GVCs in times of global crises and economic regionalization: case of Russian oil and gas industry

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Abstract. The traditional global value chains (GVCs) model is changing, which challenges the strategic decisions of multinational enterprises (MNEs). Due to the increased uncertainty in the system of international economic relations, GVCs tend to shorten, and this is an additional risk for emerging markets MNEs in the context of adjusting their integration strategies into GVCs. Deglobalization and regionalization became a new global trend. States that cannot solve the problems of partial localization and control of chains vital to their economy are doomed to a new crisis in the foreseeable future. As the global economy returns to the indicators of 2019 for quite a long time, the processes of deglobalization, regional autarky, and national isolation will continue. For Russia and the Russian MNEs, the situation is aggravated by the presence of sanctions from the EU and the United States, as well as the difficult geopolitical situation around Ukraine. The unprecedented turbulence of global political and socio-economic processes in the current period creates significant risks for sustainable development. This study examines and discusses the influence of crisis such as the COVID-19 pandemic and the geopolitical crisis of 2022 on GVCs strategies in the cases of Russian vertically integrated oil and gas companies such as Gazprom, LUKOIL and Rosneft.

1 Introduction

Global value chains (GVCs), in which the various phases of the manufacturing process are distributed across many nations, are the frameworks within which international production, commerce, and investment are increasingly organized. Companies are motivated by globalization to rearrange their operations abroad through activity offshore and outsourcing. The changing nature of international trade in recent decades has been driven by the integration of international exchange into GVCs. Cohen et al. (2018) argue that in recent years many MNEs have been restructuring their GVCs due to fundamental changes in the external environment, markets, technologies, suppliers, costs, etc., seeking compromises between risks and benefits.

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The current period is characterized by various disruptions and economic slowdowns stemming from multiple factors. These include the global COVID-19 pandemic (Gereffi, 2020), the far-reaching effects of the Ukraine conflict on logistics, energy, refugees, and supply chains (Project Syndicate, 2022), the growing wave of economic nationalism, and the competitive rivalry between the United States and China (Tung, Zander & Fang, 2023). As a response, governments worldwide have prioritized or adjusted their industrial policies to strengthen the strategic global supply chains of their respective countries. This shift suggests a transition, at least partially, from a development landscape driven by prosperity to one driven by security. In this paper, we aim to gain a deeper understanding of how global value chains (GVCs) are evolving amidst these changes (Lee & Gereffi, 2021; Zhan, 2021). Particularly we focus on Russian multinational enterprises and their GVC strategies.

Over the past decade, the Russian economy has faced not only financial and pandemic crises but also exceptional sanctions imposed by Western countries. These sanctions, first implemented in 2014 and then reinforced in 2022, have significantly impacted the strategies of Russian multinational enterprises (MNEs) operating abroad.

Therefore, the objective of this paper is to address the following research questions: How do Russian multinational enterprises (MNEs) adapt their global value chain (GVC) strategies in response to external shocks?

To investigate this inquiry, we examine three case studies of Russian multinational enterprises (MNEs) operating in the oil & gas and petrochemical industries. These prominent Russian companies have extensive international operations, with exports accounting for over 80% of their sales (OSW 2023). Our analysis primarily relies on secondary data, including company reports, media sources, and publications available on their official websites. By utilizing these sources, we construct their value chains and track the changes that have occurred within them over the past four years.

The rest of the paper looks as follows: first, we present the state of the global value chain nowadays based on industrial reports and statistics, second, we introduce a theoretical framework, then we describe the methodology, provide details on the data analysis, and discuss our findings.

2 GVCs in the Context of Global Risks

The optimal level of fragmentation implies that the expansion of global value chains cannot continue indefinitely. After the financial crisis of 2008, their reduction began to be observed in the world. The increased difficulties with financing and the growth of transaction costs due to uncertainty with the supply of raw materials and consumables were affected.

Another finding is that, from 1995 to 2010, the rate of global trade growth expanded twice as quickly as the rate of global GDP growth (Fig. 1). With the onset of the financial crisis and the collapse of international trade, there was a slight decline, confirming the tendency of some companies to curtail international activity in favor of domestic suppliers.
In the economic literature, the length of chains is estimated using an index calculated based on intersectoral balances (Dietzienbacher & Romero, 2007). The index value can be interpreted as the actual number of production stages. The minimum value of the index is equal to one when intermediate goods or services are not used at all for the production of the final product. In the period between 1995 and 2008, there was a growing trend in the average length of global chains. With the onset of the financial crisis and the collapse of international trade, there was a slight decline, confirming the tendency of some companies to curtail international activity in favor of domestic suppliers.

Since the beginning of the COVID-19 pandemic, trade has declined sharply. According to the recent fundamental research (Berthou et al., 2022) using a rich dataset of monthly bilateral product-level trade flows, provided by Trade Data Monitor, that covers roughly three-quarters of world trade (lockdowns implemented in 170 countries in the world) it was found, that both importer and exporter lockdowns reduced bilateral trade in a sizeable way. evidence for the effects of third-country lockdowns through GVCs (Fig. 2).


Note: International trade data from the Trade Data Monitor and data on pandemic-related restrictions from Oxford University. A stricter lockdown is associated with a steeper decline in exports in the first wave of Covid-19 (Annual Change in Exports and Lockdown Intensity in April 2020).

Merchandise trade recovered to pre-pandemic levels by October 2021, a very rapid recovery compared to, for example, the recovery from the global financial crisis of 2008 (Fig. 3, Baldwin, 2020).

![Trade Patterns around Global Recessions: Goods and Services Import Volume](image)

**Fig. 3.** Trade Patterns around Global Recessions: Goods and Services Import Volume

Source: Kose, Sugawara, and Terrones (2020); and IMF staff calculations.

Note: At the start of the recession (t = 0), the goods and services import volume index is normalized to 100.

Companies are constantly updating strategies and revising their boundaries. Many global value chains are based on cross-country differences in labor and capital costs, which are constantly changing.

Russian conflict with Ukraine and the subsequent sanctions imposed by various Western countries pose a risk that commodity trade may be disrupted. This is especially true for oil and gas exports to Europe. This risk manifests itself in a significant increase in prices for basic goods, potentially it can lead to even higher global inflation and a decrease in the purchasing power of the population.

In addition, sanctions have forced some companies to abandon trade with Russia, which has already led to disruption of key supply chains.

### 2.1 Literature Review and Theoretical Framework Development

The concept of GVCs originated in the 1970s. This may include work on the problems of "commodity chains" (Bair, 2005). The main idea of these works was to try to trace the transformation of the entire set of initial costs of materials and products and their transformation into the final product of consumption. Later, global trade chains were traced by the example of garments, starting from raw materials and ending with the final product, clothing (Gereffi, 1994).

In the 2000s, the concept of global commodity chains was transformed into the concept of GVCs (Porter, 1985). Typically, value chains include the following stages: design, production, marketing, distribution, and after-sales customer service (OECD. Global value chains). These stages can exist both within one company and divided between many firms.
The fact that an increasing number of them are "settling" in different countries indicates the globalization of value chains.

By the beginning of the XXI century, a situation had practically taken shape in which we can talk about the formation of a new paradigm of international trade when countries specialize in the goals and functions of the business to a greater extent than in the production of individual goods. The current situation leads to new opportunities, new risks, and new challenges for all GVCs participants. Of particular interest in understanding the impact of GVCs on individual economies is to consider the main opportunities, risks, and challenges that arise for multinational companies, governments of countries whose companies create GVCs, and governments of countries hosting GVCs.

To date, a significant number of studies have been devoted to the analysis of global productions using the apparatus of the concept of global value chains (Kim et al., 2019). Publications in the field of GVCs in crisis and post-crisis periods are especially useful for revealing the subject of this study (Alford & Phillips, 2018).

On the eve of the pandemic in November 2019, a comprehensive review was published based on the OECD database on value-added trade, as well as an analysis of cross-country inter-industry balances and other indicators for the period since 1995 (Miroudot, 2020). The results of the study based on the calculation of the number of stages of national and foreign production, border crossings, and the geographic length of supply chains showed that the pace of global development at the beginning of the 21st century corresponds to the dynamics of the GVCs. The peak of globalization fell in 2012, and there is a process of reducing the average length of the GVCs "erosion of globalization". GVCs are becoming shorter in their length and the number of countries involved in them. At the same time, the trend of transition to "internal" GVCs are developing (BIS, 2018).

Some authors recognize the objectivity of the process of localization of economic life, arguing that this, in a sense, a new trend contributes to improving the life and health of the population, contributes to achieving social harmony, and improves the state of the environment (Smith, 2019).

Localization is influenced by the following factors: 1) deglobalization; 2) strengthening of regionalization; 3) reconfiguration of the value chain. Under the influence of these processes, the discourse of national politics is changing (Devinney & Hartwell, 2020; Enderwick & Buckley, 2020; Hitt et al., 2021).

It is necessary to recognize the objectivity of the processes of localization of economic life. Among many objective reasons, the strengthening of this trend is due to the growing need for structural restructuring of the global economy as the only answer to serious challenges that threaten human life. It is important to understand that structural transformation has not only sectoral but also spatial content. In this sense, localization of business processes can mean the beginning of restructuring processes in certain regions of the world as a basis for subsequent structural changes in the national and global economy. Such an understanding of reality requires the development of a new paradigm for managing economic processes in global risks.

In the course of their sequential evolution, the GVCs have become complex, integrating more and more suppliers of the first and next levels. Such changes in the GVCs in recent years have led to a surge of interest in the resourcing strategy, that is, the return of production back to the home countries of MNEs, as well as to failures in the GVCs caused by various exogenous factors (Ocicka, 2016; Kondrat'ev, 2017; EU. Policy Department for External Relations, 2021; Kang, 2021). In this context, the discussion about the resorting of production back to developed countries seems interesting, although there is no convincing evidence that such a strategy is capable of activating the development of national industries and services.

Protectionism, expressed in government measures to victimize foreign commercial interests through trade policy, is not a new phenomenon and has been studied for many years.
during periods of crises and economic downturns (Evenett 2019). However, the issue of protectionism is taking on a new urgency today, especially in light of Brexit, the Ukraine crisis, foreign policy, and related trade tensions, and the widespread reaction against globalization provokes MNEs to apply new strategies.

2.2 The theoretical framework: globalization vs centralization

GVC research, due to its holistic perspective, has conventionally emphasized the analysis of the static elements of global industry governance (Barrientos, 2019; Palpacuer, 2019; Ponte et al., 2019). On the other hand, global strategy has primarily focused on understanding how firms make decisions by considering the interplay between their internal capabilities and external contextual factors. By adopting this approach, global strategy sheds light on the decision-making processes of GVC agents and the dynamics of relationships and power within GVCs that emerge as a result of their interactions.

To analyze the dynamics of the global value chain (GVC), we utilize the framework proposed by Barlett & Ghoshal (2002), which categorizes different value chain configurations ranging from centralized activities to a more dispersed approach of globalization. We examine each category of activities at different time points, considering the impact of external shocks such as the COVID-19 pandemic and the Ukrainian conflict.

In the context of our study on the oil & gas industry, we refer to M. Porter's (1985) classic value chain model, which identifies various groups of activities including manufacturing, procurement, research and development, finance, human resources, information systems management, logistics, and marketing & sales. However, in our specific focus on the oil & gas industry, we adopt the activities proposed by Beltran-Rodriguez & Lozano-Maya (2021), which include Upstream (exploration and production), Midstream (transportation and trading), and Downstream (refining and marketing). We introduce our framework for GVC analysis in Table 1.

<table>
<thead>
<tr>
<th>Name of category</th>
<th>Centralization</th>
<th>Transition</th>
<th>Globalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream (exploration &amp; production)</td>
<td>identifying, extracting, and producing materials mainly in the home country.</td>
<td>related services such as rig operations, feasibility inquiry machinery rental, and extraction of chemical supply</td>
<td>Oil&amp;Gas fields development, plant manufacturing or complete development of production significantly outside the home country</td>
</tr>
<tr>
<td>Midstream (transportation &amp; trading)</td>
<td>Centralized transportation (turbo lines), united planning and supply systems. Full control of headquarters</td>
<td>Mixture of headquarters and local logistics, warehousing</td>
<td>Access to global logistics, active participation and key position</td>
</tr>
<tr>
<td>Downstream (refining &amp; marketing)</td>
<td>Full in-house control over refining, finance, and marketing.</td>
<td>Participation of branches in minor marketing activities. Local refining.</td>
<td>Tight cooperation in refining and marketing, equal possibilities and facilitation, independent policy of the branch</td>
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3 Methodology

The case method is used in various fields of science is that it gives an idea of a solution or a set of solutions, describes why these decisions were made, how they were implemented, and what result they led to (Schramm, 1971). Case-study is a type of research aimed at studying the specifics and complexity of one particular case (Stake, 1995). A case study is an empirical study that conducts an in-depth study of a modern event that happened, especially in the case when it is impossible to clearly define the boundaries between the event and the accompanying factors. The case study method also allows you to cope with the peculiarity of the situation when there are a large number of variables. It relies on a large number of information sources (Yin, 2009).

Multiple case-study method is applied in this research. Such large companies as Gazprom, LUKOIL and Rosneft play a significant role in the development of the Russian oil and gas and petrochemical industries. Each of them has modern equipment and other capabilities necessary for the production of high-quality competitive products. Moreover, these companies invest significant financial resources in the discovery of innovations. All of them reflect three important directions: modernization, import substitution, and deepening of processing to a finished product.

3.1 Data analysis

We conducted secondary data analysis including the annual reports of companies, industry reports, and media materials. We synthesized information regarding MNE's value chains configuration to identify upstream, midstream, and downstream operations. We also used information from websites of foreign subsidiaries and media materials.

3.2 Cases description

3.2.1 Case 1: Gazprom

Gazprom PJSC is now a Russian majority state-owned multinational energy corporation. The main areas of activity are geological exploration, production, transportation, storage, processing and sale of gas, gas condensate and oil, sale of gas as motor fuel, as well as production and sale of heat and electricity.

Gazprom is the largest gas company in the world, a Russian monopolist in the field of extraction, processing, and sale of natural gas. It has the largest gas transportation system. Gazprom's non-core assets are mainly collected in two holdings – Gazprom-Media holding and Gazprom Neft oil holding.

In 2018 Gazprom reported a doubling of annual net profit to 1.456 trillion roubles ($22.58 billion) led by record-high sales to Europe. However relatively warm weather in the region hurt the dynamics of LNG imports in Japan, China, South Korea, and Taiwan in 2019 (Gazprom, 2019: 59). The impact of the coronavirus pandemic on the global gas market was limited, and demand decreased by only 2% in 2020, which is incomparable with the drop in consumption of other fuels. The key trend was a decrease in gas production in Europe (by almost 7% compared to 2019) and an increase in its consumption in China (by almost 6% compared to 2019) (Gazprom, 2020).
In May 2022, an artificial narrowing of the supply channels of Russian pipeline gas to the EU occurred after Ukraine refused to fulfill the nomination of Gazprom Export LLC for transit. Both Nord Stream 1 and Nord Stream 2 were hit by explosions that rendered them inoperable and caused significant leaks of gas that were idle in the pipelines on 26 September 2022. But the Nord Stream is currently the key pipeline for supplying the EU with gas from Russia, and the largest volume of supplies through it fell on the needs of Germany (CNBC, 2022).

A characteristic feature of 2022 was the change in the structure of European imports, characterized by the replacement of Russian pipeline gas with liquefied gas. The disruption of global and regional export-import flows caused an increase in production transport and logistics costs and, as a consequence, an increase in prices along the entire chain of production and distribution, up to the final consumer. Customers are spending more money to pay for a single sector that participates in the formation of the overall price. Moreover, by very long chains of surplus value or disposable income for final consumption.

3.2.2 Case 2: LUKOIL

LUKOIL is one of the largest international vertically integrated oil and gas companies, providing about 2% of global oil production (LUKOIL, 2023a). In 2018, LUKOIL's net profit under IFRS increased to 619.2 billion RUB (NeftCapital). The same year LUKOIL topped the rating of the largest private companies in Russia according to Forbes Russia (Forbes, 2019).

In 2020, the COVID-19 coronavirus pandemic had a sharp negative impact on the oil and gas market, bringing down the demand for hydrocarbons. In 2022 the increase in oil supplies to refineries, as indicated in the company's materials, is associated with a record refining margin (TASS, 2023).

LUKOIL Group pays great attention to the implementation of international projects in the field of oil and gas exploration and production in the Middle East and Central Asia, West Africa, Europe, and Central America (LUKOIL, 2023b).

The largest oil refinery in Romania, Petrotel LUKOIL, located in Ploiesti, came under the control of LUKOIL in 1998. Back in 2014, Petrotel-LUKOIL began to have problems due to the investigation of cases of tax evasion and money laundering. A certain role was played by the political factor: after the return of Crimea to Russia, the company's management was offered to sell problematic Romanian assets (Kalyeena, 2015).

After February 2022 things got even worse: due to the departure from Italy, LUKOIL lost foreign oil refining, and only Romanian Petrotel LUKOIL and Bulgarian LUKOIL Neftochim Burgas remained among its foreign assets (LUKOIL, 2023c).

In connection with the decision of the Bulgarian government on the imminent introduction of external management at the Burgas refinery, Litasco has already concluded a $12 million deal with the state operator of the oil terminal in the Romanian port of Constanta (O'Connor, 2023).

In 2023, Litasco will remain the main customer of the Oil Terminal and will transport oil to Petrotel LUKOIL refineries. The contract fully takes into account the EU embargo on sea shipments of Russian oil and petroleum products.

In May LUKOIL closed a deal to sell a refinery in Sicily, of which it has been a shareholder since 2008. The Russian company announced the sale of the enterprise, which faced a sharp decline in supplies due to sanctions against Russian oil and the threat of nationalization, at the beginning of the year. The buyer was a company from Cyprus (Enerdata, 2023).
3.2.3 Case 3: Rosneft

Rosneft is a Russian oil and gas company, which is one of the largest in the world in oil production and refining. Its mining enterprises are located in Russia, Kazakhstan, Azerbaijan, Uzbekistan, and other countries.

Rosneft owns several refineries in Russia and also has a stake in other oil refining enterprises in the CIS countries and the Middle East. Rosneft sells its products through a network of oil depots and terminals in Russia and abroad, as well as through its subsidiaries and partners. Transportation of oil and petroleum products - Rosneft has a fleet of tankers and other vehicles that ensure the delivery of its products to markets. Development of new technologies - Rosneft invests in the development of new technologies, such as oil production from shale, the use of solar energy, and other renewable energy sources. Socio-economic development of the regions - Rosneft is actively involved in the socio-economic development of the regions where its enterprises are located, including the financing of social projects, housing, and infrastructure construction (Henderson, 2012).

4 Findings

4.1 Findings from Cases Analysis

GVCs are a network of suppliers, producers, distributors, and consumers that are linked together in the process of producing and distributing goods and services. In times of global crises or geopolitical turbulence, this network can undergo major changes, which can have an impact on the economy and the social sphere as a whole.

GVCs are also an integral part of the world economy, and their stability is essential for the well-being of the whole world and each country in particular. However, in the context of global crises and geopolitical turbulence, the GVC may also undergo significant changes. Our research findings are reflected in Table 2. Below we'll introduce an analysis of each case of GVC's strategy change.

4.1.1 Gazprom

Gazprom, one of the largest gas companies in the world, has a global value chain spanning many regions.

The majority of the company's gas and oil assets are located in Russia. However, for foreign exploration and production, the company utilizes its foreign subsidiary, Gazprom International Limited, which specializes in acquiring desirable oil and gas assets overseas. Overall Gazprom International operates in seven countries and the North Sea offshore. Nowadays the company prioritizes countries that have strong relationships with Russia, including established interactions with public authorities and national oil and gas corporations. This involves engaging in dialogues within the framework of intergovernmental commissions and the industry's business community. Overall, we evaluate upstream GVC strategy as centralization with elements of globalization. The international strategy in upstream GVC was not significantly influenced by geopolitical crises as most of the production sites were located in politically neutral or friendly countries.

Gazprom Export is responsible for the delivery of oil and gas to customers. The main transportation corridors for gas include routes through Ukraine, Nord Stream (located under the Baltic Sea), Blue Stream (providing direct access to Turkey while bypassing transit countries), and Yamal-Europe, which is currently inactive. Ownership of these pipelines is
divided between Gazprom and partner companies from the countries where these routes are located.

Gazpromneft possesses five refineries, two of which are situated in Serbia under the NIS (Naftna Industrija Srbije) brand. While Gazpromneft is a significant shareholder in NIS, the latter now operates relatively autonomously in terms of marketing and local operations.

Based on our analysis, it can be concluded that there have been no major transformations in the upstream value chain. The centralization strategy with elements of globalization has remained intact. However, in the downstream value chain, Gazpromneft has strengthened its globalization strategy by allowing autonomous marketing and refinery operations for NIS. The most significant changes have occurred in the midstream value chain, where transportation has transitioned from a globalization strategy to a transitional phase, and eventually to a new form of strategy which we call consolidation.

4.1.2 LUKOIL

LUKOIL, the largest oil and gas company in Russia, has a global value chain that includes the exploration, production, processing, and distribution of oil and gas products. In 2018, LUKOIL's global value chain was focused on expanding production capacity and investing in new technologies to increase efficiency and reduce costs. By 2020, LUKOIL has expanded its global value chain by increasing production and processing capacities, as well as investing in new markets and technologies.

In 2022, LUKOIL continued to expand its GVCs through investments in renewable energy projects and the development of new markets.

In general, LUKOIL's GVCs are focused on improving the efficiency of production and processing while expanding its presence in new markets.

The company's main upstream operations are focused on the production of crude oil and natural gas, with a total production of around 2 million barrels of oil equivalent per day. Lukoil's upstream production of oil is primarily located in Russia, with almost 4% of oil production abroad. At the same time gas production is not concentrated only in Russia, about 50% of gas production is realized in foreign countries such as Azerbaijan, Kazakhstan, Uzbekistan, Nigeria, Ghana, the UAE, and Congo. Therefore, we may characterize GVC upstream strategy as a mix of globalization and centralization.

Lukoil has undergone various changes in its value chain over the years, including changes in its upstream production, downstream refining and marketing, and international expansion. Some of the most significant changes that have occurred in Lukoil's value chain include:

Upstream Production: In the last decade, Lukoil has increased its upstream production capacity, primarily in the West Siberia region, where it operates the Vankor, Samotlor, and Russkoye fields. The company has also expanded its operations in the Caspian region, where it operates the Imilskoye and Uvat fields in the Central Siberia region. Additionally, Lukoil has expanded its international upstream operations, operating the West Qurna field in Iraq and the Korchinskoye field in Kazakhstan. We define Lukoil's upstream GVC strategy as a mix of centralization and globalization.

Midstream transportation and trading: LUKOIL engages in the sale of crude oil, gas, and petroleum products in both domestic and international markets, strategically allocating flows to align with market demands. The company owns transshipment facilities for crude oil and petroleum products, as well as pipelines, which contribute to the efficient management of transportation expenses. Until 2022, approximately 80% of the company's sales were generated from international markets. However, in 2022, there was a significant decrease of nearly 50% in oil sales abroad, although it remained the primary source of sales for the company. The trading in Europe is managed by the Swiss-based company Litasco CA (owned
by Lukoil). Thus, we might conclude that the midstream strategy of Lukoil is a mix of centralization and transition.

Downstream Refining and Marketing: LUKOIL Group operates four refineries located in Russia (Perm, Volgograd, Nizhny Novgorod, and Ukhta), in addition to two refineries in Europe (Romania and Bulgaria). Furthermore, the company holds a 45% ownership stake in a refinery located in the Netherlands. All of Lukoil's foreign refineries are operated under the Lukoil brand and do not pursue independent marketing operations. LITASCO SA, which is owned by Lukoil Swiss Limited, is an international marketing and trading company responsible for managing trade and marketing operations. LITASCO SA operates refineries and a retail network in Europe. However, each subsidiary does have some autonomy in implementing local marketing initiatives and conducting independent operations. As a result, we classify Lukoil's downstream global value chain strategy as a transitional approach.

4.1.3 Rosneft

Rosneft, one of the largest oil and gas companies in the world, has a global value chain that includes the exploration, production, processing, and distribution of oil and gas products. In 2018, Rosneft's global value chain focused on increasing production and processing capacity, as well as investing in new technologies to increase efficiency and reduce costs.

Rosneft is a Russian-owned oil and gas company that operates in over 30 countries. The company is involved in all stages of the petroleum industry, from exploration and production to refining and marketing. Rosneft is active in the transportation of crude oil and petroleum products by pipelines, tankers, and railways. It also owns several refineries in Russia and abroad, including the largest refinery in Europe, located in Germany, including the Schwedt refinery in Germany, which is the largest oil refinery in Europe. In recent years, Rosneft has also invested heavily in the development of upstream assets in international markets, such as Brazil and Indonesia, as part of its global expansion strategy. Rosneft also has an impressive trading network, with partners in Asia, Europe, and the Americas. Overall, Rosneft is one of the world's largest and most diversified energy companies, with a strong presence in both upstream and downstream sectors of the petroleum industry.

Rosneft upstream production is primarily located in Russia. The company's upstream operations are focused on the production of crude oil, with a total production of around 4 million barrels of oil equivalent per day. Rosneft's upstream operations are divided into three major business segments: West Siberia, Central Siberia, and the Far East. The company also has several major international upstream projects, including the Sakha gas field in Turkmenistan and the North Stream LNG project in Russia.

Rosneft has undergone various changes in its value chain over the years, including changes in its upstream production, downstream refining and marketing, and international expansion. Some of the most significant changes that have occurred in Rosneft's value chain include:

Upstream Production: In the last decade, Rosneft has increased its upstream production capacity, primarily in the West Siberia and Central Siberia regions, where it operates fields such as the Russkoye, Novoprovskoye, and Achim fields in the West Siberia region and the Karasevsky, Imilskoye, and Irkuchinskoye fields in the Central Siberia region. Additionally, Rosneft has expanded its international upstream operations, operating fields such as the Sakhalin I and Sakhalin II fields in the Sea of Okhotsk and the Vostok oil and gas project in the Arctic.

Downstream Refining and Marketing: Rosneft has increased its refining capacity in the last decade, building new refineries in the Urals region, including the Ufimskoye refinery, and the Central Siberia region, including the Angarsk refinery in the Irkutsk region. The
company has also expanded its marketing operations, operating petrol stations in various
countries and expanding its refining and trading operations internationally.

International Expansion: Rosneft has significantly expanded its international operations in the
last decade, acquiring upstream projects in various countries, including the Central African
Republic, Venezuela, and Brazil. The company has also expanded its marketing and refining
operations internationally, establishing a robust international trading and refining network.

Rosneft owns or shares ownership of refineries in Germany, India, Venezuela, South Korea,
and Indonesia. Below we'll provide information on how downstream operations are organized
and define Rosneft's strategy in downstream GVC.

Rosneft in Germany: the operations are carried out by Rosneft Deutschland GmbH, a
subsidiary of Rosneft, managing oil refining in its share at three plants in which it has equity
participation. Deutschland GmbH located in the German district of Brandenburg, the Schwedt
Refinery is one of the largest oil refineries in Europe and was Rosneft's largest refining asset
outside of Russia. The refinery processes approximately 7.6 million tons of oil per year and has a
wide range of end-products, including gasoline, diesel, aviation fuel, and petcoke.

Under the law, the German government put Rosneft's German unit under the trusteeship of
the industry regulator in September 2023, effectively taking a controlling stake in the refinery,
PCK Schwedt, which is co-owned by Shell (SHEL.L) and Eni and supplies 90% of Berlin's fuel.
Rosneft is the third largest oil refining company in the German market with a total crude oil
refining capacity of up to 12.8 million tons per year, which is more than 12% of Germany's
capacity. There are three plants: The PCK Raffinerie GmbH Refinery is located in Schwedt,
Brandenburg, MiRO GmbH & Co. Refinery KG is located in Karlsruhe, Baden-Württemberg,
BAYERNOIL Raffineriegesellschaft mbH Refinery is located in Neustadt an der Donau.

Refinery in India: Rosneft has a 35% stake in the Nayara Energy refinery in India, which has
a processing capacity of 20 million tons of crude oil per year (2nd place in India).

The refinery produces a wide range of end-products, including gasoline, diesel, aviation fuel,
and petrochemical products.

Rosneft has been doing business in Venezuela since the late 2010s. Until 2020, despite the
increasing sanctions against Venezuela by the United States, Rosneft in such conditions was
engaged in trading oil from Venezuela, supplied fuel to the country, and issued multibillion-
dollar advances for future oil supplies to local PDVSA. However, in February 2020, the US
Treasury imposed sanctions on Rosneft Trading, a Swiss trader of Rosneft, and the president of
this structure, Didier Casimiro, for trading Venezuelan oil. All shares in the Venezuelan joint
ventures were sold to the Russian state-owned company Roszarubezhneft. Refinery in South
Korea: Rosneft owns a 20% stake in the Daesan refinery in South Korea, which has a processing
capacity of approximately 5 million tons of crude oil per year.

The refinery produces a range of end-products, including gasoline, diesel, aviation fuel, and
petrochemical products.

Refinery in Indonesia: Since 2022 Indonesian state oil and gas giant Pertamina plans to invest
up to $50 billion to build and expand refineries next year, nearly half of which will go to a
greenfield project with Rosneft that is moving forward amid international pressure on Moscow.

These refineries provide Rosneft with a significant presence in international markets and
allow the company to diversify its supply sources, products, and customers. Therefore,
considering its own proprietary assets and shared ownership, it can be deduced that Rosneft's
downstream Global Value Chain (GVC) strategy encompasses a blend of transition and
globalization. In the past couple of years, owing to geopolitical tensions, this strategy has
evolved from a mixed approach to a predominantly globalized strategy. This shift enables Rosneft's refineries to operate autonomously, thereby mitigating the impact of sanctions.

Rosneft owns several oil and gas pipelines and terminals, as well as several storage and distribution facilities. These assets are used for the transportation and storage of crude oil and petroleum products, as well as for the storage of other energy products such as liquefied natural gas (LNG) and coal. The company's pipeline assets include the Eastern Siberia-Pacific Ocean pipeline, which is the longest oil pipeline in the world, and the Turkmenia-China pipeline, which transports natural gas from Turkmenistan to China. Rosneft also owns several oil and gas storage and distribution terminals, including the Vysotsk Oil Terminal, which is the largest oil storage facility in Europe. The midstream GVC strategy can be defined as a mix of centralization and transition.

Table 2. GVC’s analysis: synthesis of secondary data

<table>
<thead>
<tr>
<th>Company</th>
<th>Upstream (extraction &amp; production)</th>
<th>Midstream (transportation &amp; trading)</th>
<th>Downstream (refining &amp; marketing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gazprom</td>
<td>Extraction and independent production: Bolivia, Vietnam, Iraq, Serbia, Angola, Bosnia and Herzegovina, Romania, Mexico, Iraq, Uzbekistan Centralization with elements of Globalization</td>
<td>Export to Germany, Italy and Turkey, large extemporaneous users of these products are Austria, France and Great Britain; Hungary, Poland, Czech Republic, Belarus, Kazakhstan, Moldova, Ukraine Transportation: access to global logistics Globalization</td>
<td>NIS (Serbia) Transition</td>
</tr>
<tr>
<td></td>
<td>2020 Azerbaijan, Egypt, Kongo, Iraq, Kazakhstan, Uzbekistan Centralization with elements of Globalization</td>
<td>Export to Germany, Italy, Austria, Turkey and France; Hungary, Poland, Czech Republic, Slovakia Transportation: mixture of headquarter and local logistics Transition</td>
<td>NIS (Serbia) Transition to Globalization</td>
</tr>
<tr>
<td></td>
<td>2022 Uzbekistan, Vietnam, Algeria, Libya, Bolivia and Bangladesh, as well as offshore operations in the North Sea Centralization with elements of Globalization</td>
<td>Export to Germany, Turkey, Italy, China Transportation: no access neither to global nor to own logistics, using local or third countries Consolidation</td>
<td>NIS (Serbia) Globalization</td>
</tr>
</tbody>
</table>
| Lukoil     | 2018 Azerbaijan, Iraq, Kazakhstan, Uzbekistan, Egypt, Cameroon, Nicerca, Ghana, Mexico, the United Arab Emirates, Congo Transportation via own pipelines and transships facilities as well as via partner’s transportation routes. Sales to CIS and Western countries | Refineries in Bulgaria Romania Netherlands Transition | 13
### Mix of Centralization and Globalization

<table>
<thead>
<tr>
<th>Year</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>Azerbaijan, Iraq, Kazakhstan, Uzbekistan, Egypt, Cameroon, Niceria, Ghana, Mexico, the United Arab Emirates, Congo</td>
</tr>
<tr>
<td>2022</td>
<td>Azerbaijan, Iraq, Kazakhstan, Uzbekistan, Egypt, Cameroon, Niceria, Ghana, Mexico, the United Arab Emirates, Congo</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Company</th>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rosneft</td>
<td>2018</td>
<td>Egypt, Vietnam and Venezuela</td>
</tr>
<tr>
<td></td>
<td>2020</td>
<td>Extraction abroad mainly in Egypt, Vietnam</td>
</tr>
<tr>
<td></td>
<td>2022</td>
<td>Centralization with elements of globalization</td>
</tr>
</tbody>
</table>

*The largest consumers are indicated*

### 5 Discussion

#### 5.1 Implications for theory

Participating in GVCs implies both advantages and disadvantages for companies such as Gazprom, LUKOIL and Rosneft. On the one hand, GVCs allow companies to gain access to a wider range of resources, reduce costs, and increase efficiency through specialization at certain stages of production. On the other hand, GVCs can increase a company's vulnerability to external shocks, such as changes in exchange rates or trade policy, and may lead to a loss...
of control over the production process. Therefore, companies carefully weigh the potential benefits and risks of participating in the GVCs.

In our study, we analyzed five years from 2018 to 2023 to examine whether the GVC strategies of Russian oil and gas companies have been influenced by external shocks. Firstly, we found that all three companies exhibit a similar upstream GVC strategy, characterized by centralization with elements of globalization. This is not surprising, considering Russia's extensive oil reserves, which provide these firms with a competitive advantage. Additionally, all three companies maintain overseas upstream operations that complement their domestic activities. This strategy has remained unchanged because countries with significant oil reserves, like Russia, are primarily emerging or least developed nations that are not entangled in the political turbulence affecting Russia.

Secondly, we observed some variations in the midstream GVC strategies. While Lukoil and Rosneft predominantly rely on a centralized approach with elements of transition, meaning they exert greater control over their transportation and trading operations, Gazprom, due to the unique nature of gas transportation and storage, employs a globalization strategy. As a result, we can observe relatively stable strategies for Lukoil and Rosneft, whereas Gazprom has undergone significant changes in its midstream operations. Gazprom's strong reliance on the European market and its robust partnerships have led to a strategic shift, involving the divestment of midstream assets and the consolidation of existing resources.

The downstream GVC strategies exhibited variations among the three cases studied, encompassing a mixture of centralization, transition, and globalization approaches. Gazprom and Rosneft, in particular, shared a similar downstream GVC design. They primarily pursued a combination of transition and globalization strategies, allowing their foreign subsidiaries to operate with some degree of autonomy. However, in 2022, their strategies began to evolve. To mitigate the risk of sanctions, they separated their downstream operations from their core business. On the other hand, Lukoil maintained its initial transition-based downstream strategy without significant changes. This approach enabled Lukoil to maintain substantial control over its operations while delegating certain tasks to its subsidiaries. The differing dynamics of downstream GVC strategies can be attributed to the ownership structure. Unlike Gazprom and Rosneft, Lukoil is not a state-owned enterprise. Although Lukoil is still susceptible to sanctions, the pressure from stakeholders abroad may be comparatively lower. In conclusion, it is worth noting that none of the multinational enterprises (MNEs) studied pursued a pure GVC strategy as suggested by the literature. Instead, there is always a combination of strategies, with one approach dominating. Over the course of five years, despite economic shocks, significant changes were not observed in the upstream strategy, while more modifications occurred in the midstream and downstream GVCs. The companies differ in their strategy adjustments; however, a certain pattern can be observed. There is a shift from transition to globalization in the downstream GVC to evade sanctions and from transition to centralization in the midstream GVC. Lukoil has undergone less transformation in its GVC compared to Gazprom and Rosneft, which can be partly explained by its initially different internationalization strategy and the private nature of its ownership.

6 Discussion and Implication

Gazprom, LUKOIL and Rosneft can use different strategies to optimize their GVCs. For example, companies can focus on developing their technological capabilities to reduce dependence on external suppliers. They can also collaborate with other companies in the industry to share knowledge and resources and increase their overall competitiveness. Finally, companies can invest in sustainable social responsibility practices and initiatives to ensure that their participation in the GVCs is environmentally and socially sustainable. By
adopting these strategies, companies can maximize the benefits of GVCs, while minimizing risks and ensuring the achievement of their strategic goals.

In conclusion, Gazprom, LUKOIL and Rosneft have created global value chains that have significantly affected the efficiency of their business. While the benefits of global value chains include increased efficiency, reduced costs, and access to new markets, the disadvantages include increased complexity and potential risks. To optimize their global value chains, these companies have implemented strategies such as vertical integration, diversification, and partnerships. As a result, they were able to increase their competitiveness and expand their activities around the world. Global value chains will continue to play a crucial role in the success of these companies in the future.

To maintain their position in the market, oil and gas companies can take the following measures:

- Increase investment in the development of new oil and gas fields.
- Expand the network of distributors to increase sales.
- Raise the price of your products to stimulate demand.
- Use alternative energy sources such as solar and wind energy to reduce dependence on oil.
- Collaborate with other companies and governments to address the crisis.
- It is important to note that global crises and geopolitical turbulence can affect all sectors of the economy, including the GVCs, and require the joint efforts of states and companies to maintain stability and sustainable development.

In order to maintain the stability of the GVCs in the industries, both governments and companies must take steps to maintain demand. For example, governments can stimulate oil and gas consumption by raising the price of other fuels or introducing tax incentives for their use.

7 Acknowledgements

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