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**TECHNOLOGICAL REVOLUTIONS AND ECONOMIC
EDUCATION FROM THE HISTORICAL PERSPECTIVE**

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Abstract

This article looks at the history of higher business schools in the late Russian Empire and identifies specific characteristics that are common to European, American and Russian business education. On the basis of these characteristics, growth of the economic education in the 19th century is considered as a process depended on the principals of technological revolution. Noting the features of economic development in the 19th century, the authors have come to the conclusion that the first educational professional and economic institutions were formed as experience of risky business under the conditions of absence of demand for experts from the industrial sector and lack of ample opportunities of financing in the context of the first technological revolution. Wide expansion of educational institutions took place in the conditions of the second technological wave (from 1890), activation of the state's attention to the issues of professional education and in presence of sustainable opportunities for public financing. At this time in the West, the main models of economic education were already determined. Russia studied the European and American experience and found itself in the conditions of choice of the most preferable model to the Russian conditions. The problem of choice of this model has generated a public and scientific discussion on economic education, which demonstrates different views on the prospects of economic development of the country in general. In a final step, a closer look is taken at how Russian business schools should prepare their students for the unique Russian economic context.

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1. Introduction

The economic literature seems to pay less attention to business education in historical perspective than would be warranted by its profound effect on economic growth.

The sphere of economic education can be considered as an independent structural unit of the modern society. At the same time, it represents an element of other, larger systems – economics, society, culture, policy, ideology, and science. Any change in these larger systems inevitably influences on education and business education.

Currently the power and the society give the first place to the research and educational system. It is represented as a key development element of all these difficult systems, a development driver of a new economy.

In this article, we distinguish the line of interaction between education and the economic system. Within the study on the interrelation "economy - business education" can be allocated different aspects. For example, public and private financing of business education, the theoretical content of education, organization of the educational process, ratio of fundamental and applied training, contacts of the education system with real production, compliance of the educational system to technological requirements of production. Important issues of scientific and practical property in relation to reorganization and transformation of the educational system arise in the conditions of technological transitions.

Consequently, technological revolutions and technological transitions exert influence on change of the educational system, processes of correction of the educational content, on dynamics of creation and opening of new educational institutions in general, new specialties or profiles of training.

These processes are studied by us on the materials of a long 19th century (1789-1914), where the first and the second technological revolutions and three leading technological modes for that period are "fit into" (see Table 01).

Table 01. Evolution of the technological modes and their expansion in Russia (Adopted from Semenov & Matveev, 2013; Perez, 2002)

Technological mode	1	2	3	4	5
Name of the historical period	Industrial revolution	The epoch of steam and railways	The epoch of steel, electricity and heavy industry	The epoch of oil, automobile and mass production	The epoch of information and telecommunication
Period of expansion in the Western Europe	1760(70) – 1830-40s	1830(40) – 1870-80s	1870(80) – 1920-30s	1920(30) – 1970-1980	1970(80)– 2020-2030s
Period of expansion in Russia	1830(40)– 1880-1890s	1880(90)– 1920-1930s	1930 – 1970-1980s	1970(80) – 2020-2030s	
Branch – Technological core	Textile, textile mechanical engineering	Steam-powered transport, transport engineering	Electric power industry, electric power engineering	Nonferrous metal industry, light-weight heatproof alloys; military chemistry, radio-electronic industry, space mechanical engineering	Telecommunications and information technologies

In the 19th century the economic development of Russia had pronounced features: local development of the market relations in the conditions of the serf economy predetermined absence/narrowness of the market "thinking path". While in the Western Europe in the 18th century there was already the capitalist production, and the market outlook was quite developed, in Russia entrepreneurship in all its sides only began to form. Another peculiarity is connected with the time shift of the industrial revolution in Russia towards 1-2 generation (Gregory, 1980, 2003; Gatrell, 1981, 1986) and compression of the "Large wave" between the first and the second technological revolutions.

The private initiative supplemented the general development line of the educational system. On the "Large wave" of the second technological revolution, the interrelation between economic development, education and the state participation became so obvious that it turned a subject of reflection of the scientific community. By that time, in the Western Europe there were already different approaches to arrangement of higher economic education, and the Russian Empire faced with a choice of possible alternatives. Discussions were revolved around the national educational systems, the ratio of academic and fundamental courses of study, the duration of training and the extent of specification and profilisation of professional education. In this regard, considerable discrepancies have arisen in understanding of tasks of the higher school and the competences of its graduates.

2. Problem Statement

In the western literature, the issues of interrelation of business education and technological revolutions are considered in detail (Korpiaho, Päivi, & Räsänen, 2007; Amdam, 2008; Hof, 2017; Holowchak, 2017). According to the authors, the most attractive one is the conception of "Large waves" of Carlota Pérez, who explains transformation of political and social institutions of regulation of the productive and economic sphere through the prism of change of the technological modes (Perez, 2002, 2009). The conception of "Large waves" in relation to the turn of the 19-20th centuries gives the chance to consider changes in the higher educational system of the Russian Empire as an element of the process of formation of the industrial society and modernization in a broad sense. According to Carlota Perez, "the 'belle époque' based on the unleashing of full potential of the third paradigm, with its truly international markets, required world-wide regulation (from the general acceptance of the London-based Gold Standard to universal agreements on measurements, patents, insurance, transport, communications and shipping practices), while the structural changes in production, including the growth of important science-related industries had to be facilitated by deep educational reforms and social legislation." (Perez, 2002, p. 24). "The range of institutions engaged in education – from public to private – needs to be much more diverse and to involve a blending of the traditional dichotomy between education and training" (Perez, 2013, p. 18). Education should become a diverse, dense and gigantic industry spanning from the local to the global (Perez, 2013).

At the same time, the time gap between two technological revolutions in the industry was very short in the Russian Empire: in the 1880s the industrial revolution (the steam revolution), which found reflection in the industrial upsurge of the 1890s, ended and almost at once the industrialization started, which was supported by the state program of Sergey Witte. The program of industrialization assigns a

task - increase in investments into the industry (including, mechanical engineering) - as a priority one due to inflow of the foreign capital, expansion of taxable base and the capacity of domestic market.

Another aspect of interrelation "economy – education" is presented in the works of Robert Locke. He explains the lag of rates of industrialization in Great Britain and France in comparison with Germany of the end of 19th – the beginning of the 20th century by the fact that in these countries entrepreneurship is poor. Its decline was the result of lag in development of engineering sciences and business education (Locke, 1984). According to Locke, successes in business and technological education provided the economic recovery of Germany at the end of the 19th century. He assigns the most important role to the golden age of business school and academic study on management of the economy between 1880s and 1940s in development of the economy.

According to Locke, well-trained engineers and business managers with good knowledge of accounting were leading experts in such capital-intensive industries as oil processing and electrical equipment. In his opinion, the company's supervising manpower needed advanced business methods in order to correspond fully to the challenges of the technological revolution (Locke, 1984). Business managers came from the business schools which gained in prestige and influence after the turn of the century. In Locke opinion, "whereas American business-school reformers promoted general management education and moral instruction for the benefit of a professional managerial class, German professors of business economics (Betriebswirtschaftslehre) created systematic knowledge in order to make the management of firms more efficient" (Wilson et al., 2008, p. 337). According to Locke (1984), by contrast with German, British and French systems of business education were not ready for the challenge: orientation of British education to practical training was not adapted for advance of the knowledge-intensive production branches, while French "academic snobbery" graduated mainly well-trained gentlemen engineers.

In the post-war world, development of the business education system (first of all, management education) became one of the means of increase in competitiveness of states (Engwall, 2007, p. 4). Lars Engwall notes that when special management education emerged at the age of early industrialization, it evolved from vocational schools of commerce that were quite different from the institutions associated with training national élites (Engwall, Kipping, & Üsdiken, 2016).

Andreas Kaplan divided the history of the business school in Europe into two periods: 1819-1944 (Founding Period) and 1945-1997 (Assimilation Period) (Kaplan, 2014). During the first period, the two types of school were established: the so called "Southern" model (led by France and Belgium) and "Northern" model (led by Germany). The European business education started with the Ecole Supérieure de Commerce de Paris (ESCP) founded in 1819 by economist Jean-Baptiste Say and trader Vital Roux. "The first curriculum was based on a combined theoretical and practical approach to business education, including pedagogical simulation games" (Kaplan, 2014, p. 2). Important role in the program belonged to the foreign languages. It was marked that the school's approach to management was social and demand-oriented due to the influence of Jean-Baptiste Say, who was a neo-classical economist. The business school was privately financed by a group of businessmen until 1869. Thus, it was outside of the public university system.

The first business school (Handelshochschule) in Germany was opened in 1898 upon an initiative of Leipzig Chamber of Commerce. It was also created outside the public university system (Kaplan, 2014). German model became more academic than French. Humboldt's tradition of education through science, deeply rooted in Germany, required scientific activities as the basis of the learning process. Since the beginning of the 19th century the first question asked about a German professor was what he had published (Locke, 1984 p. 233).

Thus, the establishment of the first higher business schools was driving by the rising demand for a new type of business professional that traditional universities were not able to fulfill. European schools such as ESCP tend to put more emphasis on cross-cultural management, societal considerations, and interdisciplinarity than their United States counterparts (Kaplan, 2018).

Adrien Passant argued that increased supply of business education must be associated with the increased supply of engineering education in mid-nineteenth century: both of them constituted a common response of the industrialization (Passant, 2016).

In our opinion, the view on a problem of "economy – education", which is traditional for Russia, prevails in the modern Russian historiography: it is focused on participation of the state in development of the higher school, the state educational reforms and financial aspects of their realization (Bessolitsyn, 2015, 2017; Sukhodolov & Maidachevsky, 2017). We believe that the Russian Empire considered development of the higher educational system mainly as a social project, but not as an economic one. Owing to political preferences of the Russian state elite, the system of higher business education was the hostage of conservative political ideas and the state bureaucracy.

3. Research Questions

Study of the problem in the scientific literature allows formulating the following questions:

- To what extent can the conception of "Large waves" of Carlota Pérez help in study of the formation features of the system of higher business education in Russia?
- What are the features of the Russian practice of higher business education in the conditions of the first and second technological revolutions?

4. Purpose of the Study

The purposes of this article are:

- To consider the process of formation of higher business education in the Russian Empire in the period of the first and the second technological revolutions.
- To verify the applicability of the conception of "Large waves" of Carlota Pérez to realities of the first and the second technological revolutions in Russia.

5. Research Methods

The work is based on the published sources: legal acts, memoirs, regulations etc. The authors assign a special role the memories of Sergey Witte and Vladimir Kovalevsky. Being the members of the Ministry of Finance of the Russian Empire in 1890s, both authors worked at the ground zero of creation

of the systems of business education in Russia, therefore their records help to reveal a position of the government in relation to commercial educational institutions. We studied the views of the Russian public on the problem of business education by means of materials, which were presented in the work of Betskoy (1772), the author of the program and the charter of the first Russian business school (1770s), in works of the congress of the Russian doers on technical and professional education (the 1890s), in materials of the Moscow merchant society (1900s). The published materials allow retracing the evolution of views of the Russian society on the needs of business education, revealing the motives of participants of the public discussion. The main legal acts concerning the activity of commercial institutions of the Russian Empire were used in the research: regulations on commercial educational institutions, charter of the St. Petersburg polytechnic institution, etc.

5.1. The conception of «Large waves» of Carlota Pérez

The methodological basis of consideration of these matters is the conception of "Large waves" of Carlota Pérez. Technological changes in the society resulted in the Large wave of changes not only in economy, but also in other spheres. As Pérez notes, the Large wave is shown in emergence of new branches of economy, rejuvenation of the old ones. It is equally important that it is also manifested in changes on arrangement and management of these branches and difficult sociocultural and institutional motions. Sociocultural changes are substantially caused by political changes. The system of business education is transformed under the influence of all these changes.

5.2. Late Russian Empire and challenges of the 2nd Technological Revolution

The methodology for the study is based on the chronological approach. The authors consider the chronological sequence of the events, reflecting the time of manifestation of the main technical inventions of the first and the second technological revolutions; edition of textbooks, reflecting the use of these inventions in the educational process; dates of formation of higher educational institutions, where training of specialists for the modernized production was conducted. The authors analyze institutional aspects of technological transformation using the materials of the Russian Empire. In particular, the issues of implementation of the state policy of the Russian Empire in the field of higher education are considered. The aspects connected with public understanding of differences of higher education, its lower steps, economic, commercial, technical, real polytechnic and other types of higher business education are considered in detail.

6. Findings

6.1. Technological revolutions as a challenge

The researchers allocate five technological modes, four industrial revolutions in the economic history. They are schematically designated in table 1. Each technological mode formed its own technological core, which is presented by the leading branch, and also by a cluster of related productions (Semenov & Matveev, 2013). Commonly, this cluster had accurate geographical outlines.

With regard to the 19th century we will designate the main technical and technological changes. The main technological changes of the started industrial epoch – invention of the steam engine, which

allowed transiting to the factory labor management and to new methods of metal working, which made it the main constructional material of modern times.

At the same time, it should be noted that formation of the machine production in the majority countries of the Western Europe and the USA was in the conditions of developed market principles of economy management. Implementation of machine technologies was followed by replacement of the medieval regulation system, which has subordinated production and distribution of wealth by the competition until then (Toynbee, 1884). The birth of the economic science, which took place on the stage of the first technological revolution in the Western Europe (the first textbook on economics appeared in 1834 Babbage), happened in the conditions of existence of market relations and what is especially important in market oriented perceptions, mainly market thinking of the society and the scientific community, which were established approximately from the 17th century. Fernand Braudel and Karl Polanyi considered emergence of the market relations as the main public change of the European society of the 19th century (Braudel, 1993; Polanyi, 2001).

The technological breakthrough of the beginning of the 19th century started a long-term tendency for economic growth, industrial production, in particular. For the first time in the history of the mankind, the economic growth began to exceed the population increase. The economic growth represented transition from simple reproduction to the expanded one. Annual rates of increase in GNP per capita in the developed countries of Europe and the USA amounted on average 0,6% in 1800-1830s, and in 1831 - 1870-1,1% (Maddison, 1991). The commodity production is universal and typical. The type of economic growth was mainly extensive: it took place through consumption of the capital, accumulated in the 16-18th centuries. Growth of investments and increase in the number of employees at factories and plants formed the basis for the industrial growth. The rates of transition to the commodity rails in different countries depended on the specific historical conditions, but mainly the extensive growth type was noticeable everywhere.

The second technological revolution was of diverse nature. The majority of researchers consider the power industry as a “powerhouse” of technical breakthrough of the turn of the 19-20th century. If railways created a uniform transport network, then the unified electric power system integrated together the whole world economy. At the beginning of the 20th century the growth ratio of GNP grew to 3-3,5%. Development of the industry was still the basis for growth of the national production. The technological revolution of the end of the 19th century laid the groundwork for the intensive growth type. Scientific and technological inventions required the use of skilled labor at production and, consequently, in the long term a combination of these production factors allowed achieving the highest labor productivity.

The economic growth of the turn of centuries designated the second structural transformation of the industry, where the branches of the first division (manufacture of the means of production) began to occupy the leading roles. Electric power industry, machine-tool and aircraft industry, chemistry and oil processing was brought forward to the leading advanced positions. New organizational forms of the monopolistic type were established together with them. The importance of control, management, accounting and planning was increasing as well as the needs for training personnel of the corresponding specialty.

The first technological revolution called the industrial revolution, the second one – industrialization, resulted in significant economic growth. Consequently, the ideas of the Russian scientists about technical and technological growth are historically connected with experience of the Western European countries, in which technical, technological growth is supported by the market ideology. At first in Europe originated the commercial (trade) education, and then owing to inquiries of industrial development, economic and technical education was formed on its basis.

6.2. First experience of commercial education in Russia

The first commercial educational institution appeared at the close of the 18th century – time of formation of the market mode in the Russian economy, but in the conditions of preservation of the serfdom. The idea about creation of an educational institution, teaching commerce and trade, belonged to two Russian figures: Ivan Betskoy – the author of the program, the curriculum and the charter of the school, and Prokofii Demidov – the most famous Russian businessman of that time, who allocated 205 thousand rubles of his own funds for establishment of the educational institution. Conceiving the commercial school, Ivan Betskoy dreamed to carry out in practice the idea of educators about training of "a new man", a representative of "the third rank of people", future support of the government (Betskoy, 1772). Prokofii Demidov, being born and raised in the commercial and industrial environment, considered distribution of business knowledge among merchant children as the main task of the school so they could conduct their trade activity knowingly. In the letter to I.I. Betskoy dated 5 March 1772 he wrote: «We lack commercial education, which consists in state strength, how the God saves us!» (Storozhev, 1914, p. 97).

Enrollment of pupils passed with great difficulty, donations to development of the educational institution were not made, and there were no other initiatives in opening of commercial schools (Sreznevsky, 1890, p. 57). The opening of the commercial school was caused not by real needs of the Russian economy, but by the joint social project of Betskoy and Demidov. A hundred years from now, analyzing the experience of this institution, Semen Grigoriev noted that "in Europe the commercial school appeared and grew as it was demanded by rapid growth and development of the commercial and industrial life. In our case, both industry and trade were mainly settled artificially (Grigoriev, 1898, p. 6).

The industrial upsurge of the 1890s, which was followed by rapid construction of new enterprises, strengthening of finance and growth of foreign investments resulted in change of the attitude of the Russian society to commercial education, to perception of necessity of its reforming by creation of the network of commercial educational institutions. The significant role in statement and discussion of this question belonged to the Russian Technical society, initiating wide discussion of needs of business education at the All-Russian congresses of doers on technical and professional education (1889–1890; 1895–1896 and 1903–1904). The report "About higher commercial education" of the associate professor of the St. Petersburg Forest Institution Leonid Khodskii found big resonance among the pedagogical society (1890). In his report, the speaker noted that "it is necessary to adapt our business education for requirements of the commercial activity. It is necessary to raise the level of vocational education of the Russian commercial and industrial class to the level of our competitors in the international market" (Sreznevsky, 1890, p. 59). As a result of debates, the participants of the section of business education

made a decision on a petition to the government for establishment of a commercial institution, which would train necessary experts and would be equalized in rights with other higher professional educational institutions.

The intentions of the public turned out to be compliant with the ideas of authorities. In the Ministry of Finance, under the general guide of Sergey Witte there was developed the program of the commercial and industrial state policy (1893) and the "Regulation on commercial educational institutions"(1896), where the significant role was assigned to reproduction of economic and managerial personnel. The subsequent opening of the network of commercial educational institutions across Russia should have shown practical embodiment of the new state policy.

The merit of S. Witte in distribution of commercial education is big. Exactly his influence, his authority among representatives of the top government echelons allowed implementing the idea about creation of the system of lower, secondary and higher commercial educational institutions in Russia. The first step was the transfer of all commercial schools to management of the Ministry of Finance, according to the law of 1894 "On jurisdiction of reopened commercial schools to the Ministry of Finance" (Bessolitsyn, 2014, p. 9). Before that, they were under the supervision of three institutes: the Ministry of Education, the Ministry of Finance and the Government Agency of Institutes of the Empress Maria. Having taken the existing educational institutions under control, the team of S.Yu. Witte initiates opening of new business schools. "Regulation on commercial educational institutions" dated 15 April 1896 allowed creating in Russia the network of lower and secondary commercial educational institutions as the right to establish schools was granted to private persons and public organizations. As a result, educational institutions of four types began to open in large quantity: trade classes, trade schools, commercial colleges and courses of commercial knowledge (Polozhenie o kommercheskih uchebnyh zavedeniyah, 1896). Then S.Yu. Witte began to push actively the idea about creation of commercial departments at polytechnic institutions. According to him, polytechnic institutions represented an organization, "which would be the most capable to develop young people, to give them universal knowledge, owing to contact with comrades, who are engaged in various specialties" (Witte, 1924, p. 209).

6.3.Higher business education in the Russian Empire as a response to the economic request

Owing to the energy of Sergey Witte, in 1896 in the Russian Empire appeared a first higher educational institution, which trained experts in economy. It was a reformed Riga polytechnic institution. Over a period of 30 years this educational institution, maintained by Baltic merchants, educated "not worse than higher commercial schools in France and in Antwerp" (Brockhaus & Efron, 1895, p. 863). Formally remaining a secondary vocational school, Riga polytechnic actually trained highly professional personnel. The program of economic department included such subjects as Commercial Geography and Statistics, Commercial Arithmetic, Clerical Work and Bookkeeping, Political Economy, Finance, Encyclopedic Chemistry, History of Trade, Establishment of the Riga Trade, History of National Economy; Trade, Exchange and Maritime Law, Merchandizing, Encyclopedic Physics and Commercial Practice. The main disadvantage of the polytechnic was absence of the rights of public service for its graduates (Rosenkranz & Ribensam, 1912, p. 688). This problem was eliminated by Witte in 1896. The

Riga polytechnic institution became the state higher school, and, as a result, its graduates were equalized in rights with graduates of other Russian institutions and universities.

After Riga, a commercial department was opened in 1902 at newly established Saint Petersburg polytechnic institution. S.Yu. Witte personally participated in development of the Charter of the higher educational institution (Witte, 1924, p. 211).

An essential condition for establishment and successful work of the higher school is not only understanding of an economic and political situation, but also perception of necessity of a higher school by various social groups, careful development and discussion of the idea about higher education with the use of international experience (Zigmunde, 2006, p. 22). A set of these factors allows creating the most favorable conditions for development of the higher educational sphere. At the beginning of the XX century, various quarters of the Russian society agreed in understanding of importance of higher business education, but aggravation of the political situation slowed down development of the process. According to the historian Anatoly Ivanov, "in the conditions of permanent aggravation of an internal political situation, tsarism opened new higher educational institutions with due diligence, because it considered students as constant "troublemakers". The liberal professorate also did not inspire political trust (Ivanov, 1991, p. 96).

The impetus for emergence of independent commercial institutions was the report of the minister of public education of I.I. Tolstoy imperial consolidated by the emperor Nikolai II in December, 1905. It allowed individuals to establish commercial courses with the education program above average (Bessolitsyn, 2014, p. 10). As a result, in 1906 three similar educational institutions appeared practically at the same time. In St. Petersburg "Private St. Petersburg Commercial Courses" were reorganized into "Higher Commercial Courses of M.V. Pobedinskiy". In Kiev M.V. Dovnar-Zapolsky established "Kiev higher commercial courses". In Moscow the courses for training educators at the "Society of distribution of business education" were transformed to the "Higher commercial courses". Outstanding scientists, teachers of the leading higher educational institutions of the country were invited for lecturing at the higher commercial courses. For example, in St. Petersburg - E.V. Tarle, A.A. Kornilov, V.N. Speranskiy, S.V. Mylnikov, A.I. Shingarev; in Moscow - P.I. Novgorodtsev, A.A. Manuylov, S.N. Bulgakov, W.R. Williams, S.A. Chaplygin; in Kiev - K. Vobla, D.A. Grave, M.B. Delone, P. Tikhomirov, E.E. Slutskiy, etc. These classes were popular among the population.

Successful activity and positive reviews of listeners and the business community allowed the heads of the higher commercial courses to draw reorganization of educational institutions into commercial institutions from the government. In 1907 was opened the Moscow commercial institution, in 1908 – the Kiev commercial institution. The only restriction in activity of these institutions proceeded from the fact that these educational institutions were non-state, and consequently their graduates had no rights of public service. Their lot was private entrepreneurship. According to the historian Bessolitsyn (2014, p. 10), such "incomplete" higher business education could not exist for a long time. On June 3, 1912 Nikolai II granted new charters to Moscow and Kiev commercial institutions. This order of the emperor became a part of the history as "The law on higher business education". Henceforth, people, who obtained diplomas of private or public educational institutions, acquired the same rights as those, who possess diplomas of state universities. The rights of professorate of these educational institutions were also equalized to the

rights of professorate of state universities. At the same time autonomy, financial independence and quality of training, which were developed earlier in commercial educational institutions, remained to a certain extent.

Further reforming of business education in Russia was stopped due to the started World War I and political changes in the society. The main unresolved issue of business education was the discrepancy of training programs of commercial educational institutions with needs of the Russian economy and requirements of entrepreneurship. The Russian business school, unlike the European one, aims at academism. It made education more fundamental, but less practice-oriented (Bessolitsyn, 2014, p. 34). This fact was also noted by outside observers. For example, James Shin, the former Minister of Education of the USA, the author of the textbook on the Russian history for secondary American school and the chief expert at the World Chicago exhibition, shared impressions about his visit to Russia in 1894 in the manuscript "Impressions". He wrote that in the empire "higher education is pulled away from the inquiries of real life; secondary education does not prepare youth for direct work, and it is difficult to understand why such realistic and democratic people as Russian, need painful studying of classical knowledge" (Kovalevsky, 1991, p. 86).

Researchers note that the elements of German and French models were combined in the educational system of the Russian Empire. In financial issues Russia followed the path of France – it practically did not support financing of business education (0,4%) (Kotsubinsky, 2016, p. 81). As for arrangement of the educational system, Russia copied the German experience: "speculative" education prevailed over the practical one. However, in Germany there were also other models, which were more practice-oriented (Bessolitsyn, 2014, p. 121).

Excessive academism of the Russian educational system was noted both by contemporaries and by researchers (Grigoriev, 1895, p. 35-36; Kotsubinsky, 2016, p. 83). French commercial educational institutions considered requirements of the national economy to a greater extent than Russian. (Bessolitsyn, 2014, p. 199).

Among the course units, studied at German business schools, the central place was taken by the political economy, "however, the German school did not set a goal to train economists, but only to prepare economically educated businessmen". In curricula of German schools the unit of studying trade and trade equipment (marketing) included 10 modules, whereas at the Russian school it was replaced by one course, which was called "Basics of Business Knowledge" (Bessolitsyn, 2014, p. 199-203).

The Russian business school was intended to serve rather interests of the state than businessmen as evidenced by the list of purposes of arrangement of economic department of Saint Petersburg Polytechnic institution (Kotsubinsky, 2016, p. 79). However, it should not be explained by "inertness" of the merchants. On the contrary, since the Demidov school (and also the project of the Moscow Academy of commercial sciences of 1810, the Odessa commercial institution of 1850s, the Riga higher commercial school of 1889) it tried to create higher business education, but until 1896 it encountered active opposition from the state (Bessolitsyn, 2014, p. 49, 159).

"Insufficient activity of the public in arrangement of business education was explained not so much by inertness of institutions of the civil society as by the "prohibitive" atmosphere, where the Russian society developed up to 1905" (Kotsubinsky, 2016, p. 80).

As noted by Bessolitsyn, the best commercial higher educational institutions "acted as pioneers regarding experimenting and practicing of new forms both of the internal arrangement and the structure of an educational institution (selectivity of a president, a rector, collective nature of headquarters, vigorous activity of the school board, the system of privileges in payment for training, cancellation of any discrimination requirements at reception, etc.), and of organization of the educational process" (Bessolitsyn, 2014, p. 134). The feature is the fact that professors of the leading state universities often taught at commercial institutions free of charge, "just because their training programs and the atmosphere in a higher educational institution was freer and more democratic, than in state government universities" (Bessolitsyn, 2014, p. 117-118).

Development of business education in the conditions of international trade competition and national-majestic expansion was one of perspective national tasks in the second half of the 19th – at the beginning of the 20th century: national governments were interested in encouragement of their industrialists and businessmen in their attempts to capture the overseas markets. It is indicative that the main goal of students' business trips at the Kiev commercial institution was not acquaintance with the country for the benefit of their future commercial activity, but the analysis of "expectations about the future of Russian export to these countries" (Bessolitsyn, 2014, p. 157).

7. Conclusion

Origin and development of a higher educational institution in the Russian Empire is connected with the first and the second technological revolutions (the long 19th century). Its basic principles, ways of arrangement, the education system were defined in this period. The leading practice of financing was established particularly due to the state investments, and then the private ones. At such key (focal) moments of the history educational institutions of the highest level play a very important role. In the meantime, they act as "adapters" of technological changes (social and cultural function) and "powerhouses" of innovative and technological development (scientific and technological function and distribution of new knowledge).

1. The analysis of the chronology of formation of commercial and technical higher educational institutions in Russia showed that at the stage of the first technological revolution (the industrial revolution) starting the Large wave, these institutions were established in the end of the semiseular cycle. The biggest part of commercial and technical institutions was established in 1890s.

2. Opening of the educational professional institution was preceded by difficult social processes, when the progressive public recognized the importance of similar institutions, groups of interests connected with education were created, the main goals and trends of activity and also sources of financing were determined. The main groups of interests in the 19th century consisted of entrepreneurial, trade and commercial structures and the state. These institutional groups acted also as organizers and financiers of the higher school.

3. Understanding the way in which education should be (it comprises institution of "higher education"), what functions it should carry out to correspond not only to needs of production, modernized economy, but also to public expectations, differed widely. These years there were different education models, practice of teaching, forms and terms of training. At the same time, understanding that higher

educational institutions should be the centers of freedom of the scientific thought remained almost everywhere.

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