Prospects for Import Substitution in the Russian IT Sector under Sanctions Pressure

Anna Kurbatova

Anna Kurbatova — senior analyst at Alfa-Bank JSC.

Abstract

Since March 2022, the Russian information technology (IT) industry has been operating under unprecedented sanctions pressure, resulting in a profound transformation. The government and private sector entities must address the challenge of facilitating a rapid transition from products sourced from foreign vendors and foreign software to domestically developed alternatives. The objective of this study is twofold: first, to evaluate the potential for import substitution in specific sectors of the Russian IT market, based on an analysis of the progress made in the transition to domestic products and developments; and second, to identify strategies for overcoming the challenges associated with this transition.

The process of import substitution in the Russian IT sector is gaining pace driven by two key factors: the government's stated objective of achieving technological sovereignty as well as private business's development needs. However, the timing of the transition will vary significantly depending on the market segment in question. The highest rates of penetration of Russian products are observed in information security segment, reaching up to 80%. The lowest rates of penetration are observed in the segment of mobile operating systems, as well as in process management tools, reaching only 25–35%. In order to achieve the stated goals, it is necessary to maintain the state support measures and, in some segments, to expand them and develop new ones. This should be done with the consideration of the initial experience of market participants in import substitution. It is possible that the government may extend the timeframe

for the complete transition to domestic products for the public sector and large state-owned companies, contingent on the progress in overcoming the existing barriers to import substitution. At the same time, the longer-term goals, set to achieve the required level of utilization of Russian IT products, will not be revised in a more conservative direction.

Introduction

In response to the unprecedented sanctions pressure it has faced since March 2022, the Russian information technology (IT) industry has been compelled to expeditiously transit from reliance on foreign vendors' products and foreign software to a reliance on domestic products.

The scale and complexity of this task can be attributed to three key factors: (1) the considerable size of the Russian IT market, (2) the historically high penetration rate of foreign products, and (3) the sudden and dramatic negative change in the situation due to the withdrawal of many foreign players from the market. By the time the geopolitical situation escalated, the annual turnover of the Russian IT market was estimated at RUB 3 trillion, with foreign suppliers accounting for over 50% of IT budgets in both the corporate and public sectors. The unfeasibility of continuing business processes in the usual mode under the conditions of foreign players ceasing their activities in the market, as well as in connection with the introduction of sanctions against Russian companies and government agencies, necessitated the implementation of emergency measures by all participants of the Russian IT market. These measures were designed to minimize damage, adapt to the new conditions, and ensure conditions for long-term development.

Over the past two years, the Russian IT sector has undergone a significant transformation with the objective of achieving technological sovereignty and strengthening its position in the global IT market.

The objective of this study is to evaluate the potential for import substitution in specific sectors of the Russian IT market, based on an analysis of initial results of the transition to domestic products and developments. Additionally, it seeks to identify strategies for addressing the challenges associated with this transition, at the level of regulators, IT product developers, and customers.

The article is comprised of six sections. The first section outlines the prevailing circumstances of discrete segments of the Russian IT market up to 2022, with a particular focus on the preponderance of foreign or domestic suppliers. The second section provides an overview of the sanctions pressure measures on the Russian IT sector and identifies the primary challenges faced by the Russian IT sector. The third section is dedicated to an examination of the adaptation strategies employed by various types of market players in response to the evolving landscape of the Russian IT market. The fourth section presents a comprehensive examination of the government's initiatives to foster the growth of the IT industry. These initiatives include measures to speed up and scale up the transition of the local IT infrastructure from imported

to domestically developed solutions, and the implementation of support measures for Russian companies, specialists and customers in the IT sector. The fifth section is dedicated to an examination of the opportunities and constraints faced by Russian IT developers. The sixth and concluding section of the study analyzes the export potential of the Russian IT sector in the markets of friendly countries.

1. Russian IT market prior to 2022: positions of foreign and domestic suppliers

In 2021, the Russian IT market[1] surpassed a volume of RUB 3 trillion (equivalent to approximately USD 41 billion), representing a 19% CAGR in dollar terms between 2019 and 2021. This is markedly higher than the growth rate of the global IT market, which increased by an average of 5% over the same period [Strategy Partners 2023 (1)]. One of the factors contributing to the accelerated growth of the Russian IT market during the 2020–2021 period was the increased demand from corporate and government entities for IT solutions (including software and hardware) and services related to the organization of remote work formats, the accelerated digitization of critical business functions, and the protection of information systems in the context of the pandemic.

Since the early 1990s, the Russian IT market has been developing in close conjunction with the global IT market, exhibiting a notable prevalence of foreign vendors' penetration into the software and hardware sectors. Prior to 2022, the Russian IT market was dominated by solutions provided by foreign vendors. In 2021, foreign vendors' solutions accounted for 55% of the total IT budgets of corporate customers and the public sector, while in the consumer segment, their share exceeded 95%. This is hardly surprising, given that the retail consumer demand for information technologies is 96% represented by the cost of PCs and laptops, while only 4% of spending is attributed to software and information security solutions [Softline 2023 (1)].

In the B2B and B2G segments, the shares of domestic and imported software and hardware varied depending on the product category. The lowest penetration of domestic solutions (less than 10%) was observed in the segment of personal computing machines (PCs, tablets, laptops). This is due to the historically high focus of this market on supplies from the leading global vendors (Lenovo, HP, Dell, Apple, Acer, ASUS, and others) and its limited domestic production base. In the IT infrastructure equipment segment (information security equipment, corporate communication network equipment, data storage systems, servers, etc.), foreign suppliers accounted for up to 70% of the market. In early October 2022, the Deputy Head of the Ministry of Industry and Trade of the Russian Federation, V. Shpak, provided an estimate indicating that the average share of domestic radio electronic products in Russia, including the public sector and the open market, was 19% by the end of the first half of 2022 [INTERFAX-PROZAKUPKI 2023].

In the infrastructure software segment (which includes operating systems for PCs and servers, backup solutions, database management systems, virtualization solutions,

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[1] Main segments of the information technology market: software; hardware and microelectronics (user and infrastructure); IT services.

and so forth), the proportion of domestic developers in 2021 was a mere 8% [Strategy Partners 2023 (1)]. Historically, Microsoft, IBM, Citrix, Dell, Broadcom, and Red Hat have held a dominant position in this field. Additionally, domestic companies were underrepresented in the segment of software development tools, which encompasses artificial intelligence platforms, testing and software lifecycle management tools, data management software, and application development platforms. In 2021, international vendors held a market share exceeding 55% in the Russian office software market, which encompasses office suites, video conferencing, email, and other software. This segment was dominated by solutions from global majors such as Microsoft, Adobe, Zoom, and others. In the corporate software segment (ERM systems, CRM, SCM, BI analytics, manufacturing software), more than 40% of Russian customers' budgets were allocated to foreign solutions, primarily SAP, Oracle, Adobe, and Salesforce.

It can be stated with a reasonable degree of confidence that domestic companies have historically dominated the Russian IT market in the following segments: IT services, information security, cloud infrastructure, and infrastructure hosting. By the end of 2021, the share of Russian information security vendors is 61% [CSR 2023 (1)]. At the conclusion of 2021, the proportion of international suppliers in the Russian IT services market was 18% [Softline 2023 (2)].

2. Unprecedented sanctions pressure

The year 2022 was a period of significant disruption and transformation in the Russian IT sector. It was a challenging time for all market participants, characterized by intense challenges and profound changes. As early as the end of February, Russian users of foreign IT solutions, domestic software developers, and equipment manufacturers began to experience profound negative changes in the external environment. These manifested themselves in a sudden disruption of established supply chains and customary business processes.

Direct measures of sanctions pressure on the Russian IT sector included the following:

1. A ban on exports of high-tech products to Russia as well as on the provision of information technology services.

In February 2022, the US Department of Commerce implemented export restrictions on goods deemed essential for the advancement of Russian defense, aerospace, and maritime industries. The sanctions had a significant impact on a range of sectors, including the export of semiconductors, computers, telecommunications equipment, information security equipment, lasers, and sensors. Additionally, South Korea enacted sanctions, prohibiting the export of strategic materials to Russia. Seoul implemented restrictions on the sale of electronics, semiconductors, computers, information and communication technologies, sensors, lasers, and other types of equipment.

In April 2022, as part of the fifth package of anti-Russian sanctions, the European Union banned the export of high-tech products to Russia. These included quantum computers and advanced semiconductors, high-tech electronics, sensitive equipment, and software.

In October 2022, the European Union member states approved the eighth package of anti-Russian sanctions. Furthermore, a prohibition was enacted on the provision of IT consulting services to Russian individuals and legal entities.

In February 2023, the US Department of Commerce's Bureau of Industry and Security (BIS) expanded the list of "luxury goods" that are prohibited from being shipped or re-exported to Russia and Belarus (the list was originally enacted in March 2022). In addition, the export of computer peripherals, including keyboards, laser and inkjet printers, and hard disks priced above USD 300, has been prohibited. The restrictions apply to goods manufactured in the United States. However, any product containing at least 25% of its components or technologies manufactured or developed in the United States is considered to fall within this category. In addition, as part of the same restrictive package, one of the largest Russian suppliers of facial recognition systems, VisionLabs (which is owned by PJSC MTS), was subjected to US export sanctions. The company was included on the list of entities subject to export restrictions on a range of technologies and dual-use goods.

2. Inclusion of Russian IT companies on sanctions lists of unfriendly countries.

Since the end of February 2022, the United States has been consistently imposing and tightening sanctions against Russian microelectronics designers and manufacturers. In March, domestic design centers and major computer manufacturers, including Baikal Electronics JSC, MCST JSC, Modul, and Elvis Research and Development Center JSC, were subjected to export restrictions. The sanctions obliged foreign contractors were obliged to coordinate with the Bureau of Industry and Security of the US Department of Commerce all their deliveries of products to these companies. However, in September 2022, these companies, along with several others, were designated as SDNs (Specially Designated Nationals and Blocked Persons) by the United States. Inclusion on the SDN list entails the most comprehensive set of restrictions, including the blocking of assets in the United States and correspondent bank accounts, the termination of financial and economic legal relations, the freezing of assets, and a prohibition on transactions except those permitted by a license, typically a license to cease business operations. Additionally, the sanctions impacted other entities within the IT sector. In September 2022, approximately 30 Russian companies and research institutes in the electronics sector were put on the US sanctions list.

In March 2022, Japan imposed sanctions on Baikal Electronics, and the US Federal Communications Commission placed Kaspersky Lab on a blacklist of communications equipment and services. The list comprises entities whose equipment or services are deemed to pose an "unacceptable risk" to national security or the security of US citizens, and are therefore considered a threat to the US.

In June 2023, the European Union introduced the eleventh package of sanctions against Russia. The most significant aspect of the package was not the inclusion of new entities on the sanctions list, but rather a shift in the methodology employed in its compilation and expansion. From that point forward, it was sufficient for sanctions to be imposed on IT companies from Russia if they possessed an FSB license to work with state secrets or specific licenses from the Ministry of Industry and Trade. These

grounds constituted the basis for sanctions against the parent company of Positive Technologies (Positive Group PJSC), the developer of Defense Ministry-certified routers Scientific and Production Association (SPA) Eshelon, and the integrators Iteranet, Poisk-IT, and Akuta [Kommersant 2023 (1)].

In July 2023, the United States Department of the Treasury imposed sanctions on Russian companies involved in the development and import of electronics, components, and equipment, putting on the SDN list Rosatom's SPA Critical Information Systems (SPA KIS), as well as a number of companies engaged in the importation of electronic components or the provision of contract manufacturing services. Simultaneously, Canada introduced restrictions against electronics manufacturer CMT-AiLogic and component supplier Device Consulting.

In November 2023, the United States sanctioned JSC CSoft Development, a developer of specialized software used for computer-aided design in mechanical engineering, industrial and civil construction, architectural design, and land management.

In December 2023, the EU approved the 12th sanctions package against Russia, expanding the sanctions list to include several information security firms, such as Informzaschita, Infotex, and Bizon.

3. Personal sanctions against Russian entrepreneurs engaged in the information technology sector.

In April 2022, A. Karachinsky, the founder and co-owner of IBS, one of the most prominent Russian IT enterprises, was designated as a Specially Designated National (SDN) by the United States. Subsequently, in May, he relinquished his position on the company's board of directors. Poland has added two individuals to its sanctions list: Eugene Kaspersky, the founder of the Kaspersky Lab, and Boris Nuraliev, the founder of the 1C enterprise software company.

In light of the aforementioned factors, the primary challenges confronting the Russian IT sector in 2022 can be delineated as follows:

- The most significant challenge for Russian customers of IT products was the abrupt and extensive withdrawal of foreign suppliers of telecommunications equipment, software, consumer electronics, and IT services (including cloud services) from the market. A multitude of prominent vendors from the US, Western Europe, Australia, Canada, Israel, and other countries ceased the sale of new software licenses and equipment supplies, terminated the provision of technical support and maintenance services for previously installed software and equipment, terminated software upgrades, and disconnected Russian clients from cloud services. It is noteworthy that the reduction in business activities in Russia by foreign IT suppliers was more extensive than the sanctions imposed by unfriendly countries directly implied. While the sanctions mandated the cessation of collaboration with specified legal entities and individuals who had been blacklisted, numerous prominent foreign enterprises (e.g., SAP and Oracle) independently elected to entirely withdraw from the Russian market, effectively terminating all ties with local customers, irrespective of their status with regard to sanctions.

- Microelectronics manufacturers have experienced a significant disruption in the supply of advanced technology equipment and components, as well as the cessation of collaboration with foreign assembly facilities. For example, following the commencement of Russia's military operation in Ukraine, Taiwan Semiconductor Manufacturing Company (TSMC), a prominent global semiconductor manufacturer, ceased collaboration with Russian entities due to US sanctions. Furthermore, the inclusion of domestic design centers in the US SDN list also resulted in the loss of access to foreign intellectual property, including processor architectures such as ARM and IP blocks utilized in chip design. The implementation of extensive restrictive measures has rendered the establishment of new facilities for the manufacture of computer hardware and electronics a more challenging undertaking for Yadro and Aquarius [Kommersant 2022 (1)].
- Russian software developers were subject to a prohibition on the export of their solutions to a number of countries, lost the opportunity to utilize the development tools of foreign vendors, and found themselves partially isolated from foreign open-source platforms.
- A considerable number of large, medium, and small Russian manufacturing companies, financial institutions, and research organizations have been included on the sanctions lists of unfriendly countries. This has resulted in their exclusion from the supply of products and services from foreign suppliers, including IT solution providers.
- A significant exodus of IT professionals from Russia. In a statement released at the end of 2022, the head of the Ministry of Digital Development, Communications and Mass Media, M. Shadayev, indicated that approximately 100,000 IT professionals had departed from the country over the course of the year. According to the aforementioned data, approximately 80% of IT specialists who relocated abroad continued to be employed by Russian companies [Interfax 2023 (2)].
- A notable increase in the cost of foreign and Russian software has been observed. In November 2023, market participants observed a price increase since the beginning of the year for specific types of corporate software and equipment, reaching up to 40%. The increase in the price of foreign products can be attributed primarily to their importation into the country through parallel importation and purchase through intermediaries. The primary factors contributing to the escalation in the cost of Russian software are the rise in labor expenses and the decline in competition resulting from the withdrawal of cost-effective foreign alternatives from the Russian market [Vedomosti 2023 (1)].

In general, since 2022, over 200 technology companies have either left the Russian IT market entirely or significantly restricted their activities within it [Strategy Partners 2023 (1)]. It is also noteworthy that a number of Chinese technology companies have ceased operations in Russia. This is due to the combination of US sanctions and the demands of their US suppliers of electronic components, which have led to a reduction in their activities in the country without any official statements being made.

Foreign entities withdrew from the Russian market without considering the financial implications of their actions. As estimated by M. Shadayev, the head of

the Ministry of Digital Development, Communications and Mass Media, the losses incurred by international IT companies that ceased operations in the country in 2022 are estimated to have reached RUB 650–700 billion [TASS 2022]. Furthermore, 2022 was a period of unparalleled activity on the part of cyber groups targeting the IT infrastructure of Russian authorities, private companies, organizations, and media. While the attacks were not particularly sophisticated, their primary strength was their sheer scale [Anti-Malware.ru 2022].

In conclusion, the radical changes that took place in the Russian IT sector in 2022 can be summarized as follows: the market did not escape contraction, but the negative dynamics did not become catastrophic. In fact, the market decline in 2022 amounted to no more than 10% year-on-year (YoY) to RUB 2.74 trillion. It is notable that there is a considerable discrepancy in the growth patterns observed in the IT equipment and software and IT services segments. In contrast, the equipment market contracted significantly, by 24% YoY, due to the inability to rapidly establish alternative supply channels in sufficient quantities. Conversely, the software and IT services segment exhibited accelerated growth, reaching 24% YoY, driven by the surge in demand for solutions from Russian IT companies. Additionally, in 2022, there was an increase in prices of select Russian-made software products, with a growth rate of 10–20%. In accordance with the projections of industry experts, the aggregate revenue of Russian software developers and integrators (comprising the Top 100 companies in the field) exhibited an increase of 28.5% in 2022. Conversely, the revenue of foreign companies experienced a decline of 62% during the same period [Strategy Partners 2023 (1)].

3. Adaptation of Russian players to new market realities

As estimated by experts, approximately 50% of Russian companies encountered difficulties in renewing foreign software licenses during the 2022 period. A significant proportion of entrepreneurs (32%) reported difficulties with technical support, while 31% encountered issues with payment for maintenance. Additionally, 10% expressed concerns regarding the reliability of foreign software. These findings are based on a survey conducted by Vedomosti in 2023 [Vedomosti 2023 (2)]. As evidenced by the survey conducted by K2Tech in December 2023, the share of direct vendor support for foreign products declined from 52% in 2022 to 14% in 2023. The majority of companies that continue to utilize foreign solutions (over 50% of respondents) either rely on in-house support or engage with local service partners. Additionally, 17.5% of these companies engage in parallel importation. Additionally, the implementation of currency control measures and sanctions has rendered it unfeasible for numerous Russian customers to recuperate cash paid for software, equipment, and services under existing contracts that ultimately were not supplied [K2Tech 2023 (1)].

The issues primarily impacted government entities and large commercial enterprises. A considerable number of Russian companies were compelled to promptly identify alternative solutions for foreign software, cloud services, and IT services, and to allocate additional budgets for emergency migration to new solutions, which resulted in an increased financial burden. Two additional behavioral patterns among Russian

corporate customers of IT products can be identified. The first of these strategies, "wait-and-see," implied that in the sharply changed market conditions, a number of companies did not make prompt decisions regarding the migration to substitute products. Instead, they preferred to observe the results of the transition undertaken by other companies as part of developing a strategy for further actions. The second model, "denial," assumes that some customers do not believe in the final and complete withdrawal of foreign IT vendors from the Russian market and anticipate their return in the future. These customers primarily utilize parallel imports or gray schemes for importing foreign software and support services and do not contemplate import substitution alternatives in the near future.

In general, it can be observed that Russian large businesses have reacted in both proactive and passive ways to the significant changes in the IT landscape resulting from the withdrawal of foreign vendors from the Russian market and the increased government requirements regarding the timing and scale of the transition to domestic software and equipment.

One example of a proactive response to the aforementioned changes is the formation of a consortium by major oil & gas companies with the objective of developing domestic IT solutions for the oil and gas industry. In June 2023, it was announced that the leading Russian companies in the fuel and energy sector are planning to create an industrial consortium with the objective of providing 100% coverage of the domestic IT landscape of the oil and gas and petrochemical industries, as well as subsoil use, by 2028. The pertinent agreement was executed at the St. Petersburg International Economic Forum [Vedomosti 2023 (3)].

Conversely, major Russian banking institutions adopted a cautious approach, advocating for an extension of the import substitution deadline. In August 2023, representatives of major Russian banks (Russian Agricultural Bank, Gazprombank, Promsvyazbank, VTB, Dom.RF) proposed at a meeting of the Central Bank to postpone by two years from 1 January 2025 the effective date of the requirement that subjects of critical information infrastructure (CII) must cease using foreign software. Credit organizations hypothesize that domestic suppliers will be unable to ensure compatibility of automated banking with domestic database management systems by the specified deadline.

4. Strengthening the role of the state in the development of the IT industry

In the context of the announcement of anti-Russian sanctions, the withdrawal of foreign vendors from the market, and the departure of a significant number of IT specialists from the country in the initial months following the intensification of geopolitical tensions, the Russian government has delineated the principal avenues for the advancement and support of the IT industry and market over the forthcoming years. The government's initiatives can be divided into two main categories: (1) acceleration and expansion of IT infrastructure migration from foreign to domestic solutions and (2) broad support measures for Russian IT companies, IT specialists and customers of domestic IT solutions.

4.1 Stimulating the transition to domestic software and IT equipment in the Russian Federation

The formal commencement of the transition from foreign to domestic software in Russia was initiated in late 2015 (a unified register of Russian software was created, and a ban on the purchase of foreign software for state needs was established). Thereafter, the regulatory framework for import substitution in IT was expanded and clarified with consideration of the practice of law implementation and the actualization of tasks. In 2017, concepts pertaining to critical information infrastructure (CII) were incorporated into the regulatory and legal discourse. In 2019, the Unified Register of Russian Radioelectronic Products was established with the objective of stimulating the production of radioelectronic products within the Russian Federation. The Presidential Decree No. 166 of 30 March 2022, "On Measures to Ensure Technological Independence and Security of the Critical Information Infrastructure of the Russian Federation," served as the pivotal document that delineated the conditions for the obligatory transition to the utilization of domestic software and hardware by specific categories of Russian customers. The decree prohibited from 31 March 2022 certain categories of customers from making purchases of foreign software and services necessary for the use of this software without coordination with the authorized federal authority. As of 1 January 2025, public authorities and certain categories of customers are prohibited from utilizing foreign software at significant CII facilities under their ownership. Consequently, the extant regulations mandate that proprietors of significant CII facilities from diverse industries must transition from foreign to domestic software within a limited timeframe, by the end of 2024. The Presidential Instruction of 12 June 2023, stipulates that state-owned enterprises must transition to domestically produced operating systems and office software by 1 January 2025.

The work being done by the government and market players to ensure the transition to domestic IT solutions is systemic in nature and can be divided into key areas.

- An analysis of the current landscape of IT solutions in different sectors of the economy must be conducted. This analysis should identify areas in which (1) there are already ready-made substitute products for foreign solutions, (2) domestic solutions that are partially available but require significant improvement, and (3) areas in which there are no domestic solutions and where development or production from scratch is necessary.
- Russian companies that will carry out finalization / development of the aforementioned missing IT solutions must be identified. The necessary financial and other resources for these purposes must also be provided.
- A series of measures is to be developed with the objective of stimulating and providing support to customers of IT solutions in the public and private sectors when switching from foreign to domestic solutions.

It is also worth noting the role of ICCs and DCCs in this process. In the second half of 2022, on the initiative of Prime Minister M. Mishustin, 35 Industrial Competence Centers (ICCs) were established under the Ministry of Digital Economy. These centers were formed with the objective of uniting representatives from various industries that were

tasked with replacing foreign software within the timeframe set by the government. The ICCs encompassed a multitude of pivotal sectors, including machine building, metallurgy, the chemical industry, electronics and microelectronics, the pharmaceutical industry, transportation, agriculture, construction and housing and public utilities, the electric power industry, oil and gas and coal, ecology, trade and services, finance, education, healthcare, communications, and media. Furthermore, development competence centers (DCCs), which include Russian software developers, have been established. The mechanism postulates that, within the framework of ICCs, major Russian software consumers should analyze their requirements for software that cannot be supported or purchased. They should then solicit explanations from developers regarding the existing solutions on the market and the potential for developing new solutions. Consequently, the ICC and DCC expert groups are to collaborate in the selection of promising projects that are capable to supplant foreign software. By mid-2023, Russian customers had identified 670 needs in industry software solutions for which they had a critical dependence on foreign solutions. These are not products per se, but operations that customers had previously carried out with the assistance of foreign solutions. In response, IT companies provided a list of 2,180 domestic products that should facilitate the realization of these operations. Of these, only 196 solutions exhibit a level of similarity to Western analogs that exceeds 70%, 1,423 solutions demonstrate a similarity of 40–70%, and 561 solutions exhibit a similarity of less than 40%. Forty-one foreign solutions that are required by businesses in Russia do not have any local equivalent. Such solutions include those for indexing and markup of audio and video streams, as well as platforms for the creation of metauniverses [Vedomosti 2023 (4)].

In June 2023, M. Mishustin instructed the Ministry of Industry and Trade of the Russian Federation and the Ministry of Digital Development, Communications and Mass Media of the Russian Federation to develop and present to the government proposals for the establishment of competence centers in the field of electronic element base, modeled on the ICC in the software development sphere, with the participation of friendly countries.

In December 2022, the government approved two roadmaps, "New Industrial Software" (NIS) and "New System Software" (NSS), which outlined over 300 domestic solutions necessary for import substitution in IT [Russian Government 2022]. The implementation of the aforementioned projects is scheduled to conclude in 2025, with the exception of a select few, which are expected to be completed by 2027. It is estimated that the total budget required for all NSS projects until 2030 will be RUB 71.5 billion, while the estimated budget for NIS projects is RUB 189 billion. As indicated by the government, the majority of the roadmap projects, amounting to over RUB 200 billion, are to be financed through the companies' own resources. This includes agreements with the government to create conditions that guarantee demand for products. The remaining projects entail the utilization of credit facilities (approximately RUB 20 billion) and grant funds (in excess of RUB 23 billion). By the end of June 2023, Prime Minister M. Mishustin had directed that an additional sum of over RUB 11 billion be made available for the implementation of the NIS and NSS roadmaps. As evidenced in the documentation, the objective is to achieve the aforementioned by 2030. It is anticipated that 71% of the Russian market for system

and application software will be domestic, with projected revenue from projects reaching RUB 211 billion [Kommersant 2022 (2)].

4.2 Support for domestic software developers and microelectronics manufacturers

In 2022, the Russian IT industry received a level of government support that was without precedent. In addition to the tax incentives that were first applied to domestic IT companies in 2021, in 2022 the Russian government introduced further robust support measures. These included a nullified income tax rate until the end of 2024, a program of subsidized loans for companies to accelerate the development, time-to-market and implementation of new domestic software, as well as significant benefits for IT specialists.

The question of whether to extend the zero rate of income tax for accredited IT companies is currently under active debate. As stated by M. Shadayev, the head of the Ministry of Digital Development, Communications and Mass Media [INTERFAX 2023 (1)], the ultimate decision will be contingent upon the prevailing economic circumstances in the regions and the status of regional budgets. This is due to the fact that a considerable proportion of income tax inflows is allocated to the budgets of the constituent entities of the Russian Federation. The zero income tax rate is applicable to IT companies and manufacturers of hardware and software complexes (HSC) included in the register of Russian software until the end of 2024. In the event that the zero rate is not extended beyond 1 January 2025, it will be set at 3%. The Minister evaluated the likelihood of maintaining other benefits for IT companies as high, with some of the benefits being open-ended.

Simultaneously, the Russian authorities are developing a plan to provide tax benefits to radioelectronics manufacturers on an ongoing basis. The current legislative framework provides for tax benefits until 31 December 2024 for enterprises operating in the radioelectronic industry. A reduced income tax rate is established for companies included in the register of organizations operating in the radioelectronic industry. The extension of the tax incentive will permit companies to obtain supplementary investment resources, thereby contributing to the modernization of the domestic electronic component base and radioelectronics production. Table 1 (p. 113) enumerates the principal current measures of state support for accredited Russian IT companies.

It is also noteworthy that customers of Russian software and IT equipment receive support, which encompasses the following measures, among others:
- Possibility of accelerated amortization of equipment included in the unified register of Russian radioelectronic products and software included in the unified register of Russian software;
- Small and medium-sized enterprises and individual entrepreneurs have the opportunity to purchase licenses for Russian software at a 50% discount. The state compensates half the cost of the license to its vendors [Gosuslugi 2023];
- Digital transformation programs developed by government authorities;
- Subsidies for the implementation of Russian software, services, and platform solutions;

Anna Kurbatova

- Zero import duties on technological equipment and components, as well as raw materials and supplies to be used in the implementation of major investment projects in priority sectors of the Russian economy, including information technologies.

Table 1. Current measures of state support for the IT industry

Taxation	Preferential income **tax rate** 3% from 1 January 2021 to 31 December 2021 for companies under the general taxation system 0% from 1 January 2022 to 31 December 2024 for companies under the general taxation system Up to 1% for the simplified taxation system (STS) "Income," up to 5% for the STS "Income minus expenses." The rate varies by region
	VAT exemption on sales of software products included in the register of Russian software
	0% tax on dividends
Insurance contributions to the payroll	14% from 1 January 2021 through 31 December 2021. 7.6% from 1 January 2021 (of which pension insurance is up to 6%; social insurance for maternity or sickness, including foreign citizens is up to 1.5%; health insurance is up to 0.1%) for accredited IT organizations (companies with IT-related revenue constituting no less than 70% of total revenue). Once the single base for calculating contributions is exceeded (if payments in favor of an employee in 2023 exceed RUB 1.917 million), contributions are charged at a zero rate
Preferential lending and grants	Digital Transformation Preferential Loan Program: From 2020 to 31 December 2024, the preferential rate is 1–5% (up to 3% for accredited IT companies), the loan amount is from RUB 5 million to RUB 5 billion for one project
	The company must comply with the following conditions: - indexation of employee salaries at least once a year, - refusal to pay dividends for the duration of the loan agreement, - retention of employment: for the period of the loan agreement, the number of employees must be at least 85% of the corresponding figure as of 1 March 2022. Preferential lending program for systemically important IT companies: April–December 2022: Working capital loan for up to 12 months is issued until the end of 2022 at a rate of up to 11%, maximum amount is RUB 30 billion Grant support for the development of certain significant software segments
Moratorium on tax audits	Accredited IT companies are exempt until the end of 2024 from control and supervisory measures, with the exception of preventive measures. Field tax audits of such organizations are suspended until 3 March 2025
Benefits for IT specialists	Preferential rate on mortgage loans Deferment from conscription for compulsory military service and/or exemption from mobilization

Source: compiled by the author.

5. Limits of import substitution: opportunities and barriers on the side of Russian IT developers

5.1. Stated objectives

The course on the utilization of Russian software was initially unveiled in 2016. Subsequently, year after year, adjustments and amendments were made to the regulatory base, with the objective of obligating government customers at all levels to purchase software developed and produced in Russia. However, it was 2022 that fully

demonstrated the viability of the import substitution course and became a catalyst for the transition to domestic solutions among both government customers and private companies. It is anticipated that the transition to Russian alternatives will continue over the next five to seven years, with the pace of change varying considerably across different market segments. Russian alternatives are already available in numerous sectors and their number is expected to increase. In certain sectors, such as oilfield service and geophysical industries, the share of foreign software remains considerable, at 80–90%. Similarly, engineering and graphic software also exhibit a high degree of foreign product penetration. The goal of achieving full substitution of foreign products by Russian systems requires local developers to enhance their functionality, reliability, performance, and fault tolerance.

The nearest time for the transition to domestic products is 1 January 1 2025. This is the date when federal and regional authorities, as well as organizations owning significant CII facilities subject to the law on public procurement (as outlined in Presidential Decree No. 166), must have migrated to domestic products. A longer period of import substitution is permitted for other authorities, budgetary organizations, and state funds, as well as for state corporations and state companies. The transition of private business to domestic software is not subject to any specific timeframes, with the exception of those pertaining to significant CII objects. The timeframes for the complete transition of significant CII objects in federal and regional executive bodies are outlined in the Order of the Ministry of Finance No. 21 of 18 January 2023. Irrespective of the category of software and the status of critical information infrastructure (CII), the penetration of Russian software in government agencies should be brought to 90–100% by 2029–2030. The highest rates of penetration of domestic software are currently observed in the category of information security tools, with some solutions reaching up to 80%. The lowest rates of penetration of domestic solutions are observed in the segments of mobile operating systems and other types of system software, as well as in automated process control systems (PCS) and geological and geophysical data processing and analysis tools, where rates of penetration range from 25% to 35%. The transition to domestic solutions in these software classes will necessitate substantial investments in the coming years.

5.2 Real opportunities

There are regulatory, technological, and market factors affecting the pace of import substitution:

- The *regulatory* environment for import substitution consists of the requirements of the previously listed regulatory acts adopted after February 2022.
- The *market* factor is the withdrawal of major international software vendors from the Russian market and the release of market niches previously occupied by them in favor of local players. This has opened up fundamentally new long-term business prospects for Russian companies and significantly increased the attractiveness of investments in the improvement of existing software and new developments. Meanwhile, the inability to fully leverage foreign software solutions compels Russian customers to hasten their transition to alternative domestic solutions.

- At the moment, *technological* aspects are rather constraining factors of import substitution. As noted above, in certain niches, domestic analogs of foreign software are not available today, while most Russian operating systems are characterized by poor application software ecosystems.

Over the past year and a half, the geopolitical situation has become increasingly tense, and state regulation has tightened considerably with regard to the use of foreign software. During this period of time, both Russian customers and software developers gained valuable initial experience of doing business in considerable different market environment. Table 2 (p. 115) represents the principal challenges or "pressure points" associated with the import substitution process in the IT sector.

Table 2. Pressure points of import substitution in the IT sector in Russia

On the customers' side	On the side of software companies
• High cost of migration to domestic software, high labor and organizational costs	• Shortage of IT specialists in a number of professional niches, high inflation of salaries
• Problems of compatibility of Russian solutions with existing IT infrastructure	• Increase in the cost of software development tools, increased risks of using open source elements due to the growing number of malware
• Insufficient maturity level of local products and reduced level of functionality when switching to Russian products	• Lack of access to direct government support (in the form of budget subsidies or co-financing of projects without the need for leverage) for a number of promising companies that do not meet the necessary criteria
• Insufficient supply or complete absence of Russian products-analogs of foreign software, lack of information on the availability of analogs	• A number of potential customers leverage in-house developed software
	• Vendors lack of sufficient resources to provide technical support to a large number of new customers who purchased Russian software licenses over the last 1.5–2 years

Source: compiled by the author on the basis of data from the Institute of World Market Studies.

According to analysts, 68% of Russian companies have started import substitution projects, but currently only 10% to 50% of foreign solutions have been replaced, depending on the industry. At the same time, only 13% of companies have import substitution roadmaps with fixed migration deadlines, more than 50% of large Russian companies continue to actively use foreign products, relying on in-house technical support or Russian service partners, as well as through parallel imports, and 64% of companies believe that existing foreign IT solutions cannot be fully replaced by Russian products [K2Tech 2023 (2)].

In general, market participants are sufficiently confident about the prospects for import substitution in the Russian IT sector. The share of Russian vendors in the Russian IT market will reach 72% in 2027, compared to 45% in 2021 [Softline 2023 (1)]. The total substitution potential of foreign products developers (additional demand for domestic products) in 2022–2027 is estimated at RUB 450 billion in 2021 prices. In the infrastructure software segment, the share of Russian developers will increase from 36% in 2022 to 72% in 2025 and further to 90% in 2030 [Strategy Partners 2023 (2)]. Russian vendors of information security products currently hold a dominant position with 70% of the market. The share of foreign vendors in the domestic market is expected to stabilize at 5% in the medium term [CSR 2023 (2)].

6. Export potential of Russian IT products in the markets of friendly countries

In light of the stated objective of attaining technological autonomy through import substitution and the advancement of indigenous solutions across various software and microelectronics domains, Russia exhibits the capacity to emerge as a more prominent and dynamic force within the global IT market. Over the 5–10 years term, the country may well emerge as a pivotal alternative to vendors hailing from Western countries, China, and India. The events that transpired in the Russian IT market following February 2022 have demonstrated to customers of IT products globally that there are considerable risks associated with developing IT infrastructures and systems based on the solutions of global, predominantly Western, vendors. While previously the competition with Western vendors was primarily focused on functionality, the current emphasis is on the assurance of uninterrupted, reliable operation of IT systems and their equivalents in the domain of information security.

As of today, Russia is beyond the top ten countries in terms of global software and services exports. In 2021, the value of Russian software exports exceeded USD 10 billion (equivalent to over RUB 730 billion) [RUSSOFT 2022]. In 2022, the export volume experienced a notable decline (to USD 8.4 billion) due to the implementation of sanctions (primarily by the US and the EU) against Russian developers, as well as the emergence of significant challenges in cross-border settlements [Kommersant 2023 (2)]. In 2022, exports of Russian IT services decreased by 23.1%, while those of Russian IT products decreased by 23.8%. Russian programmers have begun to redirect their export channels to the CIS countries, South and East Asia, and the Middle East. Additionally, there is a growing interest in the markets of Africa and Latin America. As a result, in 2022, Russian IT companies increased software supplies to "friendly" countries by 10% compared to 2021, and the share of those countries in the total revenue of Russian software companies increased to 10%. At the same time, the share of "unfriendly" countries in the aggregate volume of Russian software sales declined from 25% in 2021 to 12.5% in 2022, and projections indicate a continued reduction to 7% by the end of 2023. Nevertheless, Russian companies endeavor to maintain supplies to Western partners through engagement of formally independent third parties [TAdviser 2024].

The volume of sales of Russian software developers in the foreign market in 2023 is expected to continue its decline, reaching approximately RUB 413 billion [Finmarket 2023]. Among the factors contributing to the continuation of negative dynamics are:

- The continued rejection of Russian products by customers from unfriendly countries, which is not fully compensated for by increased sales to friendly markets;
- The lack of available resources (including IT specialists) of domestic companies for the development of export directions amid primary focus on meeting the needs of the domestic market;
- The insufficient level of state support measures for IT exports.

Measures of state support for the export of IT products were included into the second package of support for the IT industry adopted in September 2021. They provide

for partial compensation of Russian developers' expenses for marketing their products abroad, introduction of mechanisms for financial support of software implementation on the infrastructure of foreign customers as well as the creation of a role of "Digital Attachés"—lobbyists promoting domestic products on foreign markets.

To date, the implementation of support mechanisms is largely stalled and requires significant improvement. According to market participants of measures listed above, only the "digital attachés" mechanism has worked in practice, i.e. Russian trade missions abroad are quite effective. Financial measures to support IT exporters have not really been implemented, as the Russian Foundation for Information Technology Development (RFRIT) and the Russian Export Center (REC) failed to receive the necessary funds for this purpose. Representatives of IT companies also point out as a negative factor the lack of necessary coordination of processes between the authorities involved in stimulating IT exports [Kommersant 2023 (3)]. On the government side, about ten authorities and organizations are already engaged in the development of Russian software exports, including the Ministry of Digital Development, Communications and Mass Media, the Ministry of Industry and Trade, the Ministry of Economy, REC, RFRIT, and others. In general, the current level of support for Russian companies is disproportionately low compared to the level of state support received by IT exporters from the largest competing countries in the global market—the United States, India, and China.

As necessary measures to support Russian software exports, it is noted, in particular, the need to apply to them all incentive mechanisms available today to exporters of goods—credit to buyers, insurance of export contracts, issuing guarantees for participation in tenders, reimbursement by the state of expenses for participation in exhibitions. At present, these mechanisms are not applied to software exports, since the sale of software is considered a service. Companies also point out the need to create an international network of partners, as well as the creation of "export integrators"—companies that would have the necessary competencies and resources to deliver and implement complex solutions for foreign customers. This is explained by the fact that entering international IT markets with full product stacks (i.e. complex offers made of products by several vendors) is likely to be more successful rather than export efforts individually made by Russian IT companies. Product stacks allow to replace customers' IT landscapes based on the software of Western vendors.

Growing exports of Russian IT products to friendly countries is an important element of the strategy for the future development of the domestic IT industry. Against the background of the proven high level of safety of Russia's critical IT infrastructure against sanctions and cyber-attacks and taking into account the accelerated development of Russian technologies within the framework of the import substitution program, the best situation for the development of IT exports from Russia to friendly countries has emerged. Market analysts have noted a significant increase in the interest of Russian software developers in entering promising regional markets that were previously not in focus—the Middle East, Asia, Latin America, and Africa [RUSSOFT 2023]. A study has shown that the export of Russian software to Asian countries will grow the strongest and fastest in the near future. 74% of software development companies consider Asian countries as promising for export of Russian

solutions and services. 43% of Russian software development companies are interested in exporting to CIS countries. 35% of companies are interested in exporting their solutions and services to the Persian Gulf countries. The data also show that the export of Russian IT solutions to Latin America and Africa is expected to grow. The actual export experience in these regions is still insignificant and its share is no more than 8%, but the prospects are estimated at 25%. SAR, Algeria, and Egypt are the leading countries on the African continent. Products with the highest export potential include IT services, information security solutions and cloud platforms, operating systems, social networks and messengers, Internet of Things (IoT) device management platforms, retail services, healthcare, and financial services.

Conclusion

The preceding two years have been a period of significant transformation within the Russian IT sector. In 2022, the industry experienced significant turbulence, prompting IT companies and customers of IT products to prioritize minimizing potential damages in the context of dramatically altered conditions. In 2023, however, the focus shifted towards achieving long-term development goals. In a number of market segments (cloud services, infrastructure hosting, cybersecurity), the initial positive outcomes of import substitution were observed. Conversely, in other segments, obstacles and the most significant impediments to the expeditious transition to domestic products were identified. The process of import substitution in the IT sector is irreversible and is developing at a considerable pace. This is due to two factors: the goals set by the state to achieve technological sovereignty and the development needs of the private business.

Although the objective of complete rejection of foreign products at critical facilities of the Russian IT infrastructure in an extremely short time may appear ambitious, import substitution in the IT sector will undoubtedly continue in the coming years. To achieve the stated goals, it is necessary to continue the existing measures of state support, and in a number of segments, to expand them and develop new ones. This should be done in consideration of the initial experience of market participants in import substitution. It is further proposed that mechanisms of direct interaction between IT companies and interested private businesses, whether large or medium-sized, be developed (through industry associations, consortiums, and other formats). This would ensure harmonization of mutual interests, identifying most urgent and pressing needs of both parties, and reduction of time required for the development and implementation of necessary IT products.

It is not ruled out that the government may somewhat extend the timeframe for a complete transition to domestic products for the public sector and large state-owned companies, subject to the progress in overcoming the current import substitution barriers. Nevertheless, the long-term objectives for achieving the requisite level of utilization of Russian IT products will not be subject to a more conservative revision.

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