries is regulated by the Agreement dated January 1, 2021.

• Children of a foreign worker have the right to attend pre-school institutions in accordance with the legislation of the Republic of Kazakhstan.

• Emergency medical care (in emergency and urgent form) is provided in the same manner and under the same conditions as for citizens of the Republic of Kazakhstan - free of charge, regardless of the availability of a medical / insurance policy.

• In the event of the death of a foreign worker, a family member is entitled to a pension – the worker's pension savings are transferred to his heirs in accordance with the norms of the Civil Code of the Republic of Kazakhstan.

It should be noted that the Eurasian Economic Union is so far the only platform that contains specific rules and regulations for labor migrants in the region.

SCO experience in the field of irregular migration

Issues of irregular migration are considered within the framework of the Shanghai Cooperation Organization (SCO). The SCO is a permanent regional international organization founded in June 2001. Initially, it included Kazakhstan, China, Kyrgyzstan, the Russian Federation, Tajikistan and Uzbekistan. Currently, four countries - Belarus, Iran, Mongolia and Afghanistan have observer status in the organization, and six - Armenia, Azerbaijan, Cambodia, Nepal, Turkey, Sri Lanka - dialogue partners (Official web site of SCO, 2022.). The tasks of the SCO initially lay in the sphere of mutual intra-regional actions to suppress terrorist acts, separatism and extremism in Central Asia. As a long-term goal, it is envisaged to create a free trade zone in the SCO space, and in the short term - to intensify the process of creating favorable conditions in the field of trade and investment (Voronina, 2017.). Migra-

tion issues within the framework of this organization are considered through the prism of the fight against separatism, terrorism, trafficking in arms, drugs and people. In this regard, the SCO has not adopted a separate document regulating migration issues. Migration processes for the SCO are perceived in the context of economic, social and political security (Charter of the SCO, 2022)**.** The SCO Declaration of 2001, as well as the St. Petersburg (2002), SCO Charter (2002) and Astana (2005) declarations mention migration processes in the context of the fight against terrorism, separatism and extremism. Migration issues are present not only in the context of illegal migration, but also labor (Mirzekhanov, 2013). The main focus of cooperation in the context of migration issues is on the "joint fight against illegal migration and human trafficking" (Dushanbe Declaration, 2021).

The main focus is on addressing issues of human trafficking and illegal migration. This is important in today's realities, when these challenges have escalated in the post-pandemic period.

Almaty Process

The Almaty Process (AP) on Refugee Protection and International Migration is a regional consultative and advisory body established to protect refugees and migrants in Central Asia at the initiative of the Government of Kazakhstan, the UN High Commissioner for Refugees (UNHCR) and the International Organization for Migration (IOM). AP was conceived in 2010 and launched on 5 June 2013. The members of the platform are Afghanistan[i], Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkey, Turkmenistan. Observer States - Iran, Pakistan and Uzbekistan is an invited party (UNHCR, 2022).

The Almaty Process aims to address the multifaceted aspects of migration, which are determined by the complex dynamics of mobility in this space, as well as to enhance regional and international cooperation and coordination on migration and refugee issues. The operation, development and sustainability of the Almaty Process is seen as an important component in strengthening and enhancing coordination and cooperation in the management of migration processes. This also highlights the need for capacity building, due to the increased importance of migration in socio- economic and political processes, and its impact on regional stability and security in the context of sustainable development throughout the Almaty Process. An assessment of bilateral and multilateral regional cooperation among the countries of the region and with all AP members will move closer to the main objectives of the Platform through capacity building and contributions to the implementation of the Global Compact on Migration (UN, 2018). The development of this platform is a serious contribution to the development of international and interregional cooperation.

Participation of central asian countries in the Global compact for safe, orderly and legal migration

Kazakhstan and the rest countries of Central Asia have signed the Global Compact for Safe, Orderly and Regular Migration (GCM) (UN, 2018). The countries have also become part of the Global Migration Network, which aims to mobilize all international organizations to address migration issues by organizing their coordinated work. This has been made possible through productive cooperation with the International Organization for Migration.

Almost all of the Central Asian countries have already submitted voluntary reports as part of the implementation of the GCM. This illustrates the intension to cooperate globally and shows a greater responsibility in shaping modern migration policies to achieve sustainable development.

The Global Compact for Safe, Orderly and Regular Migration is the result of a collaborative process to develop a comprehensive framework for inter-state cooperation on migrants and human mobility by establishing a set of principles, commitments, and agreements on international migration in all its dimensions.

The Treaty includes 10 guiding principles, 23 goals (UN, 2018) and enables the international community to set common benchmarks for orderly migration and thereby reduce irregular migration.

Further implementation of the Global Compact requires concerted efforts by all actors at the global, regional, national, and sub-national levels.

The Global Compact for Migration is non-legally binding and is the first negotiated agreement between governments under the auspices of the United Nations to cover all aspects of international migration in a comprehensive manner. Further implementation, follow-up and review of progress in the implementation of the Global Compact require a concerted effort by all actors at the global, regional, national and subnational levels.

Thus, it is to conclude that there is sufficient multilateral dialogue and cooperation in the field of migration with the participation of Kazakhstan and other countries of Central Asia. At the same time, countries need to make efforts to create more sustainable frameworks and solutions for migration.

Conclusion

Multilateral cooperation in the field of migration at the regional level and more broadly is seen as a key link in the creation of coordinated migration.

Participation of Kazakhstan and other countries of Central Asia in multilateral multilevel cooperation has great potential. This is necessary for more coordinated migration processes to Kazakhstan, from Kazakhstan, along the perimeter of the region and to other regions.

Analyzing the agreements concluded on the basis of the CIS, we can conclude that this is the basis that served to further improve and develop migration legislation in the Central Asia region and wider.

The most advanced structure in the field of labor migration is the EAEU, but not all countries of the region are involved, and the current processes and the crisis in Ukraine are a serious challenge for the organization.

It is important to note the efforts of the SCO in counteracting irregular migration and human trafficking. In the post-pandemic period, this is important for the countries of the entire region that are members of the organization.

The Almaty process has sufficient potential as a platform for building the capacity of the participating countries and can become a platform for interregional cooperation in the future, given the geography and capabilities of the participants.

The commitment of all countries in the region to contribute to the implementation of the Global Compact shows not only an increased responsibility for creating conditions for safer migration, but also of more effective coordination and achieving an approach that leaves no one behind.

Based on the results of a brief review of the activities of regional and extra-regional organizations that are involved to varying degrees in migration issues in Central Asia, it can be concluded that there is sufficient potential for more effective interaction in this area.

Along with this, Kazakhstan and other countries of Central Asia should focus on the development of a separate body or on the common regional agreement on migration. This will enhance the positive effects of migration processes in terms of sustainable development in the region and along its perimeter. Moreover, a common agreement and more integrative approach will reduce the negative consequences of migration in the post-COVID period, which coincided with a period of socio-economic and political turbulence.

Acknowledgment for supporting in working on this study to Aliya Kozhakhmetova, Senior Project Assistant, Sub-regional Coordination Office for Central Asia, International Organization for Migration, Almaty – Kazakhstan

References

Charter of the Shanghai Cooperation Organization (2022). SCO Official web site http://us.sectsco.org/documents/20020607/43551.html

CIS internet portal (2021). Sotrudnichestvo v sphere migratsii. Cooperation in migration field // https://e-cis.info/cooperation/3127/77661/

Dushanbe Declaration of the 20th Anniversary of the SCO (2021). SCO Official web site http://rus.sectsco.org/news/20210917/779142.html

IOM (2021). World migration report, 2022 // https://worldmigrationreport.iom.int/wmr-2022-interactive/.

Ministry of Labour and Social Protection of Population of Kazakhstan (2022). Official site. Decree of the Government of the Republic of Kazakhstan On Approval of the Agreement on Cooperation in the Field of Promotion of Employment of the Population of the States Members of the Commonwealth of Independent States, made in the city of Minsk on May 28, 2021, May 06, 2022 https://www.gov.kz/memleket/entities/enbek/documents/ details/302805?lang=en.

Mirzekhanov, V. (2013). Problems of movement of labor resources within the framework of the Shanghai Cooperation Organization // http://histrf.ru/uploads/media/artworks_object/0001/02/fabc2b358b7bf52ae69ddbf87c43093ad3863738.pdf

SCO Official web site (2022). What is SCO // http://eng.sectsco.org/docs/about/faq.html

Treaty on the Eurasian Economic Union (2014). Consolidated version.2022 http: //pravo.eaeunion.org/SESSION/PILOT/main.htm.

UN (2018). Resolution adopted by the General Assembly on 19 December 2018 [without reference to a Main Committee (A/73/L.66)] 73/195. Global Compact for Safe, Orderly and Legal Migration f.

UNHCR (2021). About the Almaty Process https://www.unhcr.org/centralasia/about-almaty-process.

Voronina, N. (2017). External labor migration in the context of Eurasian integration: legal aspects// Proceedings of the Institute of State and Law of the Russian Academy of Sciences. No. 1. 2017. P. 94-113.

IRSTI 11.25.91 https://doi.org/10.26577/FJSS.2022.v8.i2.05

RUSSIAN FOREIGN POLICY AND THE LIBYAN CRISIS: A NEOCLASSICAL REALIST ASSESSMENT

M. Erkan
Sakarya University, Sakarya, Turkey
e-mail: mariya.erkan@outlook.com

Abstract. The processes taking place in the modern international system are both a catalyst and a consequence of the foreign policy of states. As a result of a number of systemic factors and the domestic political situation in Russia, the Middle East plays an important role on the Russian agenda. Moscow is pursuing an active policy towards the Libyan crisis, which resulted in the actual loss of statehood in Libya, which complicates the stabilization of the situation in the country and in the region. The purpose of this article is to analyze the systemic (independent variable) and domestic (intervening unit-level variables) processes that influence the formation of Russia's foreign policy in relation to the Libyan crisis, within the framework of the neoclassical realist theory. The significance of this study lies in the application of a relatively new theoretical approach (neoclassical realism) to a case study (the Libyan crisis) in the study of Russian foreign policy.

Keywords: Russia, Libyan crisis, neoclassical realist theory.

Introduction

The current international situation is characterized by increased conflict, which is associated with the transformational processes taking place in the modern international system. The unipolar order is collapsing; it is being replaced by another type of power configuration, which has the features of multipolarity, although its contours are still not fully formed. Under these conditions, the declining hegemon (the United States) face the confrontation of the rising powers (China and Russia) in an explicit manner, through a proxy arena in order to avoid a direct military clash, which can have irreversible consequences for the whole world. One such hotspot is the Middle East. After a surge of discontent with authoritarian regimes in a number of Middle Eastern countries, known as the Arab Spring, regional rivalry for power has acquired a global scale involving various actors.

Russia's strategic policy in relation to the Middle East has also been changed in line with the shifts of the international system. It has spun from largely neutral behavior avoiding direct involvement in the Middle Eastern affairs to decisively responses to those regional events that threat Russian interests in the region (Kozhanov, 2017, p. 116). Over the past decade, Russia has made great strides in recognizing its role in the Middle East as a major and influential actor. The question is whether Russia is projecting its power in the Middle East region just to assert itself as a great power globally or it has returned to the Middle East pursuing other interests as well. The Libyan crisis is one among the range of Middle Eastern events that constitute a complex puzzle of issues linked with the shifts in the modern international system. The ambiguous situation unfolding in Libya has divided the international community essentially along existing fault lines, Russia versus the West. Russia's foreign policy decisions towards the Libyan crisis further raised the question of its position and motives in the Middle East.

Although global attention today is focused on the events in Ukraine, Middle Eastern affairs do not lose their relevance. Thus, this article sets out to analyze the formation and implementation of Russian foreign policy towards the Libyan crisis, which has been going on for more than ten years, which determines the relevance of this study. What are Russia's aspirations in the Middle East in the context of Libyan crisis? Which systemic imperatives and domestic factors influence its foreign policy decisions towards the Libyan crisis? Against the background of many previously studied aspects of Russian foreign policy, this case study represents an underresearched example of its Middle East policy. The peculiarity of this study is also the application of a theoretical approach to the case study, namely the analysis of Russia's foreign policy towards the Libyan crisis from the perspective of neoclassical

realist theory, which takes into account both external (systemic) and domestic (unit-level) factors influencing foreign policy decisions. This article therefore sheds light on how Russia is dealing with volatile regional dynamics, including US declining role creating a power vacuum, an increasing regional rivalry for dominance and a political climate at the domestic level.

This study explores the reasons behind Russia's stance towards the Libyan crisis as a part of the puzzle in order to draw conclusions about the wider context of Russia's foreign policy in the Middle East. With the strategic decisions especially during the period of Vladimir Putin's presidency, Russia used its position in the Libyan crisis to increase its influence in the regional affairs. This topic is also of interest because, using the example of Russia's interaction with respect to the Libyan crisis, it is possible to trace the dynamics of changes in its foreign policy taken into account systemic and domestic variables. Among those are, firstly, its turn to the East, secondly, the unwillingness to put up with the existing position within the international system and its assertive foreign policy, its multifaceted strategical approach to the regional affairs, and, finally, the shifts that occurred in Russia at this period and had an impact on its foreign policy decisions.

Material and Methods

Since this article represents a study of empirical aspect (Russian foreign policy towards the Libyan crisis) through the prism of a theoretical approach (neoclassical realist theory), the materials used for this research can be divided into two groups, empirical and theoretical. Methodologically, this study is based on the investigation of primary sources (official documents and speeches of officials) and supportive secondary materials, such as research articles, scientific works, books and reports for the empirical aspects of the topic, and fundamental works devoted to the neoclassical realist theory and methodology for conducting qualitative research, for theoretical questions.

The neoclassical realist theory represents a quite new research program of foreign policy. Its appearance is associated with the name of Gideon Rose, who introduced the concept of "neoclassical realism" in a review article of *World Politics* in 1998 (Rose, 1998). Later, this theory was developed by such scholars as Steven E. Lobell, Norrin M. Ripsman, and Jeffrey W. Taliaferro, who initially did not call themselves neoclassical realists, but identified themselves with this theory (Lobell et al., 2009; Taliaferro et al., 2012; Ripsman et al., 2016).

Neoclassical realism covers both the systemic and domestic levels to explain state's behavior, which do not always derive from rational position. The key element of qualitative research is to explain the outcomes of individual case. Therefore, choosing an aspect to conduct a research about Russian foreign policy the first task was to identify an appropriate research area (Russia's foreign policy towards the Libyan crisis) that could be interesting from the practical point of view and could be analyzed applying a theory-oriented method.

Ripsman et al. (2016) distinguishes between the concepts of a "research question" and a "research puzzle." The research question implies a theoretical component of the study, while the research puzzle is intended to explain empirical observations. This study refers to one of the types of research puzzle, which is aimed at explaining political phenomena that are not anomalous as such, but are not sufficiently explained from the standpoint of other theories.

Following the logic of neoclassical realism, methodologically, this study develops gradually from the consideration of systemic imperatives, then proceeds to the definition of internal variables (leader image, strategic culture, state-society relations and domestic institutions) that influence Russia's decision making process and its policy responses regarding the Libyan crisis, which, in its turn, lead to particular international outcomes.

Since neoclassical realism includes system- and unit-level variables, theory testing is limited by human subjectivity and interpretation of phenomena, due to the appeal to cognitive aspects and ideological factors that cannot always be adequately assessed in terms of facts and value (Ripsman et al., 2016, p. 105). Therefore, neoclassical realism addresses to the so-called "soft" positivist approach.

Deriving from soft-positivist epistemology, the chosen case (Libyan crisis) is tested applying process-tracing analysis in order to assess the causal impact of systemic pressures (independent variables) and domestic factors (intervening variables) on the dependent variable (Russia's foreign policy choices and subsequent international outcomes).

Neoclassical realists differ two dimensions of the dependent variable, that is, the time frame and the level-of-analysis (Ripsman et al., 2016, p. 109). The current study is conducted over a short-to-medium time-span covering the period from 2011, when the Libyan Civil War began, to the present. Hence, it is possible to investigate Russia's foreign policy

(including security and economic components) and strategic planning, perhaps with the elements of grand strategy formation. According to the Lobell's definition of grand strategy, Russia apparently shapes its grand strategy through formulation of its military doctrine, although it may be implicitly reflected in foundational national security documents, increased diplomatic activity, its quest for foreign economic cooperation, and domestic resource extraction (Lobell, 2006, p. 14).

When applying the neoclassical realist theory to a case study, one should refer to the corresponding structural realist baseline in order to determine the value that neoclassical realism can add to the explanation of a dependent variable through the introduction of intervening variables, as opposed to the explanatory power of a structural realism. In fact, it represents the core of the explanation of the relevant issue at the system level, i.e. a systemic-level independent variable (Ripsman et al., 2016, p. 114). This study applies the balance-of-power theory as its structural realist baseline to identify phenomena in which an independent variable does not have sufficient explanatory power to determine the nature of Russian foreign policy towards the Libyan crisis.

Since this study seeks to explain a phenomenon of short-to-medium term, it is appropriate to pay greater attention to the intervening variables of leader image and strategic culture. Despite the fact that the influence of individual leaders decreases over time (Ripsman et al., 2016, p. 119), the rigid vertical of power restricts the activities of domestic institutions and suppresses public activity, which does not allow to fully explain the foreign policy behavior of the state without taking into account the leader image.

Literature Review

In attempt to develop this research, the present article is based on a number of sources dealing with both theoretical and empirical issues. The review of the literature helps to identify certain gaps in the existing works that this article aims to fill. Proponents of realism believe mainly that Russian foreign policy is shaped mainly in response to systemic pressures, losing sight of the internal component. The theoretical basis of this article is based on fundamental works on the neoclassical realist theory, which includes both systemic and state- and individual-level variables. As mentioned above, Gideon Rose is considered the founder of this theory. Thereafter, it was developed in the works of such researchers as Colin Dueck, Victor Cha, and Nicholas Kitchen (Dueck, 2006; Cha, 2009/2010; Kitchen, 2010). Their contribution is attributed to Type I and Type II neoclassical realism. The Type I neoclassical realism is the simplest form of this theory, whose proponents introduced intervening variables to explain empirical anomalies that could not be explained by structural realism. The Type II neoclassical realism no longer just addressed anomalies, but attempted to explain foreign policy using system- and unit-level variables. The most recent version of neoclassical realism (Type III) is displayed in the joint work of Norrin Ripsman, Jeffrey Taliaferro, and Steven Lobel (Ripsman et al., 2016). The scholars explain international politics addressing to system-level variables and four broad categories of intervening unit-level variables, i.e. leader images, strategic culture, state-society relations, and domestic institutions.

Although academic studies on Russian foreign policy in the Middle East have increased significantly in the recent years, there are very few works that analyze Russian foreign policy from the standpoint of neoclassical realism. Romanova and Pavlova (2012) discuss the development of three key concepts of realism (polarity, national interest and neighborhood/coalitions) in the modern Russian IR thinking and political practice, and come to the conclusion that neoclassical realism in Russian practice has its own characteristics, the so-called "neoclassical realism in Russian." Another work that links system-level variables to unit-level variables is the study conducted by Emre İşeri and Volkan Özdemir (2020), who apply neoclassical realist theory to analyze Russia's foreign economic policy in the Eurasian space, arguing that the perception of Russian political elites shapes the geopolitical contours of foreign policy. Hence, the authors associate geopolitical economics with neoclassical realism. Thus, there are not many works that analyze Russian foreign policy from the neoclassical realist perspective, and even fewer works dealing with Russian foreign policy towards the Middle East and, in particular, towards the Libyan crisis. Among the studies devoted to the various aspects of Russian foreign policy in the Middle East, the works of Kozhanov (2022), Balci and Monceau (2021), Bechev et al. (2021), Facon (2017), and many others can be mentioned. Among the authors who contributed to the study of Russia's foreign policy in relation to the Libyan crisis, the studies of Ibryamova (2022), Stepanova (2018), Beccaro (2017), and Allison (2013) deserve special attention. Nuray Ibryamova (2022) explore Russia's role in the regional conflicts, including Libyan crisis.

She puts it in the framework of Russia's interaction with other actors, such as Turkey and Egypt. She concludes that Moscow has achieved the status of regional power by the means of its active diplomacy, military presence and energy cooperation. In addition, Stepanova (2018) provides a detailed analysis of the Russian approach to the conflict in Libya. She focuses on Russia's interests in Libya and its role in stabilizing the situation there in the context of international efforts, namely in the framework of the Organization on Security and Cooperation in Europe (OSCE). Even though these authors contribute to the issue under investigation, none of them has linked system-level variables to unit-level variables.

Results and Discussion

System Level

From the second decade of the 2000s, Russia has been pursuing a more active policy in the Middle East, which is associated with its desire to improve Russia's status in the international system. These ambitions, in turn, are linked to the accumulation of resources and the distribution of material capabilities among the major states in the international system, which determines its place in it. The once unipolar world began to fade, transforming to the system with multiple poles.

Russia, dissatisfied with its role in the unipolar world order, is challenging the declining hegemony of the United States. At the same time, the Middle East was shaken by the events of the Arab Spring, which brought protracted instability in the region. One of the countries affected by this instability in the Middle East is Libya, where a civil war broke out. In 2011, NATO intervened militarily in a conflict that had devastating consequences for Libya's statehood.

Russia perceived its involvement in Syria as successful, which convinced her to believe that it has enough power to influence the development of events in the region. Initially, Moscow decided to support politically and militarily a former Gaddafi loyalist General Khalifa Haftar but the impact of domestic factors pushed the Kremlin to conduct a balancing policy. Due to Russia's policies, the 2015 UN-led Libyan agreement on reconciliation process was failed.

Domestic Factors

Intervening unit-level variables have a value-added importance for the understanding of state's behavior, which seems sometimes irrational. An important role in Russia's foreign policy towards Libya is playing domestic formal, as well as informal structures, which are able to establish communication with various actors involved in the Libyan crisis, including numerous non-state and quasi-state structures. A special role in influencing Russia's decision-making process in relation to Libya has been assigned to the domestic energy sector players. Although from the beginning Russia took a decision to side by Haftar, Russian energy companies inclined Moscow to keep balance in the relations with Haftar's forces and the Government of National Accord in Tripoli under the leadership of Fayez al-Sarraj, as they have a great interest in Tripoli, namely Russian majority state-owned energy corporation Gazprom has strong connections to the Libyan National Oil Corporation based in Tripoli (Kozhanov, 2022, p. 20). Therefore, in 2019-2020, Russia withdrew substantial military supplies to Haftar, angering him and calling into question Russia's ability to play a decisive role in resolving the crisis, but at the same time maintaining Russia's energy interests in Tripoli. In attempt to balance between two sides, Russia still provides military assistance to Haftar through third parties and in limited quantities (Kozhanov, 2022, p. 21).

Another category of influential actors is assigned to individuals who, in accordance with their own position and, consequently, their cognitive factors such as prescribed values, beliefs, and images, can push through decisions at the state level. Therefore, in 2017-2020, Russia used the connections of a Belarus-born businessman Lev Dengov to establish contact with ex-Prime Minister Sarraj. He performed a kind of unofficial functions of an honorary consul, having received the status of the "head of the contact group on Libya at the Foreign Ministry of the Russian Federation" (Kozhanov, 2022, p. 21).

Such a diversity of the players involved also makes its own adjustments to the intra-elite situation, opposing Haftar's supporters (led by Defense Minister Sergey Shoigu) to Sarraj's supporters (led by special representative for the Middle East of the Russian Foreign Ministry Mikhail Bogdanov), which naturally destabilizes the domestic political environment and sometimes prevents rational decisions from being made. The lack of elite consensus hinders effective balancing.

Policy Responses

In 2011, Russia abstained from voting in the UN Security Council on the introduction of a no-fly zone over Libya, which was followed by NATO military intervention in Libya. At that time, Dmitry Medvedev was the President of Russia. Since Putin returned to the presidency, his approach to Middle East policy has become tougher, which was also facilitated by the situation in Libya, which, according to Putin, was a violation of the terms of the 1973 Resolution and once again demonstrated an attempt of the West, led by the United States, to unilaterally resolve international issues, which categorically contradicted Putin's worldview (Kozhanov, 2022, p. 50).

Conclusion

Russian multilateral involvement in the Middle East (both in terms of the range of actors and agenda topics) has become a demonstration to the United States and its Western allies about the assertion of Russia's position as a significant player in the Middle East, whose interests will have to be reckoned with. However, while Russia seeks to increase its weight in international affairs, it has limited resources, mainly due to its economic weakness. Pursuing a foreign policy and grand strategy in remote regions, as Russia does in the Middle East, requires huge human, material, and monetary resources (Ripsman et al., 2016), which Russia cannot afford to extract from state, especially in the current conditions of military involvement in the Ukrainian conflict, when it faces restrictive international environment.

Nevertheless, not only systemic factors play a decisive role in shaping Russia's foreign policy in relation to the Libyan crisis. Systemic imperatives pass through the cognitive filters of the head of state. In addition, in the case of Libya, the lack of internal political cohesion of the Russian elites complicates the decision-making process.

Thus, the independent systemic variables (US declining hegemony, Western unilateral approach in the resolving of Libyan crisis) and the domestic intervening variables (leader image, strategic culture, state-society relations, and domestic institutions) have an impact on the dependent variable (Russian foreign policy towards Libyan crisis), which, in its turn, can influence systemic outcomes and structural changes.

References

Allison, R. (2013). *Russia, the West, and Military Intervention*. Oxford University Press.

Balci, B., & Monceau, N. (Eds.). (2021). *Turkey, Russia and Iran in the Middle East: Establishing a New Regional Order*. Palgrave Macmillan. https://doi.org/10.1007/978-3-030-80291-2

Beccaro, A. (2017). Russia: Looking for a Warm Sea. In K. Mezran, & A. Varvelli (Eds.), *Foreign Actors in Libya's Crisis* (pp. 73−90). Ledizioni LediPublishing.

Bechev, D., Popescu, N., & Secrieru, S. (Eds.) (2021). *Russia Rising: Putin's Foreign Policy in the Middle East and North Africa*. I. B. Tauris.

Cha, V. D. (Winter, 2009/2010). Powerplay: Origins of the U.S. Alliance System in Asia. *International Security*, 34(3), 158−196.

Dueck, C. (2006). *Reluctant Crusaders: Power, Culture, and Change in American Grand Strategy*. Princeton University Press.

Facon, I. (2017). *Russia's Quest for Influence in North Africa and the Middle East*. Fondation pour la recherche stratégique.

Ibryamova, N. V. (2022). Russia's Expanding Role in the Eastern Mediterranean: Opportunities and Challenges. In R. E. Kanet, & D. Moulioukova (Eds.), *Russia and the World in the Putin Era: From Theory to Reality in Russian Global Strategy* (pp. 260−275). Routledge.

İşeri, E., & Özdemir, V. (2020). Geopolitical Economy of Russia's Foreign Policy Duality in the Eurasian Landmass. In E. Parlar Dal, & E. Erşen (Eds.), *Russia in the Changing International System* (pp. 113−131). Palgrave Macmillan.

Kitchen, N. (2010). Systemic Pressures and Domestic Ideas: A Neoclassical Realist Model of Grand Strategy Formation. Review of International Studies, 36(1), 117-143. https://doi.org/10.1017/S0260210509990532

Kozhanov, N. (2017). Russian Foreign Policy in the Middle East: New Challenge for Western Interests? In D. S. Hamilton, & S. Meister (Eds.), *The Russia File: Russia and the West in an Unordered World* (pp. 101−125). Center for Transatlantic Relations.

Kozhanov, N. (Ed.). (2022). *Russian Foreign Policy towards the Middle East: New Trends, Old Traditions*. Hurst & Co.

Lobell, S. E. (2006). *The Challenge of Hegemony: Grand Strategy, Trade, and Domestic Politics*. The University of Michigan Press.

Lobell, S. E., Ripsman, N. M., & Taliaferro, J. W. (Eds.). (2009). *Neoclassical Realism, the State, and Foreign Policy*. Cambridge University Press.

Ripsman, N. M., Taliaferro, J. W., & Lobell, S. E. (Eds.). (2016). *Neoclassical Realist Theory of International Politics*. Oxford University Press.

Romanova, T., & Pavlova, E. (2012). Towards Neoclassical Realist Thinking in Russia? In A. Toje, & B. Kunz (Eds.), *Neoclassical Realism in European Politics* (pp. 234−254). Manchester University Press.

Rose, G. (1998). Neoclassical Realism and Theories of Foreign Policy. World Politics, 51(1), 144−172. http://www.jstor.org/stable/25054068

Stepanova, E. (2018). Russia's Approach to the Conflict in Libya, the East-West Dimension and the Role of the OSCE. In A. Dessi, & E. Greco (Eds.), *The Search for Stability in Libya.* OSCE's Role between Internal Obstacles and External Challenges (pp. 89−111). Nuova Cultura. https://www.iai.it/en/node/9331

Taliaferro, J. W., Ripsman, N. M., & Lobell, S. E. (Eds.). (2012). The Challenge of Grand Strategy: *The Great Powers and the Broken Balance between the World Wars*. Cambridge University Press.

DIGITALIZATION AND INDUSTRY 4.0

IRSTI 06.81.23 https://doi.org/10.26577/FJSS.2022.v8.i2.06

IMPACT OF ARTIFICIAL INTELLIGENCE ON COMMERCIAL BANKS' ATM

R.P. Adhikari* , **T. Aryal** , **G. Park**
Gangseo University, Seoul, South Korea
*e-mail: adhikarirudra2020@gmail.com

Abstract. Artificial Intelligence (AI) is a rapidly growing area that has been getting the greatest attention in the business including the banking sector. AI has huge applications in the area of commerce, education, transportation, banking as well as daily life. AI in the banking industry relies on faster inexpensive, more accurate, and efficient work at the banking sector. By using AI in commercial banks, the banker gets more benefits and audience response positive as well as strong competition in work efficiency. AI provides renovating ideas to promote the banking sector through Automated Teller Machines (ATM). In this research paper, the impact of AI in the commercial bank ATM sector has been discussed with primary data collected from five banks and 30 ATMs from the perspective of clients. It was found that AI on ATMs has a positive impact as it gives excellent client service, high work efficiency, and security.

Keywords: artificial intelligence, ATM, commercial banks, efficiency, security.

Introduction

Artificial Intelligence (AI) perceives, synthesizes, and infers information with the help of a machine. Artificial Intelligence is the field of study, which refers to systematically perceiving information through the codes like computer vision, speech recognition, and recommending system. Banking areas are the most increasing areas of the competitive market and changing customers' expectations (Santini, 2018). In the beginning stage, it was used as the mimicry machine which was used for learning and problem-solving. The father of artificial intelligence (AI), John McCarthy said that artificial intelligence is the science and engineering of making smart machines, particularly intelligent computer programs. AI recreates the capacities as humans associate with other human personalities for example learning and critical thinking.

Artificial intelligence includes the continual operation of machines without tiring and using memory and the ability to improve includes communications and information exchange within and across societies. Artificial Intelligence refers to the suffocation and productivity of non-human machines, primarily machines, computers, and software.

The current world is a technology-driven world so, the banking sector has grown as the most important field for conducting regular transactional activities. In the era of the advanced world, AI has been the most significant digital technology to promote business (Dobreacu, 2018) like Automated Teller Machines, Online banking, imaging check, and voice recognition. Day by day we need accurate work performance with errorless activities. In order to provide strong services to the customer, banks have implemented modern advanced technology including AI. AI applications are important in the banking sector for voice assistance, biometrics, antifraud risk monitoring, complex legal, compile workflows, and underwriting with smart contracts infrastructure. In order to meet the expectations of the audience most commercial banks have expanded their service areas like mobile banking, e-banking, real-time money transfer, and getting cash from Automated Teller Machines (ATM). In the context of Nepal, many commercial banks have started their services through ATM machines so, the concern here is to find out the impact of AI on ATMs in the major cities of Nepal. So, for this, 5 banks with 30 ATMs with 60 clients around the nation have been selected. Most customers want efficient, accurate, and errorless banking services so, AI enables a mile-stoning service in the banking sector.

This study provides insights into the impacts of artificial intelligence on banking services in Nepalese commercial banks. This study is based on descriptive nature so all the required and relevant data have been gathered from primary data as well as journals, magazines, and websites. Sharma (2020) explained that AI application has brought entirely

different in the banking sector and their impact on human manpower also. In the context of Nepal AI has been a recently emerging technology and it has challenges to implement. Vijay (2019) said that artificial intelligence has so many benefits and challenges to implementing the new technology in the banking sector. Tura (2017) highlighted that AI can possibly possess human character for practice. AI is changing the idea of nearly everything which is associated with human life. For e.g.; work, economy, correspondence, protection, security, morals, and social insurance. Each technology has its preferences, however, it had to create favorable circumstances in the market. Tyagi (2016) highlighted that AI advancement is accelerating more robots or self-ruling frameworks that are being conceived and supplementing human work.

The reason for selecting this research on the impact of artificial intelligence in the commercial bank of Nepal is that the banking sector should have reliability and accountability in the matter of job performance so, if AI is implemented l, the clients would get immediate service in an efficient and accurate manner. Ekimci et al. (2014) proposed that a customer live value model, supported by a deep learning approach, to highlight key indicators in the banking sector. Xu et al. (2020) highlighted the effects of AI versus human customer service and found that customers are more likely to use AI. This automatic machine is put in to support the worker to avoid unnecessary crowds and clients would get auto service. This research has the objective to find out the impact of artificial intelligence on commercial banks mostly ATM services.

Artificial Intelligence and ATM

AI gives ATM system developers a whole new prescriptive and a wide range of technologies to enhance ATM systems that have the strong potential capability to tackle challenging problems which may appear in the organization. With the support of AI, large amounts of data can support working efficiently. AI has the potential to lead to great cost of saving, banks can leverage AI banking tools to increase the transaction. AI and automation are two terms which are often used interchangeably probably because they serve similar proposes for helping business, operate smarter efficiently. Both automated machine and AI run through the data system in which automated machine collects data and AI systems interprets it. ATM are widely used as self-service machine by banks to serve their customers. In the modern world, money is required at any time or anywhere for traveling, shopping and health services so; ATM provides money at any time at any location with the support of AI. AI supports security, work efficiency and client services (Mahajan, et.al. 2019). With this evidence the hypothesis can be formed that:

Hypothesis 1: Artificial intelligence supports ATM for better client services, work efficiency and security.

Artificial Intelligence and Client Service

Artificial Intelligence has the significance impacts on our life, those machines avoids all kind of errors and any time services. Advanced community technologies such as AI and ATM are helping banking services by automating manual effort by anticipating risk and more quickly confirm to rapidly evolving regulatory environment. AI supports to the ATM to interpret the information regarding to the cash counting even in seasonality, holidays, public events, locations for withdrawing the money. With the support of AI, ATM has the following functions as loading cash, duty cycle, cash-in, cash out, cyclic and on loading. It means that AI supports the ATM strong services to the clients. Bitner et.al. (2008) stated that AI has the more and effective focus on customer service with strong developed data and expertise. AI plays dynamic role to promote the ATM network, the efficiency of which determined by the technical characteristics of the devices, their location and reliability of their operations Leonov et.al. (2019). With this fact, the hypothesis can be formed that:

Hypothesis 2: Artificial intelligence has a positive impact on the client services.

Artificial Intelligence and work efficiency

Machines are never tiring so; artificial intelligence will be provided 24 hours services. The clients, so any kind because it is left behind for getting access to banking services. Boston Consulting Group analyzed that AI can reduce conversion costs by up to 20%, with up to 70% of the cost reduction resulting from higher workforce productivity. ATM card reading and its alternatives like mobile phone bank applications are focused on AI but also on biometric security such as finger vein recognition. Ciresan (2015) highlighted that AI has more efficient data classification than human beings. AI has got the greatest accuracy in work performance Leonov et al. (2019). Artificial Intelligence has the ability of a computer or a computer-able robotic system to process data and produce results in a manner like the third process of humans in learning, decision-

making, and solving problems. Artificial intelligence forms the basis for all computer learning which are extremely efficient for calculation so that it brings errorless result. Artificial Intelligence increases the efficiency, accuracy, and speed of mathematical calculations. Alzaidi (2018). Impact of artificial intelligence on the performance of the banking industry in the Middle East. With this information, the hypothesis can be formed:

Hypothesis 3: Artificial intelligence has more work efficiency than humans.

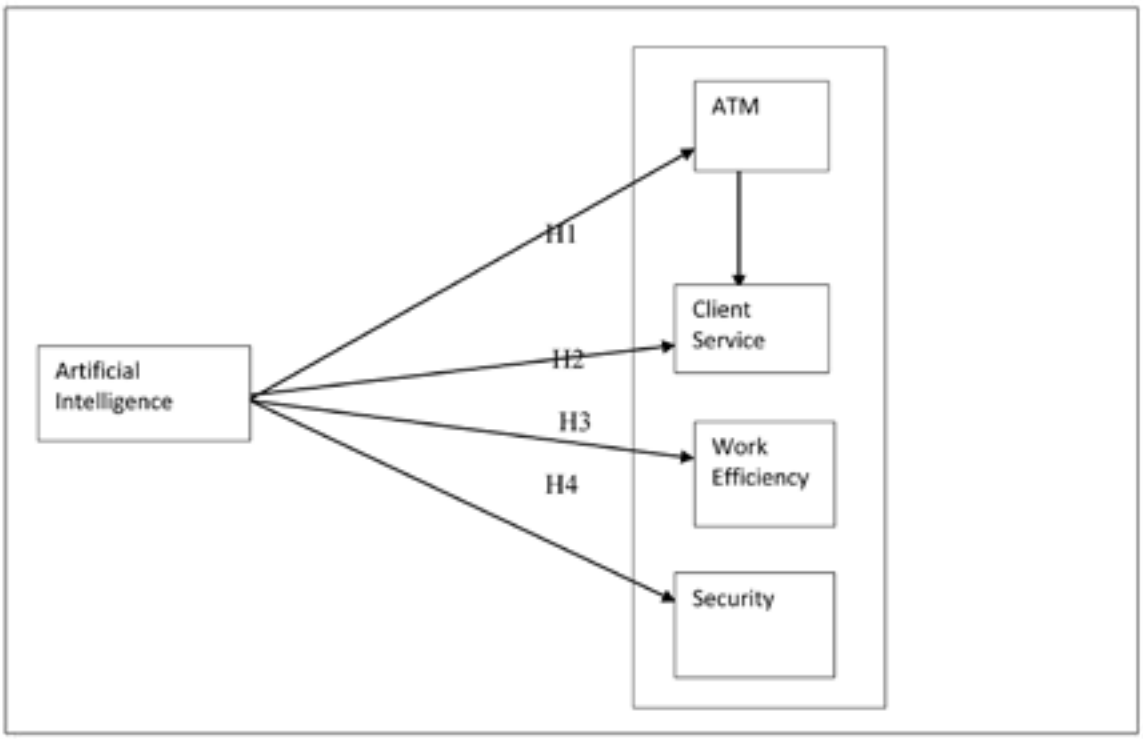
Artificial intelligence and Security

Artificial intelligence has inflicted our lives in various ways through automated professions. The machines automatically record the entire information of the clients including taking photos and it gives signally information so that, security concerns can be maintained by the implementation of artificial intelligence. A bank must be bankable for presenting secure and swift transactions, artificial intelligence is designed to detect fraud in transactions on the basis of a pre-defined set of rules. AI can offer high security to the banking sector by making the transaction quicker and safer Padmana Bhan (2021). As Manore (2020) highlighted that AI can be used for sensing and predicting. ATMs are subjected to various types of attacks and frauds like scheming cards or cash wrapping, installations of software, and even physical attacks so, artificial intelligence detects the entire information to redirect the risk. Anderkam et al. (2014). So, the hypothesis can be formed that:

Hypothesis 3: Artificial intelligence maintains the perfect security

In this study model, AI supports the ATM for data interpretation and data detection which means AI has a positive impact on ATM. Furthermore, AI and ATMs are interdependent with the perfect services so, customers get perfect service without any endurances and hazards. AI is based on big data and metadata which has a tremendous amount of information to support the ATM, as the result, it has the much more efficient work with accuracy and error less. Security concern is equally important so, AI supports ATM machine to collect entire information like thought detection and even physical violence.

Table 1 – Impact of Artificial intelligence on Commercial Banks ATM study model



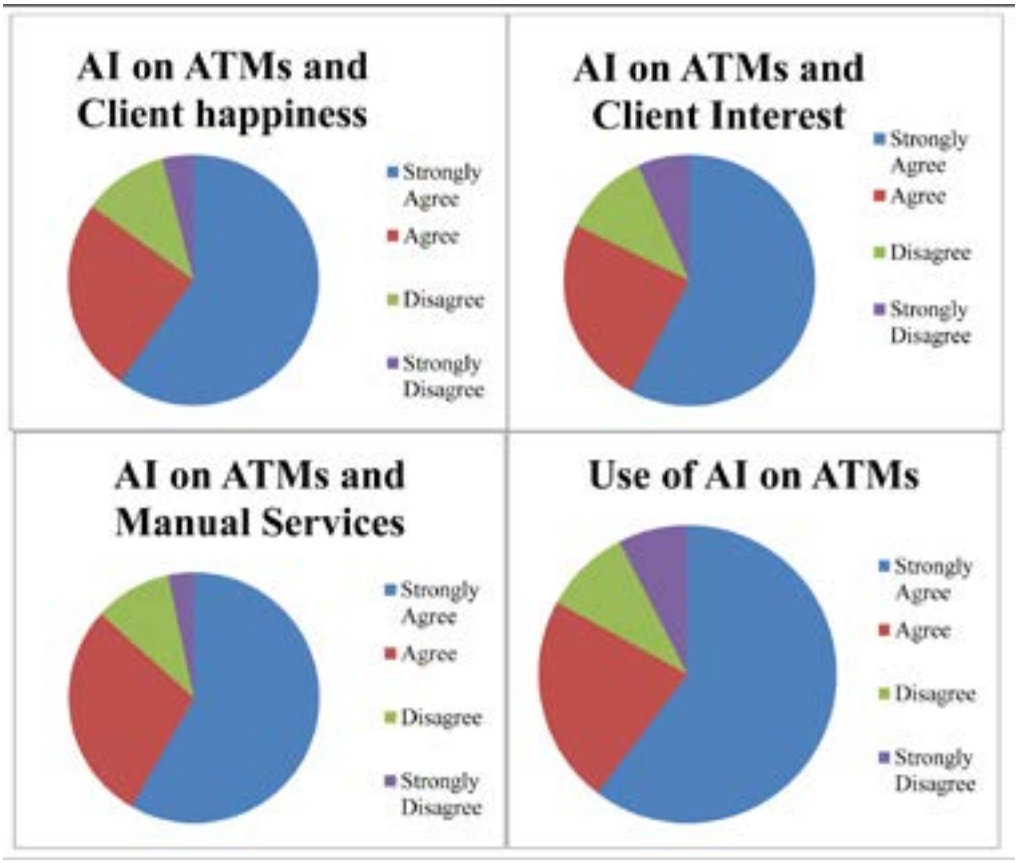
Methodology

This descriptive study explains the impact of artificial intelligence in the commercial bank through ATM services. The study is based on secondary data as well as field visits for observation as the primary data. The research papers, journals, web sites were also consulted for gathering the information. With the support, the researcher visited the five banks and 30 ATMs in the different cities of Nepal. With the random sampling Sunrise Bank, Investment Bank, Everest Bank, NIC Asia Bank, and Siddhartha Bank were selected for the study. 5 ATMs of each bank were selected around New Road, Thamel of Kathmandu, five ATMs of each banks were selected around Jawlakhel, Lagankhel of Lalitpur, five ATMs of each bank were selected from Pokhara around Prithivi Chowk, five ATMs were selected from Biragnagar, five ATMs were selected from Nepalgunj, five ATMs were selected from each bank from Dhangadi. To get data on the impact of AI, on commercial bank ATMs, the questionnaires were prepared based on major three variables as client service, work efficiency, and security. The survey was conducted among commercial bank top-level employees, managers, and customers. The questionnaires were administered to 30 managers of the 30 branches of the five banks and 30 clients who visited for ATM services.

Result and Analysis

AI is an emerging technology that has been used in various sectors mostly in the banking sector. The banking sector is the most sensitive sector because it deals with money and currently ATM machines are giving better services with excellent work efficiency and security.

Table 2 – AI on ATMs on Client Service



Source: Survey of clients 2022

As the data highlights most of the clients are satisfied with the AI on ATMs services. Regarding the concern of happiness, 60 % of clients are strongly happy with the ATM services. Only 2% of the clients have a problem with AI in ATMs. Likewise in this modern society, manual services are being gradually reduced with the technologies. The data illustrates that AI on ATMs is more reliable than manual services. Most of the clients, almost 97% clients are in favor of AI on ATMs so only a nominal number (3%) are in favor of manual services. Respectively, as the chart demonstrates, in the concern of clients' interest, 96% of clients are interested to receive AI on ATM services. Only 4% of clients have not shown interest in modern technology. Furthermore, in the current situation in the globe, the use of modern technologies is rapidly used so, in the banking sector 89% of the clients are using ATMs for financial transactions. Only the numbers are out of using the AI on ATMs.

As the subjective judgments, the clients responded that they have the greatest interest in using AI on ATMs because AI on ATMs provides auto service so that clients do not have to wait for any human for their services. Clients are getting demand-based services at any time even at midnight so, clients will not be worried if they lack currency. One respondent tells that when he started using ATMs, his money was prevented from being stolen and biased. On the other hand, some clients are technologically unskilled so, they hesitate to use ATMs. Regarding the client's services, inner mostly clients are happy and immensely interested to use ATMs.

AI and Work Efficiency

Table 3 – AI on ATMs working efficiently and accurately

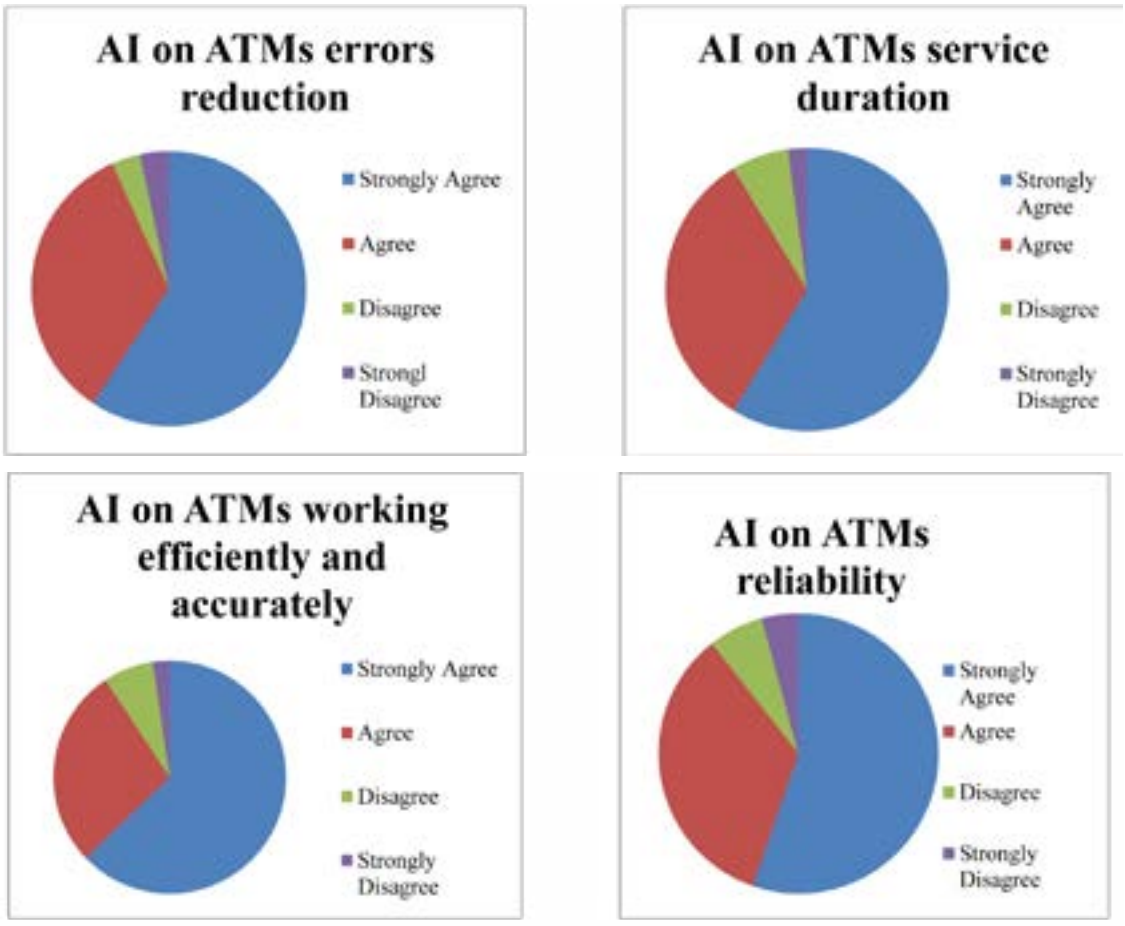
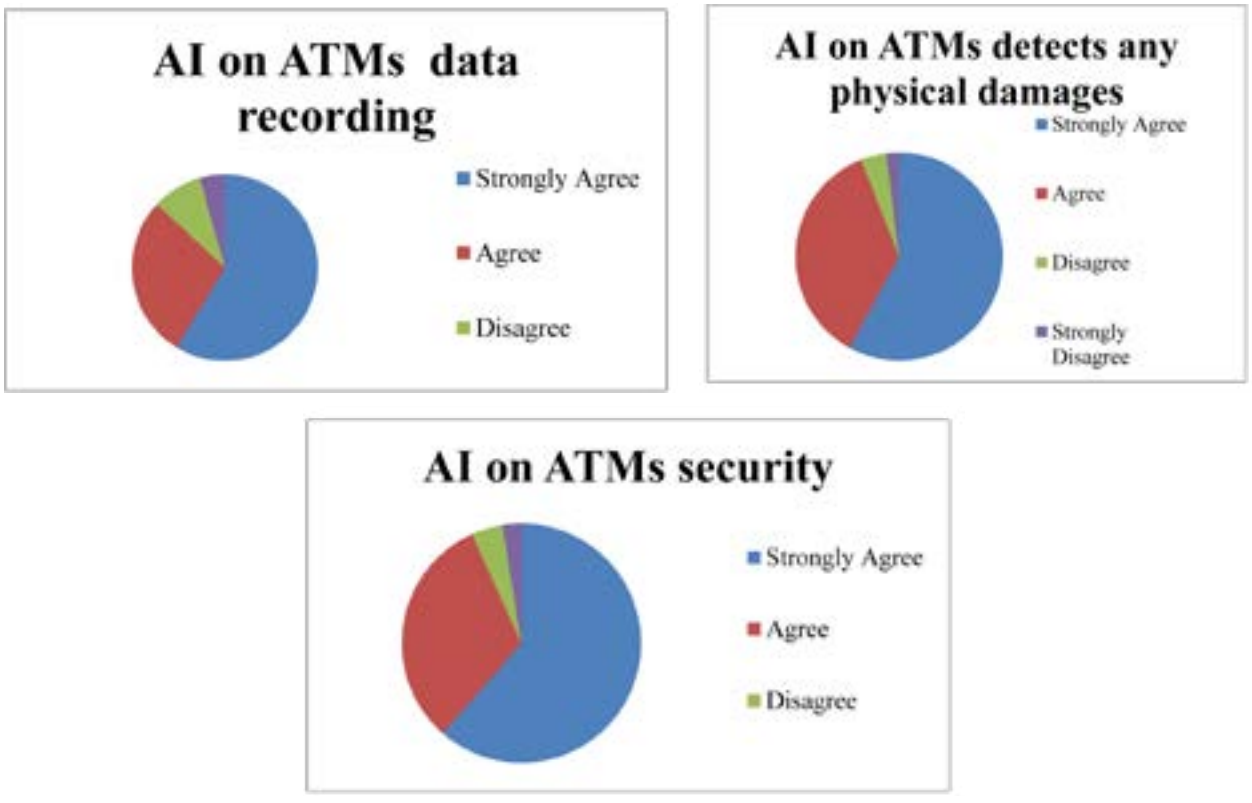


Table no 3 data elucidates that AI in ATMs has strong work efficiency. Regarding the concern of accuracy and work efficiency, most of the clients are strongly satisfied (97%) so, the craze rapidly inclined towards ATM machines in comparison to manual services. It is crystal clear that AI has deep learning efficiency through big data and metadata so, regarding the error point of view anytime the errors in cash counting, and data recording, errors would not emerge. The data reveals that 98% of clients believed that AI on ATMs has the efficiency to reduce the error. In the context of Nepal, in order to receive banking services, clients have to wait and stay in the queue for a long time for manual services but in the case of AI on ATM machines, it provides instant service. As the data demonstrates 97% of the banking clients responded with their happiness regarding to the service duration. Furthermore, in this advanced world, the concern of reliability is also a notable factor so, the data represents that 98% of clients are relying on AI on ATM machines which means that AI on ATM machines is tremendously reliable in comparison to manual services.

The subjective view of the client represents that AI on ATMs has got strong work efficiency in comparison to manual work. One said that manual services are so fatiguing, tiring, and time-consuming, staying on the line, and on top of that I have felt so many manual errors, and cash counting errors so the modern implementation of AI on ATMs has been the gift for us. With these remarks, it can be concluded that AI has a strong positive impact on the work efficiency

Artificial Intelligence and Security

Table 4 – AI on ATMs maintains perfect security



In this modern time, security concern is inevitably important in all sector but security matter is strongly pivotal in the banking sector, especially in cash counting and all kind of transactions. Table no 4 data demonstrates that AI on ATMs is 98% secured so, most of the clients have a strong belief in ATMs. AI on ATMs has the intelligence to record d tremendous amount of data in a secure way in which concern 96% of clients believed that AI on ATMs preserves the information of the clients fully.

Respectively, the concern of physical damages is equally important so, AI on ATMs has the capacity to study entire information including physical aspects like stealing, fire, destruction, etc. The data highlights that 98% of clients believed that AI on ATMs protects against any kind of physical damage through its intelligent system.

As the client extended their view that AI on ATMs is fully secured as it has been a computerized system. The view said that AI on ATMs has been linked to the computer system so, the computer itself records the data, and calculates without the inclusion of human efforts, the services of ATMs are really secured, and AI has the strong capacity to record a tremendous amount of data and information like voice recording, clients everything recordings, video recording and on the top of that AI continuously records the videos of the surroundings even it gives the signal if there is any kind of mishappening like stealing, physical damages, fire and so on.

According to the hypothesis, entirely four hypotheses, AI has a positive impact on ATMs. AI on ATMs has a strong positive impact on client services. Eventually, AI on ATMs has a strong positive impact on work efficiency, and AI on ATMs has a positive impact on security concerns.

Conclusion

Concluding, AI and ATM machines are interdependent relationships as AI provides huge services to ATMs and AI records a tremendous amount of data concerning ATMs. As the data represents, gradually the manual services are gearing towards modern technology in the banking sector after AI on ATMs is implemented. AI on ATMs has a positive impact on the concern of client services as clients are immensely happy, more believable than manual services, and strong interest and using ATMs greatly. Respectively, modern technology is more reliable accurate, and efficient. In modern technology, AI has a positive impact on work efficiency because manual work is a bit unreliable due to errors so, AI on ATMs has been providing-non error services as well as with an accurate and fixed duration of time so that clients could get services according to their desired time. AI on ATMs has accuracy and efficiency so that clients do not have to spend their valuable time on cash counting, balance inquiry, and so on. In modern society, security concern has been a burning issue so, so AI on ATMs, clients thought that it is more secure than manual services because AI has the efficiency of deep learning so, the entire data of the clients are perfectly secured and well recorded. AI on ATM machines has the true intelligence to detect the entire data including physical aspects so that any kind of physical damage and destruction can be detected.

References

Alzaidi A.A. (2018) IJCSNS International Journal of Computer Science and Network Security, Vol. 18 No. 10

Anderkan M., et. al (2014) Automatic ATM fraud detection as a defense-based anomaly problem. ICPRAM (2014); 759-764

Bitner, M.J., A.L., F.N. Morgan. (2008). Service blueprinting: A Practical technique for innovation. California Management Review 50 (3: 66-94).

Ciresan D. (2015). Multi.column deep neural networks for offline handwritten Chinese classification. IEEE International Joint Conference on neural networks (IJCNN). pp. 1-6

Dobreacu, E.M. (2018) Artificial Intelligence (AI) - the technology that saves the world. Global economic observer 6(2):71-81

Ekinci, Y., N. and F. Ulengin. (20140) A Customer lifetime value model for the banking industry: A guide to marketing action. European Journal of Marketing 48 (3-4): 761-784

Leonov P. and et.al (2019) The use of Artificial Intelligence technology in the process of an ATM service model 169:2032

Mahajan A and et al (2019) Artificial Intelligence based on smart ATM 06.11

Manore (2020). Artifical Intelligence - Implecation of business strategy MIT Sloan School of Management- MIT Computer Science and Artificial Intelligence Laboratory (CSAIL).

Padmanabhan V. and Metilda P. (2021) An Impact of artificial intelligence in Indian industry ISSN 2581-7796

Sharma, Monika (2020) The influence of artificial intelligence on the banking industry and how AI is changing the face of modern-day banks 11(6): 577-585

Turan and et.al (2017) A deep learning-based fusion of RGB camera information and magnetic localization, information for endoscopy capsule robots, international journal of intelligent robotic and application, Vol. 1,4 pp. 442-455

Tyagi, Amit (2016), Essay: Artificial intelligence boon or ban? SSRN electronic journal 10.2139

Vijay C. (2019) Artificial Intelligence in the Indian banking sector: challenges and Opportunities, international journal of advanced researcher 7(5): 1581-1587

Xu, et.al (2020). AI customer service: Task complexity, problem-solving ability, and usage and intention. Australasian Marketing Journal 28 (4:189-219)

IRSTI 06.01.05 https://doi.org/10.26577/FJSS.2022.v8.i2.07

THE EFFECTS OF DIGITAL CURRENCY (ENAIRA) ADOPTION ON NIGERIA ECONOMY

T.A. Adegbite* , **M.A. Aremu**
Al-Hikmah University, Ilorin, Kwara State, Nigeria
*e-mail: adetajud@yahoo.com

Abstract. This study examined the determinants of eNaira adoption in Nigeria, and also analyzed the effects of eNaira adoption on economy in Nigeria. The utilized data were randomly collected from banks staff, economists, and Nigerians through Google forms questionnaires which were distributed among the respondents through WhatsApp and Emails. The respondents cut across all six (6) geopolitical zones in Nigeria which are Southwest, Southeast, Southsouth, North central, Northeast and Northwest. The Google forms were continuously distributed until it reached Two thousands five hundred and eighty three (2583) respondents. These were rigorously analyzed through MANOVA, correlation, chi-square and Cronbach's Alpha statistics reliability.

Data garnered were analyzed by employing ANOVA, Chi- square, MANOVA and correlation to test the hypothesis formulated. To gauge the determinants of digital currency adoption in Nigeria, government policy, human behavior, ICT, personnel, and education were taken as independent variables while digital currency adoption was considered as dependent variable.

It was found from the outcome of MANOVA that Education, Block Chain, Government policy, Human Behaviour, and Personnel are the significant determinants of eNaira adoption in Nigeria. It was also discovered that eNaira adoption has positive significant influence on Nigeria economy. Therefore, it is concluded that eNaira has positive significant effect on economy in Nigeria.

It is recommended that CBDC should establish validation scheme (centralized or decentralized) to prevent double spending or identity theft of eNaira code. Also, Citizens must be enlightened to understand the difference between cash deposits' digital representation in bank accounts and eNaira in digital wallets through effective programme which should be organized by CBN to deepen the enlightenment of eNaira in the country.

Keywords: eNaira; economy; adoption; education: blockchain: government policy.

Introduction

The inception of the pandemic which led to the closure of many bank branches throughout the country was further deterred Nigerians to have proximic access to their savings both in urban and rural area due to the entire closure of economy indefinitely. The existence of technology has assisted Nigerians to have access to their financial system with the exemption of Nigerians who are not privy to bank accounts in rural areas. This ignited digital transaction through cryptocurrency which invariably upsurged the country's rank to sixth country that bows for cryptocurrency adoption globally (CBN 2021). Nigerians have been previously using cryptocurrency as a reliable, cheaper and faster alternative currency for both international domestic and transactions before it was recently denounced by federal government due to devaluation of Nigeria currency. Nigeria currency was devalued twice which translated to 12.5 percent reduction in value due to pandemic and emerging of cryptocurrencies (CBN 2021). In a struggle to control the rapid gaining of cryptocurrencies, CBN, in February 2021, issued instruction to local banking institutions to halt transaction in cryptocurrencies, and stop encouraging payments for crypto exchanges in Nigeria which currently illegalized it. This perhaps, four months later, prompted federal government to create digital currency (eNaira) to replace crypto currency adoption which can be used to transact without the inclusiveness of the banks.

Among the CBN's progressive goals is to digitize transactions, and enhance financial inclusion, and offer citizens' accessibility to financial services whether is banked or unbanked. As Nigeria is still considered one of the most 'unbanked' countries in the world (CBN, 2021). In order to expunge totally from this embarrassment, and decentralized identity systems, Central Bank Digital Currencies (CBDCs) have been established with the expectation of providing the users with proof of identity and access

to banking services directly from their smartphone. CBDCs are gaining worldwide popularity rapidly, and Nigeria is the country in Africa that firstly and officially launch digital currency which is backed by appropriate authority such as monetary reserves. CBDCs are evolving government path to designate the momentum that has been structure within digital assets, mainly as a response to cryptocurrencies popularity like Bitcoin, which are reorganized and not within the purview of regulatory authority.

The eNaira system is designed and integrated with the best fraud management system, which guarantees the security of transactions and fosters customers' trust. The eNaira is referred to digital currency which is issued and supported by Nigerian government authority. It is legal tender which is physical cash equivalent unlike Bitcoin and cryptocurrency which is not supported by established authorities. One of the visions of CBN is financial inclusion increment and digitization of payments as well as greater accessibility by the citizen to financial services. Before the existence of digital currencies in Nigeria, the single way the consumers transact or settle debits is physical cash and electronic transaction which is domiciled in commercial bank's account but not central bank.

According to CBN (2021) the digital currency with the involvement of blockchain technology can foster economic growth and increase the GDP of Africa's biggest economy by $29 billion over the next 10 years. The establishment of eNaira can be assisted through the blockchain ledger, eliminates third parties, facilitates efficient and low-cost transactions, and accessibility to low-risk and reliable payment options by consumers. Accessibility can be restricted by digital identity such as National Identity Number and Bank Verification Number which is dependent by eNaira. Physical currency has been devalued severally which has also lead to inflation in Nigeria. The expectation of CBN on digital currency is to control inflation, and simplify transaction without holding cash or visiting banks because it is domiciled with CBN. Nigeria which has been regarded as immature because of persistent electricity crisis, corruption, and internet accessibility problem is probable to face challenge when transact with digital currency virtual wallet which are domiciled with CBN. This new developments has raised questions among the researchers on eNaira accessibility, considerable effects of eNaira on economy. Is it worthy to access cash by the educated and illiterate citizen while offline? Can digital currency adoption impact economy significantly in Nigeria? Therefore, digital currency adoption effect on economy and its determinants in Nigeria are the pertinent motives behind this study.

Literature Review

A digital currency refers to alternative method of payment that occurs without holding physical currency in an electronic form. These currencies are issued, regulated and controlled by central bank, and supported by the government. This is absolutely different with extant electronic money, which is issued by central banks but its usage is limited to the banks and financial institutions selected. Digital currency (eNaira) is an electronic version of the physical Nigeria currency issued by CBN which is equal in value with the physical currency. It is not with the motives of replacing cash but functioning as an alternative means of settling debt and payment. The eNaira is central bank digital currency (CBDC) issued by the government which possesses the same value as the flat currency. eNaira is not in coins form neither is in notes format, it is virtual designed format. It is translated that eNaira cannot be hold physically but can be stored in value. It is legally backed by central bank to make payment. CBDC is a direct central bank liability, and can be exchanged, and transferred using blockchain as a technology to regulate and protect eNaira. It refers to a system which stores transaction records across computers network for effective eNaira implementation.

eNaira shall be controlled and administered by CBN through the Digital Currency Management System (DCMS). DCMS provides digital currency and stable coin solutions to CBN, financial institutions and ecosystem participants worldwide. The eNaira system maintenance depends on technological strength such as blockchain engaged to offer system maintenance framework. According to CBN (2021), digital currency and blockchain technology are used to facilitate economic growth, and upsurge GDP of Africa's biggest economy by $29 billion in the next 10 years. Blockchain is a Distributed Ledger Technology (DLT) which records transactions with an incontrovertible hash (cryptographic signature). This translates that if a change is made in a chain of one block, it is immediately showed that it had been altered. If hackers want to alter blockchain system, every block in the chain distributed versions must be changed across which difficult for the hackers to tamper with.

Digital currency (eNaira) according to CBN (2021), can be available only to whoever possesses

bank accounts through blockchain. Yet, eNaira is projected to be universal, that is designed to settle debts, medium of exchange, unit of account and deferred payment globally. The perquisite to eNaira usage is that eNaira wallet must be created which is digitally storage controlled, managed and created by blockchain technology. There is only one version of eNaira wallet for government, although financial institutions are permissible to develop their own eNaira versions later.

eNaira App must be downloaded by individual using smartphone in order to create eNaira wallet. This can be downloaded through Apple Store or Google Play Store. The registration can be done and completed on eNaira App. The users can be permitted to transfer money, or receive money from bank account immediately eNaira wallet has been created. According to CBN (2021), eNaira system is built with rigorous considerations for data protection, privacy, and in compliance with the National Data Protection Regulations. Nevertheless, this system is constructed based on the guidelines in order to prevent the unlawful flow of funds and usage which necessitate transactions identification and detail so that privacy rights of eNaira system users are not breached.

DCMS will be employed to superintend the currency. This will be engaged by Non Nigerian Company. According to CBN (2021), the decision to engage a Non Nigerian company is to avail the local press criticism. It was stated further that CBN which, the apex bank, selected one company (BITT I emerged the strongest.) which was evaluated through rigorous selection procedure via implementation timeline, technology, efficiency and possession of anti-money laundering, terrorism combat, interoperability, platform security, and implementation experience.

Digital currency which is electronic money, e-money, digital money, network money, digital cash, electronic currency, electronic cash, mobile money and e-cash (Berentsen, 2005). Digital currency are of two types which are digitized state issued currencies and private digital currency (Gans and Halaburda, 2015). The Integral motive for the establishment of eNaira (digitized state currencies) is the necessity to build more synergy with financial institutions. The framework of eNaira is such that it entrenches many pipelines of collaboration and further strengthens financial institutions core service delivery. It also increases customer interaction which can help adopting better customer support models. It also opens up a whole new market of digital currency users for financial institutions to increase their customer base, add value to their account owners and enhances electronic commerce globally.

The eNaira principally offers digital stability and also facilitates ease digital transactions without physical cash. This also minimizes involvement of commercial banks in transaction as intermediary. The expected benefits of eNaira also embedded with cheap, fast, reliable payment channel. It supports digital economy and improves economic activities. The following are also the benefits of eNaira. It also:

- facilitates and promote financial inclusion
- facilitates citizens' welfare disbursements
- encourages diaspora remittances
- lessens the cash processing cost
- increases the usability and availability Central Bank currency
- upsurges tax collection and revenue generation
- cross-border payments improvement.

In addition, Nigeria with the largest population in Africa is the first country in Africa to organize and control eNaira successfully. This is an omen to Africa regional monetary integration. This can totally eradicate inconvertibility currencies problem in Africa, and assist intraregional trade which has been an issues in Africa. With the operational Continental Free Trade agreement in African, the launch of eNaira can lead to Africa regional monetary integration.

Furthermore, decrease in cash handling expenses and translucent taxing systems are attained with eNaira together with sufficient resources available for capital and development projects like as roads construction, health facilities provision and affordable education services. eNaira supports the government on welfare allowance to Nigerians who are less privileged. It also facilitates immediate cross-border foreign exchange which can boosts the Nigeria economy. Further, eNaira reduces fraudulent activities and unlawful deals like money laundering, and illegal money deals which can be tracked with eNaira unique ID. The transaction cost will be cheaper because intermediary is totally expunged. Theoretically, the eradication of third-party will allow small businesses to access capital, protect Nigerian against capital control, financial extortion, and facilitate innovation. eNaira can remove a multiple authorization charges, customer service and transactions fees which hinders small businesses with current credit card system. However, the hypothesis is stated

HO_1: Digital Currency adoption will not impact economy significantly in Nigeria.

Blockchain

Blockchain is principally a transactions digital ledger that is distributed and duplicated across the whole computer systems network on blockchain. Every block in the chain comprises a transactions number, and anytime a new transaction transpires on the blockchain, the transaction record is added to all the participant's ledger. The multiple participants that manage the decentralized database refers to as Distributed Ledger Technology (DLT).

Figure 1 – Property of Distributed Ledger Technology (DLT)

Through blockchain ledger, third parties are eliminated, and also contributes to the effective and efficient low-cost transactions. Consumers, to their advantages, experiences reliable payment and low-risk options. Additionally, it improves oversight payment and funds, and provides transparency that strengthens public confidence as well as tackles with economic fraud and crime by financial authorities. Thus, Hypothesis is stated as:

HO_2: Technology (ICT and block chain) are determinant to Digital Currency adoption in Nigeria**.**

Government Policy

This refers to the policy made by government on the acceptability of eNaira for settlement of debt, medium of exchange, store of value and means of deferred payment. For eNaira to be generally accepted as a means of payment, government policy on rules and regulations on eNaira must be enforced. There is must consistent way of dealing with ENaira in Nigeria. There must also be consistent guidance on legal, tax, accounting, and audit related standards. Thus, government policy is a debated issues confronting digital currency

issuance. eNaira technology has major unique and extraordinary features that give it the prospective to be impacting on economy, institution and industries when fully implemented, and extensively backed with enforcement. The pertinent extraordinary features are capacity to drive money anywhere within a minutes globally, its decentralized nature of transfer value and its absolutely digital existence, make government policy on digital currencies to be effective and efficient. Clear legislation on digital currencies must be apparently stated so as to avoid more complex in the process.

HO_3 : Digital Currency adoption does not need government policy in Nigeria.

Human Behaviour

Human behaviour is also considered as the determinant of eNaira in Nigeria. This refers to the culture, believe and enthusiasms of Nigerians towards acceptability of digital currency. The culture and belief of the Nigerian are the determinants of any policy in the country. For the effective implementation of digital currency in Nigeria, culture, belief, attitude and behavior of the users (Nigerian) must be put into consideration.

HO_4: Human behaviour is not significantly important in digital currency adoption in Nigeria

Personnel

This refers to as the recruitment of competent, trust and responsible staff. Personnel is very important in implementation of digital currency in Nigeria, These staffs are saddled with responsibilities of controlling, administrating, organizing, check and balance, and auditing. They are also in charge of strategic positions so as to achieve the policy objectives. The strategic positions such as block chain position, ICT, cyber security, check and balance, and other pertinent positions for effective eNaira implementation. The implication is that any betray from a staff has negative effects on eNaira's successful implementation.

HO_5 : Involvement of personnel is not relatively important in digital currency adoption

Education

This is refers to the enlightenment of the Users (Nigerians) on digital currency adoption, implementation, importance of digital currency, and the benefits attach to it. This can be done through public enlightenment, medians such as Television, Radio, bill boards, churches, mosques, schools, and other channels. Enlightenment cannot be underestimated in digital currency adoption. Through this medium, numerous users will be contacted and educated on the reason behind the adoption of eNaira in the country. Many questions will be raised and answered by the facilitators. Also, the opinions of the users will be gauged, and necessary information will be garnered for effective and efficient implementation of eNaira.

HO_6 : Education is not significantly necessary on digital currency adoption

Technology Acceptance Theory

This study is anchored on Technology acceptance theory which is absolutely defined as technology's model pronounced by Venkatesh which is entrenched as user acceptance of information technology. It designed to clarify the intentions of the user of a system which embedded with consequential usage attitude and system of revenue collection. This theory is engaged to classicize acceptance and technology usage for revenue collection system in the country. The theory explains expectant effort, expectant performance, and facilitates social influence as four constructed keys. According to this theory, usage attitude, behavior, and intention determinants are classified as the first three while the fourth direct determinant is classified as adopted behavior (Adegbite, Bojuwon & Adegbite 2019). The theory was hypothesized and recognized through an evaluation and agreement of the eight constructed models which are employed by extant research to clarify information on usage behavior (motivational model, reasoned action theory, planned behavior theory, technology acceptance model, a theory of technology acceptance combined model, personal computer usage model, planned behavior, social cognitive and social diffusion theory).

The importance of this model to this research is that behavior, attitude and intention are the cogent determinants of adopted policy if the government expects favorable ends results of the policy. This theory classifies that acceptance, and technology usage are the pertinent determinants for digital currency adoption in the county. If the citizens, through their behaviour, reject the digital currency, it will not be effective in the country, and vice versa. Technology usage according to this theory is the backbone of the effective eNaira, without vital and

formidable technology, eNaira cannot be effective. Therefore, this study harnessed on this formidable theory.

Availability of the existing literatures from other countries divulged that digital currency impacted positively and significantly on the respective countries' economy. For instance, Bordo and Levin (2017) examined the effect of CBDC on Future of Monetary Policy in US, descriptive method of analysis was employed to examine CBDC effect on monetary policy. It was discovered that CBDC serve as a steady unit of account, medium of exchange, and store of value. Engert and Fung (2017) determined the effects of digital currency on general public in Canada. The study started by discussing the conceivable motivations for issuance of digital currency by central bank. The study sets out a standard CBDC with structures that are related to cash. Digital currency implication are explored and focused on central bank monetary policy, financial stability and banking system and payments. Finally, it was concluded that CBDC significant impacts general public positively in Canada.

Qianru (2017) employed econometric model to discover the connections between digital currency, velocity of money and money supply monetary system of China. To measure the digital currency effects on fiat currency, it employed inferential statistics to analyzing the connection among cash ratio, financial electronic level, electronic currency level, and interest rate. The results divulged that connection which is significant existed among the variables examined. The study advocated that extensive digital currency would bring variation to the rapidity of money both in the short and long term.

In the same vein, Appiah Otoo and Nemati (2017) analyzed the digital currency impact on quality of life in selected developing countries. Approach of mixed method was used to analyse hypotheses and conceptual model. Physical interviews were also conducted to confirm research instrument and improve the study. Survey questionnaire were administered to 400 digital currency users, particularly, students from developing country were randomly selected. Five-Likert scale were employed while partial Least Squares (PLS) was used to analyse the data collected from students selected from developing countries. It was concluded that digital currency impacted quality of life significantly and positively.

Purnawana, and Riyantia (2019) examined CBDC significant effect on Canada monetary policy. The study sets out pertinent CBDC standard in numerous countries. According to the study several central banks are aggressively exploring sovereign digital currencies initiation. Primary results showed that the new monetary instruments provided by CBDC improved financial inclusion and monetary policy transmission. In another study of Jiang and Yu Zhu (2021) which investigated the effect of CBDC on interest-bearing rate for bank deposits and monetary policy. The study, after rigorous analysis, concluded that CBDC weakened and reduced interest on reserves. CBDC interest impacted deposit market extensively and positively when compared with reserve interest. According to the study, CBDC rate is also stronger to loan market, and improved market positively more than flat currency but effective coordination of CBDC is needed to successfully attain policy goals.

Figure 2 – Digital currency adoption and Economic Development

Research Methodology

To examine the view of the Nigerians on eNaira adoption, data were collected through questionnaire which were administered to staff of selected banks and elite Nigerians through random sampling. This was done using Google forms questionnaires which were sent to respondents in Nigeria through WhatsApp and Emails. The respondents cut across all six (6) geopolitical zones in Nigeria. The six (6) geopolitical zones are Southwest, Southeast, Southsouth, North central, Northeast and Northwest. The Google forms were continuously distributed until it reached Two thousands five hundred and eighty three (2583) respondents. But each respondent was given a chance of assessment because questionnaire on Google forms was restricted to one response per respondent. Data garnered were analyzed by employing ANOVA, Chi-square, MANOVA and correlation to test the hypothesis formulated. To gauge the determinants of digital currency adoption in Nigeria, government policy, human behavior, ICT, personnel, and education were taken as independent variables while digital currency adoption was considered as dependent variable.

$$DICURR = f\ (GOVPOL, HUBEH, ICT, PERS, EDUC, \mu) \quad 1$$

$$DICURR = \alpha_0 + \beta_1 GOVPOL + \beta_2 HUBEH + + \beta_3 ICT + \beta_4 PERS + \beta_5 EDUC + \mu \quad 2$$

To examine the digital currency adoption effect on economy, eNaira was picking as independent variable while economy was taken as dependent variable. These were measured through questionnaire administered on the respondents.

$$Economy = f\ (eNaira, \mu) \quad 3$$

$$Economy = \alpha_0 + \beta_1 DICURR + \mu \quad 4$$

DICURR	-	Digital Currency
GOVPOL	-	Government Policy
HUBEH	-	Human Behaviour
PERS	-	Personnel
EDUC	-	Education
ICT	-	Technology

Results and Discussion

Table 1 – Cronbach's Alpha Statistics Reliability Analysis on Research Instrument

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

Source: Author's Computation (2022)

`As rightly stated in methodology because of the primary nature of data collection through administered questionnaires, this study carried out reliability test of the instruments employed. It was discovered from Cronbach's Alpha statistics that the instrument used was valid and reliable

Table 2 – Reliability Statistics on Digital Currency Adoption in Nigeria

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No of Items
.72	.72	20

Source: Author's Computation (2022)

Table 3 – Analysis of the Benefits of Digital Currency Adoption on economy in Nigeria

S/N	Benefits	Pearson chi-square	Pr(value)	Remark
1	Digital transactions enhancement	44.4041	0.007	Accepted
3	Financial inclusion	77.5617	0.000	Accepted
4	Employment generation	66.2314	0.001	Accepted
5	Direct welfare disbursements enablement	47.9478	0.008	Accepted
6	Revenue and tax collection Increment	43.1459	0.000	Accepted
7	Reduction in cost of processing cash	53.9410	0.010	Accepted
8	Resilient payment system supports	22.2946	0.034	Accepted
9	Central bank currency usability improvement	178.2899	0.000	Accepted
10	Economic activities enhancement	74.4925	0.000	Accepted
11	Easy payment of services by customers	23.9335	0.009	Accepted
12	It boosts ecommerce and enhances global recognition	133.7278	0.000	Accepted

Source: Author's Computation (2022)

Decision Rule: Decision rule on the significant effects of digital currency adoption on economy in Nigeria cannot be rejected because in Table 3 employed to testing hypothesis one, minimum calculated chi – square is 23.9335 (x^2 – cal) is higher than tabulated chi – square of 3.74 (x^2 – tab) which make all the benefits to be significant with the value of all probability of the benefits below 0.000. Mutually, the study rejected the null hypothesis. This signified emphatically that digital currency (eNaira) is of benefits to the economy.

Table 4 – Determinants of Digital Currency Adoption in Nigeria

S/N	Relationship	Pearson chi-square	Pr(value)	Remark
1	Government Policy	94.4041	0.000	Significant
2	Human Behaviour	77.5617	0.000	Significant
3	Technology (blockchain and (ICT)	86.2314	0.000	Significant
4	Personnel	47.1324	0.000	Significant
5	Education	69.5634	0.000	Significant

Source: Author's Computation (2022)

Table 4 showed the determinants of digital currency adoption in Nigeria. It is discovered that government policy has the highest significant figure of 94.4041. The implication is that the policy of digital currency adoption needs effective enforcement in order to be generally acceptable for medium of exchange and settlement of debts. This is followed by the involvement of technology for effective and efficient generation of eNaira code and security against hackers. Human behavior is also considered as the determinant of eNaira in Nigeria with the Pearson chi-square value of 77.5617. This displayed that the culture, believe and enthusiasms of Nigerians towards acceptability of digital currency are significant and important. The culture and belief of Nigerian are the determinants of digital currency's implementation in the country. In the same vein, education which is enlightenment also divulged Pearson chi-square value of 69.5634, translates that users' education towards the importance and benefits of digital currency is sacrosanct. This explains further that for eNaira to be generally acceptable, government must education her citizen extensively on the advantages of eNaira. Lastly, Personnel displayed Pearson chi-square value of 47.1324 meaning that recruitment of competent, trust and responsible staff is also importance. These staff are saddled with responsibilities of controlling, administrating, organizing, check and balance, and auditing. The implication is that any betray from a staff will absolutely has negative effects on eNaira implementation.

Table 5 – Results of ANOVA on Determinants of Digital Currency Adoption in Nigeria

Source	Sum of Square	Df	Mean Square	F	Prob > F	Remark
MODEL	1924.7064	21	91.652686	139.17	**0.000**	**Accepted**
GOVPOL	877.68814	4	219.42203	333.18	0.0000	
HUBEH	131.44387	4	32.860967	49.90	0.0000	
ICT	192.14857	4	48.037142	72.94	0.0000	
PERS	106.02184	5	21.204369	32.20	0.0000	
EDUC	70.852971	4	17.713243	26.90	0.0000	
Residual	1686.5967	2,561	.65856959			
TOTAL	3611.3031	2,582	1.3986457			
R-squared = 0.5330	Adj R-squared = 0.5291	Number of observations =		2,583	Root MSE =	.811523

Dependent variable: DICURR
Source: Author's Computations (2022)

Table 5 showed the determinants' effects of the adoption of digital currency in Nigeria. It was discovered that GOVPOL (government policy) enforcement will increase the level of digital currency adoption in Nigeria by 8.77%. Also, HUBEH (human behaviour) has positive effect on adoption of digital currency by 1.31%. Block chain and ICT significantly influence adoption of digital currency positively by 1.92%. This shows the importance of ICT on the adoption of digital currency in Nigeria. In the same vein, PERS and EDUC display positive influence on the adoption of digital currency in Nigeria by 1.06% and 0.7% respectively. These decisions negated the null hypotheses of each variable on adoption of digital currency, therefore, all variables under study influence the adoption of digital currency in Nigeria.

Table 6 – The Relationship between Digital Currency Adoption and its Determinants in Nigeria

	DICURR	GOVPOL	HUBEH	ICT	PERS	EDUC
DICURR	1.0000					
GOVPOL	0.6215**	1.0000				
HUBEH	0.1922	0.4321**	1.0000			
ICT	0.5532****	0.2466**	0.3342**	1.0000		
PERS	0.2642**	0.1327**	0.9835**	0.6745**	1.0000	
EDUC	0.1835*	0.0109	0.1167	0.0432	0.2245*	1.0000

**. Correlation is significant both at the 0.01 level and 0.05 level (2-tailed)
Source: Author's Computation (2022)

Table 6 showed the connection between digital currency adoption and its determinants in Nigeria. It shows that government policy has positive connection with digital currency adoption with coefficient of 0.6215*. This result implies that an increase in government policy enforcement will enhances digital currency adoption for transaction in the country. Further, human behaviour also augments digital currency adoption with the coefficient of **0.5112**** positively**.** In the same vein, Technology (ICT, and blockchain) displays positive correlation with digital currency adoption with coefficient **0.1922****. This result displays that the mindset of the final users (Nigerians) determines the sustainability of digital currency adoption.

More so, PERS (Personnel) further displays positive correlation with digital currency adoption with coefficient of **0.2642****. It translates that involvement of trustworthy personnel determines the sustainability of digital currency adoption. Lastly,

EDUC (education) can be seen from the outcome of analysis having positive correlation (0.1835*) with digital currency adoption. This signifies that enlightenment of the users has positive impacts on digital currency adoption. Having scrutinizingly analyzed the correlation, it is therefore suffice to finalize that all the determinants have positive correlation with digital currency adoption in Nigeria.

Table 7 – Analysis of the effect of Digital Currency Adoption on Economy in Nigeria by MANOVA

Source	Statistic		Df	F(df1,	df2)	F	Prob>F
Economy	W	0.9305	4	4.0	2578.0	48.12	0.0000 e
	P	0.0695		4.0	2578.0	48.12	0.0000 e
	R	0.0747		4.0	2578.0	48.12	0.0000 e
	L	0.0747		4.0	2578.0	48.12	0.0000 e
Residual			2578		Number of obs =	2,583	
Total			2582				

Dependent variable = Digital Currency Adoption.
Source: Author's Computation (2022)

W = Wilks' lambda, P = Pillai's trace, L = Lawley-Hotelling trace, R = Roy's largest root, a = approximate, e = exact, and u = upper bound on F

After discovering positive correlation between digital currency adoption and its determinants, the next steps is to examine the effects in which digital currency adoption dispenses on economy. MANOVA was employed to examine the significant effects of digital currency adoption on economy. The effects were discovered from four statistic parameters in MANOVA (W, P, R, and L). According Wilks' lambda parameter, one percent increment in digital currency adoption will absolutely enhance economy by 0.93%. This is further supported that Pillai's trace which brought out that an increase in digital currency adoption will increase economy by 0.06%.

But the opinion of the remaining parameters (Lawley-Hotelling trace and Wilks' lambda) are of the same in the sense that both agreed on 0.07% as the effects in which digital currency adoption will dispense on economy in Nigeria. In short, all the statistic parameters suggest that digital currency adoption will increases economy positively when fully implemented in Nigeria, which was further advocated by F (Prob>F) equal to 0.0000e.

Table 8 – Wald Test after MANOVA

Wald Test	**Value**	**Decision**
(1) [Economy]3.Digital Currency = 0	F(1, 2578) = 22.29	**Accepted**
	Prob > F = 0.0000	

Source: Author's Computation (2022)

To certify with the outcome of MANOVA, Wald test was carried out. The essence of this test is to confirm the significant level of the effect of digital currency adoption on economy. It was discovered from Table 8 that digital currency when adopt it fully in Nigeria will be favorably impacted economy significantly. This is advocated by Prob > F = 0.0000 which is below 0.05 significant level. Therefore, digital currency adoption will increase economy positively when it is fully implemented in Nigeria.

Discussion

This study examined digital currency adoption and its determinants, and also analyzed its effect on economy in Nigeria. It was discovered that the determinants of digital currency adoption are government policy, human behaviour, technology (ICT, and blockchain), personnel and education. This divulged that the enforcement of government

policy on the actualization of digital currency adoption on Nigerian for transaction implementation will facilitate prompt implementation. Also, it was further realized that technology through effective usage of ICT and blockchain will also enhance the digital currency delivery in Nigeria. This is line with Otoo and Nemati (2017). Personnel and education are also an integral part of the digital currency adoption determinants. This is absolutely true because the enlightenment on the usage and benefits of digital currency adoption will be superintended by dynamic personnel with formidable median. This outcome is also in consonance with Qianru (2017).

The benefits expected to dispense from digital currency adoption on economy in Nigeria are seen as employment generation, easy facilitation of transaction, security of money, direct welfare disbursements enablement, revenue and tax collection increment, reduction in cost of processing cash, resilient payment system supports, Central bank currency usability improvement, and economic activities enhancement. Also, eNaira opens up a whole new market of digital currency users for financial institutions to increase their customer base, and add value to their account owners. It is not a subtle scheme to steal customers' financial properties but it is a collaboration to grant access to more financially excluded people.

Furthermore, it was discovered that government policy has highest positive relationship with digital currency adoption with the coefficient of 0.6215*. This translates that government policy on digital currency (eNaira) adoption in Nigeria supported by full enforcement by law have impact on the general acceptability of eNaira by the end users of the currency. This further translates that it will be generally accepted as a settlement of debts and transaction. This outcome is in line with Engert and Fung (2017). This is followed by Technology via ICT and block chain with the relationship benchmark of 0.5532. This displays that ICT and blockchain are the integral ingredients for the successful of eNaira in Nigeria. This will checkmate the fraudsters in hacking CBN data base for manipulating or generating eNaira code. Without this, according to the outcome of this research, the generated code by CBN can be manipulated or hacked for their own treacherous ecstasy. The eNaira system is designed and integrated with the best fraud management system which guarantees the security of transactions, and fosters customers' trust through blockchain.

Human behaviour through culture and beliefs also has positive significant relationship with adoption of eNaira in Nigeria. This is also in consonance with the view of Qianru (2017) who revealed that culture and beliefs cannot be discarded when adopting digital currency in any country. Education was also seen having positive correlation with eNaira adoption in Nigeria. This displays that for effective implementation of eNaira, the populace must be enlightened and educated on the importance and the benefits attached with eNaira adoption in the country. The implication of education is that it will promptly enhance eNaira adoption, and gives it general acceptability for the settlement of debt, transaction, store of value, and medium of exchange. Lastly, eNaira will ensure taxable assets traceability, taxation transparency, and enforcement in the systems, which will invariably increase revenue, and impact economy favourably.

Conclusion

This study examined the determinants of eNaira adoption in Nigeria, and also analysed the effects of eNaira adoption on economy in Nigeria. The utilized data were randomly collected from banks staff, economists, and Nigerians through questionnaires. These were rigorously analyzed through MANOVA, correlation, chi-square and Crombach's Alpha statistics reliability. It is concluded that eNaira have positive significant effect on economy in Nigeria in terms of employment generation, economic stability, easy facilitation of transaction, security of money, direct welfare disbursements enablement, revenue and tax collection increment, reduction in cost of processing cash, resilient payment system supports, central bank currency usability improvement, and economic activities enhancement. It will also serve as medium of exchange, secured store of value, and stable unit of account in Nigeria. It is therefore recommended that CBDC should establish validation scheme (centralized or decentralized) to prevent double spending or identity theft of eNaira code. Also, there is need to train Nigerians about eNaira by the government on the importance of this new development. Citizens must be enlightened to understand the difference between cash deposits' digital representation in bank accounts and eNaira in digital wallets. There must also be implemented through effective and formidable programme which should be organized by CBN to deepen the enlightenment of eNaira in the country.

References

Adegbite T.A., Bojuwon M. & Adegbite A.F. (2019). The Impact of ICT on Taxation: Evidence from Oyo State. *Copernican Journal of Finance & Accounting*, *Copernican University,* 8(4), 7–25.

Adegbite, T.A. & Anene E.C. (2014): Analysis of the Impact of Internet Advertising on Productivity of Telecommunication Industry in Nigeria: MTN Nigeria Outlook. *International Journal of Multidisciplinary Research and Development,* 1 (2): 161-166. www.allsubjectjournal.com

Andolfatto, D. (2020) \Assessing the Impact of Central Bank Digital Currency on Private Banks,» The Economic Journal, ueaa073, https://doi.org/10.1093/ej/ueaa073

Berentsen,A. (1997) Monetary Policy Implications of Digital Money. *University of Bern*. **51**(1); pp. 89-118.

Berentsen, A. (2005). Digital Money, Liquidity, and Monetary Policy, (originally published in July 1997), First Monday, pp. 89-117.

Bordo D. & Levin, A. T. (2017) *Central Bank Digital Currency and the Future of Monetary Policy, Econ. Working Paper 1714* 3 n. 10, Hoover Institution (Aug. 2017), https://www.hoover.org/sites/default/files/research/docs/17104-bordo-levin_updated.pdf; *see also* Dyson, *supra* note 93, at 8; Mancini-Griffoli, *supra* note 78, at 16 n. 22

Brigid A. Appiah Otoo . A. & Nemati H. (2017). *Digital Currency and Impact on Quality of Life. Emergent Research Forum Paper, Twenty-third Americas Conference on Information Systems, Boston, 2017*

Engert W. & Fung S.C. Fung (2017). *Central Bank Digital Currency: Motivations and Implications*, BANK OF CAN. (2017), at 1, https://www.bankofcanada.ca/wp-content/uploads/2017/11/sdp2017-16.pdf

Gans, J. S., & Halaburda, H. (2015). "Some economics of private digital currency. *Economic Analysis of the Digital Economy*," University of Chicago Press, pp. 257-276.

Purnawan M.E & Riyanti R. (2019) Significant Effect of the Central Bank Digital Currency on the Design of Monetary Policy. *Jurnal Ekonomi Indonesia*, 8 (1); 125–151

Qianru X (2017). The Impacts of Digital Currency on China's Monetary System.

Zhou, G. (2006). The impact on money circulation velocity of electronic money: An Empirical study with cointegration method. *China Economic Quarterly.* 5(4); 1999-1234.

CBN (2021) https://www.trtworld.com/magazine/nigeria-launches-its-central-bank-digital-currency-enaira-51063

IRSTI 11.25.19 https://doi.org/10.26577/FJSS.2022.v8.i2.08

THE USE OF METHODS FOR OPTIMIZING THE GENETIC ALGORITHM FOR THE COLORS OF A FRACTAL STRUCTURE PATTERN IN CARPET DESIGN

F. Nuraliev[1*], S. Tastanova[1], T. Bulanova[2]
[1]Tashkent University of Information Technologies Named after Muhammad Al-Khwarizimi, Tashkent, Uzbekistan
[2]Al-Farabi Kazakh National University, Almaty, Kazakhstan
*email: nuraliev2001@mail.ru

Abstract. Customer satisfaction can be enhanced by reducing the gap between what the customer really needs (customer requirements) and what the manufacturer can provide (product specifications). The carpet industry's customer design approach, in which products are created by converting customer needs into product specifications (in a mass production system) or into product diversity (in a mass customization system), cannot provide optimal satisfaction to all customers. Some carpet buyers are still forced to soften their requirements and agree to a pre-determined product in the assortment. This study proposes a new carpet design concept and an optimal price per customer order to increase customer satisfaction by opening the maximum possible channel for customers so that they can participate in value creation, so that they are no longer only looking for goods, but can, if necessary, involve in the production cycle to specify their own design. To ensure the viability of the proposed concept, this article presents the integration of the point of separation of the participation of several customers, the analysis of product attributes, crowd screening and a new production strategy. Real resin-based desktop clock products are used as a practical example to test the applicability of the concept and demonstrate its advantages.

Keywords: genetic algorithm, fractal, Pascal triangle, fractal, mutation, optimization, fitness function.

Introduction

Optimization problems are problems in which it is required to find the best solution; at the same time, as a rule, there are various restrictions on the scope of changes in control a variable, which does not allow using the methods of classical mathematical analysis, but requires the use of various computational methods. In this article we will look at optimizing the colors of fractal patterns of carpet design. Optimizing carpet colors we used a genetic algorithm. The concept of design is different from the scientific research that we sometimes analyze, design is a design that consists not only of studying the essence of what exists, but of creating innovation. When designing carpet designs in the carpet industry, the choice of color is of great importance.

General customization and automation in the carpet industry, this method of creating a bar mat for the buyer is considered in quality. The genetic algorithm is the direction of optimizing those stimulated by an environment that works in addition, such as interrelated; mutation and the survival of the most suitable one's work for machine learning. This method is widely used in optimization and classification work.

This method used two databases; one with basic patterns and the other with colors. This work developed software to optimize the selection of paints in carpet design in the production of complex images of fractal carpets based on a genetic algorithm. As parameters of the genetic algorithm, crossover and mutation probabilities are used. They can be from 0 to 1. Thus, they are considered probability. If the operator is assigned a value of "0", it means that as a result of this operator, no individual will change in this population. Likewise, if "1" is indicated as a parameter, it means that all individuals, in other words, all populations, change. Both of these values are usually not specified, since they do not contribute to the efficiency of the algorithm. So, in this study, we will select a value from 0 to 1 for the crossover and the probability of mutation.

Material and Methods

The genetic algorithm is similar to an interactive genetic algorithm; however, there is a slight differ-

ence where there is primarily a fitness function (target function) and the user sees the level of compatibility for each chromosome. The interactive genetic algorithm can communicate with users and therefore affect the user's emotions and is used in the arts and design fields and is used in production. In the carpet manufacturing industry, the application in color optimization is blurred in accordance with the purpose. For this, too, a program was developed by the Python programming language to express design through complex fractal images. The developed software consists of the following main section. Complex fractal image patterns and colors created by the program are displayed to the user in the main part, which is evaluated by the user. In other parts, the user can view existing carpet design samples from the carpet design sample base and create, edit or delete the desired design samples and place them in the database. The user can do the same for the colors in the software component and finally enter the knitting machine pattern and color boundaries. Using the method of binomial polynomial theory, methods and algorithms for visualizing images in fractal form have been developed, taking into account algebraic structures based on the Pascal triangle and The Theory of prime numbers based on Mod p (Nuraliev F. M. N.A., Narzulloev O. M., 2019). Each pattern is shaped on the basis of a Pascal triangle, in which each component is taken into account, the number of rows indicates the number of rows and the number of columns indicates the number of rows in the pattern. For example, the first size in the Pascal triangle indicates the amount of red, the second - green, the third - blue. Genetic algorithm parameters such as population number, number of parents transferred to the next generation, intersection coefficient, mutation rate, number of generations, and time limit are shown. There is no time limit for the algorithm to work, and the chromosome population is considered as a vector, that is, all chromosomes are sent to the fitness function through a matrix, where the number of rows is equal to the number of chromosomes. The number of columns is equal to the number of chromosomes genes. Thus, the fitness function is called only once for each generation, and the speed of execution of the algorithm increases. After determining the required parameters, the task of the genetic algorithm is performed. In the recorded function, the number of genes, the upper and lower limits and previous parameters of each gene are used as inputs, and the final population of chromosomes and their assumptions are used as the final product. Since in the final population some chromosomes may be the same as other chromosomes, samples of a similar design need to be eliminated and a new population with different chromosomes formed, and the best samples are installed on the user. After optimizing the carpet design, the color is optimized in the selected carpet designs.

Genetic method of color optimization of fractal structure images

Like chromosomes, which change in nature due to changes in genes, in the genetic algorithm these elements are constantly changing, turning into full and strong populations. The size of the chromosomes and the number of genes depend on the type of problem. Genes are actually a true determinant of the variables needed to optimize the problem. The suitability of chromosomes determines their effectiveness and the function of solving the problem. Such tasks related to the tastes and feelings of people use a direct definition of fitness instead of its function by a user called an interactive genetic algorithm. The choice of color options for paints for the manufacture of a particular carpet product is a complex issue, since it is necessary, on the one hand, to ensure the established accuracy of painting, and on the other, to be able to produce carpets. The main goal is to maintain the minimum cost and at the same time the highest productivity. To solve these problems, in general, methods of mathematical programming and optimization are used.

In real problems, a connection between objective functions, criteria inevitably arises:

1. criteria can match each other;
2. criteria may contradict each other;
3. criteria can be independent.

The initial expert assessment of the selected criteria (Dariush S., Mehdi H., Hamed A. and Mohammad Sh., 2014) allows you to solve the problem of multi-criteria optimization in the simplest, but sometimes most effective ways. The genetic algorithm (Panchenko T. V., 2007) is based on the theoretical advances of synthetic evolutionary theory and C. Darwin uses the basic principles of evolution theory: heredity, variability, and natural selection. The genetic algorithm works with a set of individuals (population) with rows (chromosomes) that encode one of the solutions to the problem. This genetic algorithm differs from other optimization algorithms in that it only works with one solution and improves it. Each person is evaluated by a measure of his "suitability", depending on how "good" it is to solve the problem that suits him. For this, the fitness function (Gladkov L. A., 2006) (target function) is used, which highlights the most adapted solutions (which will

continue to be used further) and the worst solutions (which will be removed from the population and will not affect the search for the optimal solution). So we strive to increase fitness, and therefore approach the desired solution and approach the desired decision. The operation of the genetic algorithm is an iterative process. Each new iteration over current individuals uses different genetic operators that give birth to new individuals. After that, all individuals are evaluated using the target function, and the most suitable ones are used in the subsequent iteration of the genetic algorithm. This process continues until the desired results are achieved, or the number of iterations exceeds the limit value (the limit of the number of iterations allows you to limit the time of operation of the algorithm from above). Also, one of the symptoms that must stop the iterative process is the approach of the population (the state of the population, all its individuals have been in a certain extreme region for several generations and are almost identical). The convergence of the population usually indicates that a solution closes to the optimal one has been found. Usually, the final solution to the problem is the most adapted person of the last generation. Genetic operators are a means of showing one set to another. They allow the application of the principles of heredity and variability to virtual populations. All genetic operators have probabilistic properties, which brings a certain degree of freedom to the work of the genetic algorithm. The most commonly used genetic operators are the crossing over (cross) operator and mutation operator. The transition Operator models the process of crossing individuals. This genetic operator leads to the creation of new individuals based on existing ones.

Literature Review

This method was also considered in the textile industry. This article will discuss the application of genetic algorithms in the textile industry. The genetic algorithm allows you to contain a large number of answers and select perfect designs from them by receiving feedback from assignments. However, many patterns are unpleasant and may not be suitable for customer demand. According to the customer, it is not easy to choose interesting and stylish models from such a variety of designs. To find the optimal price, an interactive genetic algorithm can be used to optimize colors and select ideal patterns based on the user's necessary feedback. We can use it to optimize color in the manufacture of carpets of complex designs (Nuraliev F. M. N.A., Narzulloev O. M., 2019). Attempts to eliminate these problems led to the creation of a theory of genetic algorithms. The founder of the theory of genetic algorithms is rightfully considered the American researcher John Holland, who in the late 1960s, it proposed the use of methods and models of the mechanism for the development of the organic world on earth as the principles of combinatorial registration of options for solving optimization problems. In 1975, John Holland published his most famous work "adaptation in natural and artificial systems" (Panchenko T. V., 2007). In it, he first introduced the term" genetic algorithm". John Holland's Students Kenneth De Yong and David Goldberg continued his career in the field of genetic algorithm. Goldberg's most famous work is "search optimization and genetic algorithms. in machine learning" (Gladkov L. A., 2006). In the carpet industry, several carpet designs of different colors can be created in a complex fractal image system. However, given the time, many patterns may not be attractive and beautiful enough, and choosing patterns among a wide range of customer tastes can be a big problem. To solve such a problem, an optimization and design scheme based on artificial intelligence can be used. This method develops a design system that is consistent with the requirements of customers and is based on market demand, which gradually connects with users, collects feedback and gives optimal results for users. In the carpet weaving system, several designs of different colors can be made. Also, many patterns may not be unpleasant and in demand. According to the buyer, it is not easy to choose interesting and stylish models from such a variety of designs. With the help of an interactive genetic algorithm, it is possible to optimize colors by price and select ideal images, taking into account the necessary feedback from the user. We can use the genetic algorithm to optimize the color of fractals in carpet production with complex image carpet designs (Dariush S., Mehdi H., Hamed A. and Mohammad Sh., 2014). To create an optimal color selection plan, a genetic algorithm is used in the design of carpet production. The interactive genetic algorithm was also used to optimize the color detection of carpet products, and was used in a similar way to previous research databases that included initial reserves to begin the optimization process.

Results and Discussion

Currently, there are many different models and modifications of the genetic algorithm. In test

functions, an experimental comparison of all their strengths and weaknesses with each other is impossible to construct within the framework of one article. The size of the chromosomal population is 6, the number of chromosomes transmitted to the next generation is 5, there is activity and 4 generations. The first generation of patterns was created from simple patterns stored in the database to run the genetic algorithm, but they could be modified by the user. The rating of users is from 1 to 9, the more attractive the design, the higher the rating. Subsequently, the first generation was evaluated, the next generations will be created on the basis of user ratings. Selection opera is an interactive operation performed by the user, the number of patterns in the database is the same for each generation, so patterns with a low compatibility value are excluded and will not be passed on to the next generation. The best design in each generation is the one with the highest fitness value or the best fitness value in this generation, and the average fitness value is the average value of all fitness values in this generation. With the production of new generations, the average fitness will be higher, which will show the well-being of the developed design samples and good user ratings.

Evolution algorithms use different evolution simulations in three stages of genes - chromosomes, human and generational. The genetic algorithm uses evolutionary modeling at the level of genes and chromosomes, in which the population consists of chromosomes with arguments of the same size. The emergence of a new generation is usually caused by chromosomal binding and partial mutation. In the genetic algorithm, the population of possible solutions in the search field, that is, the so-called individuals, the iterative evolution, becomes better solutions through the process. The population in each iteration is called the generation. Each generation assesses the physical fitness of individuals, which is usually the value of the target function in the optimization problem. Then a small set of individuals (parents) is selected and a transition mechanism is used to obtain a new generation of individuals (offspring). In addition, the mutation operator can be applied to maintain genetic diversity. The operation of any search algorithm depends on the balance between two opposing goals: using the best solutions found so far (local search) and at the same time studying the search field of other promising solutions (global search). Genetic algorithms have proven to be effective as a global search method, which means that they can quickly determine the area in which the optimal solution is available. Optimization problems over finite sets have a finite set of feasible solutions that can be enumerated and the best one can be selected from them, providing the extremum of the objective function (CF). The subject area of such tasks is the processes of operations research (IO), the theory of which has been formed for several decades. In our previous work, we used the symplex optimization method, but the result gave us one result. The simplex method has developed an algorithm for optimizing colors in the production of carpets of a given size, it is advisable to use mathematical programming methods to select the optimal set of colors, which can be done with the least cost and maximum benefit. In this paper, a genetic algorithm for optimizing the colors of the carpet industry is considered. One of the optimization methods is the genetic method. This method has also been considered in the textile and carpet industry. The genetic algorithm is a method for solving optimization problems based on the processes of natural selection (mutation, crossing, selection) and is part of a broader direction of artificial intelligence — evolutionary computing. In a genetic algorithm, each possible solution to an optimization problem is called an individual. Individuals form a population. The task is that in the process of evolution, each new generation of individuals (i.e. solutions to the optimization problem) becomes more perfect. In this work, with the help of a genetic algorithm, we got some of the best options.

The production of natural paints used in the production of carpets is an important environmental problem, the economic consequences of which are numerous and diverse. This article begins with the assumption that reducing greenhouse gas emissions is a necessary policy that must be developed in a cost-effective way. It is well known that market instruments are the best option in terms of economic efficiency. Customer satisfaction can be increased by reducing the gap between what customer really needs (customer requirements) and what manufacturer can provide (product specifications). The approach of Design for Customer where products are generated by translating customer needs into product specifications (in mass production system) or into product variety (in mass customization system) is not able to give optimum satisfaction to all customers. Some customers are still forced to relax their requirements and to accept predefined product in the assortment. This study proposes a new concept of Design by Customer to increase customer satisfaction by opening maximum possible channel for

customers to involve in value creation so that they are no longer only searching for goods but they can also, when necessary, involve in production cycle to specify their own design. In order to ensure the viability of the proposed concept, the integration of multi customer involvement decoupling point, product attribute analysis, crowdscreening and new manufacturing strategy are introduced in this paper. Real products of resin-based table clocks are used as practical example to verify the concept applicability and to demonstrate its merit. Figure 1 presents the block scheme of the algorithm structure.

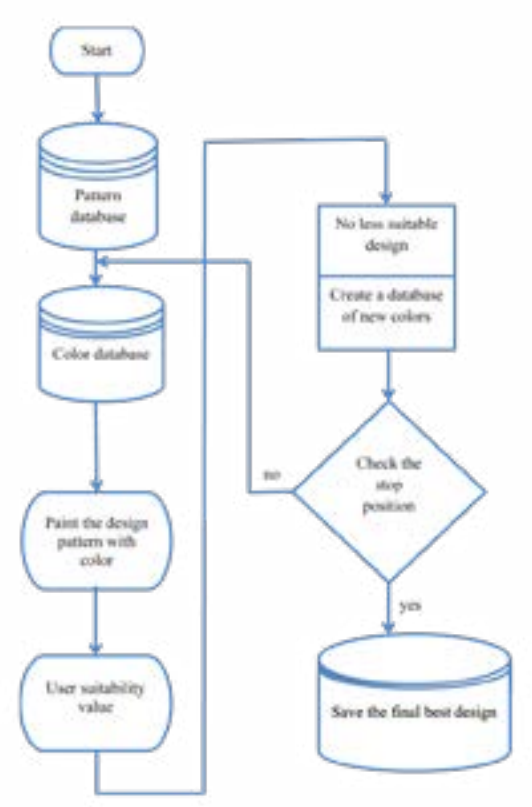


Figure 1 – Operation block scheme of the genetic algorithm

Unlike design chromosomes with the same number of genes, the number of colored chromosome genes can vary and is determined by the color variety of the selected designs. The number of genes is equal to the number of colors of the selected design. The color chromosome has an auxiliary gene that determines the number of colors, or in other words, the number of genes that are destroyed after the formation of the structure of the color chromosome. The genes of the main color chromosomes will have the desired value depending on the number of colors available in the color database. For example, if there are nineteen colors in the color database, the first gene will have a value from 1 to 19 after the auxiliary gene is excluded. The following genes cannot accept the values of the previous genes, since there may be undesirable changes in the design. In relation to the selected chromosome of the pattern, if the pattern was formed from a single pattern, the number of colors on the color chromosome is equal to the number of colors in the first pattern, if from two patterns, then the number of Colors is equal to the number of patterns. Wider color variety. After the auxiliary gene is removed, the limited color chromosomes are sent to the algorithm. The selected carpet design color chromosome and Color Matrix are sent to the coloring function of the selected design, and this feature paints the selected design in different colors and sends it to the fitness function to show the user when evaluating it. Similar to the automatic evaluation section in the design suitability function, similar colors from different generations of the selected design are included in the color suitability function. This function also imposes restrictions

on color chromosome genes for painting images and edits them as needed.

Computational experiment

A fractal pattern of 3 colors of a certain size was selected and the cost of painting the carpet was calculated. The number of each color in the Pascal triangle consists of three colors, for example 63, 78 and 30, here are these unknown price natural dyes our function is blurred in the resulting drawing:

1. Constraints that task variables must satisfy:

$$x, y, z \geq 0$$

$$n = 18(32,98,.....)\text{ line}$$

$$P = 3(m)(2,3,5,7.....)\text{ fuzzy numbers}$$

Target function of the task.

$$F = \sum_{i=1}^{p_1} x_i y_i \to \min.$$

Denote F - income from the sale of carpets, then the objective function of the problem is written as follows:

Thus, the task is to find

$$\min\ F = 63*x + 78*y + 30*z \to \min,$$

under the constraints:

$$11 \leq x \leq 140$$
$$11 \leq y \leq 140$$
$$11 \leq z \leq 140$$

Using the genetic algorithm to solve this optimization problem, it get the following results:

Here we used mutations similar to reproduction, a certain number of individuals are selected from mutants and changed in accordance with predetermined operations.

A mutation was carried out to improve the generation. For each color in the process of solving the problem.

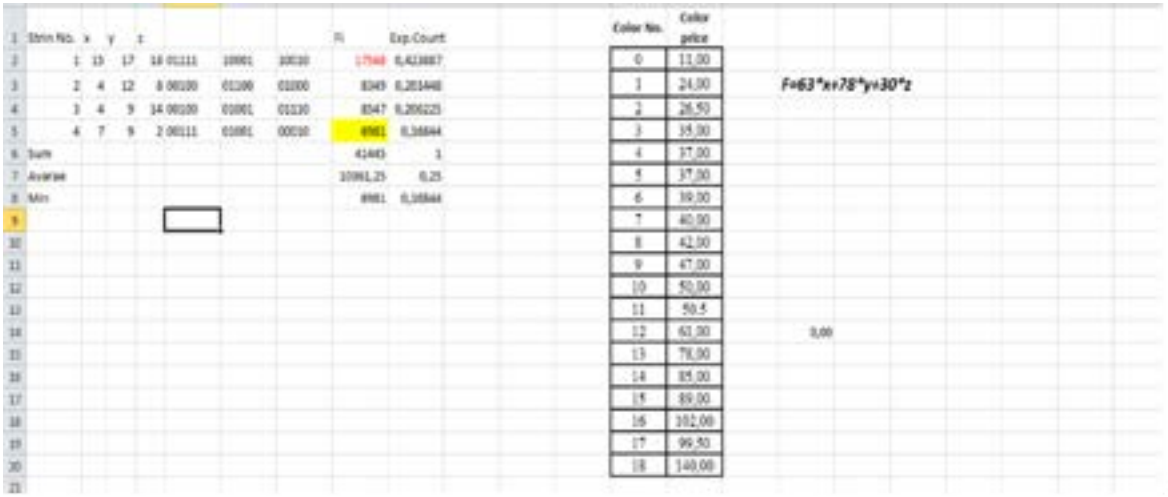
Minimize $F = 63*x + 78*y + 30*z$

over {0,1,2…..18}

Representation: binary code e.g. 00111 for 7
Chromosome length is 5 (10010 is 18)
Population size 4
3 point crossover
Roulette wheel Selection
Randomly generated Initial Population: 1.

String No.	x	y	z	x(2)	y(2)	z(2)
1	15	17	18	01111	10001	10010
2	4	12	8	00100	01100	01000
3	4	9	19	00100	01001	10011
4	7	9	2	00111	01001	00010

Figure 2 – Randomly generated Initial Population



Strin No.	x	y	z				Fi	Exp.Count
	1	13	17	18	01111	10001	10010	17548	0,423887
	2	4	12	8	00100	01100	01000	8349	0,201648
	3	4	9	14	00100	01001	01110	8547	0,206225
	4	7	9	2	00111	01001	00010	6981	0,16844
Sum								41443	1
Avarage								10361,25	0,25
Min								6981	0,16844

Color No.	Color price
0	11,00
1	24,00
2	26,50
3	35,00
4	37,00
5	37,00
6	39,00
7	40,00
8	42,50
9	47,00
10	50,00
11	50,5
12	61,00
13	78,00
14	85,00
15	89,00
16	102,00
17	99,50
18	140,00

F=63*x+78*y+30*z

0,00

Figure 3 – Computational experiment. Selection

	String No.	Mating Pool X	Mating Pool Y	Mating Pool Z	Crossover point	Offspring After Crossover X	Offspring After Crossover Y	Offspring After Crossover Z	X Value	Y Value	Z Value	F	New No.
1													
2	2	00100	01100	01000	4	00101	01101	01000	5	13	8	9675	1
3	4	00111	01001	00010	4	00110	01000	00010	6	8	2	6528	2
4	3	00100	01001	01110	2	00111	01001	01010	7	9	10	7686	3
5	4	00111	01001	00010	2	00100	01001	00110	4	9	6	7167	4
6	Sum											31056	
7	Avarage											7764	
8	Min											6528	

Figure 4 – Computational experiment. Crossover

9													
10	2	00110	01000	00010	4	00111	01001	00010	7	9	2	6981	1
11	3	00111	01001	01010	4	00110	01000	01010	6	8	10	7233	2
12	2	00110	01000	00010	2	00100	01001	00110	4	9	6	7167	3
13	4	00100	01001	00110	2	00110	01000	00010	6	8	2	6528	4
14	Sum											27909	
15	Avarage											6977,25	
16	Min											6528	
17													

Figure 5 – Computational experiment. Crossover

17											
18	1	00111	01001	00010	4	00110	01000	00010	6	8	2	6528
19	4	00110	01000	00010	4	00111	01001	00010	7	9	2	6981
20	3	00100	01001	00110	2	00110	01000	00010	6	8	2	6528
21	4	00110	01000	00010	2	00100	01001	00110	4	9	6	7167
22	Sum											27204
23	Avarage											6801
24	Min											6528

Figure 6 – Computational experiment. Crossover

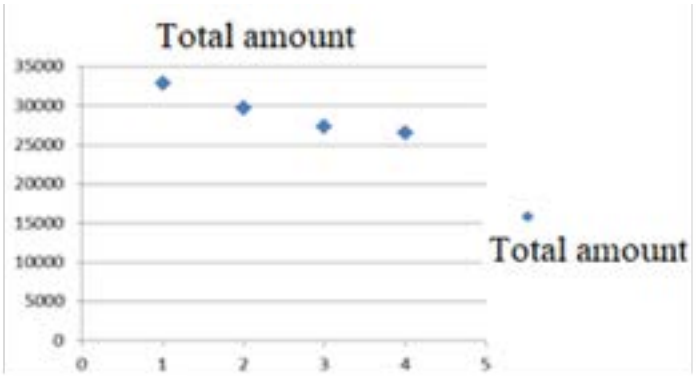


Figure 7 – The average adaptation situation of the generation and the best

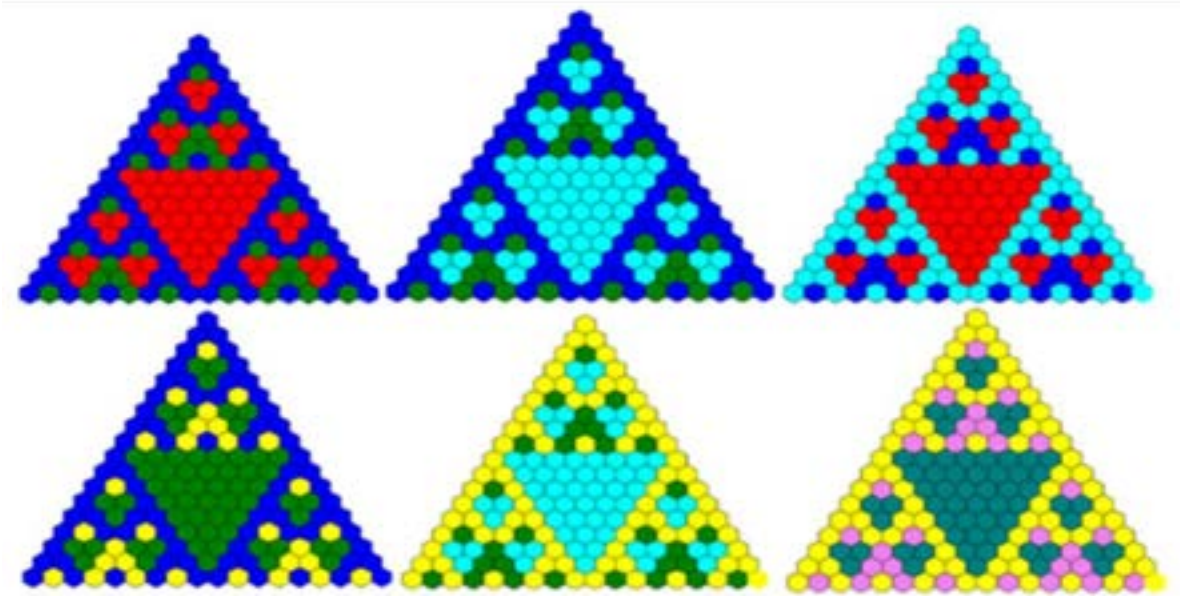


Figure 8 – Images of complex fractal structures based on Pascal's triangle
Mod=3 for carpet obtained from genetic algorithm by optimization method

Conclusion

This article analyzes the basic principles of the functioning of search genetic algorithms, presents the most important genetic operators, models and strategies used in the genetic algorithm. Also, a positive experience of practical application of the genetic algorithm for optimizing multi-extreme functions is considered. Carpets are important both artistically and commercially. Research shows that the initial desire to buy a carpet is based on its design pattern and color composition. Therefore, the developed algorithm has optimal capabilities for design and color optimization. The user interface is a powerful application to extract data and tastes from the user, which can adapt to different postures and experiences. This program can create more beautiful and attractive designs and colors from the user's point of view when creating new generations, and will extract different variants of carpets on demand, reducing the cost based on the customer's demand. Compatibility charts also show improvements in color and design.

References

Dariush S., Mehdi H., Hamed A. and Mohammad Sh. (2014). Jacquard pattern optimization in weft knitted fabrics via interactive genetic algorithm. Fashion and Textiles, pp.1-9.

Darwin C. (2001). Origin of species through natural selection. – St. Petersburg: Nauga, pp. 568.

Gladkov L. A., Kureichik V. V., Kureichik V. M. (2006). Genetic algorithms. – M.: FIZMATLIT, pp. 320.

Goldberg D. (1989). Genetic algorithms, optimization and machine learning in search. – Boston: Addison-Wesley Professional, pp. 432.

Holland J. H. (1992). Adaptation in natural and artificial systems: an introductory analysis, biology, control, and artificial intelligence. – Cambridge: Bradford Book, pp. 211.

Malea C.I., Nito E.L. (2020). Optimization of the technological process and equipment of complex profiled parts. 2020 IOP Conf. Sir.: Mater. Sci. Most. 916 012058. pp. 1-13.

Nuraliev F. M. N.A., Narzulloev O. M. (2019). "Mathematical and software support of fractal structures from combinatorial numbers", 2019 International Conference on Information Sciences and Communication Technologies (ISISST). – Tashkent, Uzbekistan, pp. 1-4.

Panchenko T. V. (2007). Genetic algorithms. – Astrakhan: University of Astrakhan, pp. 87.

IRSTI 06.01.05 https://doi.org/10.26577/FJSS.2022.v8.i2.09

INTRODUCTION OF ICT TO RESHAPE PUBLIC INSTITUTIONS IN RURAL AREAS

B.A. Yakasai
Al-Farabi Kazakh National University Almaty, Kazakhstan
e-mail: Bashirayakasai@gmail.com

Abstract. With the trend in ICT and the Internet in the 21st century, government-related services and public service delivery are becoming more accessible and easier to receive virtually. But the question is - are they available generally in and around the whole appropriate nation or country? Here comes the question this paper sort to answer. The unavailability of ICT in some public institutions in rural areas is still a challenge even as information and communication technology is widely accessible in our current world. Studies prove embracing e-government by various countries is an outstanding accomplishment, but extending this success to remote and rural regions is the prospect of triumph that needs to be worked on especially in the current digital century. Considering the role digital technology is playing in human social life as an essential factor of modernization and a century development. Introducing a wide accessible ICT resources in rural areas could mean a milestone for developing states. Although we may acknowledge some challenges in the process like illiteracy, lack of proper infrastructure and insufficient professionals in the rural areas, we should as well glance at the brighter part that ICT would influence, like some basic social sectors that consist education, economy, health and employment.

Keywords: *ICT, rural areas, public institutions, service delivery, society.*

Introduction

Governments across the globe are developing e-government platforms to simplify public service delivery in various public institutions. Using ICT citizens could easier lodge requests, receive government services or interact with other inter-government agencies accordingly via the internet. It's also through such platforms different public institutions share information and communicate or send vital administrative resources to one another feasibly. Although this is a great development and milestone achieved by different democratic governments, but the current drawback in such merry success is the inability of expanding it to rural communities across the particular country. Even though rural policy development nowadays is the topic of discussion in the government of many developing countries, and their endless effort to end and efficiently support the exact needs and demands of rural societies and their population development in the new era. Rural areas especially in developing countries across Asia, Africa and South America still face challenges in receiving and enjoying public services in spheres like quality education, inadequate electricity, transport infrastructure, communication, health care services, recreational facilities etc.

Wide access to ICT resources in rural public institutions aim to avail the government services to citizens at their village access doorstep. The introduction of Information and Communications Technology has avail a faster and better communication, efficient information storage, retrieval and processing of existing data and exchange or utilization of information to its users, from individuals, groups, businesses, to organizations or other government agencies. In a modern democracy there should be equality in public service delivery between both urban and rural inhabitants. Unavailability of efficient public institutions in rural societies might be seen as a sign of unequal freedom of citizens right. In some countries citizen could access or receive government service they require only by moving to the urban cities or capital of their respective countries. Inter-governmental services sometimes take long to be delivered, due to the fact that it has to be sent to the main office in the city or urban areas and wait for it be back after it has been processed. While practically, introducing ICT resources in public institutions within rural areas could manifest hassle free government services for rural residents. ICTs could also serve as an instrument of civil awareness creation and feedback, giving rural people a voice in national socio-political life.

Furthermore, implementation of ICT in public institutions are not reached to the expected level in the various rural areas of developing countries. Such rural population that live with minimum level

of ICT facilities in their state institutions especially the poorest communities. The role of information and its abundance has revolved the modern societies to informatics societies. It has also changed their industrial economies into economies that relied on information and science. The wide availability of internet and ICT resources in public institutions that operate in rural communities could be a great sign of E-government project completion among developing countries around the world.

Literature Review

Information and communication technologies (ICT) comprise of complex and heterogeneous set of goods, applications and services used to produce, distribute, process and transform information. Hence ICT could be a broaden term and its concepts are evolving. It consists of any product that will store, retrieve, manipulate, transmit, or receive information via electronic or digital form i.e. through personal computers ranging from smartphones, digital television, email, and robots.

Despite the fact that internet and ICT are applied on almost every aspect of our regular and essential activities, the rural societies and local communities around our world are still left far behind in this course. Noticing that ICT is increasing the gap of socio-economic development between the urban and rural societies, but consecutively its filling the loophole in this term. Introducing ICT and its tools to rural areas could end the digital divide created by unfair and unequal distribution of resources within rural and urban public institutions. Such digital divide creates a division and inequality around access to information and resources (Muschert and Ragnedda 2013). One of the benefits of ICT is the ability to improve the asymmetry in accessing information and so better manage the principal-agent problem (Gurubaxani and Whang 1991). Similarly, the availability of ICT in the rural communities lay the foundation of efficient public service delivery, citizen to government interaction and responsive and equal democracy.

Methodology

The paper was developed based on an extensive review of relevant theoretical literature. Data sources garnered consist of internet resources, published academic papers, academic journals and reports. Although the study is conceptual and explorative in nature, it sought to identify the essential factors that could help to understand the importance of applying ICT resources to institutions in rural regions in developing countries.

Results: availability of e-government services across rural communities

In most rural areas there tend to be lack of economic and social development and sometimes even high rate of poverty. The poverty could adequately be dealt with through the effective usage of e-governance and ICT application in social management. A better governance that utilize ICT can have a direct impact in reducing poverty and introducing the social development desired. Availability of ICT applications in public agencies could give easy access to all government services to a lay man in his locality, through regular service delivery locations. Nowadays Information and Communication Technologies (ICT) are widely used by the governments to deliver its range of services at the locations most convenient to the citizens. This proves that if such services could reach the typical rural resident it could bring a great ease for them in regards to accessing government services and acknowledge government effort in establishing citizen democracy, through the utilization of ICT in providing better and affordable connectivity and by processing request and solutions. For instance, computerization of land records could be a great development in application of ICT in rural development. Land record applied with other contemporary socio-economic initiatives and their revision and update are necessary for identifying the changes in rural social dynamics. As land record is one of important parts of rural development. Another essential tool that might impact rural resident lives is introduction of online personal identification program that could easily identify government service requestor and simplify communication and modification from his previous service requested. Furthermore, ICT can contribute in an outstanding way, by making government services more efficient and effective, as it encourages communication or information sharing among rural and remote residents to reach the central government through an easy process and by accessing institutions around their local areas.

Rural data capturing and information and communication sharing

Citizens engage with the government on various issues, at both individual and at the community level, to lodge complaints, or express their dissatisfaction, request services, and influence policy. Previously,

governments at different levels made efforts to share information to engage with the citizens, but most attempts were not successful. In recent years likewise, several governments of developed countries have created websites to share a portion of the data they collect. This is a concept for a collaborative project in municipal government to develop and organize a culture of open data and open government data. Using the rural data can improve the citizen's engagement in government initiatives and simplify government projects especially those that require sample data or open data. In addition, usage of websites to receive the particular information a citizen needs can be a milestone reach for rural residents. For the citizens, not only the presence of a webpage of a particular government body or agency is needed, but also the content of the appropriate web page is of great value. Meaning that any information on a government web page should be accurate and must also cover relevant questions or problems. By this, citizens could use information profitably and save themselves time dealing with government. (Mirko Vintal 2001*)* found that possibilities are not provided equal for all citizens with regard to their respective place of living, because particular government agencies are differently presented on the Internet. Many municipalities (62%) while administrative districts (50%) do not even have web pages at all. ICT application could provide the government with rural resident's data through its public institutions and this is also a priceless tool that would help the government in easy citizen communication and information sharing, or government to citizen interaction. Such initiative would be used by the government to share vital and essential information to people in rural areas, while the citizens could submit their requests, or receive information they need at an instant phase.

Internet resources in state educational institutions in rural communities

ICT is an effective tool to lay outstanding change and development in traditional education system. The use of ICT in education improves the quality of teaching and learning also free the access to education. The implementation of ICT into education aims to raise the quality of teaching and learning process, and as well to justify the democratic citizen rights of rural habitants. Additionally, high restricted access to education particularly for rural women would be reduced through the introduction of ICT, and relevant to this context will decrease the gender gap of ICT skills and knowledge. The global introduction of e-learning should be the real necessity for the implementation of ICT tools in rural public institutions. Opportunities provided by Internet-based learning resources in the developed world could undercut the achievements made by rural in their participation in education in particular with rural residents being left behind, this discourages their efforts in education area. The economical production of digital media and access to digital services, using very low marginal costs, would provide scaling up specifically in developing countries across Africa and Asia. By defining the target markets and implementation, governments can disburse IT resources in rural educational institutions at relatively low cost.

Considering the present global trend of e-contents learners are attracted to advanced learning resources like multimedia presentation and animation. The internet also introduces the trend of e-study, availing materials such as online courses and distance education i.e Moodles that gives the rural inhabitants the opportunity to learn irrespective of their geographical location.

ICT application in health care institutions in rural areas

Health care system is one of the major factors and initiative that a promising government focuses on and spends a huge part of national budget on. Although most times rural communities are usually considered late comers to receive the benefits of proper health care from the particular government. Reasons as to why we should apply ICT usage in rural health care system are; to improve or contribute to general social health status, prevent outbreak of new diseases, raise rural life expectancy and prevent sudden deaths. A research by Medline Plus shows that the healthcare needs of individuals residing in rural areas are different from those in urban areas, as rural areas often suffer from a lack of access to healthcare. Developing countries apply ICT tools to remote areas for consultation, diagnosis or treatment. ICT could also be an effective tool in establishing a medium for rural people to access health related information. Addressing critical medical needs, lack of qualified medical professionals and inefficient medical services in the rural communities is achievable through a proper implementation of ICT. The introduction of telemedicine services could enable proper access to professional doctors via web camera irrespective of the geographical location of the patient. In addition, health care web or mobile applications can help health practitioners to maintain medical record and patient database, commu-

nicate hassle free with state/regional health centers for swift delivery of health services and resources throughout rural areas.

Rural economic development

As access to information is a basic necessity in economic development, and so information and communication technology could play a great role in connecting the rural inhabitants with the outside world. Rural communities and remote areas have already been lagged behind in economic development such as labour market, agricultural development, infrastructure and poor economy scale. These in return has result to low per capita, rural-urban migration, and unemployment in the rural regions. Some of the major reasons to such development gap affecting rural areas are; lack of communication, low access to customers, unavailability of business suppliers and services and insufficient infrastructures (Riggs, 2011). It has been stated that ICT in rural areas is highly relevant to improving the competitiveness of agriculture and forestry and improving the quality of life as well as diversification of the rural economy (Commission of the European Communities Secretariat, 2009a). Providing the relevant ICT tools in rural areas would stimulate the rise in creating new businesses and opportunities to manage the existing small scale enterprises. Such tools improve income generation and build line to concrete economic development. Furthermore, communication channels can unwrap a new way for reaching government economic initiatives like loans for new businesses and transaction between businesses and consumers as far as new infrastructures are concerned.

Employment and labour market

Through the branch of ICT, we can open new horizons for rural people and give a way especially for young people to participate in labour market. Relatively, such individuals may be restricted by the high search cost and reliable job hunting platform. Women could also be blocked by social constraints in the field of employment, but if a concrete ICT tool is erected in rural institutions it could pave an easy path for an effective labour market that virtually enables job advertisement, application process and candidate interview or communication with employers. Thus, ICT is an agent of employment and generation of more direct income to the remote communities, talk more of small enterprises and private business whose potentials are higher in this sphere to the extent that they may source for labour locally, sell their products or advertise their services even thousands of miles away.

Public service delivery in rural areas through ICT

Nowadays when we talk about public service delivery we primarily refer to electronic government. Electronic government services are one of the key performers of electronic democracy. Today, there are series of electronic government services, that offer citizens a new way of accessing information, new possibilities of communication with central and local government and new forms of cooperation in their strategy or policy formation (Mirko and Mitja January 2001). It is important to understand the wide potential of deploying ICT to improve service delivery. It is equally important to understand the challenges in harnessing such potential by identifying the critical success factors for wide-scale deployment (Bhatnagar March 2014). By applying ICT in public service delivery across rural regions we could achieve gender equality and equal citizen participation in government services and public life in particular. As prescribed in this paper above, if the state could establish proper ICT tools in institution located throughout the various rural areas, it would impact large aspect of rural people's lives and bring the modern change desire in improving quality of life.

Results and discussion

Availability of ICT tools in rural schools and education centers signify the potential of achieving quality education in reference to teaching and learning process, with simplification of teaching, learning and evaluation within excellent education management. And so, improves the quality of knowledge shared at both urban and rural societies. Nevertheless, a few portion of digital development has reached some rural regions across developing countries in Asia, Africa, and South America, we can't brag on the fact that ICT is yet to reach the desired prospective level. Hence, we may say that is due to the reason that there are some potholes on the way to achieving a such milestone. The challenges being faced toward the smooth application of ICT in rural areas may include the following:

1. Connection: already most remote areas are lacking internet and power connection required. The limited power supply is a hindrance to ICT wares since most of the tool's essential working condition is a reliable power supply, followed by internet connectivity in some cases.

2. Resources: basically, some rural communities lack the modern technology and sophisticated resources needed in this case. In some cases, there might be poor infrastructure or outdated tools due to the fact of underfunding.

3. Inadequate professionals: The unavailability of required experts that would lead the relevant project is a serious challenge against the introduction of ICT in rural societies. Unlike the urban regions where real specialists are in abundance, in most rural areas availability of experienced personnel is a real trial.

4. Skills: The reality that ICT involves skills and applicable language which at some point might be English, ought to restrict the opportunities of rural residents in terms of access to information. The broad illiteracy rate in rural areas is a true fact we can't deny as a real challenge to social development, exceptionally digital modernization.

Conclusion

Creating an information rich society is a mountainous achievement towards national development. Although ICT alone cannot solve all societal issues, but it's presence in our rural communities is an objective that is inevitable. As this paper prescribed how prime introducing ICT to local areas is, we must think deeper on how to bring our imagination to reality in attaining the average digital development we require in our rural districts. Not only for social benefits, but glancing through economic perspective, governments should perceive the gain in establishing ICT in rural communities. However, governments should support ICT education in those local regions and understand that it can improve the quality of life and develop the economy by producing vast opportunities and be a means of poverty eradication. Procurement of modern infrastructures has to be equal, and extend resources distribution to locales residing in rural regions. Moreover, governments need to recognize the advantage of such technological policy not only for citizen's sake but how easy it could be for the government to reach the average rural population and communicate or share new policies. The effort government and some civil groups are making should be continued and set a target to achieve, perhaps starting late is better than staying redundant in the current poor situation. As acknowledged by a report from the (World Bank, May, 2014) ICT sustainability could be improved with greater long-term rural ICT interventions. As in creating greater use of partnerships or even shifting the obligations of telecommunications operators from infrastructure deployment to operations. In particular, libraries are logical partners for rural informatization with their community-based infrastructure.

References

Alain de Janvry and Elisabeth Sadoulet (2008). «access to land and development,» The New Palgrave Dictionary of Economics 2nd Edition.

Alenio M.S (2011) The Challenges related to ICT Development in Rural Areas Case study: Village introduction of ICT.

Ankitta G. and Gauataam S. (Nov. 2017) ICT for Rural Development: Opportunities and Challenges. International. Journal of Information & Computational Technology, Volume 7, Number 1 2017, pp. 13-25.

International Journal of Computer Science and Applications (May 2009) ICT: A Tool for sustainable Rural Development Vol. 2, No. 1, April / May 2009.

International Journal of Computer Science and Applications ICT: A Tool for sustainable Rural Development Vol. 2, No. 1, April / May 2009.

Kuruksshettra K. (2018) The Gists: Role of ICTs In Rural Development, pp. 23-34.

Maxwell C.C Musinga and Shupikai Z. (2014) The role of information and communication technology in rural socio-economic development in Africa. International Journal of public policy and administration research, 2014 1 (2), p. 38-46

Mirko V. and Mitja D. (2001) The use of ICT in the public sector and its influence on communication with citizens in Slovenia. Conference Paper. January 2001.

Muschert & Ragnedda M. (2013). The digital divide: the internet and social inequality in international perspective Routledge.

Nirajj K.R (2012 Oct) ICT Enable Rural Education. an International Journal of Information and Educational Technology.

Ozdamli, F. and Ozdal, H. (May 2015). «Life-long Learning Competence Perceptions of the Teachers and Abilities in Using Information-Communication .Technologies»

Procedia Social and Behavioral Sciences.

Rural Area https://en.wikipedia.org/wiki/Rural_area Retrieved (Nov 2022).

Nayak S.K. (2009) ICT: A Tool for sustainable Rural Development International Journal Of Computer Science And Applications Vol. 2, No. 1, April / May 2009 ISSN: 0974-1003

Shruuti S.A and Aditi R.N (2007) ICT Needs and Implementation for Rural Development, Review. Journal of Scientific Research, Science and Tech., Volume, 9, Issue: 5, 602 2007.

Content

EDUCATION

ECONOMICS AND MANAGEMENT

INTERNATIONAL RELATIONS

DIGITALIZATION AND INDUSTRY 4.0