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TECHNOLOGY AND IDEOLOGY: MASS COMMUNICATION AND INFORMATION REVOLUTION IN THE SOVIET SOCIETY

Abstract

For many historians and scientists Russia has always been an enigma, especially so during the Soviet era. At the same time, this was a conservative, underdeveloped country, but a country that viewed itself as a revolutionary model that other countries should follow suit. Simultaneously, everyday this society used both the abacus and the computer, which was just one of many similar paradoxes, such as a hundred percent fulfilled production plans accompanied with frequent and widespread shortages. The aim of this paper is to explore successes and failures of mass communication and ICT development in the Soviet Union, and its implications for Russia today.

Keywords: Soviet Union, Technology, Ideology, ICTs.

In one of his radio addresses in October 1939, Winston Churchill said the following: 'I cannot forecast to you the action of Russia. It is a riddle wrapped in a mystery inside an enigma. But perhaps there is a key. That key is Russian national interest.'

And truly, for many historians and scientists Russia has always been an enigma, especially so during the Soviet era. At the same time, this was a conservative, underdeveloped country, but a country that viewed itself as a revolutionary model that other countries should follow suit. Simultaneously, everyday this society used

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both the abacus and the computer, which was just one of many similar paradoxes, such as a hundred percent fulfilled production plans accompanied with frequent and widespread shortages.

Since the first days of Soviet Union, science and technology have played one of the most important roles in social processes and the structure of this state, affecting a series of changes which are still today subject of scientific analysis. Certainly, any deterministic point of view which would exclude other aspects such as economy, politics, and culture would be erroneous for understanding the relationship between science and technology, and any nation, not only the Soviet one.

Architects and ideologists of the October Revolution believed that they are not only initiating a new epoch in the history of mankind, but also in science. According to the Marxist theory, education and learning were constituents of an ideological basis of a society, and as such it owed its characteristics to the economic base. After achieving the transformation to the socialist economy, the entire education system would be reformed thus replacing capitalist approach to natural and social science with a Marxist one. Early Soviet theoreticians of Marxism denied the achievements of bourgeois scientists in western countries and demanded an authentic Soviet-kind of scientific development, however, a complete rejection of western scientific theories came about with the arrival of Stalin to power and the ideological offensive during the late twenties and thirties. The most dangerous shift whose consequences were felt in the coming decades revolved around the theory of Marxist and capitalist biology by a lowly educated agronomist Trofim Lysenko whose approach was accepted in 1948 and was not officially refuted until 1965.

Among the early political elite of the Soviet Union, there was a conviction that in the socialist mode of production and socialist environment technology would have a far greater potential than in the capitalist countries. It was seen as a value neutral engine of progress, independent of the system in which it was created. It is not surprising, then, that Leon Trotsky asserted that the tractor is 'the cultural towboat' capable to take workers and peasants to the modern age – for him, technology was the highest form of culture.[2]

Socialist societies which were until then mostly oriented to agriculture, strived to secure top-notch industrial technology in the shortest period of time, believing

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[2] Paul R.Josephson, *Would Trotsky Wear A Bluetooth?*, The Johns Hopkins University Press, Maryland, 2010., p.4.

that it will transform uneducated peasants into self-aware citizens, also making them loyal by providing all of the necessities of life. In utopian visions that leaders of people's democracies had, technology was poised as an elixir for a series of economic issues, such as drought, chronical agricultural problems, inadequate transport and telecommunication infrastructure, and short life span. Attempts to copy modern technological solutions from capitalist countries, showed that there is no actual value neutrality, but that accompanying political and economic issues of such an approach carry a high price for the nature and society, such as mass migrations to urban centers that do not have adequate housing capacities, or hunger terror in the beginning of collectivization and industrialization in Russia and Ukraine. In short, the first generation of Soviet leaders overestimated the potential of technology by expecting an overnight transformation of the society into paradise, and at the same time underestimated it by disregarding its disturbing influence on social, political, and cultural processes.

Due to inherited underdevelopment from the period of the Imperial Russia, the Soviet Union significantly lagged behind when compared with advanced capitalist countries, risking to stay in such a position as western countries had a continuing and advancing economic growth. Leon Trotsky regarded that the chance exists, because in his opinion, capitalism went into a phase of decay, a dead-end, while the Soviet Union at the same time released human potential through new organizational forms, including planned development of science and technology. He reminded his associates to dedicate the utmost effort to connecting the country: with steam boats, post services, radio programs, telegraph and telephone connections, as well as with railroads. He believed, also, that the main obstacle for the development of a modern socialist economy is the low level of cultural and economic development, which was most obvious in the differences between villages and cities. Trotsky viewed modern technologies as a means to overriding these discrepancies, which will later become known as 'smichka' (смычка – a connection) – a link between peasants and the proletariat, the new and the old, the modern and the outdated. In his speech at the opening of the All-Union Congress of the Society of Friends of Radio in 1926, Trotsky looked back on the way in which he created a 'smichka' with Turkmenistan, a republic larger than any European country, whose citizens lived in isolated areas. In the absence of roads and railways, radio made the first steps in the name of Socialism.[3] As he pointed out,

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[3] Ibid.,p.45.

three quarters of the society of this republic did not know what a radio was, and the remaining quarter was familiar with it only due to the demonstration of this technological miracle by the Bolshevists. During the occasion, he made ridicule of sceptics for their doubt in the Soviet ability to use radio for socialist causes, as well as its use of latest scientific and technological achievements in ways which were unknown to capitalism. Sceptics were requested to ponder on how in front of their eyes, the world has been changed in the last twenty-five years by airplane, car, phonograph, and tractor.

Following Stalin's Great Purge which annihilated progressive forces in the Politbureau such as Trotsky and Bucharin, the nation was on course of a 'great break', a discontinuity with previous party programs, especially with the NEP (New Economic Policy). Although initially retaining a positive approach to influx of western technology into the Soviet society as an important factor for a rapid modernization, soon the slogan 'Technology will decide all!' was replaced with 'Cadre will decide all!', justifying such an attitude with existence of enemies within its ranks and being 'surrounded by the capitalist enemy'. The orientation towards self-sufficiency prevailed along with an overemphasis of the innovative character of the Soviet industry and technology. Western technology has kept its place in the developmental process of the budding state, but through the directive of acquisition, copying of successful technological solutions and industrial espionage. Unsatisfied with the rate of industrialization and unrelenting peasants who refused to succumb to the Bolshevists, he embraced heavy industry and electrification as a priority for Soviet interests, while viewing commodities, housing, and health care as secondary. His main idea concerning agriculture was to extract and overflow capital from villages to the industry, and had nothing to do with the concept of 'smichka'. Because of that, this sector will remain a weak spot of the economy until the dissolution of the Soviet Union, marked by poverty.

Unlike Lenin and Trotsky who highlighted the universal characteristics of technology, Stalin advocated an urgent development of an autochthonous socialist technology, different from the capitalist one. One of possible reasons for disregarding the social aspect in the policy of Soviet modernization could be found in the inadequate educational structure of the Politbureau where the percentage of members with technical education background in the period from 1956 to 1986 rose from

59 to 89 percent.[4] During this fervor, especially in the initial phase, there was no proper investigation into the relationship between workers and socialist technology, including women workers, peasants, and clerks in facing the paradoxes of socialist technology at home and at work. Eventually, paradoxes and contradictions will contribute to the final end of this empire, with science and technology playing a significant role as another force which, this time under the influence of progress, broke loose from the Politbureau's hands and turned from an ally into an enemy.

Faith of the Soviet leadership under Stalin in the proletarian science and technology was accompanied by the concept of earlier theoreticians of Marxism (Proleteriancultists) who had quite a puritan relationship towards productive forces of capitalism (including science) and their possibility to continue serving the working class after the revolution, albeit under different terms. Emphasizing exclusively Soviet technology and science was adhered to as a dominant approach all the way until late 1950's, but without changes in general acceptance of all Bolshevik leaders since the October Revolution that mastering modern technology and its spreading is of greatest importance above all due to its clearly visible transformative potential for the society. Belief that it is apolitical and able to serve the interest of large capital and socialist societies equally well was quite inconsistent, notably in the first decades of the Soviet state with the exception of Leon Trotsky who was the only one completely assured that USSR has to obtain the highest cultural level - modern technology and apply it within the society without regard to its origin.

It will later show that the USSR's discrepancy between the desire to become an equal participant in the telecommunication revolution led by developed countries, and thus bring about certain benefits, and simultaneously expecting to keep new technologies under ideological control, was unsustainable precisely because of the inherent tendency of the new world of communication to strive towards structural decentralization of the media system and individualization at the social level. Another, perhaps far more important reasons is the inability to, regardless of the invested energy and enthusiasm, transfer technology from one socio-economic organization to the other without repercussions and differentiations. Observation of the French philosopher Bruno Latour that social values are ingrained in tech-

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[4] Graham Loren, Science and the Soviet social order , National Forum, Vol. 70 Issue 4, Fall90, Internet, http://web.a.ebscohost.com/ehost/detail/detail?vid=5&sid=644af014-853a-4d64-8d8d-be276e6779e5%40sessionmgr4006&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#AN=9609192154&db=f5h, accessed on Dec 25th 2017.

nologies seem to have been confirmed in the USSR at the very moment that state decided to disregard this fact.[5]

RADIO AS A KEY LEVER OF THE BOLSHEVIK AUTHORITIES

Did Vladimir Ilyich Lenin have an appropriate perception of this new media when as the first world leader he recognized the role of radio signal as an interlocutor for spreading the revolution, naming it 'the spokesperson of the revolution' and 'newspapers without paper and borders'? Even though these statements today sound naive, in a feudal and a lapsed country such as Russia in 1917, this was the only right approach to converting an illiterate and poorly educated people, making radio one of the main infrastructural elements of a new society. Despite a powerful initiative from the top, the spreading of new media was sluggish until the forties when limitations in supplying electricity to rural areas were surmounted along with bottlenecks in the production of radio receivers. From the modest number of 92.000 devices throughout the Soviet Union, a total of 7 million was attained during the forties, with the number of radio stations going from 22 to 90 in 1937.

The greatest challenge for the Soviets in the radio sphere, ironically, was in the successfully resolved issue of long distance radio transmission, with intention to reach as many listeners as possible. By embracing broadcasting and receiving via short-waves, the Soviet Union became 'vulnerable' to foreign radio programs such as BBC or VoA in Russian, as a large number of population owned radio devices able to operate on all wavelengths. Thus, Russians not only received the news from the West, but also pop and rock music which in following decades was recorded and distributed on cassettes as one form of what is today known as 'soft power'. The struggle against foreign radio waves resulted with 200 operational radio jamming stations with 3-4 megawatt transmission power in 1952, while this number rose to 1700 in the beginning of sixties, with the combined power of 45 megawatts.

Television: Impressive signal coverage and program unification

Television is to develop at a far quicker pace than radio, mostly due to a thoroughly established industrial infrastructure after the war. Experimenting with this media will begin in 1931, with broadcasting in 1939. The Second World War ex-

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[5] Bruno Latour, Technology is society made durable, Internet, http://www.bruno-latour.fr/sites/default/files/46-TECHNOLOGY-DURABLE-GBpdf.pdf, p.111, accessed on Dec 20th 2017.

pectedly affected these dynamics, thus regular broadcasting will not begin before 1955. Having in mind the size of state territory, satellite transmission of domestic programs was necessary, and in 1965 the first satellite of Molniya series - relays which since 1967 formed the basis of a program broadcasting system named 'Orbit', which was also in color, starting in that year.

It does not suffice to say that successful coverage of the territory of the Soviet Union with TV signal was in itself a serious and unique quest - Soviet empire spanned over 22 million square kilometers, covering one sixth of the planet. Western part of the USSR covered more than half of Europe, but at the same time comprised only 25 percent of the total surface of this country, compared to which the United States were two and a half times smaller in size. Television program faced numerous challenges, and not just technical ones. One of the biggest challenges was the collision between the need to accommodate the contents of programs to population of 15 federal republics, 19 autonomous republics, 9 regions (oblasts), 123 counties, and 10 autonomous districts (okrugs) spread over 11 time zones whose people spoke over 100 languages belonging to 75 nationalities, and still keep hold of the centralized party control over what was to be broadcasted. Leading property of electronic media, always emphasized by the officials, was its 'massive character', ie. promotion of national unity of the Soviet state. As time went on, preferences of the audience evolved, thus it was not viable that the adaptation of contents for specific regions should remain on socio-political topics, but ideological messaging had to give way to entertainment.

In order to at least partially grasp the importance and influence of television for the Soviet expanse, it will suffice to acknowledge the intimidating size of the audience that observed the prime information program 'Vremya' and associated programs: each night an average of 150 milion people watched the evening news, representing 80 percent of adult population. In comparison, at the same time, three news media in the United States had the audience of 60 million in the evening, or just over one third of adults. In the period between 1979 and 1984, 'Vremya' increased its auditorium by 20 percent, above all due to it being simultaneously transmitted on all TV channels.

However, the same issue which arose with the radio, re-emerged in a slightly different form in relation to television. Although the price of VCR devices (video recorders) in the mid-eighties amounted to approximately 5000 USD, they were sought for on the black market, in as much that in 1987 there were between 250

and 300 thousand pieces across the Soviet Union. As with the Western music which was tirelessly copied from one cassette to another, movies were hugely popular. Even though the government prohibited them because of 'anti-Russian prejudice', movies such as 'Rocky' and 'Rambo' were at the top of the list and were sold for as much as 300 rubles per copy, amounting to an average workers monthly pay.

Soviet regime had a justly founded fear that exposure to the Western produced entertainment via video tapes would consequently lead to a more expressed criticism of the Soviet informative program. Attempts to regulate the video recorder market and steer the phenomenon itself by producing its own model 'Elektronika VM/12' were almost in vain. This is mainly due to the fact that the domestic device could not reproduce the Western standard of cassettes (VHS and Beta), which along with poor quality and slow production process led to it being unavailable on the market nor popular.[6]

THE RED NETWORK

In the last decades prior to its dissolution, the USSR was not world-famous for its microelectronics and successful catching up with Western trends in development of computer technology, which was primarily due to falling behind with acceptance of cybernetics as a transdisciplinary approach to regulatory systems - their structure, limitations, and possibilities. During the fifties it was prohibited and marked as reactionary, bourgeois pseudoscience, along with being the weapon of imperialistic ideology, meaning that meddling with it came with the risk of being sanctioned. The official state attitude on this matter was clearly discernible from an article published in the 'Voprosy Filosofii' (Problems of Philosophy) magazine in 1953, titled 'Whom Does Cybernetics Serve', which argued that this science is in confrontation with dialectic and historical materialism as the most important

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[6] Glider Eric, An Enigmatic Embrace: Problems of Regulating the Effects of New Communications Technologies in the Soviet Union, Paper presented at the Annual Meeting of the Speech Communication Association (73rd, Boston, MA, November 5-8, 1987.), Internet, http://web.a.ebscohost.com/ehost/detail/detail?vid=7&sid=644af014-853a-4d64-8d8d-be276e6779e5%40sessionmgr4006&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#AN=ED289187&db=eric, accessed on Dec 30th 2017.

criteria of acceptability.[7] In such an atmosphere, the attempts of a young mathematician and officer of the Red Army, Anatoliy Ivanovich Kitov, do use this science for realization of the first ever idea to create a civilian computer network could not conclude in any other way than with sanctions and expulsion from military service. Although all of this was happening in 1959, in the era of Khrushchev, it would take several years for change to be initiated.[8] In the beginning of sixties there is a massive turnaround regarding this issue, and cybernetics is proclaimed to be an innocent victim of repression and 'science in service of Communism'. Things went to such length that it was asserted how prior opponents of this science had recklessly hostile notions which were propagated by reactionaries in order to conceal the true potential of cybernetics from Soviet scientists, with it becoming not only the science of rationality parallel to Marxism, but a movement for a radical overhaul of the Stalinist scientific system as well. Soon it will become an overarching discipline for many professions and will bask in prestige greater than in any other country in the world, far away from 'a mechanistic equalization of processes such as nature, society, and technical systems, which makes it antithetical with materialistic dialectics and modern scientific physiology of Ivan Pavlov', as it was defined in 1954, in the edition of 'The Small Vocabulary of Philosophy'.

By perceiving the opportunities which arose with such disposition in the scientific community, a skillful cyberneticist (and a colleague of Anatoliy Kitov) Victor Mikhailovich Glushkov proposed the OGAS project in 1962 (Общегосударственная автоматизированная система учёта и обработки информации - State Automized System of Accounting and Data Processing). This Kitov's updated concept consisted of creating a national computer network with the possibility of real time working and independent access, which would be based on existing telephone lines and those that would be developed for this purpose only. In the best case scenario, the network would, like a nervous system, cover the entire area of Euroasia, spreading out between all factories and companies of the Soviet planned economy. Hierarchical modeling based on three layers of a pyramid-like structure would consist of the main computing center in Moscow connected with 200 computing centers of the second level in all major cities, which would further be linked to 20.000 terminals in production companies

[7] Martin Cave, *Computers and Economic Planning: The Soviet Experience*, Cambridege University Press, 1980., p.2

[8] Benjamin Peters, The Soviet Internyet, Foreign Policy, 17.10.2016, Internet, https://aeon.co/essays/how-the-soviets-invented-the-internet-and-why-it-didn-t-work, accessed on Jan 5th 2018.

throughout the country. Besides stated above, an important characteristic of the system would be its decentralization - the center in Moscow would assign user permissions for lower levels, but afterwards authorized users could communicate between each other independently of Moscow, as well as to enter data into the central base which would be accessible to all. With this idea, Glushkov not only anticipated what is today known as 'cloud computing', but he also foresaw the possibility of eliminating physical currency by enabling OGAS to electronically process all transactions. Projected cost of the realization of this project was in accordance with his idea of megalomaniac proportions: 20 billion rubles (today's 333 million dollars) with engagement of 300.000 operators and a deadline of 30 years for reaching full capacity. Still, given numbers guaranteed significant savings in comparison with the current situation, as in the beginning of 1960 as much as 3 million officials were attempting to track undiscernible flows of information coming from the economy, estimating that in order to achieve intended growth goals in the next 20 years the bureaucratic machine would require number of people equal to the entire population capable of employment. Although initially having the support of general secretary Leonid Brezhnev and prime minister Alexei Kosygin, their absence from a key meeting in which the decision on the implementation of this system was to be made encouraged the already hostile finance minister Vasily Garbuzov to impose his own concept and edit Glushkov's proposal until it was no longer recognizable. Apparently the OGAS project threatened numerous particular interest, and besides its great potential it was not meant to come to life in the original form. Consent was given for the set-up of computers in industrial centers, but not for their interconnectedness, and the existing bureaucracy was kept in place without a possibility of digital network formation.

That Gluskov's project was not solitary and overly utopian is shown by a specific attempt to implement 'electronic socialism' in Chile during the seventies. Short lived government of Salvador Allende tried to rationalize and democratize the planning of Chilean economy by using a national network of telex machines through the 'Cybersyn' project (a combination of 'cybernetics' and 'synergy'), in accordance with promises of worker's participation made after the nationalization of key companies. Besides the possibility of tracking all relevant parameters in real-time from a futuristic center in Santiago, the project as its integral component anticipated a minor system named 'Cyberfolk' whose main characteristic would be devices similar to voltmeters (Algedony - from the Greek 'algos' for fear and 'hedone' for pleasure) that would be located in all Chilean homes, and

through which citizens could express the intensity of their (dis)satisfaction with the government.[9] Following the *coup d'etat* by Pinochet in September 1973, the need for central planning evaporated, and so did this ambitiously imagined project, which if it had longer would probably see the same fate as its Soviet counterpart annihilated by bureaucracy that survived thanks to squandering and pestilence that OGAS was intended to eliminate. Ironically, the USA managed to develop ARPANET, harbinger of the Internet, due to successful cooperation between the civilian, government, and military sector, which was unfeasible for the chaotic system of Soviet government. In other words, the first global network owes its occurrence to capitalists behaving as socialists. Similar forces which put a stop on the Soviet network would later end the USSR, and these were, above all, informal forms of institutional disobedience: tendency for status quo, subversive ministers, nervous factory managers, and opponents of reforms whom protected their personal interest.

Telecommunication revolution that played out in the eighties, expectedly caused powerful structural changes in the culture of the Soviet Union, but also in regard to media, ideology, and society in general. With the standard of living rising, so did the population's requirement for general consumption goods (including radio devices, HiFi systems, and television), but also a more diverse supply on existing frequencies which brought into question the 'mass character' of until then broadcasted content. Although the government, concerned with political effects of new technologies, introduced a series of restrictions for their use and disposal, it is clear that traditional Soviet collectivist values were inevitably replaced with Western, individualistic ones. Concerning this, interesting are thoughts of Evgeny Velikhov, the vice president of the Academy of Sciences of the USSR in charge of Informatics, who confessed in the late eighties that PC computers are a subject of specific limitations, but that in his opinion the situation is changing. In the past, as he claimed, Soviet citizens were so politically immature that they were an easy prey for the Western propaganda, forcing the state to protect them with censorship of all traditional Western media and availability of printed materials. Similar attempts were made with regard to computers, however, in Velikhov's words 'two axis converged', the axis of rapid maturing of the Soviet society and the axis of developing communication technology. The resulting intensity of information flow

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[9] Evgeny Morozov, The Planning Machine: Project Cybersyn and the origins of the Big Data nation, 13.10.2014, Internet, https://www.newyorker.com/magazine/2014/10/13/planning-machine, accessed on Jan 3rd 2018

came to be such that it was impossible to block, even if the government wished it so, and the society, as he optimistically concluded, matured enough for it to be deemed unnecessary.[10]

A conclusion may be drawn from the above mentioned as to what kind of dilemmas the Soviet authorities pondered considering telecommunication technology. Despite being humble in comparison to today, the all-presence of computers, networks, fax machines, and satellite transmissions was such that traditional Soviet censorship had no way of resisting. Along with this, restrictions and impediments would negatively affect the growth of computer literacy and innovation in the Soviet society, additionally slowing it down in the race against developed countries.

Compared to the pace of expansion in USA, Japan, and Western Europe, popular computing culture was spreading slowly throughout the Soviet area, which expectedly faced numerous limitations, most of which were imposed by the regime. It is important to mention here the way in which the USSR reacted to the development of new technologies abroad. Reaction speed always depended on whether a given technology was clearly applicable to the military, or a wider civil-military character, while disregarding the speed of its development. The best example for this were the nuclear and information technology. In the first case, Soviet response was brief and clear - as soon as Stalin learned of the American project of the atomic bomb, he recalled a nuclear physics expert called Igor Vasilyevich Kurchatov away from research on tank armor and appointed him as head of the Russian equivalent of the Manhattan Project. By focusing all available resources on the defense sector and combining ancient means of repression with modern technology and organization, by 1949 the American nuclear monopoly was gone.

When it comes to information technology, the response was quite complex, manifesting a degree of confusion probably due to the technology and multiple possibilities of its application being so overwhelming that the usual Soviet method of centralized control was very difficult to implement. In an attempt to place this cumbersome sector under one roof, several consecutive coordination bodies were formed starting with the information division at the Academy of Sciences, over to the Intersector Science and Technology Complex, all the way to the state committee for computer technology formed in 1986. Subordinate to these bodies were ministries tasked with production of computer components: Minradioprom,

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[10] Graham Loren, Science and the Soviet social order, op.cit, p.5.

Minelektroprom, and Minpribor, while at the very bottom there was a series of production and research organizations.

Another reason for the slow penetration of this technology is to be found in the development of chips and microprocessors which made the production of small-sized personal computers possible, with the idea of free distribution and use of those without the appropriate state supervision horrifying the Politbureau. Thus, a kind of an enchanted circle was formed, one which was best explained in 1984 by the Soviet expert for information technology A. P. Velikov in the following manner: demand for personal computers is poor as their number is insufficient, and they are insufficient due to the poor demand.[11] Up to 1985, this type of computer was given almost no attention to,[12] which is clearly visible by observing the press which almost completely ignored this topic. Around this time in the West there were numerous speculations as to why such a stance exists, also regarding weak efforts to develop and produce a personal PC. In this light, interesting are observations such as the one by professor Loren Graham from the MIT who said in the beginning of 1984 that 'it is becoming quite clear that these machines, along with the accompanying culture, are a challenge for the basic principles of the Soviet state, which is state control over the flow of information and data secrecy'. Dr Olin Robinson from the Middlebury College also noticed that 'Russians cannot easily accept information technology as it gives too many information to a too big number of people'.

This relationship will, at least in a declarative way, change just in 1985 with the decisions of Politbureau on giving priority to informatics, as well as with Mikhail Gorbachev stating that 'Microelectronics, computing technology, and the entire information industry are catalysts of progress'. Soon appropriate reforms would follow of the (mostly middle level of) education system in order to increase information literacy in the fifteen years. This plan foresaw that up to 1995 there would be 100 thousand computer equipped classrooms, and 120 thousand before year 2000, or 1.6 million computers in total. If for comparison we look at the data that already in 1987 in American state schools there was one million computers,

[11] Richard W. Judy, Jane M Lommel, The New Soviet Computer Literacy Campaign, Educational Communication and Technology Vol. 34, No. 2 (Summer, 1986), Internet, https://www.jstor.org/stable/30219882?seq=1#page_scan_tab_contents, accessed on Jan 3rd 2018.

[12] Richard W. Judy, Technology and Soviet National Security, National Council for Soviet and East European research 11/98, Internet, https://www.ucis.pitt.edu/nceeer/1988-801-5-3-Judy.pdf, accessed on Jan 3rd 2018.

it becomes clear how far behind they were. Also, on the path of information technology development there was a number of already mentioned bureaucratic limitations stemming from the organizational structure of the Soviet society whose removal demanded special radical measures in order to finally arrive to the necessary contemporary hardware and software.[13] In the end, it is paradoxical how Perestroika itself contributed to the confusion by providing unexpectedly wide authority to companies which did not have those from their founding.

Such a decision caused another set of speculations in the West, mostly regarding the way in which personal computers were to be used. Guesses varied from assumptions that they would be kept under lock, mirroring the practice regarding copy machines, all the way to free usage, except for the use of printers. As time went by and Glasnost took hold, estimates in the beginning of 1988 showed that computers would be freely available for professional and educational purposes, which created space for imagining an imminent and soon-to-be information society modeled by the American one. It was estimated that the impulse of personal computer expansion was such even in the Soviet Union, that no prohibitions would yield success, but that precisely due to its limited availability to the general public except through gray economy channels they would become not only a significant means of productivity in the work place, but also a status symbol. That the ambitious Gorbachev's plan was not met is shown by the estimate that in mid-1989 in the entire Soviet Union there were only 50.000 personal computers, or one per 5.600 people, a stark difference compared to USA where at that moment there were more than 30 million computers, or one per eight people.[14]

From the historical perspective, introduction of new, revolutionary technologies to a society causes three classes of effect. Primary class relates to expected utility from the acceptance of given technology, the reason why the decision was made in the first place. Secondary effects stem from adaptations which are necessary for the implementation of technology, and are of transitory character. Tertiary class is manifested in the long run, mostly unexpected with a diffusive social impact. Final two classes can be interpreted differently as favorable or not, depending on the point of view. This tertiary effect of information technology in a socialist so-

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[13] Richard W. Judy, Technology and Soviet National Security, op.cit., p.11.

[14] Frank Gaffney, A Formula For Disaster: Computers For The Soviet Military, Center for security policy, 25.07.1989., Internet, https://www.centerforsecuritypolicy.org/1989/07/24/a-formula-for-disaster-computers-for-the-soviet-military-2/, accessed on Jan 3rd 2018.

ciety is perhaps best shown through the testimony of P. Vasyak, who by describing the influence of personal computers on the build-up of the social identity of young Poles in the second half of eighties, most certainly provided a faithful description of occurrences almost anywhere in the countries of Warsaw Pact, especially having in mind the powerful influence of USSR on the situation in Poland. By using the impulse of local communist youth organizations which came about following the information reforms of 1985, as well as the consequent, as it was, computer market, members of the younger generation accepted computers as cultural artefacts giving them significance greater than pure value of use. Possession of this device made in the West beaconed the beginning of creating an imaginary world influenced by available knowledge on cultural movements in the West, in the context of ever faster socio-economic changes in the countries of the Eastern Bloc. It is important to note that a significant role was played by aforementioned state organizations which provided courses necessary for acquiring required abilities. The following step in this process was 'dropping out' from the state club, and joining the 'underground' sphere by forming one's own computer group or joining an existing one.[15]

CONCLUSION

Under the cover of Perestroika, a prerequisite and an environment for application of new technologies, especially information ones, was created in the Soviet society. Under some other type of a leader, less liberal than Gorbachev, perhaps this would have been used for redefining politics of national security, paragon to the period of development of nuclear and rocket technology, but also for a parallel controlled opening towards the West. However, only the second possibility was realized, further weakening the already jagged Soviet system. Although science and technology contributed to the USSR, in a way, becoming equal with the rest of the world, during the Gorbachev mandate and reforms, it was obvious that in this sense the highest peak of development and convergence with other societies was reached. One of the prime reasons for this was the influence of growing nationalist tendencies which resulted in a paradoxical situation that science and technology had a weaker impact under a liberal Gorbachev who was a proponent of modernization, than during repression, censorship, and political control of his predecessors. It turned out that fears of the early Soviets who thought that Western science

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[15] Juliane Fürst, Josie McLellan, *Dropping out of Socialism: The Creation of Alternative Spheres in the Soviet Bloc*, Lexington Books, 2016., p.157.

and technology represent a surmounting challenge for the Bolshevik society were well founded, specifically focusing on the possibility that 'embracing these refined products of bourgeois civilization would contaminate the society itself with social and political values of this civilization'.

In different variants, with different subtleties and corrections, Marx and Engels always stressed that with the development of productive forces, so does their social character develop, becoming expressed in the beginning of large operations, intensifying cooperation during labor-technical processes, in the overlapping of certain production processes and in the decisive importance of industrial production for the society. Capitalist property relations thus become an increasing hurdle for the development of productive forces, whose social character then becomes a greater obstacle for the private property of means of production.[16] Could we say that this thesis was inversely confirmed on the very moment when development of productive forces in the Soviet Union reached the limit of telecommunication and information revolution? In another definition, they say that 'on a certain level of development of these means of production, feudal property relations were no longer suitable for already developed productive forces, rather preventing instead of improving it, and turning into its shackles which had to be broken, and broken they were' - so in front of the Soviet eyes of the late twentieth century, their society collapsed due to 'underground forces that they have summoned' and made a full turn.

Once more, the thesis of Bruno Latour should be restated, regarding how social values are ingrained in technology, but also in its inverted form according to which along with changes of social values, what we consider evident with technologies also changes.[17] As cybernetic collectivism and planned economy were values that shaped the Soviet network, which today seem alien to us, so will perhaps liberal values of the Internet today be a distant idea to future observers.

Did Russia, as the largest successor of the USSR, draw appropriate lessons on this field? Judging by the Doctrine of Information Security of the Russian Federation adopted on December 6th 2016, certain things have not changed. This document, among other things, calls for the creation of a 'national management system of the Russian part of the Internet', as a response to threats in the form of foreign propaganda, cyber espionage, and terrorism. Further, it is stated that companies

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[16] Franz Marek, *Filozofija svjetske revolucije*, Riječka tiskara, Rijeka, 1965., p.23.

[17] Sam Dresser, *The Soviet InterNyet*, 17.10.2016, Internet, https://aeon.co/essays/how-the-soviets-invented-the-internet-and-why-it-didn-t-work, accessed on Jan 5th 2018.

that provide telecommunication and information services should consult security services prior to introducing novel products and services, as well as that Russia should end the 'dependence of domestic industry on foreign technologies'.[18] Although for some this could seem as a bold step by Russia towards a new direction, it is only a signal that the Kremlin has the same attitude on accepting technological changes and innovations as it did 30 years ago. As the USSR, the Russian government and security services are trying to limit the access of new technologies out of fear for socio-political changes which could arise.

Will Russia of this century replace the technological development for inner stability, or will it be sufficiently selectively porous for technological trends from the West remains to be seen. Vladimir Putin is a Soviet student who politically matured during the dissolution of the Soviet Union, and it is certain that for him giving in to chance is not an option.

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[18] Andrei Soldatov, *Moscow is still sacrificing innovation for state security*, 22.12.2016., Internet, http://foreignpolicy.com/2016/12/22/the-unlearned-lessons-from-the-collapse-of-the-soviet-union/

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TEHNOLOGIJA I IDEOLOGIJA: MASOVNA KOMUNIKACIJA I INFORMACIONA REVOLUCIJA U SSSR-U

Apstrakt

Za mnoge istoričare i naučnike Rusija je oduvijek bila enigma, posebno u sovjetskoj eri. U isto vrijeme, to je bila konzervativna, nerazvijena zemlja, ali zemlja koja je sebe smatrala revolucionarnim modelom koji druge zemlje trebaju slijediti. Istovremeno, svakodnevno ovo društvo je koristilo i abakus i kompjuter, što je bio samo jedan od mnogih sličnih paradoksa, kao sto je sto posto ispunjenih proizvodnih planova praćeno čestim i široko rasprostranjenim nedostacima. Cilj ovog rada je da istraži uspjehe i neuspjehe u masovnoj komunikaciji i razvoju ICT-a u Sovjetskom Savezu, i njegove implikacije za Rusiju danas.

Ključne reči: Sovjetski Savez, Tehnologija, Ideologija, ICT.