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RESEARCH ARTICLE

University-Industry Relations in the Oil and Gas Sector in Russia

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ABSTRACT: Russian technical universities carry on the tradition of Soviet-era industrial institutes by providing skilled labour force to the industry. In recent years university-industry collaboration has grown in size and depth to include several other functions. This study explores university-industry relations in the oil and gas sector. Taking cues from the Triple Helix theory, a comparison is made between two renowned technical universities in Western Siberia that have been adopting different models of cooperation with industrial partners. The analysis shows that university's mission, funding strategies, and organizational culture determine the pace of cooperation. Findings underline the high regional engagement of both academic institutions, which figure as crucial nodes of the oil and gas value chain. On the background of increasing state pressure on higher education institutions to become more entrepreneurial, it is argued that technical universities are set to become crucial innovation actors in the coming years. This enables a more nuanced look at oil and gas governance in today's Russia and offers new insight into the role played by refashioned elite universities.

KEYWORDS: Higher Education, Oil & Gas, Russia, Triple Helix, University-Industry, Western Siberia

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1. Introduction

Post-Soviet Russia is often described as a highly centralised, neo-patrimonial regime that relies on a rentier economy structured in large conglomerates (Gel'man 2016; Hanson 2011; Robinson 2011, 2017; Sakwa 2009,

2014). Since the early '90s the petroleum industry has risen to prominence as a leading economic sector, to the extent that oil and gas revenues account for more than one-third of the federal budget and about 50-60% of all exports (OECD 2020). These figures tell the story of the country's addiction to hydrocarbons, with all the benefits and drawbacks that entails. The oil rent has enabled economic restructuring and revived a bold foreign policy, so much that the catchphrase of the "energy superpower" has gained currency to connote the long-running presidency of Vladimir Putin (Bouzarowski & Bassin 2011), despite limited analytical purchase (Rutland 2008). In parallel, however, commodity dependence has stifled economic diversification, slowed institutional reforms, and spread rent-seeking behaviour and corruption at all government levels. For all the weight of the commodity sector, enterprises are nevertheless characterised by low innovation activity (Simanchev & Kuzyk 2018), this being a long-term consequence of the industrial structure of the Soviet period (Gustafson 2012). Moreover, prospective extraction from Siberia and the Arctic Zone, which account for 73% and 93% of oil and gas production respectively, "necessitate an intensified innovation capacity" but national companies are lagging behind in the development of the required technologies (Kryukov & Tokarev 2021). For these reasons, the performance of the petroleum industry intersects more and more with innovation policies and the establishment of national innovation systems.

This article presents a snapshot of relations between technical industrial universities and oil and gas companies. Despite the intense traffic between academia and business, the abundant literature on Russian political and economic elites has devoted very little attention to the role of the former. Our contribution attempts to fill this gap. University-industry relations are rooted in the Soviet past, but since the mid-2000s historical ties have evolved in response to a large-scale reform that is aimed at raising the competitiveness of higher education institutions while supporting the innovation of strategic industries. In the oil and gas sector, cooperation has typically involved developing courses and curricula, offering internships and apprenticeships, collaborating on research activities and joint ventures, and bringing corporate stakeholders onto university boards and vice versa. In recent years these partnerships have grown in size and depth. Technical universities have added new entrepreneurial functions to the training of highly qualified specialists for the purpose of procuring a stream of contracts and thus compensating meagre state funding. On their part, energy companies have favoured the knowledge transfer from research to industry to close the technology gap with international competitors and exploit unconventional reservoirs in hard-to-reach areas. This two-way interaction has solidified into formal and informal practices, which unfold within a government-sponsored framework.

For the considerations made above, these bilateral relations are noteworthy, as they hint at a lesser-known side of oil and gas governance. Still, the need for an empirical examination of these links remains. Universities are ostensibly connected to state and business, and the Russian academic community is often acknowledged as over politicised (Gel'man & Tarusina 2000), but the nature of these ties is unclear. How permeable the boundaries between these domains are? Are universities integral to innovation policies and corporate strategies or do they enjoy some degree of autonomy? How has the government-driven transition towards an entrepreneurial university influenced university-industry relations? This work aims to shed light on these broad issues through the comparison of two leading technical universities, the Tyumen Industrial University (IUT) and the Tomsk Polytechnic University (TPU). Both have been pivotal institutions in Western Siberia, which is home to the world's largest hydrocarbon basin.

The paper is structured as follows. It begins with an overview on recent government reforms in the higher education system and an anecdotal exemplification of how universities and the petroleum industry are tethered to each other. The case selection is then explained by placing IUT and TPU within the context of Western Siberia's political economy. This section is followed by an illustration of the Triple Helix theory and of the concept of entrepreneurial university. Data are then presented and discussed. The last paragraph elaborates on results and offers recommendations for future research.

2. Revolving Doors

Government-business relations and the ambivalent position of oligarchs are hotly debated topics. The rise of a relatively small group of businessmen from diverse backgrounds who took the opportunities arising from mass privatisations to acquire huge fortunes in a short amount of time has been chronicled in many journalistic and academic accounts (Fortescue 2006; Hoffman 2011; Rutland 2018; Schimpfössl 2018). What remains relatively unexplored in the literature, instead, is the role that higher education (and academic elites at large) holds in hyper-extractive Russia.

Especially after the global financial crisis hit the nerves of the rentier economy via the dramatic fall in crude oil prices, the government began redirecting attention and resources towards the development of an innovation infrastructure to find additional drivers of growth and stimulate the transition to a knowledge-based economy (Leydesdorff & al. 2015). The same strategic goal also guided the profound organisational transformation of the university system. Since the mid-2000s, the Ministry of Education and Science has supported selected universities with increased federal funding to make progress in global rankings. Following the implementation of innovative education programmes, 39 federal and national research universities were created across the country with the presidential decrees no. 716 and 1448 in 2008 (Balzer & Askonas 2016). With such decision the government decided to make focused investments in a new class of elite universities to foster innovation and be more competitive internationally (Block & Khvatova 2017). The investiture of 11 “flagship” universities was announced with great fanfare in 2015¹. Furthermore, the enhancement of a research capacity was designed to sustain economic growth by encouraging universities to embrace an entrepreneurial mindset and contribute to the blossoming of industrial clusters. In the period 2009-2011, during the post-recession recovery, legislation was passed to facilitate cooperation between universities and industrial firms (Leydesdorff & al. 2015).

This marked a radical change from how higher education was previously organised, since until then research had been a prerogative of the Russian Academy of Sciences (RAS) and industrial institutes, while universities mainly served a pedagogical function (Graham & Dezhina 2008). During the Soviet era, RAS typically focused on basic research, leaving applied projects to branch institutes tied to local industries. Universities were instead at the margins of the research sector, also due to low funding. After the dissolution of the Soviet Union, the separation between research and teaching was more a legacy of the past than an efficient organizing principle (if it ever was), but conventional research organisations have retained a preponderant role to the extent that, still in 2015, “[universities’] share of the country’s gross domestic expenditures on R&D was less than 10%, and they employed about 12% of all Russian researchers” (Kuzyk & al. 2017: 85). As higher education is now a strategic target of innovation policies, these percentages are sure to rise.

This study focuses on a sub-set of higher education institutions – namely, technical universities specialised in petroleum engineering and other related disciplines. In this regard, there is ample evidence of very close ties with industrial firms. To take an example, one need only look at the internal structure of the Gubkin Russian State University of Oil and Gas. Later renamed after the geologist, Ivan Mikhailovich Gubkin, who pushed for the exploration of new oilfields in the Volga-Ural basin (Rogers 2016), it was originally founded in 1930 as

¹According to Forrat (2016) the reform masked an attack on university autonomy by placing non-elite institutions at a disadvantage in the higher education market and thus preventing anti-government mobilizations amongst students to rise (on the model of the color revolutions that erupted in many areas of the former communist bloc in the early 2000s). Forrat’s argument raised criticism (Chiricov 2016), but there is little doubt that the governance of higher education is intensely political. From a different thematic perspective, for instance, it has been suggested that universities are part and parcel of the public diplomacy strategy towards Soviet republics, sometimes even to the point of replacing official institutions (Fominykh 2017).

Moscow Mining Academy to accomplish the tremendous task of preparing a highly qualified workforce of petroleum engineers to power the industrialization of the Soviet Union. Still renowned as a major educational institution in petroleum geology, the university looks back on a long history of cooperation with the industry, so much so that various specialised departments were established in conjunction with companies and have since been headed by directors holding both academic and corporate positions.

That is the case, for instance, of the Department of Gas Technologies and Underground Gas Storage, which is based on a long-standing synergy with Gazprom VNIIGAZ, Gazprom's in-house research centre. Tellingly, since 2001 only VNIIGAZ general directors have led the department. Cooperation has spanned from training to technological innovation. Along the same lines, many other branches of the Gubkin University carry the name of energy giants such as Rosneft or LUKoil, and company managers themselves are involved in teaching. In such a way, by the time of graduation students are already familiar with the business cycle of their prospective employers. In addition, scientific research is primarily focused on meeting the needs of companies. As further demonstration of strong university-industry entanglements, the presence of senior business executives in the board of trustees catches the eye. In other words, companies exert a direct influence through the university's governing bodies. Sometimes, the reverse is also true: for instance, Gubkin's Rector Viktor Martynov sits on Gazprom and RussNeft boards of directors.

3. Case selection and methodology

Virtually all Russian specialised universities carrying on the tradition of Soviet-era industrial institutes have partnerships of the same kind with oil and gas companies. However, this is just the tip of the iceberg. Our ambition was to glimpse what is under and disentangle the dynamics at play. What is the balance of power between universities, industry, and political authority? In order to answer this question, IUT and TPU were identified as main interlocutors to carry out an assessment of bilateral relations with industrial partners. The choice was justified by the fact that both institutions have long been at the forefront of socio-economic transformation in Western Siberia. Since late 1970s this vast and scarcely populated region has been the key producing area for the whole country. Although hydrocarbon deposits were discovered and drilled already during the 1960s, exploitation was made expensive by geographical remoteness and harsh climate conditions, and was hence delayed until the First Secretary of the Communist Party of the Soviet Union, Leonid Brezhnev, announced in 1976 the industrialisation of Western Siberia as a top priority (Krempin 2017). Pushed for by the Siberian branch of RAS and encouraged by the detente with the Federal Republic of Germany, which set its sights on Soviet supplies at times of price shocks and energy crises, production from the massive Urengoy gas field started two years after and would later make the country "a global player on the international energy market" (ibidem: 272).

Nowadays, West Siberian oil and gas riches have lost none of their importance. Moreover, the region offers an advantageous access point to untapped deposits in the Arctic. Historically, oil extraction has shaped a mono-industrial economy and driven urbanization in an underdeveloped area lacking basic infrastructure. Suffice it to say that two-thirds of urban settlements in Western Siberia came into being as oil or gas towns (Vaguet 2013). In an institutional vacuum determined by peripherality, corporations found themselves to be the main actor of this process of community making. In our view, the legacy of these exceptional frontier conditions still has a bearing on how IUT and TPU see themselves and their mission.

During 2021, remotely held interviews were conducted with teaching, research, and administrative staff of IUT and TPU². Respondents were selected based on position and expertise; priority was given to department chairs and university managers who are responsible of implementing agreements with industrial partners. Although there may be conflicting views within the same organization on the scope and the outcomes of collaboration with industry, our assumption was to consider respondents as socialised in the same cultural, economic, and institutional environment. As we launched the study at the beginning of the COVID-19 pandemic, travel restrictions prevented employing in-situ methods of data collection. To overcome this limitation and triangulate information, interviews were conducted online and were later supplemented with expert interviews with energy professionals, think tank analysts, and researchers from other Russian universities.

One of the primary limitations of this study pertains to our sample. Our initial intention was to include other technical universities, and agreements were underway. However, the worsening of the Ukrainian crisis and the outbreak of armed conflict ruled out the possibility of broadening the research beyond Western Siberia. A partial remedy to this was triangulation of data with expert interviews. Given the qualitative nature and size of this sample, the findings here are not statistically representative, but nonetheless highlight indicative trends that are new to the literature and may open up uncharted research trajectories on the topic.

4. University-Industry Relations from a Triple Helix Perspective

The Triple Helix (TH) model (Etzkowitz & Leydesdorff 1998, 2000) is a benchmark in the literature on innovation dynamics in knowledge-based economies. Proponents define it as a methodological tool to analyse the “recursive overlay of communications among universities, industries, and governments” (ibidem 1998: 1). The argument is straightforward: the more the interactions between these institutional spheres, the higher the innovation potential. Accordingly, the country’s long-term performance depends on the degree of relations between the actors involved in the innovation process. Among them, universities and research institutes figure as the core spiral given that these are best positioned to transfer knowledge, technology, and skills. Incubators, science parks, and venture capital firms are examples of TH synergies.

The model builds on the concept of entrepreneurial university, which “integrates economic development into the university as an academic function along with teaching and research” (Etzkowitz 1998: 833). Institutional entrepreneurship sets universities on a new mission and transforms them into economic actors “on their own terms” (Clark 1998: 3–4) endeavouring to generate more revenue through research dissemination and application of knowledge to economic activities. Universities are therefore encouraged to embrace an entrepreneurial culture and adapt organisational structures and practices accordingly. Information-sharing is the key mechanism setting the stage for the confluence of interests with the state and business. Although intertwined, the spirals of the helix can turn differently depending on their relative independence: while in a statist regime the government designs and directs relations with business and university, in a laissez-faire regime the three spheres are separated from each other, and government provides the regulatory framework only. These two opposite ideal-types point towards alternative pathways to innovation. Central planning in the Soviet Union is taken as the quintessential example of the former type given government’s strong control over both academic and industrial spheres. It is specified that “translated into science and technology policy, the statist model is characterized by specialized basic and applied research institutes, including sectoral units for particular industries”, while “[universities] are largely teaching institutions, distant from industry” (Etzkowitz 2008: 13-14).

²17 online semi-structured interviews were conducted in total. This does not include follow-ups with the same interviewees. Names are not disclosed for confidentiality reasons. All interviews took place during the first semester of 2021.

To what extent does post-Soviet Russia still reflect a traditional statist regime? Even more importantly for the sake of this article, how does the country perform in TH cooperation? The consensus is that the lack of synergy is the rule rather than the exception: differentiation still outweighs integration between education and entrepreneurship. In comparative perspective, Russia appears to be trailing well behind OECD and BRICS countries (Pavlova & Burenina 2016). Although effectiveness metrics are difficult to define, it is quite clear that the poor record stems from aged-old institutional gaps and suffers from low civil society involvement. This owes much to the institutional fragmentation inherited from the past, which has created little scope for collaboration between autonomous and isolated sectors (Perevodchikov & Uvarov 2012). A culture of trust does not take roots overnight, after all. Furthermore, the knowledge transfer from research to industry has always been one of the weakest aspects of the country's science and technology system (Williams and Kluev 2014). Caught between the remains of the command economy and the newly introduced market mechanisms, the transitional post-Soviet Russia lacked favourable preconditions for TH interactions to grow (Perepechko & Belyakova 2018). However, it is worth noting that China (a former communist country of comparable size and imbued with an equally strong statist tradition) has been far more successful in facilitating or fostering TH initiatives (Balzer & Askonas 2016). Therefore, Russia's delay may be well ascribed to different reasons, such as an incentive structure encouraging government officials to adopt predatory behaviour, with financial resources being allocated based on political loyalty (*ibidem*).

This notwithstanding, the Russian government took active steps to promote innovation through the reorganization of higher education. A new university taxonomy was introduced (Pavlova & Burenina 2016), and institutional change was paralleled by the re-allocation of state funding. The creation of an elite group of universities, endowed with more sustained financial support, was arguably the most significant change (Block & Khvatova 2017). Science and technology parks, innovation centres (such as the Skolkovo Institute in Moscow), and regional clusters were also established (Sosnovskikh 2017). After oscillating between a neoliberal market model and an institutional support model, the funding approach switched towards the latter with an emphasis on elite institutions (Forrat 2016). Three years after the launch of the "flagship universities" program, most of the selected universities engaged local enterprises and strengthened their position as economic hubs for regional development (Ovchinnikova & al. 2018). Despite the policy effort, the laborious transition from the Soviet-style higher education system is still in the early stages and is beset by a number of obstacles: declining quality standards, path-dependencies, uneven funding, poor internationalization, aversion to a business-oriented attitude, outmoded institutional frameworks, and mismanagement (Klochikhin 2012; Perevodchikov & Uvarov 2012; Balzer & Askonas 2016), to name a few. Consequently, university-industry interaction has predominantly taken the conventional form of jointly developed educational programs and vocational trainings. Albeit to a lower extent, R&D contracts are also common. In contrast, attempts at creating regional innovation systems have been rare and piecemeal. Flagship universities predominantly opted for direct cooperation with the industry rather than trilateral coordination mechanisms involving regional institutions (Ovchinnikova & al. 2018).

Our study fits into this broad context by focusing on university-industry linkages inside the beating heart of Russia's resource-rich economy. While most analyses on the politics of oil and gas in the country share a government-centric perspective, we decided to focus on the agency of technical universities to see whether these act as initiators of TH synergies within what is conventionally understood as an overcentralised economic sector. The next section illustrates some exploratory findings through the comparison of two key academic institutions in Western Siberia. In so doing, we applied the metrics already systematized by Pavlova and Burenina (2016) to assess cooperation with industrial partners.

5. A Comparison between University-Industry Models of Cooperation

Established in 1963 as the Industrial Institute of Tyumen to help remedy the shortage of petroleum engineers for the development of oilfields in Western Siberia, IUT has historically been at the service of the industry through the provision of a skilled labour force. During the 1960s the city of Tyumen was quickly transformed into a gateway and a transfer hub for oil and gas production in the northern Khanty-Mansi and Yamal-Nenets autonomous okrugs, where the bulk of hydrocarbon reserves are located. The industrialisation of the Tyumen region was based on relations between the federal centre and operators in the upstream sector; even nowadays “all other areas of regional development, including science or education, are held in a subordinate position” (Rudenko & al 2017: 97). As a consequence, the training of specialists is the proud boast of IUT, which was reorganised as such in 1994 when the abrupt transition to the market economy deprived industrial institutes of state financing (Ivanchev 1998). In 2015 IUT was granted the status of flagship university, along with other 10 institutions across Russia, setting in motion the new industrialisation wave announced by President Putin in May 2012 (Andrianova & al. 2017). Eventually renamed in 2016 with its current name, IUT consequently adapted its strategic mission from the training-oriented industrial institute of the early days to that of a more corporate-oriented university, which would continue backing the resource-based regional economy and foster the modernisation of the industrial base. Yet, that transformation has been slow in coming. Despite strong ties with companies, IUT still clings to a traditional educational model, albeit with lower returns than in the past as it has lost ground to other universities in terms of graduates’ employment rate in the regional industry (Skolkovo 2019).

The importance of collaboration with industrial partners clearly emerged in our interviews with research and administrative staff, and was recognised as pivotal by both. The IUT has long-term agreements with all major operators in Western Siberia such as Gazprom (of which it is a flagship partner), Gazprom Neft, Transneft, Rosneft, LUKoil, Surgutneftegas, Sibur, and others. The university also partners with international services companies such as Halliburton, Schlumberger, Weatherford, Baker Hughes, and KCA Deutag Drilling. Despite having their own advanced analytical facilities, industrial partners frequently outsource data analysis to IUT laboratories. This allows companies to reduce the amount of data they need to process and not employ resident researchers, thus freeing up resources for production processes. Regular meetings at conferences, job fairs, and other networking events act as the glue to keep communication open. Personal connections between professors and managers are equally critical to laying the groundwork for joint projects.

However, our interviews also revealed several points of friction. A former assistant director told us that industry partners often complained about the quality of education because curricula and courses are not updated to reflect the latest developments and pressing challenges of the oil and gas business. This is a quite common observation raised by oil and gas companies with respect to Russian universities. Confrontation between basic science and applied research was a recurrent theme in our talks. According to what we gathered from our sources, the gap has worsened in recent years because of the digitalisation of the industry, which was not accompanied by any corresponding shift towards digital technologies in academia. As universities lag in upgrading their educational model, the graduate talent pool has proved to be less competitive than what it used to be. On the other hand, IUT management showed discontent with the companies’ short-termism, as well as their reluctance to share know-how. Regarding the latter, the secrecy surrounding upstream activities weighs on cooperation with universities given that the most strategic projects are off the table.

The TPU was faster to adapt to changing conditions and move completely towards an entrepreneurial model. Originally founded in 1896 as Tomsk Technological Institute to give impetus to the extraction and processing of raw materials in the Siberian resource frontier, it is the oldest technical university beyond the Urals. The institute established itself not only as a source of industrial manpower, but even more as an engine of

technological innovation for the industry. A National Research University since 2009, the TPU has climbed national and international quality rankings and is known for its contribution to several research fields. With respect to similar higher education institutions in the country, TPU has put greater effort into the integration of research, education, and training. This synergic approach bore fruit. Along with the Novosibirsk State University, TPU was one of the first academic institutions fusing advanced engineering with entrepreneurship. This includes the oil and gas sector, within which the university has struck agreements with major companies such as Gazprom, Rosneft, Transneft, Surgutneftegaz, Gazprom Neft, and others.

A department director explained that after the breakup of the Soviet Union, at the time of the large privatisation that restructured the petroleum industry, TPU began attracting the best graduates from all over the country. That cadre of young professionals, later hired by oil and gas companies, has maintained a strong connection with the university. The mature partnership with Gazprom Neft, for instance, grew upon an informal basis. It began with some consulting, then expanded into a small pilot project, and eventually led to larger joint ventures. TPU is now part and parcel of Gazprom Neft's research strategy. This was confirmed by managers of the Science and Technology Centre, the company's in-house research institute through which joint research initiatives with universities are being made. Whereas the narrow specialization of technical institutions such as IUT reduces the scope of joint initiatives to engineering and the optimisation of existing technologies, universities modelled on liberal arts education and with a broader range of curricula facilitate spillover opportunities from various fields that can be translated into cutting-edge research and breakthrough methodologies. Although TPU remains a technical university, in recent years the university has distinguished itself by innovating its mission to accommodate the industry's ever-changing needs.

As with IUT, insufficient public funding solicited the adoption of a business-oriented approach, but TPU exhibits a more pronounced entrepreneurial stance by engaging industrial firms as stakeholders: "We started working as if we were a business partner, not a scientific advisor". From this perspective, engineering education and technology entrepreneurship are seen as inseparable, as evidenced by the high number of start-ups and spin-offs. If we look at numbers, TPU is the first university in the region in terms of vocational training programs, participation in conferences and exhibitions, value of contracts, small innovative companies, licensing agreements, and technology platforms, while its innovative belt (i.e. the number of companies established by the university or with which the university signed contracts in the area of science and technology) is second only to the Tomsk State University of Control Systems and Radioelectronics' one (Pavlova & Burenina 2016).

Table 1 summarises the range of activities that IUT and TPU have undertaken with oil and gas companies. The checklist is based upon a survey that administrators compiled and later discussed through a series of follow-up interviews. The comparison shows that there are no differences between the two universities in education and research areas. On the contrary, whereas IUT's entrepreneurial initiatives are limited to consulting only, TPU has been teaming up with industrial partners much more extensively in several other activities, encompassing pilot production and participation into clusters and technology platforms. In addition, small businesses and joint ventures are in their start-up phase. Besides what is there and what is not on the list, TPU's emphasis on winning new contracts signals the development of a business-like culture and an attendant operational model that is the closest to the idea of an entrepreneurial university.

Table 1 - University-Industry Cooperation by Institutional Function and Activity

Area	Activities	IUT	TPU
EDUCATION	Joint educational programs or courses	✓	✓
	Positions for university staff in business		
	Positions for industry staff in university	✓	✓
	Student internships in companies	✓	✓
	Mentoring and tutoring	✓	✓
	Training for companies' staff	✓	✓
	Scholarships funded by companies	✓	✓
RESEARCH	Scientific publications	✓	✓
	Exploiting universities' labs and facilities	✓	✓
	Joint research projects	✓	✓
	Professional communication exchange	✓	✓
ENTREPRENEURSHIP	Consulting	✓	✓
	Small business creation and joint ventures		✓*
	Licensing		
	Pilot production		✓
	Interaction within clusters		✓

Source: Elaborated by the authors. Notes: (*) currently in their start-up phase

This difference in approach also reflects the type of funding. Albeit state-owned, national research universities such as TPU are transitioning to an autonomous status that allows greater freedom to make investments, conclude contracts, and define pay scales (Block & Khvatova 2017). In a nutshell, greater freedom to operate according to a market logic. The cost of autonomy is obviously greater financial responsibility since autonomous universities are required to self-finance non-core activities through the commercialisation of R&D. Therefore, only the universities capable to generate revenue through entrepreneurial activities will maintain such status and be competitive in an open market. Given decreasing state expenditure on higher education, this far-reaching policy process inspired by the capitalisation of knowledge will most likely drive a wedge between elite universities and non-elite ones.

6. Conclusions

The main purpose of this work was to investigate university-industry cooperation in Russia's oil and gas sector through the comparison of two specialised universities in Western Siberia, which has long been the country's resource base. Our results indicate that two alternative models can be observed: IUT's training-oriented model, which is very much in line with the tradition of industrial institutes, and TPU's entrepreneurial model, which took up opportunities and challenges of the free market economy by integrating a business logic into the research agenda. There is no doubt that the latter is most approximate to the TH theory. However, the two approaches are equally shaped along historical trajectories, as both were largely influenced by the "pull of the past" (Gustafson 2012) and the different policy environments within which universities are embedded. For instance, it needs to be remembered that the largest fields in the Western Siberian petroleum basin are found within the Tyumen Oblast. As said, those deposits drove the country's economic recovery in the post-Soviet period contributing to the lion's share of total energy production. As capital of a major producing region,

Tyumen houses local headquarters and offices of big players in the industry, including leading international firms such as Schlumberger. The history of IUT is therefore tied to the training of a qualified workforce for the local industry, and agreements with industrial partners continue to be a preferential channel for personnel recruitment. In comparison, oil and gas production in Tomsk Oblast is small and has been in rapid decline. Therefore, TPU chose to be at the forefront of applied research, creating an environment for university-entrepreneurial initiatives to flourish nationwide. Interviews with the representatives of Gazprom Neft's STC confirmed that this distinction is perceived by the company itself.

Our look at university-industry relations does not claim to be exhaustive, but a few general considerations can be made. In the first place, our assessment paints a more nuanced and contextualised picture of oil and gas governance. Previous research on post-Soviet Russia has explored the intricacies of energy politics from multiple perspectives: the Putinist vision of an “energy superpower” reclaiming its past imperial status (Rutland 2008, 2015; Bouzarovski & Bassin 2011), the tense geopolitical relations with the European Union and neighbours (Kratohvil & Tichý 2013; Kuzemko 2014), the resurgence of state ownership after the large-scale privatisation of the 1990s (Hanson 2009; Domain & Stone 2010; Gustafson 2012), the role of oligarchs amid co-optation by and confrontation with political elites (Fortescue 2006), and climate change (Tynkkynen 2019). The thread connecting all these works is the depiction of a unitary rentier state under strict control of the federal government. This is an oversimplification. Beyond appearances, oil and gas governance is rather composite and multifaceted. As reminded by Rutland, “there is not one Russia, but 85 Russias, with each region having its own distinctive political microclimate” (2015: 77). After the end of the Soviet Union, the reconfiguration of the petroleum industry followed different pathways depending on local histories, identity politics, strategies of corporate projection, and centre-periphery relations. The contours of university-industry relations allow us to see regional differences in how energy, political power, and institutional change are linked to one another. From this viewpoint, we found evidence that technical universities in Western Siberia stand out as relevant innovation actors within a dense milieu of relations, and that cooperation with industrial partners is influenced by organizational culture and funding strategies. This finding tends to refute the notion that universities are passive purveyors of knowledge and organizations that are slow to change.

One question we had at the beginning was about the universities' degree of autonomy from both government control and corporate influence. We had expected that regional governments would take the lead in developing trilateral synergies on the heels of a time-honoured statist tradition. In contrast, IUT and TPU management agreed that regional authorities play a very marginal role in forging agreements with universities and industrial partners, only providing basic administrative support or acting as a moderator with the federal level. Whilst companies and universities kick-start cooperation schemes, regional governments play a facilitating role without imparting political direction and in most cases not even participating with any financial contribution. Given greater concern about falling production, institutions in Tomsk are seemingly more involved in three-sided projects than counterparts in Tyumen, but this remains at the initiative of academic and/or commercial parties. In other words, it appears that bilateral university-industry cooperation has greater depth than trilateral configurations involving regional administrations, which are loosely coordinated instead. This was unexpected given the vertical organization of power in the country. This is not to say that the top-down dimension is absent or irrelevant but suggests rethinking verticality in a way that accounts for horizontal processes based on economic interests. A senior researcher told us that Gazprom “is the real power holder” in the northernmost Yamalo-Nenets Autonomous Okrug, whereas local institutions are summoned and instructed by the state-owned company about what needs to be done. Based on the data collected, we cannot substantiate this point further. However, the fact that a similar form of corporate domination cannot be found neither in Tyumen, nor in Tomsk suggests broader public engagement and a more inclusive and multi-layered policy making process.

In this sense, the present study introduces a framework for future work on the interplay between political, economic, and academic elites in extractive localities.

Despite a low level of TH interactions, our assessment of bilateral university-industry relations highlights the strong connection of both universities to the extractive economy of their regions. Such “regional engagement” (Chatterton & Goddard 2000) bears witness to the importance of the territorial dimension in understanding the contribution of higher education institutions to innovation policies and economic development. As masterfully explained by Rogers (2016), the (re)making of oil regions is filled with mentalities rooted in the Soviet past and is now confronted by the tumultuous integration in the global economy. Peripheral to Moscow and St. Petersburg, where national innovation systems and financial flows are concentrated, IUT and TPU have reshaped their missions to meet local needs and adapt to reforms, albeit in a different manner.

The petroleum industry itself is also on the move, though encumbered by structural inefficiencies and historical lack of investments. In a climate of heightened uncertainty and low oil prices, international sanctions have restricted access to foreign capital and high-tech equipment that would be sorely needed for deep water exploration in the Arctic and the exploitation of shale oil formations. The depletion of mature reservoirs and the consequent shift to unconventional fields in northern and eastern regions dictate Russian companies to develop new extraction technologies, but lack of expertise in these very areas casts a shadow over the replacement of production declines (Mitrova 2016). This makes the knowledge transfer from national universities and its implementation along the oil supply chain of utmost importance. If that was already a concern before, it is so even more after Russia’s military aggression against Ukraine because of which British Petroleum exited its 19.75% shareholding in Rosneft and was soon followed by other foreign oil and gas companies (such as Shell, Equinor, ExxonMobil, and Total) that left the country despite significant investments and stakes. In this light, the way university-industry relations are being reorganized, in the context of rising international tensions and within the fragmented landscape of regional contexts will likely say a lot about the future of the energy superpower.

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