

YAROSLAV V. SOKOLOV ON PARADIGMS OF ACCOUNTING AND STATISTICS

Svetlana Karelskaya

Saint-Petersburg State University, Russia

SNKarelskaya@mail.ru

Ekaterina Zuga

Saint-Petersburg State University, Russia

ekaterinazuga@mail.ru

Abstract

Among those most outstanding scientists and researchers who facilitated the development the theory and application of accounting in Russia at the end of the 20th and the beginning of the 21st centuries was Professor Yaroslav Vyacheslavovich Sokolov (1938-2010). His forte and major field of research was accounting history. It would not be erroneous to say that in modern Russia Professor Sokolov was in fact the founder of this sphere of science and research. His works on the history of accounting gained unanimous recognition in the world and were published in Bulgarian, Chinese, English, German, Italian and Ukrainian translations. Ya.V. Sokolov was the first researcher in Russia to look into the development of accounting as a paradigm shift, with regard to the major provisions of Thomas Kuhn's (1922-1996) theory of scientific revolutions. The accounting paradigms singled out by Prof. Sokolov for Russia are universally accepted.

Less known are works written by Ya.V. Sokolov on the history of statistics development to which he also applied T. Kuhn's theory. The most valuable work in this respect was a multi-author book written under Prof. Sokolov's guidance 'Statistics at St. Petersburg University'. He had been working on it to the end of his life, and the book was published posthumously by his followers in 2010.

Prof. Sokolov gave a description of the theory of paradigm shift in accounting in his work 'History of Accounting Development' published in 1985. In the development of accounting he distinguished two levels of paradigms. Methodological paradigms of accounting, i.e. unigraphic, cameral and digraphic ones, comprised level one. The core category (object) in the system of accounting, i.e. property and capital in the unigraphic paradigm; budget and financial estimate in the cameral one, and financial result in the digraphic paradigm served the grounds for their assignment. Level two represented content paradigms, that is, naïve naturalism and accounting realism. The shift to the paradigm of accounting realism can be characterized by rejection in accounting from the idea of a mirror reflection of business life facts and by the change of the accounting objective – from disclosure of information about the company assets to presentation of information requisite for efficient decision-making in the course of management a business.

As opposed to the views on the accounting paradigms, for the purpose of finding the grounds for identifying paradigms in statistics Prof. Sokolov assigned the subject of science, allocating in this respect four paradigms: the state (state activity), society, statistic methods and statistic groupings. It should be specifically pointed out that Prof. Sokolov dedicated his work to the development of statistics at St. Petersburg State University and not to all of its history as a whole. This was probably the cause why the statistic paradigms allocated by Prof. Sokolov describe statistics only as a science and do not include practical application.

The said shows that the approaches which Prof. Sokolov chose to apply Thomas Kuhn's theory to dealing into accounting, have major differences. The first one of them lies in the fact that, according to Prof. Sokolov, the dominating paradigms replace each other,

and in this aspect, the paradigms of methodological level coexist on parallel basis until currently. In statistics the author describes the paradigm shift as a process of evolution. The dominating paradigm is replaced by a 'new' one which supplants the former one. The other difference is rooted in the approach to paradigm review. In accounting Prof. Sokolov distinguished general paradigms characterizing the development of accounting practices. In statistics he singled out the paradigms of science, showing its evolution as evidenced from St. Petersburg State University.

Key words: Paradigm, Accounting History, The Paradigm of Statistics, Naïve Naturalism, Accounting Realism.

Introduction

Yaroslav V. Sokolov (1938-2010) was one of the most outstanding scientists who influenced the theory and practice of the accounting development in Russia at the close of the XX century - beginning of the XXI century. The theory of accounting and its history were the main areas of Professor Yaroslav V. Sokolov's activity. He is considered the founder of a new branch of the Russian economic science dealing with the methods of creation the quantitative information about business entities. It is known as Sokolov's Accounting School (Пятков, 2011, p. 122).

Throughout his life, Professor Yaroslav V. Sokolov was interested in the history of accounting. His papers were generally recognized and translated into Bulgarian, Chinese, English, Italian, German and Ukrainian. Yaroslav V. Sokolov was the first scientist in Russia who analyzed the history of accounting development as the paradigm shifts in accounting. At present his approach to the identification of accounting paradigms is generally recognized in Russian historical research.

In his studies on the history of statistics Ya.V. Sokolov took advantage of T. Kuhn's theory. However, in his research into statistics he did not plan to study history at large. He only provided a description of its evolution at St. Petersburg University.

In terms of this article, its main objective aims at the analysis of Ya.V. Sokolov's employment of the theory of scientific revolutions by T. Kuhn's in the history of accounting and statistics.

1. Major Provisions of T. Kuhn's Theory of Scientific Revolutions

The word 'paradigm' was first given by a philosopher-positivist G. Bergman (1906-1987). But it obtained a wide circulation after T. Kuhn (1922-1996) published his study 'The Structure of Scientific Revolutions' in 1962.

T. Kuhn viewed a paradigm as 'universally recognized scientific achievements which for a certain period of time provide the scientific community with a model for posing problems and their solutions' (Кун, 2003, p. 12). Scientific knowledge evolves, according to his theory, through a shift of scientific paradigms. The transition from a paradigm to a paradigm is brought about by way of a scientific revolution. In between scientific revolutions there comes a normal period of science. At this time science accumulates knowledge, perfects its methods and instruments, and expands its practical applications. A scientific revolution discards all that has been achieved at the previous phase as irrelevant, and the work of science starts as if anew. Therefore, in the history of science there appear alternating phases of vying between various scientific communities and phases of normal science. The period of the supremacy of the adopted paradigm gives place to the period of its disintegration, which shows itself in the notion of a 'scientific revolution'. The victory of one of the vying paradigms restores the period of normal scientific development. The period prior to the rise of a new paradigm

is accompanied by the process of accumulating facts and anomalies (where anomalies correspond to the loss of the paradigmatic ability to puzzle-solving). Moving out of this period suggests the establishment of scientific practices standards, of theoretical postulates, the exact world view and the unification of the theory and method.

Therefore, T. Kuhn described the development of science as successive replacement of the following phases: normal science, developing within the framework of the universally recognized paradigm, to be replaced by the growth of the number of anomalies – which defame the dominant paradigm and lead to its crisis – and then to be followed by a scientific revolution which brings forth the replacement of the dominant paradigm with a new one.

Theory of scientific revolutions was described by Kuhn by the example of the natural sciences. But soon it became used for the research of humanities development including economics. Accounting and statistics were not the exceptions.

2. Accounting History and Theory of Scientific Revolutions

R.J. Chambers (1917-1999) was the first scientist to use the T. Kuhn's theory in accounting in 1965 (Chambers, 1965, p. 97-104). However, the first description of the theory of paradigm shift in accounting appeared in 1976 in the works of M.C. Wells (Wells, 1976, p. 471-482). At different times a lot of outstanding scholars began to apply it.

The main difference between author's approaches to the theory of scientific revolutions was in the comprehension of paradigm's essence. Classifications of some authors include only the paradigms of accounting science in strict compliance with the theory of scientific revolution by T. Kuhn. Others tend to divide the whole history of accounting into paradigms, including pre-scientific stage of its development (figure 1)¹.

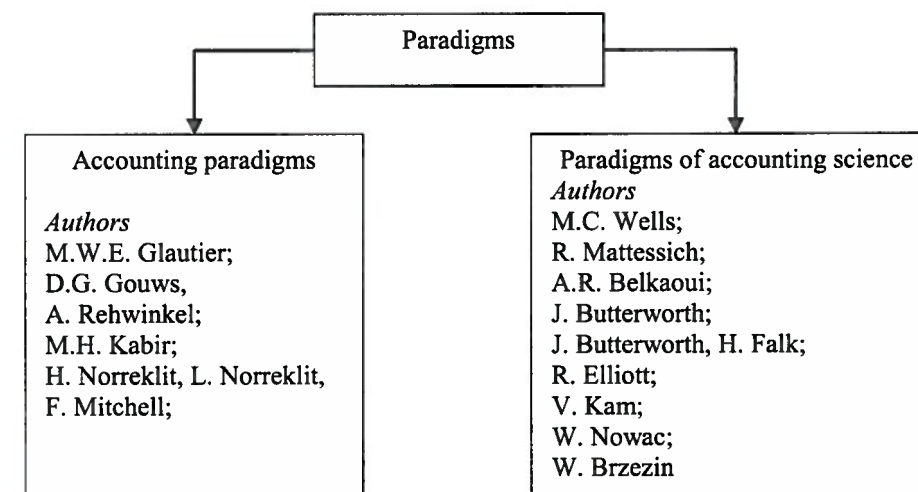


Figure 1. Approaches to the identification of paradigms

Thus, notwithstanding the external differences in the names of certain paradigms in the approaches of each author, they are joined by general understanding of paradigms as historical stages of accounting development.

In Russian accounting literature the first mention about the possibility to apply Kuhn's theory for accounting history examination and the term 'paradigm' was first appeared in 1979 in the joined book by Ya. Sokolov and V. Paliy 'Introduction to the Theory of Accounting'.

¹ Fig. 1 after: 3yra, 2012, p. 11.

3. Definition of 'Paradigm' in the Works by Ya. V. Sokolov

Sokolov and Paliy suggested to apply to T. Kuhn's theory of paradigm shift where the term 'paradigm' was stated as 'the set of beliefs, values, technical tools and so on which are inherent in this society' (Кун in Палий, Соколов, 1979, p. 23). There is neither description of process of paradigm shift nor classification of paradigm in accounting in this book.

In his follow-up research Yaroslav Sokolov described the theory of shifts and co-existence of paradigms in accounting. The first theses were given in the book 'The History of Accounting Development' published in 1985. In this book Yaroslav V. Sokolov devoted a chapter 'Three Paradigms in Accounting' to the description of the theory of paradigm in accounting, where he gave his own definition of the term 'paradigm' as 'the set of beliefs which are inherent in this society' (Соколов, 1985, p. 40).

In 1996, Professor Sokolov published a monograph 'Accounting: From the Backgrounds Till These Days' in which he gave the most complete explanation of the theory of accounting paradigm shift. The author gave two definitions of the term 'paradigm'. One of the definitions was close to the one given in 1985 as 'set of beliefs which are inherent in this society' (Соколов, 1996, p. 63). Yaroslav V. Sokolov said that such understanding of paradigm is used 'during the research of science development' (Соколов, 1996, p. 63). The second definition by Sokolov was to be employed in the theory of science. Here, the paradigm is 'set of the widely spread and shared views of people concerned' (Соколов, 1996, p. 63). New definition of the paradigm was less philosophical but more about accounting. Yaroslav V. Sokolov when he said about his theory of science meant the science of accounting and when he said about paradigm in science meant the accounting paradigm.

Accounting is first and foremost an activity aimed at accumulating qualitative information for those interested. The methodology of accounting is being formed in response to the objectives placed before the makers of accounting information. Also, the objectives of select business entities are singular. However, a paradigm appears only when the views of the majority in respect to the objective content and to their decision-making approaches are unified, i.e. 'when they are wide-spread and shared by the majority'. It is important to emphasize that they may not be necessarily shared by the unanimous majority but just by a majority. This is exactly what was accentuated in the definition provided by Ya. V. Sokolov.

The analysis of the amendments introduced by Ya. V. Sokolov to the 'paradigm' concept has disclosed the fact that the researcher was making an attempt to 'adapt' T. Kuhn's definition to accounting. He sought his 'own' definition for a 'paradigm' that would correlate with his theory of paradigm shift in accounting.

4. Classification of Accounting Paradigms and Ya. V. Sokolov's Theory of their Shift

The author distinguished three paradigms in the development of accounting – single-entry, cameral and double-entry accounting.

In accounting history the single-entry paradigm is considered to be the first one. According to Yaroslav V. Sokolov, there was a unique single-entry paradigm before the XIII century (Соколов, 1985, p. 41). In this paradigm the methods of accounting had 'a unique goal: to show the existing assets and payments between the participants of the commerce' (Соколов, 1985, p. 41). The following 'methods were worked out to realize this paradigm: accounts to systemize the accountable objects, inventory to register the accountable objects, account current and, finally, the budget. The control of paradigm implementation became one of the most important tasks of accounting together with safety of assets' (Соколов, 1985,

p. 41). Thus, Yaroslav V. Sokolov in his description of a single-entry paradigm showed the origin of cameral and double-entry paradigm.

'Cameral – the second paradigm – was so far a particular case of single-entry accounting and was used in the entities where they recorded the alteration of budget and cash-register' (Соколов, 1985, p. 337).

Interesting enough that Yaroslav V. Sokolov did not discuss thoroughly the double-entry paradigm. He said that 'the double-entry accounting came from the single-entry accounting'. He also made a remark that 'such idea is shared by the majority of researchers. Though, I. Schär believed that the single-entry accounting is an abridged version of the double-entry accounting' (Соколов, 1985, p. 43). Further on, the book described the methods of the double-entry accounting, but not a double-entry paradigm. The origin of this kind of accounting was connected with the emergence of the 'two wings (debit and credit), which initiated the creation of procedures and rules and possibility to expose the financial results from the accounting data without checking the cash-box or current bank account' (Соколов, 1985, p. 58). Therefore, Yaroslav V. Sokolov described the methodology of three paradigms. The author explained the process of development and shift of a single-entry paradigm in details, marking out five stages of its evolution: '1) inventory accounting (recording of the balance of material assets); 2) account current (recording of payments); 3) money (coins) was the object of accounting; 4) money as object of accounting merged with payment recording; 5) money and account current absorbed inventory as well (this is a complete single-entry paradigm – all accounts are in-the-money). Finally, introduction of capital accounts meant the end of the single-entry paradigm and the triumph of a new paradigm' (Соколов, 1985, p. 43).

The reasons for development of the single-entry paradigm and appearance of a new one were connected by the Russian scientist with the following malformations of its methods: '1) records were not a unique system, its objects were an accounting population, elements of which could not be measured; 2) each object as a rule was recorded in the units which denoted it, for example, bread and grain were recorded in natural units, cash-register – in monetary units and so on; 3) if there were any systems integrating the accountable objects, they were a single-entry accounting systems which had neither the owner account, nor results-based accounts; 4) it was impossible to expose any financial result from the accounting without inventory. That is why our predecessors were obliged to search for something better, for more conclusive and efficient paradigms' (Соколов, 1985, p. 42).

It is important to say that there is no description of development and shift of two other paradigms in that paper either, there is no clear interpretation of the separation of three mentioned above paradigms. It was revealed that their classification is explained by an expansion and changes of the accountable objects instead of the differences in the methods of accounting, as it can be supposed after the analysis of single-entry and double-entry paradigms which are based on single and double entry records. This hypothesis is proved after the review of a cameral paradigm in comparison with the single-entry and double-entry paradigms. The accountable objects of a single-entry are property and own funds, while at a cameral accounting they are cash-register and budget, at a double-entry – property, own funds and accounts of own funds.

According to the chronological description given by Yaroslav V. Sokolov, there were three paradigms in XIV-XV centuries: single-entry, cameral and double-entry (Соколов, 1985, p. 42). And 'the history of accounting in XVI and the first part of the XX century was the history of double-entry paradigm, its development, internal separation into other smaller paradigms, its illness and slow death' (Соколов, 1985, p. 44).

However, all stated above are only particulars which hide the real content of the Sokolov's paradigm theory. The essence of the theory is 'in the existence of several paradigms in one accounting and, beside, intellectual assumptions of each accounting paradigm resulted from business activity and its nature as well as psychological set of bookkeepers and traditions they were brought up with' (Соколов, 1985, p. 340). Consequently, the Sokolov's theory does not mean the shift of at least three methodological paradigms of certain accountable objects. It means the change of the methods of revealing the data which implies the transfer from 'naive naturalism' to 'scientific naturalism'. It was that way which Yaroslav V. Sokolov thoroughly described. It was the evolution of these paradigms or concepts, as the author named them, which he outlined in his paper. The analysis of the single-entry, cameral and double-entry paradigms only illustrates the development of two main concepts.

The paradigm of 'naive naturalism' is based on the idea of the data reproduction of business activities. 'Each fact of real economic life can be matched with an informational fact or data, the least being the reflection of the first one. Accounting does not include criticism, shortages recorded do not concern accounting. Different facts are recorded in different units, so, in accordance with the concept of consecutive naturalism, the accounting is done in the same units. Abstract units, even such essential as profitability, are not recorded' (Соколов, 1985, p. 43). This concept is acceptable for the single-entry accounting which record certain values and liabilities.

The process of development of the concept of 'naive naturalism' performed the significant shortcomings, as follows: '1) it does not reveal either legal or economic factors of business activity; 2) there is no possibility to sum up different facts as there is no unique unit (many currencies were used); 3) there are no conditions for computing the goal of a private entity – profit margin; 4) there was no rule for automatic control of the recorded sums' (Соколов, 1985, p. 43-44). Insolvent paradigm was substituted with the paradigm of accounting realism. Its major characteristics are as follows: 'undercoverage of business activity and introduction of conceptual, logically artificial restraints. These restraints helped to distinguish essential from external, notoriously distort the partial in order to depict the integral whole more properly' (Соколов, 1985, p. 44). The transfer to realism caused the substitution of naturalistic degree of approximation with the arithmetic truth, the last having increased with the perception of its relativity. This concept corresponds to the double-entry accounting which records abstractive accounts of the own funds, financial results and other accounts of order and method as they were named by E. Léautey and A. Guilbault, i.e. depreciation, *del credere*, advance booking (Соколов, 1985, p. 339). It was a long period of time from the appearance of the first abstract units in accounting up to the transfer to the paradigm of realism. This transfer took place when accounting records ceased to reflect the business activity and the accounting transformed 'from the supervision tool into the instrument of the business management' (Соколов, 1985, p. 33).

In the framework of this concept, the cameral accounting was developing in its own way. It was used for budget recording. Yaroslav V. Sokolov did not pay much attention to its description in his theory of accounting paradigm shift. Meanwhile the history of accounting development allows us to make the conclusions as follows. The cameral paradigm was initially focused on the introduction of imputation, which had no connection with real business factors. The cameral accounting was born when cash-register was recorded, and it evolved into a new stage of development with the introduction of the budget or plan. So, when the budget was recorded by means of cameral accounting this paradigm, which used to be the feature of naturalism, became the instrument of management. The cameral paradigm was highly developed in the budget accounting. During the Soviet period it was used in commercial or

patrimonial accounting when the planned targets were also recorded. In foreign practice the cameral paradigm development depended on standard-costs and normative accounting, which Yaroslav V. Sokolov named as 'qualitative breakthrough in the development of accounting' (Соколов, 1985, p. 338). From the research of the evolution of accounting it is known that those methods (standard-costs and normative accounting) have not been successful in practice, and it can be assumed that the time of cameral paradigm domination has not come yet, and it is the future of accounting development.

All in all, it should be stated that Ya.V. Sokolov applied the theory of paradigm shift for the description of the history of accounting practice development but not science. According to this theory we can distinguish two levels of paradigms. The first level interprets the methodological paradigms in which Yaroslav V. Sokolov had distinguished three paradigms – single-entry, cameral and double-entry. The second level consists of informative paradigms. Description of its shift was the main aim of Yaroslav V. Sokolov, revealing the process of accounting development as a transfer from natural concept to the realistic one. After the transfer to the realistic paradigm the accounting is dealt with certain goals, which are connected not with adequate reflection of business activity, but the necessity of its efficient management (Соколов, 1985, p. 340).

It should be noted that this present study into Ya. V. Sokolov's theory of paradigm shift in accounting its new interpretation for it has been found, and it differs considerably from the well-established one in Russia. It is generally connected with the shift of the same level paradigms, i.e. methodological; and it is this part in the theory of paradigm shift that such Russian authors as V.D. Andreyev, T.O. Terentyeva, K.Yu. Tzygankov and others use, admitting it as the only possible version for the study (description and analysis) into the history of accounting. Moreover, there are but few researchers into the history of accounting in Russia who take advantage of a most important provision of Ya.V. Sokolov's theory, according to which accounting and statistics are deemed parts of the uniform information system of the society. Meanwhile, the author turned this provision to account in all of his historical and theoretical studies.

5. Accounting and Statistics as Parts of Information Accounting System

Ya.V. Sokolov considered accounting as part of the uniform information system of accounting which can be divided into micro- and macro-level. Accounting at a micro-level implies bookkeeping, or accounting the object of which is an entity or a group of entities. Accounting at a macro-level in this system is part of economic statistics (Соколов, Соколов, 2009, p. 21).

Macro- and micro-accounting, comprising a uniform accounting system, exist in close crosslink, as long as, on the one hand, 'statistics and accounting deal, in essence, with data streams reflecting, as a general rule, the same information processes' (Соколов, Пятов, 2010, p. 19); on the other hand, accounting serve as a data source to form many indices of modern economic statistics.

Considering accounting and statistics as two parts of one single whole, Ya.V. Sokolov applied the same approach which he had used in his study into the history of accounting in his research into the history of statistics. He viewed the development of statistics through the replacement of paradigms.

6. Application of the Theory of Scientific Revolutions to History of Statistics

T. Kuhn's theory is rather seldom applied to the development of statistics. This approach was implemented by Murrey Atkin who distinguished two paradigms in the history of statistics, i.e. Bayes paradigm (a quantitative paradigm) and the paradigm of sampling (Aitkin, 2011, pp. 1-26).

In Russia A.I. Orlov wrote about paradigms in statistics in his work 'A New Paradigm in Applied Statistics'. The author did not set an objective to describe the shift of historical paradigms. While implementing T. Kuhn's theory, he proves the necessity for shift of an old paradigm of mathematical statistics with a new one. The outcome of the shift of paradigms, in the author's opinion, must be a transition from parameter-oriented statistic methods to non-parameter-oriented ones, from numeric data to non-numeric, as well as extensive use of information technologies (Орлов, 2012, pp. 89-91).

Therefore, Ya.V. Sokolov was not the only one scientist who employed T. Kuhn's theory into the study of historical development of statistics.

7. Ya. V. Sokolov's Academic Views on Statistics Paradigms

The most outstanding work in which Ya.V. Sokolov employed T. Kuhn's theory for the study of the history of statistics was a multi-author book 'Statistics at St. Petersburg State University' written under his guidance. He described there the theory of statistical paradigms at St. Petersburg University. Apart from that, a year before he published an article 'Paradigms of Statistical Science' (Соколов, 2009, pp. 56-66).

In the multi-author book Ya.V. Sokolov brought forth four paradigms of statistics, whereas in his article published a year before that he marked out five, emphasizing that 'paradigm five is also paradigm one' (Статистика в Санкт-Петербургском университете, 2010, p. 8; Соколов, 2009, pp. 56, 64).

The distinguishing feature in Ya.V. Sokolov's theory of paradigm shift in statistics is that the author, abiding T. Kuhn's provisions on the defining role of scientific communities, wrote about the shift of scientific paradigms in the history of statistics. In his words, 'sciences (e.g. statistics, develop as a result of alternation of generations: some of them pass away, others appear in their stead' (Соколов, 2009, p. 57), and described in this way the evolution of statistics via the alternation of generations of scientists who facilitated the development of sciences at the University. The range of science, in his opinion, was the prime basis for the identification of statistics paradigms. The distinctive characteristics of the paradigms of statistics marked out by Ya.V. Sokolov, is shown in Table 1.

Table 1²
The distinctive characteristics of the paradigms of statistics at St. Petersburg University

Dominant Paradigm Period	Subject of Statistics	Major Representatives
1806-1864	State	E.F. Zyablovsky (1764-1846), K.F. German (1767-1838), K.I. Arsenyev (1789-1865), O.L. Krylov (1798-1853), V.S. Poroshin (1809-1868), I.Ya. Gorlov (1814-1890)
1864-1909 (1910)	Society	Yu.E. Janson (1835-1893), P.I. Georgievsky (1857-1938), I.I. Kaufman (1848-1915), L.V. Khodsky (1854-1919), V.V. Stepanov (1868-1950)
1909 (1910)-1929	Methods of statistics	A.A. Kaufman (1885-1919), R.M. Orzhentsky (1918-1919), G.G. Schwittau (1875-1950), A.K. Mitropolsky (1885-1977), M.V. Ptoukha (1884-1961)
1929-1950	Grouping	V.A. Losievskaya (1895-1936), A.K. Mitropolsky (1885-1977), L.V. Nekrash (1882-1949), N.M. Novoselsky (1897-1975)
1950- until currently	State	I.V. Sypovskaya (1907-1987), I.P. Souslov (1915-1981), P.Ya. Oktyabrsky

Table 1 shows that evolution of statistics was regarded by Ya.V. Sokolov in the period between paradigm 1 and paradigm 4 as the process of narrowing of the range of this science (Fig. 2³): 1 – the state, 2 – the society, 3 – methods of statistics, 4 – grouping. The last paradigm, the fifth one, was defined by the author as return to paradigm one, i.e. to a wider one.

² Table 1 has been compiled after Соколов, Еременко, 2011, pp. 71-74; Соколов, 2009, pp. 56-66; Статистика в Санкт-Петербургском университете, 2010, pp. 8, 11, 173.

³ Fig. 2 after: Статистика в Санкт-Петербургском университете, 2010, p. 8.

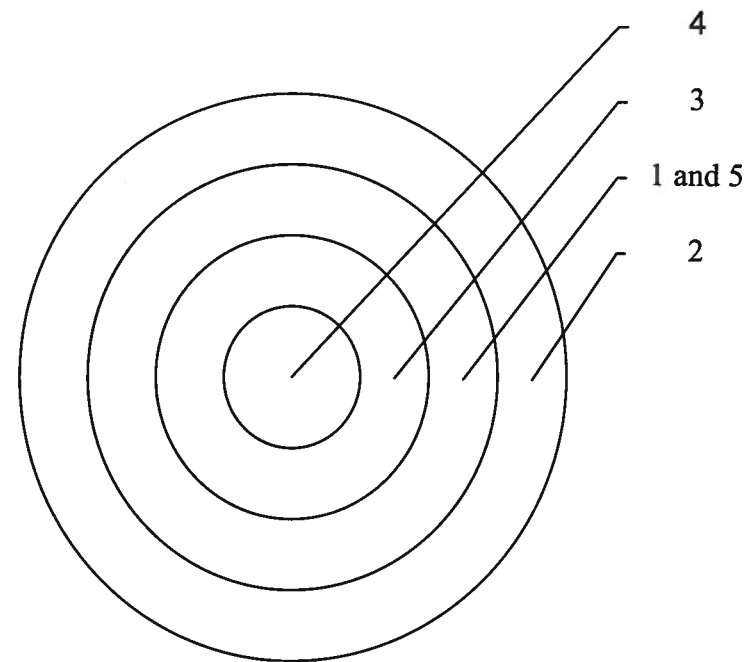


Figure 2. Evolution of knowledge on the content of statistics

Ya.V. Sokolov considered activity of the state the subject matter of the first paradigm. This paradigm bore the name of political science, or descriptive statistics. It originated and formed as one in Germany. One of its founders, G. Achenwall (1719-1772) believed that the subject of statistics lay in the description of a country and its people as a set of objects of interest that place an impact on the welfare of the state. Statistics was treated within the framework of the paradigm as a tool requisite for ruling the state. This was what determined its name of political science, which lay somewhat in between economic geography and political economy (Соколов, Еременко, 2011, p. 71). German political scientists 'interpreted statistics as 'a device for indices production'. An index is a statistical product, and the subject of statistics is characteristics of the state which are primarily confidential and classified and designed for people in charge of the state to take requisite and always justifiable decisions' (Статистика в Санкт-Петербургском университете, 2010, pp. 13-14).

By the time it started to develop in St. Petersburg University, the political science paradigm 'was already losing its scientific significance' (Статистика в Санкт-Петербургском университете, 2010, p. 11). Nonetheless, K.S. German, Prof. of Department of Statistics, wrote that, 'taken precisely, statistics is fundamental knowledge of everything that has a noticeable influence on the well-being of a state in a particular period of time' (German, cit. Соколов, 2009, pp. 56-57), i.e. in other words, the true importance of statistics as of a purely social science is to find out 'how the state becomes rich and what does it live on' (Соколов, 2009, pp. 56-57).

Summarizing the achievements of St. Petersburg Professors involved in political science, Ya.V. Sokolov pointed out that: 1) Declaration of quantitative measurements as a prerequisite for statistical observation deprived statistics of its qualitative characteristics or, in particular, what the earliest statistician called objects of interest; 2) Statistical data but

seldom held absolute truth. Their strong point lay in relative truth, and a skilled statistician always knows the threshold of his observation mistakes; 3) Objectiveness is a most important demand, however, in the first place, it is rather difficult to find its criterion and, in the second place, it often happens that with the contemporary systematic approach it appears to be unnecessary, for a statistician forms his own summation proceeding from his observations. He collects materials not for the sake of idle curiosity in general, but for concrete and topical issues; 4) Critical approach to statistical data in contemporary environment has been growing as never before. Philosophers even proposed a special method of conceptual reconstruction which make it possible to clean the objects under observation of distortions imported by the 'game with interest'; 5) In whose interests a statistician plays, as a rule, remains a riddle, yet, it is frequently rather easy to solve it the paying party runs the show (Статистика в Санкт-Петербургском университете, 2010, p. 49).

The book provides confirmation for the provisions of the said opinion.

Thus, while analyzing the issue of the statistical data validity, Prof. German proposed 'two methods for examination of the numeric data validity, i.e. of 'internal examination of statistic measurements and figures' and of 'approximate correctness of correlation between/among figures'. The first method entailed collating multitude data on one issue. The second one originated due to distrust of primary data and allowed to disclose and exclude mistakes in absolute figures by way of analyzing data of lengthy times series. The importance of data reliability for Prof. German could be explained by his belief in the ability of statistics to provide an objective description of the phenomena under consideration, i.e. he did not accept the subjective character of statistical generalizations (Статистика в Санкт-Петербургском университете, 2010, p. 22). In opposition to the critical attitude to statistical data German suggested 'that each check of statistical information would be made thoroughly; compare the same information; draw conclusions out of different information; find out in what way statistical information is provided and how the subordinate officials benefit from distorting the truth; analyze the forms of information presentation...' etc. (German, cit. Статистика в Санкт-Петербургском университете, 2010, pp. 23-24). Prof. German also found an answer to the question in whose interests statisticians worked. 'Prof. German emphasized that a statistician worked not for the sake of abstract ideas, but in the interests of the administrative machine, i.e., in other words, statistical data should be considered as the grounds for making administrative decisions' (Статистика в Санкт-Петербургском университете, 2010, p. 20).

By mid-19th century the political science paradigm at St. Petersburg University had run its course, and a new paradigm took its place. According to the new paradigm, society was the subject matter of statistics (Статистика в Санкт-Петербургском университете, 2010, p. 8). The second paradigm of statistics had formed under the influence of the then-dominant ideas of A. Kettle (1796-1874) which in a course of a rather short time won a lot of supporters all over the world.

At the University the second paradigm started to develop with Yu.E. Janson who rejected the ideas of political scientists point blank. He claimed that 'society is liable for statistical research, i.e. its structure, composition and all its vital functions. In one word, all and everything which take place in society in the aggregate, can serve the subject for statistics' (Janson, cit. after Статистика в Санкт-Петербургском университете, 2010, p. 53). Therefore, the end user of the statistical information is not the state, but the society. 'The study into the data only for the state is scholasticism. Data and figures are necessary for people, for all people and for the whole society. The society must have a close look at itself, understand itself and perfect. In this case the state will only flourish' (Статистика

в Санкт-Петербургском университете, 2010, p. 51; Соколов, 2009, p. 58). Prof. Janson, while undoubtedly sharing Kettle's idea on the social character of statistics, still criticized some of his important ideas, for instance, his theory on an average person. Later on Prof. Janson's ideas serving the core for this paradigm were developed by his pupils and supporters P.I. Georgievsky, I.I. Kaufman, L.V. Khodsky and V.V. Stepanov.

Ya.V. Sokolov expressed the essence of this paradigm in the following provisions: 1) Society, not the state, becomes the subject of statistics. This implies that there is no secretiveness, and people are beginning to understand their life, their success, and their failures anew; 2) Statistics is interpreted as a most important science dealing in all humanities; 3) Yet, this provision already bears certain ambiguity, i.e. all the calculations made by a statistician, are connected with the methods which he/she has chosen, hence, the subject matter and the method in statistics are beginning to counteract each other; 4) The subject and method are requisite not only to describe social events and phenomena, but mainly to disclose the causes which have brought them forth. Thereby statistics was turning into an analytical subject foreboding and inspiring future discussion whether the analysis of business operations should be deemed part of accounting or economic statistics; 5) Statistics studies indices. Both drawing indices and their analysis comprise, pursuant to this paradigm, the essence of our activity. Also, like most faithful political scientists, Prof. Janson maintained compulsory quantitative measurement of the indices (They would call it quantification nowadays); 6) And the main thing is that, until and as long as the country has public and official authorities in charge of statistics, this country will have the subject field of social and humanitarian science called statistics (Статистика в Санкт-Петербургском университете, 2010, pp. 93-94).

When drawing conclusions for the second paradigm, Ya.V. Sokolov referred at large to the ideas of Prof. Yu.E. Janson who claimed that 'society is the subject matter liable for statistical research...' (Janson, cit. after Статистика в Санкт-Петербургском университете, 2010, p. 53), and to the ideas of his pupils and supporters. One of them, L.V. Khodsky, defined statistics as a science studying 'the structure and life of society in terms of studying social multitude or publicly shared events and phenomena' (Статистика в Санкт-Петербургском университете, 2010, p. 69). Another pupil and supporter of Prof. Janson, Prof. I.I. Kaufman wrote on the counteraction of the subject and method of statistics, and also on its analytical function.

Ya.V. Sokolov wrote that 'Janson's paradigm was a collection of eclectic ideas which could not survive alongside with each other for a long time' (Статистика в Санкт-Петербургском университете, 2010, p. 93) and, therefore, it was superseded by a new paradigm.

The third paradigm, according to Ya.V. Sokolov, bore methods of statistics as its subject matter. They drastically changed the content of statistics which was becoming to be known as the science of methods. 'The object of research in statistics has narrowed: statistics turned its interest away from the boundless society and retreated to logical and mathematical constructions. At the same time, though, its object of research expanded, for it was now understood as a universal method, like mathematics and logic' (Статистика в Санкт-Петербургском университете, 2010, p. 8). Prof. Ya.V. Sokolov named A.A. Kaufman, R.M. Orzhentsky and G.G. Schwittau who built up a new understanding of statistics founders of the new paradigm (Статистика в Санкт-Петербургском университете, 2010, p. 95).

A.A. Kaufman claimed that 'everything that statistics study lawfully belongs to other sciences; statistics stays without its own subject matter, and only method is just its core feature' (Kaufman, cit. after Статистика в Санкт-Петербургском университете, 2010, p.

98). This became the new paradigm's major provision. As a result, he persisted, as opposed to the views of his teacher Prof. Yu.E. Janson, that statistical methods should be applied in various sciences, i.e. in history and in natural science (Статистика в Санкт-Петербургском университете, 2010, p. 98). R.M. Orzhentsky developed the mathematical school of statistics, prepared a lecture course on mathematical statistics and was the first to publish a textbook under the same title. He relied on the ideas of the outstanding world-famous statistician K. Pearson (1857-1936) and claimed that 'the teaching on the theoretical assemblages and their laws makes the background for the teaching on empirical assemblages and comprises, therefore, the basis for the statistical method' (Orzhentsky, cit. after Статистика в Санкт-Петербургском университете, 2010, p. 120). G.G. Schwittau described the methods of economic statistics and divided them into two groups, i.e. methods of observation and methods of scientific and statistical research. He paid his major attention to elaborating methods of statistical research of professions and types of employment of the population (Статистика в Санкт-Петербургском университете, 2010, pp. 109, 114).

It is obvious that the attention of the three researchers whose work Ya.V. Sokolov described within the framework of the third paradigm, was attracted by various issues. Yet, all of them wrote on the methods of statistics. A.A. Kaufman proved that statistical methods are in essence the subject matter of this particular science; R.M. Orzhentsky was elaborating mathematical methods of statistics; G.G. Schwittau provided a classification and showed the existing methods of collecting and processing primary statistical data.

The content of the new paradigm, in the opinion of Ya.V. Sokolov, entailed the following provisions: 1) Statistics is a purely methodological science to which no specific content belongs. In this respect it performs the functions similar to logic and mathematics; 2) K. Pearson stands out as a leading figure in the world of statistics. Statistics accumulates his asymmetric curves of distribution making it possible to classify various types of distribution and to set and measure the extent of the theoretical and empirical curves compliance; 3) The priority belongs to the first, i.e. to the theoretical ones, and, henceforth, Bayes theorem protracts. A priori probability turns into a methodological tool for all logical and statistical constructions which, and it is important to point out, are targeted by the will and objectives of the researcher. Researchers' interests ruin the regular distribution of probabilities, for they create asymmetric distortions imposed by the wishes of the interested parties; 4) Henceforth, the will of people making decisions is absolutely undetermined and, therefore, can make wonders. People need an order; 5) The analysis as the subject matter of statistics, places out true statistics, being mathematical. (For businesses econometrics was set up); 6) Statistics abstracts from such methods as observation and delves deeply into the methodology of analysis. Statistics turns to summarizing its methods and forms its specific category, i.e. composite elements (Статистика в Санкт-Петербургском университете, 2010, p. 139).

Thus, understanding of statistics as a science of methods and rejection of its subject matter as such, was the cumulative idea for statisticians belonging to the third paradigm. In the remaining provisions of the opinion on the third paradigm Ya.V. Sokolov described the ideas of R.M. Orzhentsky to whom he referred as its leading theoretician.

When the third statistical paradigm was advancing at St. Petersburg University, a new school of statistics acquired a wide-spread recognition, i.e. stochastic. The concept of 'stochastic theory of statistics' (stochastics, orig. Greek for 'suppose') belongs to J. Bernoulli (1654-1705). It was brought into the scientific environment by V.I. Bortkevitch (1868-1931) (Плошко, Елисева, 1990, p. 118). The stochastic (probability) theory of statistics proposed by A.A. Tchouprov (1874-1926), head of the school of statistics at St. Petersburg Polytechnic,

played an important part in the history of statistics (Плошко, Елисеева, 1990, p. 128). In his representation it was fully based on the theory of probability (Плошко, Елисеева, 1990, p. 125; Соколов, 2009, p. 59; Статистика в Санкт-Петербургском университете, 2010, p. 74). L.V. Nekrash was a student and follower of this school. He was a student with A.A. Chouprov, however, despite that, he was antagonistic to the stochastic theory (Статистика в Санкт-Петербургском университете, 2010, p. 159). He was the advocate and elaborator of another theory that belonged to his teacher, i.e. the theory of grouping (Плошко, Елисеева, 1990, p. 128). L.V. Nekrash formed his own theory which declared grouping the subject matter of statistics. For him 'statistics meant not the calculation as such, not the absolute, mean or relative values, not any composite elements, but grouping. Grouping were responsible for summations. And whichever grouping features the statistician chooses, the respective results he will gain' (Соколов, 2009, p. 62). Theoreticians from St. Petersburg University belonging to all the preceding paradigms had also written about grouping (i.e. K.F. German, K.I. Arsenyev, belonging to the first paradigm; L.V. Khodsky belonging to the second paradigm; A.A. Kaufman, R.M. Orzhentsky and others, belonging to the third paradigm). A.A. Kaufman even persisted that that grouping of data 'are among the chief elements of statistical practices' (Статистика в Санкт-Петербургском университете, 2010, p. 101). However, it was only L.V. Nekrash who called this method the subject matter of statistics.

A.K. Mitropolsky, a graduate of St. Petersburg University, was also a fellow of the same department and a colleague of L.V. Nekrash who worked there at the same time with him. According to Ya.V. Sokolov, he was an advocate of two paradigms at one and the same time, i.e. the third and the fourth ones. A.K. Mitropolsky was the follower of R.M. Orzhentsky, for he was also developing mathematical statistics and founded a special subject – statistical calculation. 'Throughout the 1920s Prof. Mitropolsky seemed to be building his own paradigm within the paradigm established by Prof. Orzhentsky, and called it statistical calculation' (Статистика в Санкт-Петербургском университете, 2010, p. 144).

Another scientist who deserves special attention within the framework of the fourth paradigm was V.A. Losievskaya. Ya.V. Sokolov called her an advocate of the Marxist paradigm. She was dealing in statistics on the grounds of Marx and Engels's principles. 'The Marxist paradigm had three main provisions: 1) statistics truly reflects the objective environment; 2) statistics develops in pursuance with laws of dialectical evolution, and 3) statistics reflects class interests of social groups. Losievskaya ... was trying to develop and justify these provisions' (Статистика в Санкт-Петербургском университете, 2010, p. 149).

As it appears evident, while describing the fourth paradigm Ya.V. Sokolov mentions another two paradigms: the paradigm of statistical calculation and the Marxist one. Yet, it was only through L.V. Nekrash's works that we learn about the justification of this paradigm grouping. This shows that there was no unity among the theoreticians who worked within this paradigm. So it might be that in distinguishing this paradigm Ya.V. Sokolov was probably relying only on the temporal factor, i.e. a period of time when the forenamed scientists worked at St. Petersburg University.

Ya.V. Sokolov called the fifth paradigm political science. He also believed that the appearance of this paradigm was the return to the first one. The state once and again became the subject matter of a paradigm. Prof. Sokolov defined the content of this paradigm in the following way: 'Statistics is a science dealing in the study of the facts of the state rule; its aim is to set indices allowing to assess the efficiency of decisions taken by the administration bodies

at different levels; conditions for development lie in the preferable secret of disclosing; tables serve as a method of presentation; propaganda and facilitation of the party and government decisions serve as the complex of its objectives' (Статистика в Санкт-Петербургском университете, 2010, p. 173).

Prof. Sokolov formed the following provisions as the major objectives which the followers of this paradigm pursued: 1) Statistics is an applied science which exists and studies social and economic relations within a country; 2) Statistics objectives and the work of statisticians is subject to the interests of the state and its government; 3) An important factor is not how the indices are calculated and what they disclose, i.e. not their scientific and economic content, but the social importance of the methodological calculations; 4) Like in the times of Prof. German, statistics is turning into the science of indices; 5) Results of statistical works, like it was with political science, make the state secret; 6) The main objective of statistics is to justify the decisions of the party and government; 7) Science was supposed to disclose the wisdom of the formative power (Статистика в Санкт-Петербургском университете, 2010, p. 206).

As opposed to the third and fourth paradigms, this paradigm advocates united in one single scientific community within which scientists shared common views.

In order to complete the study of the paradigms of statistics at St. Petersburg University, brought out by Prof. Ya.V. Sokolov, it should be pointed out that their description bears a lot of blank pages. The first paradigm was studied by the author in detail. However, the study does not provide the causes of the shift to another paradigm via the analysis of anomalies. The author demonstrated the essence of all the paradigms through description of the scientists' ideas whose notations often varied at large. For instance, owing to considerable incompliance in the notations of the scientists, Prof. Ya.V. Sokolov had to single out two separate paradigms, i.e. of statistic calculation (A.V. Mitropolsky) and the Marxist one (V.A. Losievskaya). His study in essence bears no description of the process of paradigms shift.

More than that, it is important to emphasize that Ya.V. Sokolov insisted, thus bringing himself to contradiction with the founder of the theory of scientific revolutions, that the shift of paradigms take place not through revolutions, but through evolution (Соколов, 2009, p. 56). Thus, according to Prof. Sokolov, a new paradigm absolutely displaces the previous one. However, in part concerning the content of the distinguished paradigms, Ya.V. Sokolov followed the provisions inherent to T. Kuhn's theory, i.e. he described the development and evolution of the paradigms of statistics as of a science.

The said hedges recognition of Ya.V. Sokolov's described ideas on the development of statistics as a theory of statistical paradigms shift; it is rather a description of the shift of historical phases in the development of the science of statistics at St. Petersburg University.

Non-compliance of Prof. Sokolov's ideas on the content of statistical paradigms may be caused by the absence of the author's definition of the statistical paradigm as of the basic category of the theory of scientific revolutions. As a result, the boundaries of paradigms are distorted, it is not clear what the cause of transition from one paradigm to another is no adequate reasoning why the author denied a possibility of their coexistence and, what is the core factor, the subject of the science as the basis for paradigms distinction does not find sufficient confirmation within the fourth paradigm, thus, destructing, the harmony of the theory description. A reason for that could be the lack of time: Prof. Sokolov did not have life long enough to complete his study.

However unusual was application of T. Kuhn's theory in the study of Prof. Sokolov, we cannot but point out that the idea of distinguishing paradigms in the history of statistics

deserves attention, for gradually it finds its advocates and supporters.

Conclusion

The study of Prof. Sokolov's ideas on the paradigms of accounting and statistics makes it possible to provide several final considerations. A comparative analysis of the core provisions of the theories showed considerable non-compliance in Ya. V. Sokolov's application of T. Kuhn's theory in the study of the history of the development and evolution of accounting and statistics.

For instance, Ya. V. Sokolov provided his personal definition of the paradigm of accounting, however, he did not provide the definition for the paradigm of statistics. He set various grounds for singling out paradigms: in accounting this is the object of accounting; in statistics it is the subject matter of the science. In accounting Ya. V. Sokolov singled out paradigms of science and practice; in statistics – only science. Moreover, he narrowed the study of statistics to the study of its history at only one academic institution, i.e. St. Petersburg University. Defining the shift of paradigms, in accounting Ya. V. Sokolov relied upon a possibility of their successive shift and coexistence, which fully complies with the provisions of T. Kuhn's theory. In describing the shift of paradigms in statistics the author wrote only about their successive transition. He also insisted that in statistics paradigms replace one another not through revolutions, but by way of evolution (Соколов, 2009, p. 56).

Ya. V. Sokolov's consistent summary of the theory of paradigms shift in accounting illustrates the fact that it was elaborated by him in detail, despite the fact that he was only beginning his work on establishing the theory on shift of statistical paradigms. The author was dealing in research on paradigms in accounting for over 25 years (starting from 1985), while statistical paradigms stayed within his scientific interests for two years (2009-2010) only.

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