



Historic horizons of Frederick Taylor's scientific management

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Abstract

Purpose – The purpose of the article is to historically position F. Taylor's scientific management in a broad socio-economic landscape, arguing that Taylorism was predetermined by the distinctive industrial type of economic growth and shaped by a political environment of an industrial economy. The authors further aim to discuss how scientific management transcended national boundaries and to analyse the case of Russia, with the focus on the rise and fall of Taylorism in that country in response to political transformations in the twentieth century.

Design/methodology/approach – The authors summarize key attributes of F. Taylor's scientific management as a systemic theoretical approach to efficiency with prioritized practical programmatic orientation and perceived social effects. The discussion on how scientific management fits the industrial economic growth and responds to the political environment follows. The authors conduct archival research and aggregate major literature on the history of Taylorism in twentieth century Russia.

Findings – The key findings of the study include: a summary of F. Taylor's management paradigm; Taylorism as the product of the industrial type of economic growth; how the political environment in Russia modified the unique cycle of scientific management with its emergence in the 1910s, rise in the 1920s, fall in the 1930s, and rebirth on a technocratic basis in the late 1950s.

Research limitations/implications – The paper contributes to the general discussion on Taylorism and provides unique assessments of its historic development in Russia. The results of the study have both academic and educational implications.

Originality/value – The findings of the study enrich the discussion about Taylorism and its application in other countries. The archival and analytic results of the study permit conclusions at a high level of aggregation; highlight conflicting positions on the history of Taylorism in Russia in the literature; provide the framework to better understand the scope of scientific management in a historic socio-economic landscape; and display original arguments to support major findings.

Keywords Scientific management, Taylorism, Russia

Paper type Research paper



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Introduction

Published 100 years ago, Taylor's (1998) *The Principles of Scientific Management* responded to the fundamental change in America's economic growth by the early twentieth century and summarized advanced ideas in search for a scientific view on managing large industrial systems. The book substituted empirical apprehension of industrial processes and administration with a new management paradigm based on the integrative perception of people and technology in organizations. It offered the analytic framework of production process and its administration; developed algorithms for implementing new scientific principles; and emphasized the societal consequences of application of those principles. Aimed originally at improving American industrial organizations, the concept transcended national boundaries and influenced industrial practices in multiple countries.

F. Taylor – an imaginative thinker and energetic practitioner – was far ahead of his contemporaries in accomplishing a phenomenal intellectual agenda. One century later, discussions about Taylorism raise new questions and offer new insights on its founder's intent to integrate learning and action; on his holistic view of the organization and social relations at the enterprise level; on the transition from an empirical to a scientific approach in improving productivity and delivering prosperity; and on the scope and universality of those principles.

The main purpose of this article is to re-visit and historically position F. Taylor's work in a broad socio-economic landscape. First, the authors argue that Taylor's advanced mechanistic management was predetermined by the distinctive industrial type of economic growth which it served. However, Taylorism was also limited by that type of growth and conflicted with the follow-up innovative, organic management of the post-industrial society. Second, they explore the scope of Taylorism in transcending national borders and applying to systems far beyond free market economies, including those in the centrally planned totalitarian societies. In particular, an article offers the overview and respectful critique of the rise and fall of Taylorism within the socialist experiment of twentieth century Russia and the USSR.

Thought revolution in management

Scholarly literature on Taylor's concept and its applications formed two major streams of discussion. One displayed a traditional organizational perspective focused on the shift from empirical to rational (analytic) approach to management and work organization, and on the aggregation of tools and techniques for higher productivity and effectiveness at the level of the firm (Nelson, 1980; Locke, 1982). The other took a broader societal, political and ideological perspective on Taylorism including know-how transfer to the other countries (Merkle, 1980; McLeod, 1983; Morgan, 2006; Wagner-Tsukamoto, 2008; Simha and Lemak, 2010).

The authors consider both streams of studies and summarize F. Taylor's heritage with the following key attributes.

First, not only did F. Taylor advance work organization at the shop-floor level and enterprise management to a higher level of aggregation, but he also laid the foundation for the science of managing production systems in the industrial age at large. The principles of integration of the work of machines and mechanisms, and the work of people emerged as a new field of scientific inquiry (Rakitski, 2005).

Second, when F. Taylor designed a theoretical system of organization of work, production, and management, he explained that “scientific management, in its essence, consists of a certain philosophy, which results [. . .] in a combination of the four great underlying principles of management” starting with “the development of true science” (p. 113). He approached the new philosophy as an experiment-oriented scholar who never disconnected theory from action[1]. He clearly defined the basic goals of his theory, prioritizing the combination of the following elements: “science, not rule of thumb”, “harmony, not discord”, “cooperation, not individualism”, “maximum output, in place of restricted output”, and “the development of each man to his greatest efficiency and prosperity” (p. 123).

Third, in challenging the contemporary empirical approach and offering an advanced management paradigm, in moving from rational analysis of elements to understanding their interactions, F. Taylor was far ahead of his contemporaries in the methodology of management by displaying seeds of systems thinking. He explored the fact that “principles of scientific management differ essentially from those of ordinary management” (p. 21) and explained that “in the past the man has been first; in the future the system must be first” (p. ix). Taylorism offered the new paradigm when “true scientific management required a ‘mental revolution’ on the part of employers and employees” (Wren and Bedeian, 2009, p. 149).

Fourth, intellectual effort was supported by the algorithm, and this programmatic aspect of F. Taylor’s science included the shift in responsibility for implementing the system from men to management (pp. 29, 52). Such a program emphasized development of a science for each element of a man’s work, which replaced the old rule-of-thumb method; considered scientific selection and training, teaching workmen, and cooperation between employees and management with balanced responsibilities for efficiency and productivity (p. 27).

Fifth, the last but not least important theoretical aspect of F. Taylor’s work was attention to the potential broad societal effects of his new system. While F. Taylor was not able to experiment at the societal level, he offered extrapolations of theoretical constructions and summarized “the good which would follow the general adoption of these principles” such as greater material gain, increase in productivity of human effort, increase both in the necessities and luxuries of life, shortening the hours of work and increased opportunities for education, culture, and recreation for the whole country (pp. 123-124). This far-reaching message displayed socially responsible approach to management, and explained that the new philosophy if and when implemented could provide benefits to the whole nation.

To sum up. The scientific management phenomenon stemmed not only from the collection of advanced organizational instruments in response to the needs of its time but also from the combined intellectual effort – a systemic theoretical approach to efficiency with a prioritized practical, programmatic orientation and perceived societal effects.

To further understand this generalization of scientific management it is important to explore if it has emerged as the universal societal phenomenon or if it has been historically (economically and politically) predefined. In the other words, two questions arise in response to this inquiry. First, what were the limits of its practical applications relative to distinctive economic systems? Second, did a transfer of Taylorism to the

other countries with different political environments created its qualitatively different identity? These questions and arguments should be discussed in more details. Historic horizons

Taylorism and economic growth

The first hypothesis about universality stems from F. Taylor's great conviction about the "absolute" nature of his scientific paradigm. He wrote that the new scientific methods, "four elements that differentiate the new management forms from the old [...] can be applied absolutely to all classes of work, from the most elementary to the most intricate" (p. 30).

F. Taylor understood the difficulties in implementation of scientific management; considered employees' and unions' potential resistance to organizational innovations, the role of timing and considerable effort in the transition from the system of the past to the system of the future, and the importance of favorable conditions such as training workers and adjusting production system. But he viewed society as an industrial and organizational engineer, with deep knowledge of techno-organizational dimensions of the work and production however, with limited exploration of the scope relative to their socio-economic foundation.

In real life however, various generic organizational patterns co-exist: dominant forms, as well as obsolete and prospective ones; each having its own "safety margin" and conflicting with the others to a certain degree. Each pattern displays distinctive type of interrelations between worker, technology, work process and management. Those distinctions are rooted in economic epochs which can be conditionally defined as "pre-industrial", "industrial", and "post-industrial" types of economic growth. And "craft", "technocratic (mechanistic)", and "innovative (organic)" systems proved to be the most effective in those relevant economic epochs (Grachev, 1988).

In the later period of pre-industrial growth, before the Industrial Revolution of the late eighteenth and nineteenth centuries, individual craftsmen typically worked together within capitalist manufactory. "Craft" management displayed a simple pattern of administering people and processes in organizations, when manufactory production destroyed the previous shop (guild) system and combined crafts that were previously independent, under the single supervision of the owner.

On the contrary, the industrial type of growth was based on machine production with workers typically acting as extensions of those machines. The Industrial Revolution – the enormous leap in production and efficiency – brought to life systems of machines and demanded qualitatively new principles for subordinating workers and their movements to monotonous rhythm and the functions of those mechanisms. The growing mass-production industries combined large groups of workers at medium and large enterprises – typically low-skilled, performing narrowly specialized functions; and this increased complexity demanded qualitatively new combinations of work processes along with relevant combinations of line and functional management – all integrated into the well-designed organizational system. However, even in the economically advanced North American and European countries of the late nineteenth century, organizational practices lagged far behind rapidly developing technologies and systems of machines. One of the major reasons was a traditional empirical nature of management and its connection with the past practices, along with administration's conformism and resistance to radical organizational changes in a production system.

In the earlier period of industrial age technocratic, mechanistic forms of management and organization emerged spontaneously, in accordance with past experiences; and methods of “ordinary management”, in F. Taylor’s words:

[...] have been handed down from man to man by word of mouth, or have, in most cases, been unconsciously learned through personal observation [...] but have not been codified or systematically analyzed or described (pp. 22-23).

F. Taylor took the lead in challenging the conventional system, theoretically proposing and practically implementing the qualitatively new approach to management and work organization. The key principles formulated by F. Taylor along with the other organizational engineers of his time (F. Gilbreth and L. Gilbreth) such as a focus on “rational economic man”, normative approach to work organization and incentives, maximum division of labor, and rationalization of work and motion – emerged as fundamental pillars for technocratic, mechanistic management of the industrial age[2].

Overall, *The Principles of Scientific Management* served the urgent needs of its time – closing the gap between advancing technologies and obsolete organizational means; radically improving productivity; and providing the critical mass of managers with a science of effective work and administration. At the moment of publication of the book, the USA, Germany, and Imperial Russia served as fertile lands for the introduction of scientific management. Other countries that lagged behind economically, appealed to Taylorism historically at a later time. For example, not until 1930s had pre-Communist China expressed a growing interest in application of F. Taylor’s works (Morgan, 2006).

The transition of the leading economic powers to the post-industrial era in the late twentieth century shifted focus in production systems to new dimensions of productivity and organizational efficiency such as innovation, creativity, networking, group organization, and value-based leadership. Those dimensions were not a part of F. Taylor’s prescriptions and contradicted many of them. Hence, the authors assume that emergence of scientific management was historically predetermined by the specific economic environment and was most effective in the industries that defined the industrial type of growth. Even today, industries which created the backbone of the industrial age (machinery, steel, or textile) may still exploit F. Taylor’s guidelines quite effectively; however, many of those principles and techniques (maximum division of labor, detailed monitoring of individual time and motions, focus on an individual, not a group, etc.) turned out to be much less applicable to innovative industries of the post-industrial era (like software or biotechnology).

Taylorism and socio-political systems: the Russian experiment

The second argument relates to the societal implications of F. Taylor’s work and its applications to non-American industrial practices. The authors suggest that historic limits to scientific management were defined not only by the type of economic growth but also by the political environments that directly influenced economic systems.

F. Taylor was optimistic in his interpretation of shared interests and harmony among major stakeholders of production organizations. In the book he explained that the majority:

[...] believe that the fundamental interests of employees and employers are necessarily antagonistic [...] Scientific management, on the contrary, has for its very foundation the firm conviction that the true interests of the two are one and the same [...]. This close, intimate,

personal cooperation between management and the men is of essence of modern [...] scientific management [...]. Scientific management will mean, for the employers and the workmen [...] the elimination of all causes for dispute and disagreement between them. [...] the close, intimate cooperation, the constant personal contact between the two sides, will tend to diminish friction and discontent (pp. 2, 17, 125).

While the history of the twentieth century's industrial age in the USA may not have displayed sufficient mass of "harmonious" industrial relations under those principles, some examples of union-management cooperation, such as supportive initiatives displayed by the United States Taylor Society and American Federation of Labor (AFL) in the 1920s, have been documented (Jacoby, 1983). Not surprisingly, this stream remained on the periphery of organizational scientists' attention while it was emphasized by politicians and leaders of labor movement, especially by those on the left spectrum of political life. The later traditionally harshly criticized F. Taylor's system, like the Founder of the Italian Communist Party Gramsci (1959, p. 438), who claimed that:

Taylor with cruel cynicism expressed American society's goal to maximize the development of employees' machine and automatic skills, destroyed the previous psycho-physical complex of skilled professional labor, that required sufficient active brainpower, creativity, and initiative, and limited all production functions by their physical machine-based aspect.

To further explore the application of F. Taylor's concept to non-American societal environments, the authors conducted a detailed study of scientific management know-how transfer to Russia, to the country which in the early twentieth century was among the fastest growing economies. The history of Russian Taylorism displays a complex metamorphosis under changing political conditions and provides new insights on the cycle of:

- interest in and excitement about the concept in Imperial Russia; to
- communist leaders' dual approach to scientific management; to the acquisition of Taylorism as an economic and political tool in industrializing the Soviet state; to
- the elimination of scientific work organization on political and ideological grounds under J. Stalin; and to
- re-birth of interest in F. Taylor's works in post-Communist Russia.

Within the stream of on-going discussions about Soviet Taylorization ranging from pessimistic (Van Atta, 1986) to optimistic opinions (Merkle, 1980) the authors take balanced position by addressing historic and social boundaries of scientific management in response to the universality assumptions by its founder.

In the early twentieth century Russia's strong economic development stemmed from the elimination of serfdom, the migration of the workforce from agriculture to industry, the expansion of railroads and infrastructure, the development of a national market, and the inflow of foreign capital. The high concentration of workers at large enterprises in the textile, machinery, coal mining, and metallurgy sectors exceeded that of Europe or the USA. However, the Russian economy was the exemplar of an oversupply of cheap labor, lack of safety and work culture, as well as entrepreneurial despotism at the enterprise level.

In that buoyant economic environment, progressive Russian industrialists responded to the gap between accelerated production technology and obsolete organizational practices. In particular, they looked for fresh organizational ideas and efficiency concepts that have been emerging in the USA. In 1908-1909 the first Russian translations of and publications about F. Taylor's system in professional journals "Metallist", "Zapiski Russkogo Tekhnicheskogo Obshestva" (papers of the Russian Technical Society) sparked intense discussions and public disputes in Moscow's and St Petersburg's business and political circles, students' and trade union organizations, and even advanced to the level of hearings in the State Duma (Russian Parliament). The new journal *Fabrichno-zavodskoye Delo* (Factory Business) provided comprehensive information about F. Taylor and his system (Golosenko, 1991, pp. 64-65).

Those debates in the 1912-1914 displayed conflicting opinions about Taylorism. Critics appealed to a low quality of work and quality of life in the country as a whole, lack of a supportive legal environment and poor work culture, and claimed that F. Taylor's system was not applicable to Russia; or, if applied, only predatory businesses would benefit from exploiting the masses. Supporters praised technological progress, disseminated ideas about advanced work methods, and encouraged industrialists to learn from the best foreign organizational practices.

At the moment of the original publication of *The Principles of Scientific Management* V. Lenin worked in Switzerland on theoretical concepts for the future Bolshevik Revolution. In March 1913 he carefully analyzed F. Taylor's book, reviewed the relevant discussion at St Peterbourg's Institute of Transportation Engineers; and responded with harsh criticism blaming this system as man's enslavement by the machine and labeling it as "scientific system of sweating" (Lenin, 1970b, p. 18).

However, after the Bolshevik Revolution in the late 1910s-early 1920s Russia had to restore its economy from the ashes of the First World War and the Civil War. Under those extreme conditions, in the original version of the 1918 article "The immediate tasks of the Soviet Government" Lenin (1970c, p. 137) explained how necessary it was:

[...] to a considerable extent, take a lesson in socialism from the trust managers, [...] take a lesson in socialism from capitalism's big organizers, [...] enlist to the service of the Soviet power a great number of bourgeois intellectuals, especially from among those who were engaged in the practical work of organizing large-scale capitalist production.

He obviously faced the "complexity of position towards Taylorism" (Linhart, 1976, p. 105) and a difficult task to re-assess F. Taylor's work as valuable resource in economic restoration. Hence, he conceptualized the dual role of Taylorism in the socio-economic (socialist) system. Some authors advocate sharp distinctions in V. Lenin's positions before and after the revolution (Bailes, 1977, 1981; Josephson, 1995; Linhart, 1976; Wren and Bedeian, 2004; Scoville, 2001) while others carefully argue that he supported the dual role of Taylorism from the beginning (Sochor, 1981a, b).

In 1918 V. Lenin wrote that:

F. Taylor's system was a combination of the refined brutality of bourgeois exploitation and a number of the greatest scientific achievements in the field of analyzing mechanical motions during work, the elimination of superfluous and awkward motions, the elaboration of correct methods of work, the introduction of the best system of accounting and control, etc. (Lenin, 1970c, p. 140).

Linhart (1976, pp. 111-114) emphasized V. Lenin's positive attitude to Taylorism when it had been applied under the workers' supervision and permitted the reduction of working time. With such an endorsement, F. Taylor's system was accepted as one of the powerful instruments for increasing productivity and efficiency in the emerging socialist state. And the argument for resolving the duality stemmed from the proposition that capitalism historically paved the way to socialism and since F. Taylor's work was among the advances of capitalism it was possible to hedge capitalist technique not by scientific development but by political means.

In the early 1920s, Soviet Russia's shift from war communism to the New Economic Policy (NEP) permitted, to some extent, private property, private enterprise and competition. It also incorporated non-party engineering talent and specialists into socialist enterprises under government regulation and control. The "great turn" to rapid industrialization and collectivization was "accompanied by thorough-going adoption of Taylorist methods in Soviet industry" (Van Atta, 1986, p. 330; see also: Bailes, 1977; Merkle, 1980; Hughes, 2004). That policy favored studies of foreign organizational techniques; and encouraged research, training, and consulting with the focus on scientific management.

Participants of two major national conferences on "scientific work organization"[3] in 1921 (convened by L. Trotsky) and in 1924 prioritized careful analysis of the production process and synthesis into the most effective plan; large-scale training and studies of advanced methods of organization and production. At the same time, those events triggered an ideological battle over Soviet Taylorism with deeper roots than the traditionally emphasized discussion between "narrowly technicist Taylorism" and a "Taylorism modified by industrial psychology and protection of workers". It related to the larger set of issues "how to implement ideological goals under adverse political and economic conditions", "how to learn and borrow from capitalists while constructing a non-capitalist path of development", and "how to erect the cultural infrastructure essential to the developmental needs" (Sochor, 1981a, pp. 246-247). It also related to how to fit the power structure of the socialist state when some political elite groups opposed Taylorism as resenting the diminution of workers' control inherent in it. Others feared the technocratic prominence of engineers "and what they believed were the utopian expectations of the Taylorists" (Josephson, 1995, p. 527).

The politicization of the problem resulted in open clashes between primary groups of advocates of scientific management in the ruling elite: "pragmatists" (A. Gastev) and "ideologues" (P. Kerzhentsev). R. Miller explained the differences between A. Gastev's and P. Kerzhentsev's approaches to Taylorism: the former were narrowly conceived studies which concentrated on the psychological and physiological processes of workers and small groups; the later sought organizational principles based on systematic observation of integrated production or administrative processes (Miller, 1971, p. 250). Beyond visible differences in the scope and technocratic frameworks both streams however, shared fundamental similarities on organizational power and ideological role of Soviet Taylorism as well as on who would control and use Taylorism[4]. Luke provided arguments in support of the conversion of the long-term intentions of "pragmatists" and "ideologues" explaining that Gastev's conception of scientific management transcended the rationalization of industrial productivity to become a system of "social engineering" to mechanize life completely; aiming to re-engineer entirely the psychophysical make-up of the typical Russian worker; and

Gastev's popularization of industrial thinking extended into the home life and personal behaviors of people (Luke, 1983, pp. 598-599)[5].

As a matter of fact, the search for class harmony resonated with F. Taylor's original position on harmonious relations at the enterprise level. However, in contrast to the original scientific management that arose as response to "systematic soldiering" among industrialized labor, Soviet Taylorism was spurred by the problem of an unskilled and barely literate labor force thus making it, in the words of P. Kerzhentsev, even more urgent than for America (Sochor, 1981a, p. 257). V. Lenin even advised using P. Kerzhentsev's book as the universal textbook on work organization in general, especially managerial work (Lenin, 1970a, p. 395).

In 1921 V. Lenin personally supported A. Gastev, the Founder of the Central Institute of Labor (CIL), with millions of rubles in gold for research and training programs. Known as the "Russian Taylor", A. Gastev published over 200 books and articles, promoted "social engineering" and best organizational practices, and emphasized the shift from empirical rule-of-thumb approach to analytic one. He demanded increases in productivity from workers and from machines; advocated deep specialization and optimized work functions through time-and-motion studies, strict order, discipline, and planning; and integrated social and biological components into social engineering. "The methodology of machine-based work with its analytic background, consideration of small factors, creation of norms, was inevitable for the live work of employees" – wrote A. Gastev in 1921. And if Taylor was not born with his time-and-motion studies and rational analysis of elements, one should create him "on demand" (Gastev, 1971, p. 27).

The CIL took the lead in developing methodological principles of work organization and management, designing the optimized organizational forms and processes. It created the national training system, added medical and biological factors into effective work patterns, and applied the results at industrial enterprises as well as within ranks and structures of the Red Army. In that particular period, a network of about 1,500 research, consulting, and training centers was created across the country, where more than a million workers (Bailes, 1981, p. 437, 1977, p. 393) were trained and re-trained with CIL instruction materials. These arguments contrast with the simplified position in the literature that in the USSR before 1929 "scientific management rarely made it from laboratory to factory floor", "few improvements were made because of the Communist Party's distrust of capitalism" and "basic distrust of bourgeois experts and their methods" (Wren, 1980, p. 5; Wren and Bedeian, 2009, p. 242).

During rapid industrialization, Russia lacked a sufficient corps of professional managers. Hence, among the successful applications of scientific management was F. Taylor's idea of "functional foremen" which supported the development of technical specialists with higher levels of authority in the planning and coordination of broader phases of production at the shop floor level; and promoted the educational and training value of scientific management. The other successful application was piece-rate performance plans that required efficiency standards. Those high standards were further introduced and applied through Stakhanovites movement, with 60 percent (in 1926) to 75 percent (in 1931) of workers being paid based on performance (Polakov, 1932). The movement, however, relied more and more on workers' indoctrinated enthusiasm rather than on careful work and time measurement, and created superficial norms which in many cases upset and broke production process and safety.

In the centralized authoritarian state the CIL's mission was linked to the creation of communism under the unique historic conditions of the 1920s. Communist organizational designers viewed workers not as individuals but as elements of the large complex socialist state. The CIL's recommendations encouraged and praised enthusiasm, continuous initiative, inspiration of large masses of workers, and creation of collective culture of the "working class" as a whole.

Scientific management know-how was transferred into Russia by different channels: hiring American organizational consultants for large-scale projects; importing technology (factories, machinery) with organizational support; starting industrial colonies with immigrants from the USA, Germany and other Western countries.

Foreign technical assistance played important role in industrializing the Soviet state. By 1930, 45 American companies were among 200 Western firms that provided assistance for industrialization. According to Merkle (1980, p. 122), J. Stalin admitted that two-thirds of Soviet industry was built with American assistance.

Soviet authorities hired American consultants such as R. Keely, W. Clark, and W. Polakov to study working conditions and to transfer Taylor's and Gantt's instruments into industrialization process (Polakov, 1932; Wren, 1980; Wren and Bedeian, 2004). Russian engineers and managers were sent to the leading foreign manufacturing firms such as "Ford" in the USA (Vasiliev, 1927); and the Soviet state has been aggressively acquiring American technology for industrialization. For example, tens of thousands Fordson tractors were imported to Russia (Josephson, 1995, p. 528).

The ideas of the Russian Revolution attracted professionals from different countries who were willing to contribute to industrialization and creation of new socialist cities. One of the most impressive examples was the Colony of Kemerovo (Autonomous Industrial Colony). In 1921 American Union Leader B. Haywood and Engineer F. Calvert together with Dutch Engineer S. Rutgers presented to V. Lenin the program of the rapid revival of Russia's economy and proposed to form the international industrial colony with advanced technology, expertise, and capital. The agreement signed between this group and the Council of Labor and Defense provided the ground for the Colony's existence in 1922-1927, and its practical contribution to the development of mines, power and metallurgical plants in Siberia. About 750 foreigners along with 5,000 Russian workers and specialists worked in Kemerovo, applied advanced machinery and efficient organizational methods.

This experience laid the foundation for the other cases of foreign voluntary contribution participation to Russia's industrialization in the late 1920s. The construction of the largest in Siberia metallurgical facility in Kuznetsk which started in 1928 was designed by Chicago-based company "Frain". Kuznetsk industrial complex imported technology from Germany (which was cheaper than American), and about 450 foreign specialists, many with knowledge of advanced Western management participated in its development.

After V. Lenin's death and the transition of supreme powers in the USSR to J. Stalin, the change in political attitudes towards "scientific work organization" was inevitable. It should be noted however, that in the earlier years of the NEP, J. Stalin praised American efficiency and emphasized its importance in building the socialist society. In his lectures "The foundation of Leninism" at Sverdlov University (published by daily

Pravda in April-May 1924) he defined Leninism as “a school of theory and practice which trains a special type of party and state worker [...] and creates a special Leninist style in work” characterized by “(a) Russian revolutionary sweep and (b) American efficiency” (Stalin, 1976, p. 114)[6]. But in the follow-up years, according to Josephson (1995, p. 530), “Americanism faded under Stalin and the establishment of economic autarky”.

The late 1920s marked the end of the NEP and the beginning of an enormous shift in cadre policies substituting professionals (non-party engineers and administrators) with party loyalists, replacing bourgeois specialists with professionals of proper working-class social origin, and holding political show trials accusing and convicting many of those specialists. In the detailed study of the Russian industry of the 1930s, Granik (1954, p. 7) explored the fact that:

[...] important industrial posts were by 1934 mainly held by Communist Party members, and that these had sufficient technical training to be able to carry out managerial duties themselves. In earlier years, Party members had often been managers in the name only, and mistrusted prerevolutionary engineers had carried on the actual work. But by the mid-thirties a close interlocking of industrial management and Communist Party ranks have been achieved.

He also explained the distortions in the sources for organizational cadre and large differences among management groups due to the “turned upside down class structure” when “entrepreneurs, managers, and professionals who were the top group before the revolution now found themselves at the bottom” (Granik, 1961, p. 39).

Since Taylorism emerged not only as organizational innovation but also as political and ideological instrument, its transformation reflected the changing social and political conditions of the 1930s and economics of the Second World War that followed. Members of J. Stalin’s inner circle (V. Molotov, L. Kaganovich) were persistent in turning the socialist rationalization movement into a populist uprising against the managerial elite (Shearer, 1991, p. 601).

In the thorough evaluative essay on ideas, techniques, and the validity of criticism of Taylorism, Locke (1982, p. 19) explained that authoritarianism as belief in obedience to authority was “in total contradiction to everything Taylor stood for”. The state-wide GULAG system of prisons and labor camps supervised by J. Stalin’s security apparatus provided a massive inflow of “free labor” into colossal industrial projects. Under those new conditions, scientific management with economic stimuli and optimization focus was no longer in demand and was substituted by fear and punishment of monopolized and militarized labor (Grachev, 1993). A. Gastev was swept away by the purges of 1938 (with date, place and circumstances of his death not revealed), the totalitarian apparatus eliminated NOT centers and bureaus; and by 1940 all research institutes including CIL were closed. Nothing comparable was created until mid-1950s after J. Stalin’s rule ended.

Political changes in the post-Stalin era with the introduction of elements of a market economy under the state supervision (Prime Minister A. Kosygin’s reforms in the 1960s) reversed the interest in scientific work organization. Most industries established NOT centers coordinated at ministerial levels; national conferences and publications disseminated fresh organizational ideas. In agriculture major breakthroughs in acquiring new fertile lands (*tselina*) would not be possible without application of advanced methods of work organization and mechanization at large state and

collective farms. In this case the authors disagree with simplistic arguments that primarily extensive rather than intensive economic development of the Soviet economy in the period 1970 to the early 1980s, reliance on adding more workers rather than using existing workers more intensively was “one clear proof that Frederick Taylor’s methods have never taken root in the Soviet Union” (Van Atta, 1986, p. 335).

Revitalized NOT focused on organizational advancements and efficiency needs and promoted new organizational methods, economic-oriented stimuli, and time charts. According to Clarke (1995, p. 1), NOT in Russia in that period was:

[...] largely determined by technological characteristics of the production process, [...] was embodied in reams of technical and normative documents which defined labor and production process in minute detail, in a managerial hierarchy that was dominated by engineers, and in a formal system of accreditation of employees according to their level of technical education and training.

However, ideological grip, censorship, and tight control over information about advanced foreign practices defined the Soviet (national) identity of NOT. Until late 1980s, the inflow of fresh management ideas from the West was blocked administratively and ideologically[7], and official publications about foreign management practices were supposed to prove the exploitation of the working class. The construction of several large factories per American design was only possible with the Communist Party leadership’s positive personalized attitude to selected business leaders such as G. Kennan (PepsiCo) and A. Hammer (Occidental Petroleum). But the impact of those leaders on organizational practices was minimal.

Following M. Gorbachev’s radical transformation of society, economic restructuring (“perestroika”), “new thinking”, and “openness” in the late 1980s, and with privatization and the large-scale shift from state to private property further in the 1990s, the interest in internationally recognized organizational concepts and effective techniques at the enterprise level has been renewed. Translations of F. Taylor’s books were published in Russia again, his fundamental ideas were included in business schools’ curricula, and history of Russian entrepreneurship including the history of Taylorism in Russia was re-introduced to a new generation of managers and entrepreneurs (Ageev *et al.*, 1995; Kuzmichev and Petrov, 1993). Of course, successful acquisition of new organizational ideas from abroad was shaped by cultural attributes of Russian management (De Vries, 2000; Grachev *et al.*, 2007; Grachev, 2009).

Conclusions

This article contributed to the discussion about historic boundaries of the major paradigm shift in management triggered by F. Taylor’s *The Principles of Scientific Management*. It raised questions about conceptual models (science vs organizational practice), efficiency (firm vs society), implementation (economic vs ideological), and the transfer across borders (fit economic epoch vs fit political context). Several lessons should be drawn from this study.

First, when viewing F. Taylor’s intellectual contribution the authors emphasized his science-based systemic view of organization of machines, people and production with programmatic and societal effects as unique revolution in the twentieth century management. They explained that the transfer of conceptual thinking was different from exporting practical organizational methods. Advanced scientific knowledge has no boundaries while applications take place within specific socio-economic and

political context and respond to dominating interests at the “commanding heights” of society which either support or conflict with the effective application of scientific management. The analysis of the historic cycle of Russian Taylorism supported this argument.

Second, the authors positioned scientific management relative to distinctive economic epochs and considered F. Taylor’s contribution as a natural component of the industrial era, especially of the industries that created the backbone of the industrial age. This in turn generated additional arguments in support of management know how transfer to the other countries (and industries) that reached the stage of industrialization (strong interest in economically accelerating Imperial Russia in the 1910s vs delayed interest in China which was economic laggard in the 1930s). At the same time the authors were convinced that many key components of scientific work organization may not be applicable to many industries that stem from the post-industrial economic growth.

Third, the historic case of Russian Taylorism revealed initial strong interest in the new organizational ideas and willingness of the country’s leaders to expand those principles to the level of society as a whole. However, the shift from a mixed economy and entrepreneurship to the centrally planned authoritarian society resulted in loss of interest in Taylor’s system. Industrialization in J. Stalin’s USSR based on indoctrinated enthusiasm or fear of labor camps – the source of cheap but productive labor where many original supporters of “scientific work organization” vanished – proves the contextual dimension of F. Taylor’s system. When Taylorism did not fit the ideology-based totalitarian society that followed mixed economy of the 1920s, the communist leadership removed it from the economic and political arena.

Overall, the findings of this study enrich the discussion about scientific management and application of Taylorism in the other countries. The archival and analytic results of the study permit conclusions at a high level of aggregation; highlight conflicting scholarly opinions on the history of Taylorism in Russia; and provide the framework to better understand the scope of scientific management in historic socio-economic landscape.

Notes

1. This approach resonated with L. Boltzman’s famous statement that there is nothing more practical than a good theory: “I am of the opinion that the task of theory consists in constructing a picture of the external world that exists purely internally and must be our guiding star in all thought and experiment; that is in completing, as it were, the thinking process and carrying out globally what on a small scale occurs within us whenever we form an idea” (Boltzmann, 1974, p. 33).
2. F. Taylor in his book makes multiple references to the works of contemporary organizational engineers such as F. Gilbreth’s motion and time study (pp. 64-72) as well as to the studies by C. Barth (p. 96).
3. The origins of the Russian term “scientific work organization” (*nauchnaya organizatsiya truda* – NOT) come from the French translation and interpretation of F. Taylor’s term “scientific management”; in the mid-1920s the term NOT was more and more often substituted with the term “rationalization”).

4. The authors suggest not only distinguishing those groups as “pro-Taylor” (with V. Lenin) and “anti-Taylor” factions (Wren and Bedeian, 2004, p. 291) but also explore their common grounds.
5. E. Luke refers to Gastev’s directives on personal hygiene, bathing and cleanliness as tangible signs of a socialist society (Luke, 1983, p. 599).
6. Herein, the authors present the more accurate quote from J. Stalin compared to popular secondary reference from Hughes (2004, p. 251).
7. Until the mid-1980s ideas of the leading Western organizational scholars were available only through censored interpretation; journals and magazines like *Business Week* or *Economist* were not allowed for distribution in the USSR.

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