ACCOUNT BOOKS OF THE MOSCOW PRINT YARD (1622-1700):
THE ORIGINS OF COST ACCOUNTING IN RUSSIA

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Abstract: This paper reports the results from the study of the account books (1622-1700) of the Moscow Print Yard, the largest Russian state manufactory in the 17th century. This case confirms the existence of sophisticated calculative techniques in pre-industrial societies and adds an argument in the debate about origins of the cost accounting. Management of the Russian state owned monopoly enterprise used the original cost technique not for efficiency reasons but only for pricing and control of material, labour and financial resources.

We also investigate the influence of the organizational changes at the Moscow Print Yard on the evolution of its bookkeeping practice for eighty years. The cause of calculative practice development was intuitive reaction of enterprise management to changing political and economic circumstances. The methods of product costing, pricing, expense recognition and production control are examined within the political, economic, and social context of Russia at the time. The 17th century was the epoch of the formation of the Russian state and the awareness of the state power as the driver for governing of a public life. The paper argues that the political attitudes of the state determined the organizational changes at the state manufactory and transformation of traditional bookkeeping practice to the new type of administrative activity – cost accounting.

Keywords: Cost accounting, 17th century, Moscow Print Yard, state enterprise, organizational changes

LIBROS DE CUENTA DE MOSCOW PRINT YARD (1622-1700): LOS ORÍGENES DE LA CONTABILIDAD DE COSTES EN RUSIA

Resumen: Este artículo muestra los resultados del estudio de los libros de cuentas (1622-1700) del Moscow Print Yard, la mayor fábrica estatal de Rusia en el siglo XVII. Este caso confirma la existencia de sofisticadas técnicas de cálculo en sociedades preindustriales y agrega un argumento en el debate sobre los orígenes de la
contabilidad de costes. La administración de la empresa monopolista estatal rusa utilizó la técnica de coste original no solo por razones de eficiencia, sino para fijar precios y controlar los recursos materiales, laborales y financieros.

También hemos investigado la influencia de los cambios organizacionales en Moscow Print Yard con relación a la evolución de su práctica de contabilidad durante ochenta años. La causa del desarrollo de la práctica de cálculo fue una reacción intuitiva de la gestión empresarial ante las cambiantes circunstancias políticas y económicas. Los métodos de cálculo de costes de productos, fijación de precios, reconocimiento de gastos y control de producción se examinan en el contexto político, económico y social de Rusia en ese momento. El siglo XVII fue la época de la formación del estado ruso y la conciencia del poder del estado como motor para gobernar la vida pública. El trabajo argumenta que las actitudes políticas del estado determinaron los cambios organizacionales en la fábrica estatal y la transformación de la práctica tradicional de contabilidad al nuevo tipo de actividad administrativa: la contabilidad de costes.

Palabras clave: Contabilidad de costos, siglo XVII, Moscow Print Yard, empresa estatal, cambios organizacionales.

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1.- Introduction

The development of accounting in Russia is usually associated with the coming to power of Russia’s first Emperor Peter I. The era of Peter the Great’s sole rule (1696-1725) was the time when government regulation of bookkeeping began, special accounting terminology appeared, an accountant position was introduced in government administration bodies, foreign experts knowledgeable in Western accounting techniques were invited to work for the government (Lvova, 2014; Motyka, 1990; Platonova, 2009; Sokolov, 1985). In our opinion, this process did not start on its own; it has been prepared by the documentation and calculation practices of the previous century.

The focus of our research is a cost accounting practice in Russia in the 17th century. At that time an accounting in most European countries passed through the stage of identification as a special area of social activity: there was documentary evidence of government regulation of accounting procedures in Italy, France, Spain; special educational institutions were created; the number of textbooks summarizing the accounting practice had increased (Kuter and Sokolov, 2012; Mattessich, 2008). In Russia at that time, even the knowledge of the double-entry system or any accounting system was yet to come. Bookkeeping was not regulated by the government in any way. Some researchers mentioned the procedures used for control over inventories in monasteries (Ivanov, 2005; Sokolov, 1985). Trade and manufacturing transactions were registered by the means of very simple techniques in books of receipts and charges, in textual form, with letters used to designate figures (Medvedev and Nazarov, 2007; Sokolov et al., 2018). There were no specialized publications on accounting (see Motyka, 1990; Sokolov, 1985). Motyka, while dividing the development of Russian accounting into periods, characterizes the stage by the 18th century as ‘rudimentary/primitive’ (Motyka, 1990:37). At the same time, there is an evidence of using of well-developed techniques of product cost calculation at the Russian state manufactures in the 17th century. A perfect example of that can be found in the account books of the Moscow Print Yard¹ (1618-1722), which demonstrated an original costing technique for evaluation of finished goods.

The 17th century was the epoch of the formation of the Russian state and the awareness of the state power as the driver for governing of a public life (Klyuchevskiy, 1908; Solovyev, 1879). Absolute monarchy was a traditional form of government in Russia at that time. The supreme authority was interested in the spread of its influence on the consciousness of the citizens. To this end, Russian Tsar Mikhail Romanov² initiated the re-creation of the state enterprise Moscow Print Yard in the beginning of the 17th century where religious and educational books began to be published and sold. In order for books to be obtainable, they were sold at no extra charge at first. Later the Moscow Print Yard began to sell the books at a price with a mark-up. The state wanted to know exactly the cost of printed books and to control investment in typography. So an original costing system was developed at the Moscow Print Yard. Previously, such a system (including in related sectors of the economy) was not used in Russia. The state-owned manufactories were directly controlled by the state and subordinated to the political tasks of the supreme authority. The Moscow Print Yard was an example of such a state manufactory, in which the organizational forms of labour

‘…accounting owes more to the evolutionary forces of society than to particular genius…’
Littleton (1927:140)
transformed under the political attitudes of the state and determined the creation of a base for a new type of administrative activity – cost accounting.

By analyzing the scientific publications, we conclude that studies on 17th century cost accounting in Russia are hitherto neglected. Motyka (1990) investigated the influence of Western accounting practices on the development of accounting in Russia; however, the scholar concentrated on accounting in the merchant trade. Sokolov et al. (2018) analysed the bookkeeping and control of production and circulation of alcohol in Russia from the 16th to early 20th centuries; but the authors of that work did not focused on the costing. Papers published on Anglophone journals and monographs have devoted their attention mainly on cost accounting in other countries in the same or similar periods (Banos and Gutiérrez-Hidalgo, 2011). For example, these studies - addressed to UK (Boyns and Edwards, 2013; Burley, 1958; Edwards et al., 1990; Edwards and Boyns, 1992; Hammersley, 1988; King, 2010), Canada (Sprakman and Wilkie, 2000), France (Lemarchand, 1994; Nikitin, 2002), Spain (Carmona and Gomez, 2002; Carmona and Donoso, 2004; Carmona et al., 1997; Gutiérrez-Hidalgo et al., 2005; Prieto and Larrinaga, 2001), Italy (Carmona, 2006; Sargiacomo, 2006; Zambon and Zan, 2007) or Portugal-Brazil (Carvalho et al., 2007; Sangster and Rodrigues, 2013) - may be mentioned. At the same time Russian cost accounting investigations - focused on the 17th century - are absent in the international literature.

There are just a few works on the development of cost accounting published in Russia. Mackevichus (1974) conducted a detailed study of the calculation methods used in Russia before the 1917 revolution, but he did not have access to archival documents dating back to the 17th century. Sokolov (1985) provided interesting information about accounting practices in the manors, monasteries and industrial enterprises of the 17th century, but focused mainly on the development of accounting in later periods of time. Ivanov’s book (2005) discussed bookkeeping in monasteries of the 16th and the 17th centuries, where single entry bookkeeping was used. The history of accounting in the work of Medvedev and Nazarov (2007) was represented through documents regulating the economic life and accounting practices: government decrees, orders, and instructions. Lvova (2014) examined the relationship between different economic theories and the development of accounting in Russian public sector economy.

This paper reports the results from the study of archival sources of the 17th century, account books of the Moscow Print Yard from 1622 to 1700, which provide evidence of original calculative technique. The authors examine how well-developed cost accounting technique formed at the largest state manufacture and then changed to meet the needs of Russian state bodies throughout the 17th century. The paper contributes to the previous literature by analysing the interrelations between government needs, organizational changes at the state enterprises and transformation of cost accounting practice in 17th century Russia.

The following issues are consistently disclosed in the paper: the theoretical and explanatory framework of research (section 2); characteristic of the primary sources (section 3); description of the organizational and technological processes (section 4) and explanation of calculative technique used at the Moscow Print Yard (section 5). The considerations presented in the section 6 of the paper are devoted to the organizational changes at the Moscow Print Yard during the 17th century in response to emerging new political tasks of the high authority and transformation processes in the documentation and calculation technique closely related with these changes. Concluding remarks are presented in the final part of the paper.
2.- Theoretical and explanatory framework
Miller and Napier (1993) stressed the need to expand the field of historical research: moving away from describing consecutive stages of development of increasingly sophisticated accounting techniques towards the study of their ‘genealogies’, i.e. cause-and-effect relationships in the evolution of accounting methods. The object of the study is the cost accounting as a part of management accounting. Traditionally, accounting is associated with maintaining a system of accounts. Industrial cost calculations more likely are the product of a formal system of bookkeeping (Boyns and Edwards, 2013). At the same time the accounting information prepared for management may be seen to arise not only from a formal system of accounts. Boyns and Edwards (2013) gave such examples in which the calculations created for performance assessment and decision making outside a formal accounting system were very useful for managers in the Middle Ages (Burley, 1958; Edwards, 1989; McKendrick, 1970).

Jonhson and Kaplan (1987) dated the birth of sophisticated cost accounting practices as the end of the 19th century. This position fits with a notion of cost management developed by entrepreneurs to face competitive markets for efficiency reasons (Fleischman and Parker, 1991). However, some scholars demonstrated the existence of sophisticated cost accounting and control techniques before the industrial revolution in different countries such as the United Kingdom (Fleischman and Parker, 1991), Spain (Carmona and Gomez, 2002; Carmona and Donoso, 2004; Carmona et al., 1997; Gutiérrez-Hidalgo et al., 2005; Prieto and Larrinaga, 2001), Italy (Carmona, 2006; Sargiacomo, 2006; Zambon and Zan, 2007) and Portugal (Carvalho et al., 2007). These researchers focused on the organizations operating in non-competitive markets and on firms operating in competitive markets with governmental support (Gutiérrez-Hidalgo et al., 2005). Therefore more recent investigations have questioned the role of efficiency and suggested institutional explanations for the development of cost accounting (Carmona et al., 1997; Gutiérrez-Hidalgo et al., 2005; Larrinaga et al., 2008). Institutional sociology provides the theoretical framework for analyzing the effects of institutionalized environment on the organizational structure and changes and its expression through a process of bureaucratization as a mean of establishing organizational rationality (Nuñez, 2002).

In recent years, accounting history studies based on Foucault’s theory also have shown the greatest potential (Banos et al., 2005). Foucault (1991) developed a view of the state as a mechanism for coercing an individual. In this sense, management accounting is a tool that allows government to impose a certain course of action on ordinary person. In these circumstances the accounting becomes the management technology aimed to meet the needs of the authorities (Miller, 1990). Foucault (1991) stressed that the ideas of the Enlightenment became an incentive for changing the way by which populations in European countries were governed in 17th-18th centuries. The supreme authorities needed to develop new technologies of government that would allow for setting measurable goals and evaluating their fulfilment.

Latour (1987) offers the concept of action at a distance as an explanation as to how powerful actors can successfully enrol and mobilize persons, procedures and artefacts in the pursuit of their goals. Different instruments of paper-work replaced the work with things: diagrams, lists, formulae, archives, files, dictionaries and so on. These objects have many advantages; they are mobile, but also immutable, presentable, readable and combinable with one another. The printing press was obviously a powerful cause of that sort. Immutability is ensured by the process of printing many identical copies; mobility by the number of copies,
the paper and the movable type. The links between different places in time and space are completely modified by this fantastic acceleration of immutable mobiles, which circulate everywhere, and in all directions (Latour, 1987:10).

It is no coincident that the Moscow Print Yard which aim was publishing and distributing printed books became the largest and possibly the most successful enterprise in the Russian state economy. 17th century was the epoch of significant social events and upheavals in Russia: the Time of Troubles (1598-1613), change of royal dynasty (1613), schism of the Russian Orthodox Church (1653-1656), the plague epidemic (1654-1655), the financial crisis of 1660, Thirteen Years' War (1654-1667), and peasant uprisings (1670-1671). In this period of Russian state formation the supreme power faced with the complex tasks of expanding and protecting state borders, creating an army, building new towns, and solving many social and economic problems. The central event in the political life of Russia in the century was the adoption of the Council Code of 1649, which determined the character and principles of state power in Russia for the next two centuries. The printed word acted as a conductor of state policy, resolved the issues of public education, spiritual development of people and the formation of the Russian nation.

Russian Tsar as representative of the supreme authority was interested in strengthening the state's economy, therefore, the government aimed to improve the organization of labour at the state manufactories. These changes directly influenced the applied cost accounting practice. The cause of calculative practice evolution was intuitive reaction of management to changing political and economic circumstances. It was not yet planned and rational actions of the government but the chain government tasks – organizational changes at the state enterprises – transformation of bookkeeping practice is clearly visible when studying archive documents of the Moscow Print Yard. The analysis of the relationship between the elements of this chain is the aim of our research.

3.- Description of the primary sources
In the history of science, it is difficult to determine who first developed a new theory or conception (Sokolov, 1985:82). It is also problematic to date the beginning of the application of new accounting technique, and to discover how widely the procedures were employed in practice (Boyns and Edwards, 2013:97). However, having a representative archival data homogeneous in structure, it is possible to trace changes in the application of this technique over time and analyze the factors influenced these changes. The 17th century in Russian history is represented by archival documents kept in various public archives, such as, the Russian State Archive of Ancient Documents (RGADA), the Russian State Historical Archives, and others. Difficulties in historical research are connected with primary sources as evidence of the past which are often lost or destroyed. Therefore it can be considered that historians have at their disposal an invaluable archival resource because the archive of the Moscow Print Yard contained thousands of documents dating back to the 17th century is well preserved and accessible for researchers.

This paper investigates the archival sources from the 17th century kept in RGADA, Fond 1182 Moscow Print Yard. This archive was discovered in 1863 in the attic of the Sankt-Petersburg Synodal printing house by its manager M.I. Gilyarov-Platonov. The Fond contains the total of 606 documents dated 1618-1722 on more than 30 thousand sheets combined into three inventories.
Researchers identified three periods in the study of an archive (Pozdeeva et al., 2007:1:18). The first period included the end of the 19th - beginning of the 20th century, when the description and systematization of documents were carried out, and the first essays on the architecture of the Moscow Print Yard, the range of its publications, the printing technology in the 17th century, based on information from the archive, appeared (Belokurov, 1887; Nikolaevsky, 1890; Pokrovsky, 1913; Solovyov, 1917 and oth.). The second wave of interest in researching the archive of the Moscow Print Yard dated back to the 1950-70s. Zernova (1958) published a fundamental research, which included bibliographic descriptions of all books of the Moscow Print Yard, known by that time (501 editions with 109 titles). Kiselev (1960) formed a point of view that corresponded to the concept prevailing in Soviet science and denied the significance of Christian culture. He argued that the cultural significance of the Moscow Print Yard was reduced to the production of books necessary for liturgy. This view was later corrected by the Soviet writers Luppov (1983) and Rogov (1979), investigated the influence of the Moscow Print Yard activity on the enlightenment and education in Russia. At the end of the 20th and the beginning of the 21st century, academics from Moscow State University conducted a comprehensive study of the Moscow Print Yard archive, as a result of which most archival sources were systematized and published (Pozdeeva et al., 2001, 2007). Using economic and mathematical modeling, these researchers investigated the relationship of various factors (circulation, number of pages, cost, etc.) with the margin on the books of the Moscow Print Yard. The studies of this period made it possible to draw interesting conclusions about the significance of the Moscow Print Yard activity for the development of Russian culture (Guseva, 1990; Pozdeeva et al., 2001, 2007). The study of archival documents engaged experts from various areas of historical knowledge: history of public administration, literature, education, religion, etc. (Lukyanova, 1996; Sazonova, 2008 and oth.). However, until now there were no special studies focusing on the evolution of bookkeeping at the Moscow Print Yard.

The study period was chosen with regard to the content of the Fond 1182. Year 1618 as the start-date for our study has been determined by the earliest archival document, although the Moscow Print Yard existed since the middle of the 16th century. The end-date of the study is 1700, because as at the beginning of the 18th century fundamental changes in the regulation of accounting, connected with the coming to power of Peter I, took place in Russia, so a separate study of this period should be conducted.

As mentioned above, the Fond contains three inventories. The Inventory 1 contains financial documents for 1618-1700. More than 140 financial documents for 1700-1721 are included into the Inventory 2. There are 349 documents dated from the middle of the 17th century to 1722 in the Inventory 3: official correspondence with higher authorities, job applications, petitions of the staff members, salary requests, notes, memoranda, etc. We paid the most attention to the study of financial documents from the Inventory 1, since it contains account books related to the study period: sales books, inventory books and receipt and expenses books. Additionally, documents from the Inventory 3 were investigated to form a comprehensive view of the activities of the Moscow Print Yard in the 17th century. The analysis of the sources also took into account historical information contained in other documentary evidence of the 17th century; it also drew upon the results of research conducted by modern scholars working in such fields as history of accounting, public administration, finance and taxes.
4.- The Moscow Print Yard as the largest Russian state manufacture in the 17th century

The Moscow Print Yard was created in the middle of the 16th century. This event was connected with the activity of the first Russian printer Ivan Fyodorov\(^4\) and his assistant Peter Mstislavets\(^5\) (Pozdeeva, 2017). The first Russian printed book appeared in 1564. After Ivan Fyodorov left Russia, his work was continued by his followers (masters Andronik Timofeev Nevezha, Nikifor Tarasiev, and others). However, the production process of the Moscow Print Yard was irregular and often suspended for a long time. Having suffered the invasions of the Crimean Khan Giray\(^6\) and the great fire of 1571, the Lithuanian devastation and the destruction period of the Time of Troubles (1611-1612), the Moscow Print Yard was revived in the first years of the reign of Tsar Mikhail Romanov in the Kremlin. January 8, 1620 printing presses were moved from the Kremlin to new buildings built specifically for this purpose: a large stone two-storied building with Upper and Lower Chambers and wooden building located in Kitay-gorod\(^7\). Documentary evidence of the Moscow Print Yard activity has been preserved from this date; some facts before 1620 can only be obtained from epilogues of several books printed at that time.

At the beginning of the 17th century, there were 2 printing presses, on which small editions of books were produced (RGADA:1182:1:11:7). Five new presses began to work in 1622, the 10\(^{th}\) press started in 1629, and 13 machines operated by the end of the 40s. In 1642-45 the buildings were rebuilt and expanded (RGADA:1182:1:40:462). In 1620 number of workers at the Moscow Print Yard was 16, in 1624 - 98, then already 150 persons worked in 1642. Thereby by the end of the 17th century, the Moscow Print Yard had turned into a complex, well-organized manufacture with modern technology. Circulations of the published editions gradually increased, and as a whole for the period from 1620 to 1700 over 500 editions of more than 1 million copies of books were published. The Moscow Print Yard had no competitors on the printing market throughout 17\(^{th}\) century, so it had a state monopoly in this area.

The Moscow Print Yard was managed by the Office of the Book Printing (Prikaz knigopecchatnogo dela\(^8\)), in which the Head of Office, senior clerk (dyac) and two or three other officials (pod'yachty) served. The Head of Office was responsible for contacts with higher authorities - the Office of the Grand Palace (Prikaz Bolshogo Dvorta\(^8\)) and the Patriarch's Office (Patriarshiya prikaz\(^9\)). He made decisions on the most important issues of the printing house. During 17\(^{th}\) century the Office of the Book Printing had been successively held by such statesmen as Prince Alexei Lvov (1640-1652), Boyar Vasily Buturlin (1653-1654), Patriarch Nikon (1654-1656), Metropolitan Pavel (1667-1675) and others. The Head of the Office was a person close to the Russian Tsar and he did not receive a salary for this. Clerks were responsible for the correspondence and received a fixed salary.

The Office of the Book Printing was subordinate to the Office of the Grand Palace. The former made all current production decisions: salary payment, press repair and so on. The latter, if necessary, intervened in the activities of the printing house. The choice of books for printing, the date of the beginning of printing process, the appointment of the most qualified typesetters, the pricing decisions - all this was done by the decree of the Tsar, i.e. through the Office of the Grand Palace. The Patriarch's Office also had a great influence on the activities of the Moscow Print Yard. This office made decisions on inviting qualified correctors; disagreements on the texts of liturgical books were discussed and settled. Like many other Russian state offices, the Office of the Book Printing governed some areas of life beyond its
direct purpose. For example, it considered judicial property claims, minor criminal crimes of employees.

The activities of the Moscow Print Yard were funded by the state treasury. Responsibility for the maintenance and control of the finance of the printing house was carried by a person appointed by decree of the Tsar, called tselovalnik. This position was occupied for two years by influential and wealthy merchants who performed civil service and did not receive payment for this. At the end of his service, the tselovalnik handed over all affairs to his successor, and the inventory of the property of printing house was compiled.

At first the Moscow Print Yard published primarily liturgical books (Gospel, Psalms, Prayer-books). Religious consciousness, rituals, prayers occupied an important place in the life of the Russian people at that time. The liturgical services assisted any member of the Russian Orthodox Church throughout his life. Strengthening of autocracy was accompanied by an increase of the church power. Liturgical books were created and protected by the state and the church as the most important political, legal and diplomatic texts. However, the relationship of the Church and the state power were not unambiguous in the 17th century Russia. On the one hand, these were unity and kinship: the first Tsar from the Romanovs dynasty, Mikhail Romanov, was known to be the son of Patriarch Filaret; the Russian Tsar was referred in religious texts as “the God chosen”. On the other hand, one can observe increasing rivalry, which led to significant reforms in the administration of the country and the subordination of the Church to secular authority later. It is worth mentioning the internal schism of the Orthodox Church of the mid-17th century, associated with the struggle of various streams of church thought. The schism occurred at the highest level of church authority, and at the same time it touched the fate of millions of people, dividing Russian society into Old Believers and followers of Patriarch Nikon.

The first book for learning published at the Moscow Print Yard in an edition of 500 copies in 1632 was the ABC-book, created by Fyodor Burtsov (RGADA:1182:1:20:147). During the 17th century, the number of educational books published by the Moscow Print Yard noticeably grew. ABC-books were a very popular product. For example 3,966 copies of it were sold for 16 days in 1659. The century ended with edition of the ABC-book of unprecedented size - 24,400 copies (Pozdeeva et al., 2007:1:63). A very popular educational book was Grammar of Meletius Smotritsky (1648), which contained a brilliant hymn to grammatical knowledge. M.V. Lomonosov wrote the anthem to the Russian language as a supplement and continuation of this text in the 18th century (Pozdeeva, 2017:79). The publication of educational books accounted for more than a third of all published books in the first half of the 17th century. In the second half of the century, out of 410 book editions, at least 143 times there were educational books or nearly 35%. At the same time, by the number of copies, they accounted for 53% of the total number of published books (Pozdeeva et al., 2007:1:126). In the first half of the century, the printing house supplied the society with 135 thousand books for learning, and in the second half there was 536 420 copies, which is almost 4 times more.

Considerable book collections were formed in Russian towns due to the activities of the Moscow Print Yard in the second half of the 17th century. The scope of monastic and church libraries has expanded; they contained a large number of publications of not only theological character, but also geographical, philosophical, bibliographic books (Pozdeeva, 2017:82). The 17th century was the time of the creation of numerous personal libraries. In 17 personal libraries in the 17th century there were 3,410 books, including 60% of books of...
domestic production (Sapunov, 1983). Distribution of printed books led to the writing poems by a large number of people. This allowed Simeon Polotskiy\textsuperscript{11} to publish a poetic version of the Psalter in 1680 (Zernova, 1958).

Along with the nature of the book itself, two conditions are necessary for the printed book to be accepted by society: literacy of the population and the availability of the book. The price of books varied from 1 kopeck\textsuperscript{12} (\textit{ABC-book}) to 3 rubles (\textit{Gospel}). Sometimes the same book had a different price, depending on which paper it was printed - the more expensive Alexandrian, or cheaper grades of paper. To give a comparison of a price of a book against goods for everyday needs, the market price of 1 \textit{pood}\textsuperscript{13} oil cost 1 ruble 20 kopecks, \textit{chetverik}\textsuperscript{14} wheat flour - 13-15 kopecks, 1 \textit{arshin}\textsuperscript{15} canvas -3.5 kopeks, 100 candles - 42 kopecks (Pozdeeva et al., 2001:37). The salary of a typesetter at the Moscow Print Yard was 20 rubles a year, i.e. about 10 kopeks a working day, a watchman - 4 kopecks a day. This means that they could buy from 10 to 4 \textit{ABC-book} for one day's work. Thus, it is obvious that educational books were available to all strata of Russian society. Archival documents indicated a wide book distribution area; they were bought not only by Muscovites but also by the residents of Novgorod, Kostroma, and other towns. This conclusion was confirmed by the findings of books printed at the Moscow Print Yard, in monasteries and state archives of many Russian towns. Examples of the Moscow Print Yard products are presented on the Figure 1.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{moscow_print_yard}
\caption{Examples of finished goods of the Moscow Print Yard.}
\end{figure}

The publication of the book was a rather complex organizational and technological process. It was necessary to obtain the Tsar's permission to print a specific book, to conduct research on handwritten sources (sometimes to compare several editions of one manuscript), for which originals of old books were purchased in monasteries or from private owners. This
part of the preparatory work involved the correctors, the most competent employees of the typography, well versed in complex theological matters. Sometimes not only staff of the Moscow Print Yard, but invited representatives of the clergy acted as correctors, readers and scribes. After the decision to print a book, the scribe copied from the original all the sheets, the readers read it with the assistant and gave it to the master (typesetter). The typesetter printed the first copy on the poor-quality paper and carried it to the correctors, where the text was again read and edited.

At the next stage of the technological process, the edition was printed in the amount of 1200 or 2400 copies (RGADA:1182:1:90:543). Eleven persons worked for one press: two naborshchiks (compositors who typed text in printed form), one razborschik (distributor who disassembled letters from the used printing form, putting them into cells of the typesetting box office), and eight other pressmen of two types: 4 batyrshchiks (workers who applied ink to the type), and 4 teredorshchiks (workers who pulled the bar and worked the paper). One watchman worked at each press. There were workers in the staff, common to all the presses - znamenshchik (illustrator), slovolitchik (typcaster), perepletchik (bookbinder), joiner, blacksmith. Olifthenniks prepared the boiled linseed oil - the basis of printing ink, rudniks prepared soot and cinnabar, black and red pigment for ink. The labour was highly specialized at the Moscow Print Yard. Several workers moistened the paper before printing, dried the finished sheets, corrected the typographical errors, and stitched the sheets in the notebook.

The remuneration of employees was made up of two parts (Table 1): a fixed salary, which was issued for half a year (usually in October and March) and feed money, which were measured by yuft of bread and were issued by money at the price of bread for 1 yuft (RGADA:1182:1:6:6).

Table 1
The annual remuneration of employees at the Moscow Print Yard in the 20s of the 17th century

<table>
<thead>
<tr>
<th>Position of employee</th>
<th>Fixed salary, rubles</th>
<th>Feed money, yufts of bread</th>
<th>Price of bread for 1 yuft, rubles</th>
<th>Feed money, rubles</th>
<th>Total remuneration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master (typesetter)</td>
<td>30</td>
<td>40</td>
<td>0.45</td>
<td>18</td>
<td>48</td>
</tr>
<tr>
<td>Naborshchik (compositor)</td>
<td>10</td>
<td>12</td>
<td>0.45</td>
<td>5.4</td>
<td>15.4</td>
</tr>
<tr>
<td>Razborschik (distributor), other pressmen</td>
<td>6</td>
<td>10</td>
<td>0.45</td>
<td>4.5</td>
<td>10.5</td>
</tr>
<tr>
<td>Slovolitchik (typcaster)</td>
<td>8</td>
<td>12</td>
<td>0.45</td>
<td>5.4</td>
<td>13.4</td>
</tr>
<tr>
<td>Znamenshchik (illustrator), perepletchik (bookbinder)</td>
<td>8</td>
<td>10</td>
<td>0.45</td>
<td>4.5</td>
<td>12.5</td>
</tr>
<tr>
<td>Joiner, blacksmith</td>
<td>6</td>
<td>12</td>
<td>0.45</td>
<td>5.4</td>
<td>11.4</td>
</tr>
<tr>
<td>Watchman</td>
<td>4</td>
<td>7</td>
<td>0.45</td>
<td>3.15</td>
<td>7.15</td>
</tr>
</tbody>
</table>
In 1629 the senior clerk Yefim Telepnev attempted to replace the fixed salary with premium payments for the published book edition trying to interest employees in increasing the volume of books produced. However, the workers wrote a complaint against him to the Tsar (RGADA:1182:1:11:7), asking to pay them fixed salaries. This was due, apparently, to the fact that premium payments were not regulated, and in addition, the publication of books was irregular. After reviewing the case and comparing salaries, the former system of salaries was returned, and Yefim Telepnev was fired.

An original system of hiring workers was formed at the Moscow Print Yard. It should be noted that the employees were royal servants, had a stable income and quite a lot of privileges (abolition of various obligations). They were quite well-to-do, some had their own trade or craft workshop. At the same time, the specifics of labour involved high skill and responsibility. Therefore, new employees were hired only by the recommendations of experienced employees. Most often, these were their close relatives. A distinctive feature of the staff was the presence of labour dynasties. For example, Andronik Timofeev Nevezha worked at the Moscow Print Yard for 34 years (1568-1602), and then his son Ivan Nevezhin worked for 13 years (1598-1611). A little later, the name of the third member of this family, Alexey Nevezhin (from 1614), appears in the documents (Pokrovsky, 1913:7). There are many such examples in documents of the Moscow Print Yard. Therefore the enterprise was perceived by its employees as a community of highly professional and responsible persons.

We have not found accurate information about the duration of the working day. The workers wrote in their complaints that they were working “day and night”. A large number of purchased candles confirmed the assumption about the work in the evenings (RGADA:1182:1:28:1). The employees worked at the Moscow Print Yard throughout their life and could not leave it at own will. The illness, old age or death of an employee was the reason for leaving the staff most often. As noted in archival documents sometimes they eloped, were fired for stealing, or transfer to another social strata with the permission of the Tsar (soldiers, clergymen).

5.- Calculative technique at the Moscow Print Yard
The registration of transaction in the books of receipts and expenses was used in 17th century in Russia. Other large state manufactories were created at that time, such as the Money Yard, the Copper Mines, and this registration practice was also found in their archival sources (Sokolov, 1985; Medvedev and Nazarov, 2007). But the original calculative technique was created only at the Moscow Print Yard.

The Inventory 1 of RGADA’s Fond 1182 Moscow Print Yard contains three types of account books: sales books, inventory books and receipt and expenses books. Sales books appeared from 1632, when the bookstore began to function at the Moscow Print Yard and the sales turnover of books increased significantly. Until 1635, the format of records and registers was varied and then became quite stable. The second type of archival documents is books, written to account for the property of the Moscow Print Yard. Usually they were drawn up when a new iselovalnik started to work. The example is the inventory of the Moscow Print Yard 1667 (RGADA:1182:1:70:1-20). The list of debtors who have not paid for the received books in the current year, as of the end of the year, can be attributed to the same type of books. All production costs were carefully documented in the books of third type. Expenses books – okladnye and neokladnye - were used for the purpose of calculation the cost of finished goods. Ondahnye books recorded cash spent on employees’ salaries. They contained
royal decrees on the issuance of salaries, a list of all employees grouped by specialty (compositors, distributors, etc.), their signatures about receiving cash and feed money. Transfers of employees from one press to another, changes in salaries, reasons for dismissing employees were registered in these books too.

Neokladnye books were intended to registration purchases of materials and various works. They contained exhaustive information on all the necessary materials for the production. Each record looked like this:

1) the date of the transaction;
2) the place where the transaction was made;
3) the names of participants in the transaction - the seller, buyer;
4) the object of the transaction;
5) price;
6) for what purposes purchased, who gave the purchased material or item.

Some records contained information about the contracts with craftsmen for jobs that were not made by the Moscow Print Yard itself: making engraved boards, repairing presses, etc.

Raw materials were given to employees in normative quantities. The master received for production of 1,200 copies of book (normal size of the edition) the following quantities of materials: 480 sheets of good paper, 6 sheets of the poor-quality paper, 1 arshin of canvas, 2 belts, 5 sazhens of rope, 1 pound of soap, ¼ a pound of cinnabar and 3 buckets of linseed oil for cooking the ink. In addition, master received 200 small nails, 24 candles, etc. for a month.

Expenses books were drafted by tselovalnik. These records became the basis for reports of new type, called Smetnye spiski, which included brief summary list of expenses (RGADA:1182:3:111:7). Master (typesetter) informed tselovalnik about the number of finished goods. Transactions were registered in textual form, with Slavic letters used to designate figures (Figure 2).

Figure 2. Pages from Expenses book of the Moscow Print Yard, 1621:
a) Title of Expenses book (RGADA:1182:1:2:1) - 'Expenses Book of 1621 year';
b) The text about the salary of compositors (RGADA:1182:1:7:23) –
   'Naborshchiks (compositors)
   10 rubles and 12 yufts of bread for the sum 5 rubles 13 altyn 2 denga, total 15 rubles 13 altyn 2 denga'.

Already in the first books (1612-1620), one can see a desire to group records according to the items of expenses: expenditures on paper, cinnabar, linseed oil, for repair of the press, etc. Subsequently, this approach later influenced the appearance of special books: the book of the paper purchases (RGADA:1182:1:38 and RGADA:1182:1:48), as well as the book of free distribution. For example, the book of free distribution for 1650-1654 was found...
in the archive (RGADA:1182:1:8). Another trend traced in early books is the concentration of records for the edition, which was necessary to determine the cost of one copy of book. The result was a consolidated expenditure report written by tselovalnik (RGADA:1182:1:34).

Figure 3 shows the content of the accounting books used for the calculation of the cost of one book copy.

The material cost (paper, leather, parchment, linseed oil, canvas, etc.), the cost of prayer and treats, other costs (ink, equipment repair, etc.)

Fixed salary and feed money of each worker

Planned and actual edition (number of copies), the name of the buyer and the amount received from him, the type of sale

Number of copies for free distribution

Figure 3. Accounting books used for calculation of the cost of one book copy

The cost of one book copy was the basis for pricing of new editions. Representatives of the supreme power — the Tsar and the Patriarch — were primarily interested in receiving information on the cost of each book, since any publication served the interests of the state and acted as a guide to the policy of absolutism. As mentioned above, in the first half of the 17th century the books of the Moscow Print Yard were sold by the Tsar’s decrees at a price "without profit, but how much did they become in the production", i.e. equal to the cost.

The cost of each book copy was calculated by summarizing all the costs:
- fixed salary and feed money of employees who worked on the presses and employed in the service of the printing process;
- the cost of all purchased specifically for this edition and recorded in the expenses books;
- the money spent on free handing out treats and prayers, which always marked the beginning of the printing of a new edition.

After calculating the cost of the edition, the initial cost of one copy of the book was determined by dividing the amount of costs by the number of copies. Then the total cost of books donated to the church by the orders of the Tsar, as well as the cost (usually 3 or 9), presented to the Tsar, his mother and the Patriarch were calculated. The cost of copies for free distribution was added to the cost of all other copies, intended for sale. The result was approved by the Tsar’s decree as the sales price of the book. For example, the cost of the Church's Eye, 1100 copies of which were issued on February 20, 1633, was 1 ruble 13 altyn192 denga20 (1 ruble 40 kopecks), and after adding of the cost of the copies for free distribution the sale price became equal 1 ruble 27 altyn 2 denga (1 ruble 82 kopecks).

Production cost of one edition of the book included raspisnye and neraspisnye expenses. This classification corresponds to the modern concepts of direct and indirect costs. Raspisnye (direct) expenses included: the cost of materials and the salary of press workers. Neraspisnye (indirect) expenses included the cost of firewood for space heating, the purchase of candles and some office expenses. The basis for distribution of indirect cost among the
different books was number of working days. There is no description of this technique in archival materials. As a result of analysis of accounting books, we noticed that if the book was printed within 3 months, its cost included 1/4 of the annual salary of office employees and other office expenses, if 4 months, then it was 1/3. But if 2 or 3 books were printed simultaneously, such an approach could lead to a doubling of the amount of indirect costs when they are included in the cost. To clarify the procedure for the distribution of indirect costs, further analysis of archival materials is needed.

Usually the salary of employees accounted for about 49% of total costs, paper cost – about 42%, the other cost – 9% (Pozdeeva et al., 2001:123). The cost of each subsequent edition of the same book was often a little less, since less time was spent on correcting errors. For example, the Prolog21 edition of 1641, 1642 and 1643 sold at the same price of 3 rubles, but the mark-ups increased - 54, 76 and 91% respectively. This was due to a decrease in the cost of 1 sheet from 0.22 kopecks to 0.16 kopecks (reduction in the number of presses involved or printing time) (Pozdeeva et al., 2001:521).

6.- Organizational changes and transformation of cost accounting practice

6.1 From a domestic household to the state manufactory

The organizational processes transformed at the Moscow Print Yard during the 17th century in response to emerging new political tasks of the high authority. These facts led to changes in the documentation and calculation technique.

The decision of the Russian Tsar to restart the activity of the Moscow Print Yard in 1620 was directly connected with the task of spreading the printed word, praising the new royal dynasty of the Romanovs. The Tsar Mikhail Romanov himself paid great attention to the choice of books printed. At the beginning of the 17th century, the central figure of the printing house was the print master; he united his assistants around himself, making up a single community with them. Printed presses were named for the masters. The edition of each book was a significant event. Masters received a significantly higher salary, they were responsible for the quality of the book produced, their name indicated in the afterword to the book (Nikita Fofanov, Joseph Kirillov, Anisim Radishevsky, Kondrat Ivanov and oth.).

After 20 years of rule, the dynasty grew stronger and it faced the task of extending its influence to remote areas of Russia, which required an increase in the production of books. The tasks of political power changed and led to organizational changes at the state manufacture. In the 30s and 40s of the 17th century the number of presses increased, the editions of books grew; the activity of the printing house became more regular. This craft was transformed from a domestic household to a state manufactory. As the number of presses increased, the influence of the masters more and more decreased. Already since 1625, the presses were called Number 1, Number 2, Number 3, and so on. Strengthening the activities of the Moscow Print Yard led to necessity for one person to coordinate the activities of several masters and to be the representative of the state institution. So the master lost its role gradually and the senior clerk became a central person at the manufacture (Pokrovskiy, 1913:18). In 1626 the Office of the Book Printing was created, in which one senior clerk (dyak), three clerks, as well as two tselovalniks worked. The dyak’s salary was equal to 70 rubles a year, and his personal qualities were very important for the office’s activities. Over the years, these persons served as dyacs at the Moscow Print Yard: Yefim Telepnev (1620-1630), Moses Glebov (1631-1633), Semyon Volynsky (1633-1634), Ivan Chicherin (1634).
Organizational changes have affected the evolution of the structure of okladnye books (Pozdeeva et al., 2001:55). In 1620-1632 the grouping of employees in these books was carried out by printing press (RGADA:1182:1:1, RGADA:1182:1:9, RGADA:1182:1:11). Salary for different specialties could vary from press to press. By the end of this period, there are increasingly records of transfers from one press to another, about temporary employees. Since 1634 (RGADA:1182:1:17) signatures of employees on the receipt of money appeared in the book (or a receipt of another person who took money instead of employee). Naborschiks (compositors) and pressmen were the most literate, they signed for their salaries themselves. Since 1642 (RGADA:1182:1:37) the list of employees was divided into chapters by specialties, the rate of payment for each specialty is unified, within each specialty the grouping of employees was carried out by printing presses.

An increase in the number of printing presses led to the changes in the share of neraspisnye (indirect) expenses. The amount of indirect expenses included in the each edition cost was calculated as the proportion of the annual salary of employees corresponding to the book production period (from 38 days to 635 days, as the process was sometimes suspended due to a lack of paper or difficulties of correction). Information on the procedure for determining this amount in cases where several books (from 2 to 4) were printed simultaneously has not yet found in the archive documents.

6.2 Changes in the state price policy

Profitability has always remained only the second goal of the Moscow Print Yard's activity. The first one was the goal formulated in the epilogue to the publication of the Instructions of St. Ephraim the Syrian, published at the Moscow Printing House on February 1, 1647: 'The edifying books ... release all over the great Russia for the enlightenment and adornment of the holy churches of God, and for the Orthodox people's reading and listening, and for the common benefit of Christianity'. In the early years of its work, the Moscow Print Yard was viewed as a godly business, so the books were sold at the price of 'how much did they become in the production' (or as sometimes the latter is called in the archival sources, 'own cost'). This practice continued until 1634, when, after the Fires on May 3, 1626 (RGADA:1182:1:5:37) and April 25, 1634 (RGADA:1182:1:19:16), the sale price of the book began to include the cost of repairing and renovation of the buildings of the Moscow Print Yard. For example, Psalm (1634) cost 1 ruble 17 altyn 1 ½ denga, then they added to it 'for repairing and construction' another 32 altyn ¾ denga, and so its price was equal 2 rubles 16 altyn 4 denga, in other words, 65% more. (RGADA:1182:1:23:47-49). The treasury had these expenditures, and it was necessary to reimburse them. So the Moscow Print Yard began to sell the books at a price approved by the Tsar's decree with a mark-up. Table 2 presents the example of price with mark-up calculation for Prolog (1642).
### Table 2
Price calculation for *Prolog* 1642 (1,200 copies)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Calculations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total production cost (1,200 copies)</td>
<td>2,011 rubles 33 <em>altyn</em> = 2,011.99 rubles</td>
</tr>
<tr>
<td>The cost of 1 copy</td>
<td>2,011.99 / 1,200 = 1.67625 rubles</td>
</tr>
<tr>
<td>Number of copies for free distribution</td>
<td>38</td>
</tr>
<tr>
<td>Number of copies for sale</td>
<td>1,200-38 = 1,162</td>
</tr>
<tr>
<td>Cost of 1 copy for sale</td>
<td>2,011.99 / 1,162 = 1.7315 rubles</td>
</tr>
<tr>
<td><strong>Sale price</strong></td>
<td><strong>3 rubles</strong></td>
</tr>
<tr>
<td>Mark-up, rubles</td>
<td>3 - 1.7315 = 1.2685 rubles</td>
</tr>
<tr>
<td>Mark-up, %</td>
<td>1.2685 / 1.7315 *100% = 73%</td>
</tr>
</tbody>
</table>

According to the archival data, the biggest markup was made on cheap educational books, which remained cheap in this case. For example, the production cost of the *Chasovnik* (1635) was equal 2 *altyn* 2 *denga* (0.08 rubles), and its sale price was 5 *altyn* (0.15 rubles), i.e. the mark-up was 87%. More expensive books received a lower mark-up from 40 to 7%. For example, the sales price of *Minea* (1636), equal to 1 ruble 20 *altyn*, i.e. 1.60 rubles, was only 26% higher than its cost, i.e. 1 ruble 9 *altyn* or 1.27 rubles (Pozdeeva et al., 2001).

### 6.3 New distribution channel

Throughout the 17th century, the distribution channels of books changed. Up to 1632 the following ways of the books distribution were noted: donation in monasteries, wholesale to Moscow merchants, retail at the Moscow Print Yard, sales books to people in debt. For example the record in the sales book (1622) indicates that 1,000 copies were transferred for sales to the merchants of *Kitay-gorod* (RGADA:1182:1:1). In 1632 its own bookshop of the Moscow Print Yard was opened. This fact was due to increased demand for books. For example, in 1636 an average 376 customers came to the shop every day, who bought an average of 537 books a day (Pozdeeva et al., 2001:82). In 40s this form of sales became dominant.

The opening of the bookshop led to the changes in the structure of the *Books for outputs and sales*. The text of each entry consists of two unequal parts. In the first, lesser, the pre-history of the book being sold was described. The second part contained a list of the buyers. The sale began a few days after the Tsar’s decree on pricing was issued. Each record was devoted to one fact of purchase and looked like this:

1) place of the buyer residence;
2) his social position;
3) name of buyer;
4) number of books purchased;
5) price of one book;
6) total amount of money paid.

The analysis of sales records allows us to conclude that among the readers of books published by the Moscow Printing Yard were the clergy (patriarchs, metropolitans, bishops, priests, deacons, hymns), boyars, merchants and other townspeople (Luppov, 1983). Detailed records remained in sales books allowed the researchers to trace the circulation of 4,663 out of 4,800 copies of the *Prolog* (1641-1643), i.e. 97.1%. Only 176 copies out of 4,663 were free
distributed, and 4,487 were sold, i.e. 93.5%. Based on the results of studying books found and preserved in archives and libraries, it can be concluded that the distribution had the widest geography (Kostroma, Kazan, Rostov, Yaroslavl, Ryazan, Vologda, Kolomna, etc.).

Books for outputs and sales were absent in the archive after 1665, Books on extracts of new books appeared instead of them (RGADA:1182:1:75). Here, information about each edition was given: a brief version of the list of expenses, the start and end dates of the sale, the amount of revenue and the amount of profit (without names of buyers). The disappearance of Books for outputs and sales is a fact that requires an explanation. Pozdeeva et al. (2007:1:57) suggested that the existence of such a detailed list of buyers in the period from 1632 to 1665 was based on the desire of the managers of the Moscow Print Yard to prevent the sale of too large a share of the edition to the intermediaries (among which were the employees of the printing house). Comparison of the book prices in the bookshop with prices in the Moscow regional markets shows that books in the bookshop at the Moscow Printing Yard were always much cheaper. Detailed information about the buyer made it possible to check the reality of transaction, in order to prevent a fraud. We offer another explanation - the itemized record of each sale was justified until the number of transactions has become significant. With an increase in output and sales, keeping detailed records about each buyer slowed down the sales process, so shift of attention to the financial result of sales led to a simplification of record format.

6.4 Schism in the higher church authorities

The Office of the Book Printing had been successively held by Prince Alexei Lvov during 1640-1652. Under his leadership, the Moscow Print Yard reached its highest peak. In 1640-1641, the stone building was repaired, and in 1642-1645 new stone buildings were constructed on the site of the existing wooden ones. The staff of correctors was enhanced by two well-known scribes: archpriest Mikhail Rogov and the priest Ivan Vasiliev’s son Nasedka (Nikolayevsky, 1890:463). As mentioned above, priority was given to religious books at that time. Alexei Lvov carried out changes in the repertoire of books and began to actively publish books for individual soul-saving reading, for example, the encyclopedia of Christian literature Prolog (1641-1643), collection of teachings of early Christian authors Margaret (1641), teachings of Ephraim Sirin (1647), etc. In the prefaces and epilogues to these books, the main provisions of the state ideology were carried out - strengthening the power of the Tsar from the Romanov dynasty. Active construction managed by Lvov and the expansion of the staff led to the emergence of separate registers with detailed records of the purchases of building materials (from buying moss and the first brick at the beginning of construction to the finished building, from the price for one ancillary worker cleaning garbage to the bricklayer and icon painter).

In 1652-1655, the Moscow Print Yard was headed by Patriarch Nikon22. A phenomenon known in Russia as the “Church schism” occurred in Russian state in the middle of the 17th century. The main slogan of Nikon was the purification of the Orthodox religion from the influence of Catholicism. In 1654 higher church authorities decided to re-examine the liturgical books and correct them according to ancient Greek patterns. In the prefaces to new books Nikon was glorified as a person sharing power with the Tsar. When Nikon headed the Moscow Print Yard, the printed book became a conductor of Church reforms. Since 1655 the correction of books became a regular stage of the production process. The books were corrected at the Moscow Print Yard before, but it was carried out to prevent errors and
During the years of his patriarchate, Nikon set the task to correct the content of all published books; therefore, the correction was being conducted extremely actively (RGADA:1182:3:27-32). The corrector’s work acquired a completely different meaning; this work was constantly monitored and verified by the Church. When detecting unauthorized corrections, the edition was reprinted, the employee fired.

Changes in the labour processes at the Moscow Print Yard affected the content of account books. Up to this moment, the correctors received salaries in the Patriarch’s Office. After reforms they entered the staff of the Moscow Print Yard. The increased demand for the services of correctors led to an increase in their number, and, accordingly, the salary of correctors was allocated a separate section in the okladnye books and became a new element of production calculation. Many manuscripts were purchased to verify the text, including several revisions of the same text. A collection of books used for reconciliation was actively formed, copies of all newly published books were carefully preserved (RGADA:1182:1:69:66-70, 1182:1:78:287-404) and so new type of expenses were included in the cost calculations.

6.5 Financial crisis in 1660s and organizational changes

In the middle of the century, the Moscow Print Yard was a successful enterprise; its financial position was stable. For example, in 1630 the senior clerk Telepnev transferred to the high authority (Office of the Book Printing) a significant amount of 500 rubles (RGADA:1182:1:8:144). However, in the autumn of 1654 Moscow had survived a plague epidemic that killed thousands of citizens. Only 25 employees of 145 continued to work; they had to recruit new ones, to train them, which led to a decrease in quality of printing (Lukyanova, 1996). In the early 1660s, an economic crisis erupted against the backdrop of a protracted Russian-Polish war (1654-1667). The issuance of copper money led to higher prices and reduced demand for books. The Moscow Print Yard paid for imported paper with silver money, but, as a state institution, it was forced to sell books for new copper money, which led to significant losses (Pozdeeva et al., 2007:1:171-226). In addition, some number of buyers was lost due to the non-recognition of Nikon's reforms and the newly-edited printed books.

Under these conditions, on August 21, 1667 the management of the Moscow Print Yard decided on a planned staff reduction: only 53 of the 140 employees worked at 4 presses (RGADA:1182:1:69:5-6). The remaining employees worked on the temporary contract. In the future, this form of contract has taken a significant place in the activities of the printing house. Anti-crisis measures also included permission to combine positions. For example, the watchman could work at the same time as a blacksmith and the pressman combined his position with the bailiff. Part of the salary to regular employees was paid by finished products, i.e. books (RGADA:1182:1:33:3-124). In accordance with archival documents, 157 persons out of 171 full-time employers came to the bookshop to buy books (92%). Of particular interest to workers caused cheap editions. Some bought 2 or more copies of books. For example, typesetter Simeon Gavrilov bought 18 books a year for a total of 18 rubles 28 kopecks, with an annual salary of 20 rubles 33 ½ kopecks (RGADA:1182:1:33:51). This is evidence of possible additional income of employees received by re-sale of books.

The rise in bread prices has led to the demands of workers to take inflation into account when paying salaries. Repeatedly, the employees appealed to the Tsar with a request to recalculate the second part of the salary — feed money — at the market price of bread, as the
prices of foodstuffs increased greatly. As a result, several times the workers received additional payments as the feed money. For example in 1660 the employers received an additional payment of 155 kopecks for each yuff of bread (with the initial price 80 kopecks per 1 yuff), and this amount of 209 rubles was included in the cost of the Psalter (RGADA:1182:1:61:96). As a result, a new type of register Additional feed money books appeared for the records about the supplement payment of the feed money due to the increase in bread prices (RGADA:1182:1:22, 24, 27, 32, 33, 37, etc.).

The financial crisis led to new organizational changes at the Moscow Print Yard in the end of the 17th century. The majority of employees no longer received a fixed salary, but began to work under a temporary contract. This fact changed their behavior and psychology. If traditionally the Moscow Print Yard was perceived by employees as a community of high-skilled and respected people, now only economic interest connected them with the enterprise (Pozdeeva et al., 2007:1:159). As a result of strengthening state control, a system of personal financial responsibility of typesetters for errors and typos and strict collective censorship of published books was developed. Special decrees appeared that reinforce financial responsibility for damage of books, for typographical errors in the form of withholding part of salary (RGADA:1182:1:67:53, RGADA:1182:1:67:105, RGADA:1182:1:81:12-19).

Organizational changes mentioned above became the reason for further transformation of bookkeeping practice at the Moscow Print Yard. Since the beginning of the 17th century, responsibility for the accurate keeping the records in account books has been assigned to the tselovalnik. Serving as tselovalnik was a duty for the townspeople. They performed it in turn, without salary, distracting from their own affairs. Until 1682, these servants acted independently: managed the cash, concluded contracts for the supply of raw materials, hired workers, sold goods at his own risk and kept the account books at the same time. After the expiration of his service, the tselovalnik transferred all the documents and money to the next one in turn, and a complete inventory of the property was drawn up. The financial independence of the tselovalnik resulted in insufficient controllability of his operations. During the period of the tselovalnik service 1678-1680 and 1682-1684, two major shortages of about 1,500 rubles each were revealed (RGADA:1182:3:51:1-7). These incidents have resulted to the deletion of the position tselovalnik from the staff of the Moscow Print Yard since the beginning of 1683. All functions of tselovalnik were shared among other employees of the enterprise. The pressmen took part in the purchases of raw material, but documentation and calculation have become a special area of the office activity. All bookkeeping procedures were now conducting by clerks who were full-time employees and received a fixed salary at the enterprise. These facts marked the identification of bookkeeping as part of administrative activity at the Russian state enterprises at the end of 17th century.

7.- Conclusion
Modern historians of accounting are critical about a linear understanding of the historical process as a progressive development of the economy and the society. Not every change is, in essence, an improvement. Without a clear idea of what represents an “improvement”, it is difficult to classify and evaluate historical facts. The general assumption is that the development and introduction of new accounting methods aims to improve the quality of information based on bookkeeping data (Mattessich, 2008:2). However, this process is not simple. The reality is much more complex and progress in the development of a certain branch of knowledge is achieved through trial and error.
The professional community expresses a variety of views on the determinants of accounting change. The speed with which accounting innovations spread around and their scope is influenced by many factors, both internal and external to a particular economic unit. Therefore, it is important to use a comprehensive approach to the study of improvements in accounting methods, investigating changes in the political and economic environment at both micro and macro levels.

We favour the idea of the dominant influence of state policy on the development of accounting in Russia, including cost accounting (see Sidorova et al., 2018). The emergence of new state tasks throughout the 17th century led to the organizational changes at the state-owned enterprise Moscow Print Yard: the construction of new buildings and presses, the changes in price policy, the emergence of a new way of distribution, wide spread implementation of temporary contracts, the transfer of the cost recording function from merchants to clerks.

Historical studies of the RGADÁs Fond 1182 are indisputable evidence that the Moscow Print Yard was the locomotive of both Russian and pan-Slavic culture in the 17th century. The large quantities of not only liturgical, but also educational books, first of all, the ABC-book and Grammar, available to all strata of Russian society were printed, sold and distributed throughout Russia. This activity of the first Russian printing house ensured ‘the creation of a wide range of literate people, preparing the possibility of future Peter reforms’ (Luppo, 1970:58). Simultaneously the printing word became a conductor of the state policy, affirming in the minds of citizens the ideas of absolute monarchy, religiosity and subordination to the hierarchical order of government.

Archive of the Moscow Print Yard contains information about the publishing policy, organization of labour, movement of personnel. It also serves as a source of the interesting data about price calculation techniques, which allows us to conclude that there was an original system of registration and documentation for the cost of printing books. The development of calculation and gradual improvement of documentation techniques served as a response to the political and economic challenges of the century and led to the formation of a new kind of administrative activity, which later was called the cost accounting.

The transformation of bookkeeping practice at the Moscow Print Yard was not a direct result of rational decisions of government. Archival sources do not contain any normative act or direct instruction governing cost accounting. Therefore analyzing the chain government tasks – organizational changes at the state enterprises – transformation of bookkeeping practice we conclude that the influence of government actions on the calculative techniques may be determined as indirect in the 17th century in Russia. The government did not yet fully recognize cost accounting as a rational tool for governing production processes at the state enterprises. It will become the story of the 18th century.

NOTES
1 The Moscow Print Yard was the first Russian printing house, founded in 1563 in the reign of Ivan the Terrible.
2 Mikhail Romanov (1596-1645) became the first Russian Tsar of the House of Romanov after the Zemskiy Sobor of 1613 elected him to rule the Tsardom of Russia.
3 Ivan Fyodorov (1525-1583) was one of the fathers of Eastern Slavonic printing, he was the first known Russian printer, he was also a skilled cannon maker and the inventor of a multibarreled mortar.
Peter Mstislavets was a Belarusian printer. Together with Ivan Fedorov, he printed the first Russian dated printed book Apostole on March 1, 1564 in Moscow.

Crimean Khan Giray (1512-1577) was a khan of the Crimean Khanate during whose long reign (1551–1577) the khanean rose to the pinnacle of its power.

Kitay-gorod also referred to as the Great Possad in the 16th–17th centuries, was a cultural and historical area within the central part of Moscow in Russia, defined by the remnants of now almost entirely razed fortifications, narrow streets and very densely built cityscape.

Prikaz knigopechatnogo dela was a governing body in Russia that existed from the middle of the 16th to the beginning of the 18th century and ruled the printing business.

Prikaz Bolshogo Dvorta was a governing body in Russia, which ruled the royal estate from 1627 to 1709 (bought goods, food, registered the income and expenses of the royal estate).

Patriarshiy prikaz was a central institution of the Moscow Patriarchate of the 17th - beginning of the 18th centuries, who ruled over the patriarchal estate, appointed the clergy for the posts.

Tseltovalnik (kisser) was a common term for various officials in Russia in various judicial, financial and police functions. The term is a contraction of the expression krestny tseltovalnik, ‘the one who kissed the cross’.

Simeon Polotskiy (1629-1680) was an academically-trained Russian poet, dramatist, churchman, and enlightener who laid the groundwork for the development of modern Russian literature.

1 ruble = 100 kopecks.

16 kilograms, it was an Old Russian weight measure.

1 chetvert = 24 liters. It was Old Russian measure for bulk products.

1 arshin = 0.7112 meters. It was Old Russian measure of length.

1 yuft was a measure for bulk products. It was equal 1 chetvert of rye and 1 chetvert of oats. chetvert ≈ 209.912 liters.

The table is prepared on the basis of Pokrovskiy (1913:27-29).

1 sazhen = 2.16 meters. It was Old Russian measure of length.

1 alyn = 3 kopecks.

1 denga = ½ of kopeck.

Prolog is a collection of short descriptions of the lives of saints, stories, legends, teachings, located on 366 days of the year - from September to August, more than 2 thousand literary plots with the names of historical figures, ecumenical patriarchs, Russian princes (Sazonova, 1978).

Patriarch Nikon (1605-1681) was the seventh Patriarch of Moscow and all Rus' of the Russian Orthodox Church, serving officially from 1652 to 1666. Nikon introduced many reforms which eventually led to a lasting schism known as Raskol in the Russian Orthodox Church. For many years he was a dominant political figure, often equaling or even overshadowing the Tsar.

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