

Import Substitution in Russian Shipbuilding

Industrial Resilience Technological Sovereignty and Global Competitiveness

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Abstract

This study examines import substitution in Russian shipbuilding as a policy instrument situated at the intersection of industrial resilience, technological sovereignty, and international competitiveness. Its objective is to assess whether substitution measures merely reduce short-term exposure to foreign suppliers or can support the development of durable domestic capabilities with export potential. The study applies a qualitative policy and documentary analysis of sectoral programs, regulatory measures, industry reports, and selected production cases. The evidence indicates that localization has advanced most visibly in materials and selected mechanical systems, whereas propulsion, electronics, welding equipment, and other knowledge-intensive components remain structurally dependent on external technologies. The analysis further shows that a closed model of self-sufficiency risks higher costs, weaker technological variety, and insufficient scale, while an open and selective localization strategy can combine domestic capability building with international cooperation. Effective policy therefore requires differentiated priorities, stable demand, coordination between shipowners and equipment producers, and sustained collaboration among government, industry, research institutes, and universities. The article contributes an integrated framework for evaluating import substitution not as an end in itself, but as a staged pathway from supply security to innovation and export competitiveness.

Keywords: shipbuilding; import substitution; industrial policy; technological sovereignty; supply-chain resilience; competitiveness; Russian Federation

1 Introduction

Shipbuilding is a strategically important industry because it combines transport infrastructure, industrial capacity, national security, and technological development. Modern vessels depend on extensive networks of suppliers, specialized engineering firms, research organizations, and equipment manufacturers. This complexity makes the sector particularly sensitive to disruptions in cross-border supply, restrictions on technology transfer, and the loss of access to critical components.

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Russia's import-substitution agenda intensified after the adoption of the federal anti-crisis plan under Government Decree No. 98-r of 27 January 2015. In shipbuilding, the policy was formalized through Order No. 661 of the Ministry of Industry and Trade, which established sector-specific measures intended to reduce dependence on foreign products and equipment. The policy response reflected a substantial structural vulnerability: in civilian shipbuilding, imported components were reported to account for as much as 80% of the total equipment base.

The central policy question is therefore not simply whether imported products can be replaced. A more consequential issue is whether substitution can produce reliable, technologically competitive, and economically viable domestic systems. Rapid replacement may address immediate supply risks, but long-term competitiveness requires innovation, quality assurance, production scale, and access to markets. This article evaluates import substitution through that broader lens.

The study addresses three questions: (1) Which segments of Russian shipbuilding are most exposed to import dependence? (2) What institutional and industrial mechanisms have supported localization? (3) Under what conditions can import substitution evolve from a defensive response into a source of international competitiveness?

2 Conceptual Background

2.1 Import Substitution and Industrial Development

Import substitution has historically been used to accelerate industrialization, protect emerging sectors, and reduce exposure to external suppliers. During the twentieth century, several Latin American and African economies adopted protectionist measures, preferential investment conditions, subsidies, and concessional finance to expand domestic manufacturing. Reported increases in the industrial share of gross domestic product in Argentina and Brazil illustrate the capacity of such policies to alter production structures (Korabel.ru, n.d.).

These experiences also reveal a persistent trade-off. Protection may create space for domestic producers, but prolonged insulation from competition can reduce incentives for quality improvement, cost control, and product diversification. Import substitution is therefore most effective when it is treated as a transitional capability-building mechanism rather than a permanent barrier to international exchange.

2.2 Strategic Autonomy and Selective Openness

Two broad pathways can be distinguished. A closed model aims to reproduce the full technological chain domestically and minimizes reliance on foreign actors. An open model prioritizes selected strategic capabilities while preserving horizontal cooperation, access to complementary technologies, and participation in international markets. The distinction is especially important in shipbuilding, where the diversity of systems and the cost of specialized production make complete national self-sufficiency difficult.

Strategic model	Primary mechanism	Potential advantage	Principal risk
Open and selective localization	Domestic capability building combined with external partnerships	Access to technology, scale, and specialized suppliers	Continued exposure in non-localized segments
Closed self-sufficiency	Domestic control of vertically integrated	Greater autonomy in strategically critical	High costs, duplication, weaker variety, and technological

Strategic model	Primary mechanism	Potential advantage	Principal risk
	production chains	systems	isolation

3 Methodology

The study uses a qualitative documentary and policy-analysis design. The evidence base consists of the 2015 sectoral action plan for shipbuilding import substitution, public materials issued by the Ministry of Industry and Trade, industry reports, and documented examples from shipyards and research organizations. The analysis compares policy objectives with reported production initiatives and organizes the evidence across three dimensions: technological criticality, localization feasibility, and potential contribution to competitiveness.

The approach is interpretive rather than econometric. It is appropriate for identifying institutional relationships, implementation constraints, and strategic alternatives, but it does not estimate causal effects on productivity, prices, or export performance. The results should therefore be read as a structured assessment of policy mechanisms and sectoral evidence rather than as a quantitative impact evaluation.

4 Policy Architecture and Priority Segments

Order No. 661 established a portfolio of projects extending to 2022, with 2020 serving as an interim milestone. The plan concentrated on areas in which dependence on imported systems was especially high or where the absence of domestic alternatives created operational risks. At the time of adoption, imports reportedly accounted for 100% of several categories, including large-capacity transport vessels, turbochargers for hybrid diesel-reduction systems, and propeller-rudder columns. The policy aimed to reduce the maximum import share in these categories to between 20% and 60% by 2020.

Priority segment	Strategic relevance	Localization challenge
Specialized vessel classes	Transport capacity and sector-specific operational needs	Complex integration and certification requirements
Low- and medium-speed diesel engines	Core propulsion capability	High engineering complexity and long development cycles
Deck machinery	Operational reliability in fishing and offshore fleets	Specialized design, materials, and control systems
Propeller-rudder columns and thrusters	Maneuverability and propulsion performance	Precision manufacturing and systems integration
Collective life-saving equipment	Safety and regulatory compliance	Testing, certification, and dependable serial production

Institutional support extended beyond direct industrial measures. The Import Substitution and Localization Center in Saint Petersburg was created as a platform for exhibitions, business events, supplier-customer matching, analytical data, and information dissemination (Importnet.ru, 2016). Such intermediary institutions

can reduce coordination failures by connecting demand from shipyards with domestic suppliers capable of developing or adapting equipment.

5 Evidence from Industrial Implementation

5.1 Areas of Progress

The available cases indicate that localization progressed unevenly across the value chain. Severnaya Verf reported the exclusive use of domestic metal suppliers and maintained tenders open to Russian firms (Sudostroenie.info, 2016). This case illustrates the relative feasibility of substitution where domestic industrial capacity already exists and where product standards can be integrated into established procurement processes.

A more technology-intensive example is the Zvezdochka shipbuilding center's development of a thruster with a capacity exceeding 500 kW. The first unit was delivered to the Nevsky Shipbuilding and Ship Repair Plant in January 2016, and the program envisaged broader domestic coverage of demand for thrusters and propeller-rudder columns (RUEconomics, 2016). This initiative demonstrates how substitution can move beyond procurement toward domestic design and production capability.

5.2 Persistent Technological Bottlenecks

Progress in materials and selected mechanical systems does not eliminate dependence in other critical areas. Welding equipment remains a notable constraint. Some devices have no direct Russian equivalents, and shipyards often prefer foreign systems because of their flexibility under frequent production readjustments. Although approximately 20 equipment models were reportedly tested each year, successful adoption remained selective (Morskoy biznes, 2016). Robotics could improve productivity and consistency, but slow automation limits the speed of transition.

Marine engines constitute another major bottleneck because they require advanced design, materials, precision manufacturing, control technologies, and extensive testing. Development activities at enterprises such as Zvezda and Penzadieselmash indicate domestic effort, yet the scale and complexity of propulsion technology make rapid substitution difficult. These constraints show why simple procurement targets cannot substitute for sustained investment in engineering capability.

6 Research Industry Collaboration

The role of science is central in segments where localization requires new designs rather than direct replication. The Krylov State Research Center prepared proposals for the domestic production of more than 600 shipbuilding components. Cooperation between the United Shipbuilding Corporation and the Kurchatov Institute also targeted advanced materials and software for the sector (Minpromtorg Rossii, 2016). These arrangements reflect the importance of connecting scientific knowledge to production requirements.

Effective collaboration requires more than isolated research projects. Universities and research institutes must be integrated into long-term technology programs, while shipyards should communicate performance requirements early enough to guide applied research. Stable procurement commitments can reduce commercial uncertainty and give producers a credible basis for investing in testing, certification, and serial manufacturing.

7 Discussion

7.1 From Supply Security to Competitiveness

The evidence suggests that import substitution should be evaluated in stages. The first stage secures access to critical equipment and materials. The second establishes dependable domestic production and after-sales support. The third improves cost, quality, and technological performance. Only the fourth stage—successful participation in external markets—demonstrates that localization has generated internationally competitive capability rather than protected production alone.

This staged perspective changes the policy objective. A domestic product is not strategically successful merely because it replaces an imported item. It must also be reliable, certifiable, maintainable, and economically sustainable at realistic production volumes. Without these conditions, substitution may increase supply security while weakening fleet economics and slowing technological renewal.

7.2 Market Scale and Demand Coordination

Shipbuilding equipment often requires high development costs and relatively small production runs. If domestic demand is insufficient, producers may be unable to recover investments or maintain continuous technological improvement. Export orientation is therefore not an optional final benefit; in several specialized segments, it may be necessary for commercial viability. The acquisition of the German Sietas shipyard by Pella and the purchase of German industrial firms by the Kirov Plant illustrate efforts to gain foreign market access and complementary capabilities.

Shipowners also play a decisive role because approved-vendor lists and technical preferences shape equipment selection. Their involvement at the design stage can prevent the development of components that meet formal policy targets but fail to satisfy operational or certification requirements. Demand coordination should therefore connect shipowners, design bureaus, shipyards, equipment producers, regulators, and research organizations.

8 Policy Implications

- Prioritize components according to strategic criticality, technological feasibility, and expected market scale rather than applying uniform localization targets.
- Use multi-year procurement commitments and transparent technical standards to reduce uncertainty for domestic equipment producers.
- Link public support to measurable improvements in reliability, lifecycle cost, certification, and export readiness.
- Strengthen joint research programs in propulsion, control systems, advanced materials, robotics, and maritime software.
- Preserve selective international cooperation where it accelerates learning and does not create unacceptable strategic dependence.
- Include shipowners and classification requirements early in product development to improve adoption and operational relevance.

9 Limitations and Future Research

The analysis relies on policy documents and publicly reported cases, many of which describe planned outputs rather than independently verified long-term outcomes. It does not provide firm-level cost data,

comparative performance testing, or post-2020 evidence on target achievement. Future research should combine updated administrative data with interviews, patent analysis, procurement records, and vessel-level performance indicators. Comparative studies with other shipbuilding economies would also help distinguish sector-specific constraints from broader features of industrial policy.

10 Conclusion

Import substitution in Russian shipbuilding can strengthen economic and political security, but its contribution to global competitiveness depends on how the policy is designed and evaluated. The strongest early gains appear in segments supported by an existing domestic production base, while engines, electronics, welding technologies, and complex integrated systems require longer development horizons. A closed pursuit of complete self-sufficiency would impose substantial costs and could deepen technological isolation.

A more viable strategy is selective and capability-oriented localization. The state should protect continuity in critical systems, while industry and research institutions develop technologies that can meet international standards of quality, cost, and reliability. Cooperation with external partners may remain appropriate in non-critical areas or where it accelerates learning. Under these conditions, import substitution can progress from emergency replacement to industrial upgrading and, ultimately, export competitiveness.

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