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Comparative Analysis of the Transition to an Innovative Economy in Developed Countries

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Abstract*--This article is comprehensive, exploring the innovative development model of Switzerland, Sweden and the Netherlands.*

The purpose of the study is to:

- to study the Swiss innovative model of development and its features;

- To analyze the conditions of development of innovative economy and trends of state support in Sweden;

- To analyze and study the specifics of the industrial innovation policy of the Netherlands.

The study concluded that:

- The state must be the main reformer in the innovative development of the country;

- Innovation related to production activities;

- Innovative activity and parallel financing of business;

- The existence of attractive tax policy in the country is the main stimulus for innovation.

Keywords*--Switzerland, Sweden, Netherlands, Innovative Economics, Innovation Policy, Manufacturing, Business, Tax.*

I. INTRODUCTION

In the 21st century, the term innovation has become increasingly important in both developed and developing countries. For developing countries, the use of ideas and technologies introduced in developed countries in industries and sectors of the economy is an innovative activity, whereas for developed countries, innovation is a product and technology that has no analogues in the world economy.

Robotics, nano and bio technologies, algal technologies are a major part of the economy of modern developed countries.

Modern industrialized countries operate within the framework of the "Industry-4.0" project and integrate the innovative economy into this program.

As you know, there have been three industrial revolutions in history that are linked to:

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1. The invention of the steam engine, the mechanization of production (the end of the eighteenth century);
2. Electrification, conveyor, division of labor, mass production (end of XIX - beginning of XX century);
3. Electronics, IT industry, automated production (end of 20th century).

The development factor now known as the Fourth Industrial Revolution is through the deep integration of information technology into the industry ("cyberspace systems" or CPS).

The term "Industry 4.0" appeared in Europe in 2011 and was widely used by the German government in the development of information technology at one of the industrial exhibitions in Hannover.

For this purpose, a special team of officials and experts has developed a strategy for transforming German industrial enterprises into "smart" ones. In other words, other countries have embarked on the introduction of new technologies, and now the idea of "Industry 4.0" has begun to conquer the world.

Industry 4.0 is the introduction of the Internet of Things factor. To illustrate this in an industry example, imagine a device that receives the software needed for the workflow from the network itself, analyzes its obsolescence, quickly orders parts from the repository, and operates independently to improve its performance. may also be used. In agriculture, soil sensors automatically control the irrigation of land according to the weather. There are many such examples.

The key feature of Industry 4.0 is that other systems and systems for achieving a specific goal, with a significant reduction in human interference in the operation of all components of the manufacturing process (enterprise equipment and its information systems - warehousing and logistics, accounting, management, etc.). interacting with people.

Implementation of the principles of Industry 4.0 will help to achieve a number of advantages that are not common in traditional industrial models. For example, companies can customize their orders according to customer preferences.

Older factories and factories are now becoming "smart" companies, and they are starting to produce a lot of products based on specific orders. At the same time, the cost of producing a single product is reduced, and companies have the opportunity to produce a unique product, which is set at a standardized standard product.

For example, you can download the Nike app on your mobile device from anywhere in the world, or go to the company site, choose a sneaker model, paint your favorite football team, pay for it and receive it in a few days. Except for the cost of delivery, its value will not be less than that of the company's popular sneakers.

Engines, servers, and more can be manufactured according to individual orders. The Fujitsu Siemens factory in Augsburg, Germany manufactures computer systems and servers for a specific customer.

Ultimately, the cost of an automated enterprise does not increase the cost of an individual product - if previously two pairs of crushers had to be manually adjusted, now the computer system would do it within minutes.

The first result of the Fourth Industrial Revolution is the huge income gap between the winning countries and the losers.

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The purpose of this study is to explore and analyze the ways in which the industrialized countries came to this industrial revolution with the support and tools of the state, thus developing proposals for shaping the modern stage of innovation policy in Uzbekistan.

II. RESEARCH METHODOLOGY

In the process of the study widely used and widely used such methods as analysis and synthesis, induction, deduction, grouping, digital technologies in foreign countries, their introduction and experience of state stimulation.

Economic and mathematical methods were used to draw conclusions on the topic and to ensure the accuracy of the results.

III. THE DEGREE OF STUDY OF THE SUBJECT

Trends in innovative economies in developing countries and the factors influencing them are reflected in the research of many economists.

Dina M. Abdelzacher & Alexey Martynov & Endji M. Research by Abdel Zaher (1, Dina M. Abdelzaher, Alexei Martynov, Angie M. Abdel Zaher) shows that the development of innovation affects export and production, but climate change has a negative impact on innovative research, and this also affects the country's economic development. .

Research by Adina Letiția Negrusha & Rosalia Veronica Rus & AvrelianSofică (2, Adina Letiţia Negruša, Rozalia Veronica Rus, Aurelian Sofică) investigated the importance of clustering in the country's innovative development. The development of communications between production and production infrastructure as a result of clustering has been explored.

Despite the weight of scientific research on this topic, there is little research on the policy of innovation development in Switzerland, Sweden and the Netherlands. This is the relevance of the topic.

IV. ANALYSIS AND RESULTS

According to the Global Innovation Index in 2019, the top 5 innovative countries of the world include Switzerland, Sweden, USA, the Netherlands and the United Kingdom.

Each of these countries has its own innovation policy.A characteristic feature of the Swiss economy is the dominance of market laws and free competition with minimal government intervention in economic life. These constants of the Swiss economic system, in many respects predetermined the features of the Swiss NIS, the role and functions of its key actors. The participation of the Swiss federal government in the innovation process is small. Its main task is not to increase investment in research and innovation at the expense of budget expenditures, but to create and ensure framework conditions favorable for the development of the innovation process. In particular, it is about creating such a legal and institutional environment in which direct generators of new ideas, technologies, products (individual inventors, entrepreneurs, business entities, etc.) could receive competitive advantages and corresponding returns from the actions taken.

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The federal government takes the bulk of the costs of creating infrastructure, financing school and university education, training qualified personnel, financing basic science, providing indirect financial support to individual researchers and teams in implementing innovative projects through government funding agencies in the form of grants, etc. In general, the proportion of the Swiss public sector (federal government and cantons) in financing domestic the cost of research and innovation is 24.1% or 0.8% of the gross national product (one of the lowest among developed countries). Allocations from the federal budget go to research at universities (66%), public research institutes (4%), non-profit research organizations (8%), to support research through the EU framework programs (21%), etc. Research and innovative projects in the private sector does not actually receive funding from the federal budget. This is due not only to the dominance in the Swiss economy of the principles of free competition and minimal government interference in economic life, but also to the extent of state ownership. The latter is represented by a small number of objects of important public importance, where the state is the full owner or majority shareholder (national bank, post office, railway network, main communications operator, etc.). In industry, state ownership is practically absent.

Support for research in the private sector from the federal budget is possible only indirectly in the form of co-financing research projects carried out by grants by universities with the participation of researchers from private firms. Funds from cantonal budgets almost completely go to finance university education and university research (98.5%), the remaining small part to support research and development carried out in the format of partnerships between universities and private business. It is important to note that the cantonal authorities have great authority in using budget funds, and independently allocate more than 2/3 of their budget to the development of their regions.

The main conductors of the scientific, technical and innovation policy of the state in Switzerland are the relevant units of the federal departments (ministries), as well as formally independent federal agencies that provide financial support for research and innovation on the basis of competitive selection of projects submitted by applicants. These federal agencies are the Swiss National Science Foundation and the Technology and Innovation Commission.

The Swiss National Science Foundation supports the priority areas of basic research in various academic disciplines (from history to mathematics and medicine), the results of which expand and deepen the accumulated scientific knowledge, but have little (or no) commercialization potential.

The second institution, with the help of which the state pursues its scientific and technical policy and provides financial support for innovation, is the Commission on Technology and Innovation (KTI). Unlike the Swiss National Science Foundation, this state agency conducts competitive selection and provides financial support for applied research projects focused on the commercialization of results. Start-up projects, projects in the field of the use of renewable energy sources and environmental technologies, as well as technology transfer are also supported. In 2016, KTI supported 161 innovative projects, providing grants equivalent to approximately $ 235 million. Of the total, 82% was allocated to support applied research projects in the fields of micro- and nanotechnology, engineering, biotechnology and pharmaceuticals; 12% was allocated to projects on the use of renewable energy and environmental technologies, startups and technology transfer projects also received financial support. One of the

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conditions for supporting a project from KTI funds is the participation of at least one private sector enterprise in it, interested in the commercialization of project results and committed to co-financing the project by at least 50%. Thus, using methods of indirect regulation (through project financing and mandatory co-financing schemes), KTI, in addition to coordinating and financing innovative projects, contributes to the development of cooperation between science and industry. It is significant that Switzerland ranks first in the global index of innovation in terms of the indicator of scientific and technical partnership between universities and business.

An important factor in the innovative activity of the Swiss business is a fairly simple, transparent, private-friendly tax system. Unlike most developed countries, the Swiss tax system does not use special tools to stimulate the innovative activity of enterprises. It is assumed that the necessary and sufficient incentives for innovative activities of enterprises are ensured by market laws and free competition with minimal government intervention in the economy, and the provision of tax benefits and preferences to certain categories of business entities deforms the pricing system, undermines the principles of free competition, and violates the functioning mechanism of a market economy. At the same time, taxation of profits of enterprises in Switzerland for many years remains one of the lowest among developed countries. In 2018, the total corporate income tax (including cantonal and federal profit tax rates) is 17.77%, providing entrepreneurs with the conditions for optimal decisions on the use of funds for investment, research and innovation (3, Klavdienko, V.P.).

Table 12019 Leaders in Innovation Implementation (4, GLOBAL LEADERS IN INNOVATION 2019)

High-income countries	**Middle-income countries**	**Low-income countries**	**Low-income countries**
Switzerland	China	Vietnam	Rwanda
Sweden	Malaysia	Ukraine	Senegal
USA	Bulgaria	Georgia	Tanzania
Netherlands	Thailand	India	Tajikistan
Great Britain	Montenegro	Mongolia	Uganda

As for Sweden, the task of its innovation policy is the sustainable development and formation of a competitive socio-economic system. The bulk of government-funded R&D is carried out at universities and universities. Sweden's innovation infrastructure is made up of the organizations listed in table 2. In addition to these organizations, Sweden has an extensive network of private and public organizations collaborating with academic institutions. Their goal is to develop new types of products and services that will create the basis for sustainable economic growth. These are organizations such as:

• Innovation Bridge - supports the commercialization of the results of intellectual activity;
• ALMI Business Partnership - supports the creation of a business;
• Industrial Fund - is a state venture investor.

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Table 2 Innovation system of Sweden (5, Udaltsova, N.L)

Organization	**Promotion**
Swedish Scientific Council	Basic research support
Swedish Scientific Council for the labor market and social sciences	Engaged in research supporting global well-being, healthcare, social services, the labor market and related working conditions.
Swedish Scientific Council for Ecology, Agricultural Sciences and Regional Planning	Issues of ecology, biology, geography, communal planning, construction and architecture, land and water management, conservation of cultural property

Currently, the Netherlands has 9 sectors with the greatest innovative potential:

- agro-industrial complex;
- crop production;
- high-tech materials and systems (Brainport port, nanotechnology, automotive, aerospace, agrotechnical sector, security systems);
- energy (sustainability of energy systems, integration into the international market for electricity supplies);
- logistics (development of nodes included in the international supply chain, innovative aerospace transport systems, innovative freight transport; development of the infrastructure of the ports of Schiphol and Rotterdam);
- creative industry (architecture, fashion, industrial design, media);
- Biotechnology and biotechnology (vaccination and diagnostic systems, pharmaceuticals, biomedical materials, disease prevention systems, the creation of the Bio Science Park complex in Leiden);
- chemistry (petrochemistry, production of basic chemicals and fine chemicals);
- water supply (construction of coastal facilities, protection of water resources and water treatment).

Strengthening the involvement of representatives of the industrial sector in the implementation of the new industrial policy. To do this, the initiators of the changes that will form the basis for the formation of a new industrial policy should be the enterprises themselves.

State financing of innovative projects on the principle of "minimal intervention". In other words, only the function of choosing industrial sectors to which support will be directed, but not innovative projects, should be assigned to the state. The logic of this measure is as follows: since the state does not have effective mechanisms for identifying promising innovative projects, it is more expedient to provide a grant to the company, the innovator, which will independently choose the object of financing.

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For the success of innovation policy, according to Shokh, the most professional managers of the industrial sector, politicians and representatives of the scientific community should participate in its development. In order for the created tools to be effective, all members of the group must have an agreed opinion on the areas being formed. Without this unity, says Schoch, innovation policy is unlikely to be effective.

Among other measures designed to increase the innovative activity of companies, the speaker noted:

- a significant reduction in the tax burden for innovative enterprises;
- removal of administrative barriers and simplification of regulatory procedures for innovative companies;
- increasing the subsidization of innovation of small firms (including those not related to nine priority sectors);
- promoting intensive staff development;
- stimulation of international cooperation in the field of innovation;
- Formation of a system of innovative contracts between the industrial sector, research institutes and government bodies;
- Creation of conditions for participation of applied research institutes in innovative contracts.

TNO is an important actor in the "golden triangle" (industrial sector - state – research institutes) of the innovation economy. Currently, the company's activities are aimed at solving a number of problems, including:

- cooperation with state bodies, industrial enterprises and public organizations on innovation policy issues;
- Applied research under the contract;
- granting licenses for patents and specialized software;
- testing and certification of new products and services;
- expert evaluation of innovative projects (7, Yanik Andrey Alexandrovich& Popova Svetlana Mikhailovna).

It should be noted that the Netherlands is the only country in the world in which the Ministry of Defense does not carry out research for military purposes on its own, but only finances. The contractor is TNO.

The eighty-year history of TNO is a series of ongoing transformations. The company has gone from a large public institution to a research organization that receives funding from a variety of sources. In the 1960s and 1970s, it consisted of 4 separate organizations, each of which conducted research on a separate topic (defense, industrial development, healthcare, the country's food system). In the 1980s, individual organizations within TNO were integrated into a single company, including 15 research institutes, managed by the Supervisory Board and the Board of Directors. State funding was reduced, more and more funds the company received from private sources. In the 1990s, the course towards decentralization of management continued. TNO's working style has also changed - the company has reorganized its activities in accordance with market demand. In the 2000s, there was a unification of the thematic areas in which research was conducted in 7 large "central areas" (core areas). Further changes are associated with increased flexibility of the studies and their relevance to market demand, as well as increasing internationalization and strengthening the position in the international market.

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V. CONCLUSION

In conclusion, we can say:As we have seen in the experience of developed countries, the innovative development of the country depends, first of all, on the policy pursued by the government and on the sectors and sectors that are supported. In the Netherlands, for example, 9 sectors and industries are currently supported by the state. Subsidizing innovative activities and providing tax breaks is a key area of the country's innovation policy.

In Sweden, state-owned funds play an important role in the implementation of innovative activities, and parallel business and innovation support.

In the innovative development of the country the infrastructure of innovative activity is also practical. In Switzerland, for example, the Technology and Innovation Commission operates and co-finances research activities in institutes and universities.

An attractive and liberal tax policy is one of the factors that directly impact the development of innovation in developed countries.

Another important factor in the innovative development of developed countries is the close link between scientific research and production. This can be seen in the Swiss and Dutch experience.

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