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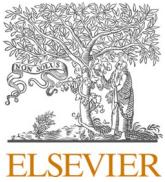
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Win-win strategies for firms operating in resource-abundant countries: Technological spillovers and a collaborative diversification policy[☆]

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ABSTRACT

This paper responds to the growing need to be aware of the opportunities presented by technology spillovers resulting from value co-creation supported by diversification policies in resource-abundant host countries. It examines the effects of such a policy on both the local market strategies of multinational enterprises (MNEs) and on technological upgrades of local companies, where such policies require international oil and gas companies to build linkages to induce spillover. We argue that the effects of the policy with regard to spillovers can depend on the actors' approach to collaboration. To suggest a theoretical foundation for such a collaborative approach, we integrate the value co-creation perspective with the concept of spillovers. The resulting approach is based on win-win strategies: the internationalization of the resource sector, and a shift towards the provision of service-based economy aid in an attempt to develop opportunities for sustainable operations on the part of multinationals in resource-abundant host countries. The development of local capabilities resulting from technological spillovers can enable local businesses to have access to international expertise in technology, create strategic opportunities and introduce long-term benefits for both local and international companies. This study adopts an abductive method as the basis for logical reasoning, employing an analysis of multilevel longitudinal case studies based on interviews with experts and multiple sources of industry documentation.

1. Introduction

"The purpose of institutions is to define the rules by which the game of upgrading competitiveness and attracting foreign direct investments is played, monitored, and enforced. But the objective of the players (the organizations) is to use the institutions in a way which will win the game" (Dunning, 2004).

This paper responds to the growing need to understand how the host-country institutional environment affects the activities of MNEs in resource-abundant host countries in relation to diversifying those countries' industrial structures. Economic diversification involves transitioning away from dependence on one or a few commodities, such as crude oil, minerals, and agricultural products towards a broader range

of new non-natural resource sectors (Usman and Landry, 2021). Nowadays, diversification commonly consists of the transformation of traditional business sectors into digital ones. This involves the creation of virtual products and values respectively, transforming the country from an oil-driven to a data-driven digital and knowledge economy (Ambalov and Heim, 2020; Antwi-Boateng and Al Jaberi, 2022). The World Bank Group describes economic diversification as encompassing two related dimensions of diversification: (i) trade diversification, i.e., exporting new or better products or to new markets) and (ii) domestic production diversification, i.e., cross-sectoral rebalancing of output, driving the reallocation of resources across industries and within industries between firms to increase total factor productivity (Brenton et al., 2019). This paper is looking at the policy to promote domestic

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Table 1

Stakeholders affected by diversification policy in the oil and gas cluster in Kazakhstan.

Actor	Number of interviews	Interest	Type	Activity
1. Major projects operators and major international oil and gas companies	2	Gain rent, costs savings	Market	Develop local industrial capabilities and social infrastructure; formulate requirements related to goods, services and technology; provide information on their procedures, registration and supplier's database, pre-qualification of suppliers, and tender requirements
2. Local engineering, constructors and service providers	7	Access to the world technology	Market	Take part in partnerships with international companies; upgrade their technological and managerial expertise; need foreign equipment, technology, striving to become more competitive; require more collaborative approaches
3. Foreign engineering, constructors and service providers	4	Gain projects, costs saving	Market	Perform design and engineering work on complex production facilities
4. Educational and research institutions	4	Expanding research	Social/Market	Take part in projects, collaborate with exMNEs on technological development
5. Institutions of collaboration (associations, chambers, unions)	1	To implement the mandate from associate groups	Social/Market	Represent the interests of local industry
6. State-owned enterprises	5	Implementation of local content policy	Political/Market	Take part in partnership with international companies; upgrade their technological and managerial expertise
7. Development agencies	1	To attract investment	Political	Take part in development projects; distribute financial resources; analyze information
8. Governments	–	Implementation of local content policy	Political	Take part in development projects; provide financial resources
9. Citizens	–	Personal economic improvement	Social/Market	Benefit from new jobs and knowledge transfer

production diversification as implemented by the Government of Kazakhstan in the oil and gas (O&G) and information and communication technology (ICT) industries and, more specifically, the policy to create linkages through procurement from domestic companies broadly enacted by the national *Law On Subsoil and Subsoil Use*, together with other related legal acts, and promoted through government agencies such as the National Agency for Local Content Development (NADLOC) and, more recently, - the Kazakhstan Industry and Export Center (KazIndustry).¹ The high concentration of foreign investors in the O&G sector in Kazakhstan such as U.S.- based Chevron and ExxonMobil, and European firms such as BG Group, Royal Dutch Shell (UK- Netherlands), Total (France) and Eni (Italy), as well as Russian Lukoil and Chinese CNPC, is evidence of the significant proportion of the industry controlled by MNEs (Orazgaliyev, 2018).

The new industries/firms resulting from the new policy can arise 1) within the oil and gas value chains, resulting in vertical or related diversification and 2) in new sectors, resulting in horizontal or unrelated diversification (International Monetary Fund, 2016; Lebdou and Chang, 2020). Numerous authors have suggested that vertical integration is the best avenue for diversification in resource-abundant countries (Bond and Fajgenbaum, 2014; Maloney et al., 2002; Morris et al., 2012; Ovadia, 2016). In particular, it is suggested that in resource-abundant countries such as Kazakhstan, industries could rise within the sectors representing a country's comparative advantages, i.e., the resource extractive sector, agricultural, and transportation sectors (Howie, 2018). The argument is that while it is extremely complex to diversify into unrelated industries, for example, the pharmaceutical industry when specializing in aerospace, it is more feasible to diversify into trucks when specializing in motorbikes since these activities are related (Xiao et al., 2018; Neffke et al., 2018). In addition, for emerging countries like Kazakhstan, it can be too ambitious to aim to diversify into industries with too great a distance between the new and the existing industries' underlying capability bases.

Therefore, this research looks at both the diversification into the related oilfield services and the unrelated information and communication (ICT) industries. In particular, this paper examines the creation of

the ICT service industry initially to serve the O&G industry, and subsequently its branching out as a separate sector. Following the definition of diversification suggested by Usman and Landry (2021) and empirical research undertaken by Antwi-Boateng and Al Jaberi (2022), the development of a suggested digital and knowledge economy is a relevant direction for economic diversification in resource-rich countries. Consequently, the ICT industry represents diversification in the form of the new sector. For example, in Kazakhstan, starting from zero in 2000s, the volume of ICT services accounted for 2.7 billion USD in 2018 (Bureau of National Statistics of Kazakhstan, n/d). As we demonstrate, the ICT industry in Kazakhstan evolved due to the adoption of a diversification policy by companies in the O&G industry and related MNC companies through the creation of linkages and spillovers. We also demonstrate that value co-creation played an important role in the development of the ICT industry. Specifically, we explore which opportunities in resource-abundant countries are presented by linkages and technology spillovers resulting from value co-creation supported by diversification policies.²

In emerging countries, the debate on MNEs and local development has focused on economic issues, often in the form of *linkages and spillovers*, in relation to foreign investments (Kolk, 2016). Linkages refer to the relationships created by foreign companies with local companies and other actors and sectors, such as other companies, as well as academic and research institutions. Policies aiming at linkages development

¹ More information about the government agencies can be found from here: <https://qazindustry.gov.kz/en/about> and <https://strategy2050.kz/en/news/52195/>.

² Diversification policy is a specific host-country policy, which is applied in resource-abundant countries with the aim of creating industries other than focusing on primary extractive industries and the creation of new jobs. In Kazakhstan, the term is applied to several industries, including the O&G and the ICT industries (Ambalov and Heim, 2020). It is a complex construct, often with blurred boundaries, both explicit and implicit, which includes a matrix of different policy tools, such as public procurement requirements, including those relating to procuring some degree of goods and services produced locally, special economic zones, support for innovations, education, financial support for SMEs, local employment requirements, public R&D investment, individual companies' corporate policies, etc. (see Figure 1.3 in Baldakov and Heim, 2020). However, the main feature of diversification policies in emerging countries is that they are based on the transformation of foreign capital into local advantages through the value co-creation mechanism. The focus in this research will be on building linkages and spillovers between domestic and international O&G companies.

enable increased interaction between local and international companies or sectors of the economy. Spillovers represent a dynamic and reciprocal process with knowledge flowing between and among foreign and domestic firms (Li et al., 2013). In resource-rich countries, linkages are used as one of the instruments of the diversification policy (Bastida, 2014; Venables, 2016; Lebdioui, 2019). The effects of such policies in countries with abundant natural resources on foreign direct investment (FDI) spillovers are a subject of research in this study.

Previous researchers have examined the role of contingencies (other than policy) that enable local companies to better benefit from linkages with MNEs and the spillovers which can result from their presence. Scholars have investigated the development of local absorptive capacity, including domestic firms' technological productivity³ and investments in research and development and in human capital (Cohen and Levinthal, 1990; Liu et al., 2000; Narula, 2004; Wei and Liu, 2006; Singh, 2007; Liu et al., 2009; Zhang et al., 2010; Zanfei, 2012), the role of the country of origin of MNEs (Buckley et al., 2007), as well as non-technological constraints such as limited access to finance (Agarwal et al., 2014; Eapen et al., 2019), or supplier-customer embeddedness (Meyer, 2004; McDermott and Corredoir, 2010). The literature also recognizes that institutional environments in host countries play a fundamental role in shaping MNEs' strategies and behavior. However, such studies have focused mainly on how institutional environment affect MNEs themselves (e.g., Peng et al., 2008; Arregle et al., 2016).

However, the question of how institutions – and specifically domestic policies – affect host-country firms' ability to improve their capabilities resulting from FDI technological spillovers, remains largely unexplored, except for recent studies, for example, a study on the effects of special economic zones (e.g., Frick and Rodriguez-Pose, 2019), which examined the limited effect of individual policies. A recent review of the literature revealed that the issues related to the role of MNEs in terms of diversification are sparingly addressed by researchers (Fu et al., 2021). However, with decreasing regulation and increasing internationalization, as well as the wider adoption of digital technologies significantly impacting the O&G industry (Perrons and McAuley, 2015), studies on the natural resource sector are becoming increasingly important. This is why several questions regarding policies in O&G industries still need to be addressed, and in particular need to focus on the research question considered in this study. The question of how MNEs grapple with the challenges involved in complying with policies in resource-abundant countries while remaining competitive, becomes particularly relevant in these settings (Ngoasong, 2014). Given this research gap, we are attempting to answer the following research questions: how can value co-creation between MNE in extractive industry and local companies leads to ICT technological upgrade and local development through diversification? What is the role of diversification policy in such as context?

This research thus also responds to the broader call for developing a strategic view of the activities of MNEs in emerging countries in possession of natural resources (Hansen, 2017). From the theoretical perspective, we achieve this by integrating the strategic marketing perspective with regard to services (Vargo and Lusch, 2004; Vargo and Lusch, 2008; Gummesson and Mele, 2010; Vargo and Lusch, 2011; Aarikka-Stenroos & Jaakkola, 2012; Jaakkola & Hakanen, 2013; Vargo and Lusch, 2016; Vargo and Lusch, 2017) with the theory of FDI-generated spillovers. Methodologically, we adopt abductive reasoning which comprises both deductive and inductive elements. That allows us to produce new theoretical concepts to propose future policy practices. To suggest possible answers to the research questions, we develop propositions by integrating a preliminary theoretical framework and longitudinal multi-level case studies. Geographically, the research is conducted in relation to Kazakhstan, thus offering rich insights into the effects of the diversification policy on FDI spillovers, since

the O&G sector in this country has attracted significant FDI (e.g., Kalyuzhnova et al., 2016; Heim et al., 2019). Investigations into transition countries so far have tended to be limited. Consequently, theory in this field also stands to benefit from testing a new geographical, economic, and legal context.

Overall, this article makes contributions in two ways. First, this paper provides new insights into the strategic responses of MNEs and local companies and the effects of diversification policy on spillovers contributing to the management and economics fields concerning the role of MNEs in economic development. However, the second contribution is to propose two theoretical propositions⁴ which suggest that 1) to be effective, diversification policy has to support collaboration and value co-creation, and 2) local ICT technological capacity can be built through a digital transformation based on value co-creation between actors in the O&G industry network. We suggest a conceptual model explaining the effects of the proposed policy on service technological spillover.

Although our findings are related to Kazakhstan, our conclusions conservatively apply to other resource-abundant countries in that the researcher and the practitioner involved are confident that there is sufficient similarity in terms of relevant conditions between the two countries. The practical recommendations in this study suggest that a collaborative policy approach to local and international stakeholders could prove more effective than policies requiring MNEs to procure some level of locally-produced inputs. We also suggest that the integration of ICT technologies into key industries benefitting from a local comparative advantage could be a way of pursuing industry diversification in economies with a high concentration of specific industries. Therefore, the novelty of this paper is that it studies the adoption of the value-co-creation view, as well as examining the effects of diversification policy on FDI spillovers in countries with abundant natural resources, an aspect which has not been systematically studied prior to this research. Other countries such as Malaysia have accumulated internationally competitive local capabilities in upstream activities of the O&G sector, largely as a result of aggressive targeted industrial policies that allow local suppliers to accumulate skills and production experience through "learning by doing" (Lebdioui, 2019). However, the industrial policy of countries like Malaysia does not take into account the ongoing digitalization of the O&G industry. Rather, most are focused on the oilfield service industry and consequently, have not led to a significant degree of diversification. Therefore, the evidence from Kazakhstan will be of interest for resource-abundant countries pursuing such a strategy.

2. Economic diversification in resource-abundant countries

Since the interest of our research is the strategy of organizations in response to environmental changes, this section discusses the diversification policy in resource-abundant economies, and more specifically, in the O&G industry⁵ in Kazakhstan. In the economic and political economy literature, researchers have developed explanations for why resource-abundant countries choose a policy to regulate the macroeconomic structure of the economy, while microeconomic-policy perspectives are virtually absent (Hansen, 2017). The previous literature highlights the profound macroeconomic effect FDI on the economy of a host country (Oetzel and Doh, 2009), including the crowding-out effects of FDI on the productivity of local firms (Aitken and Harrison, 1999;

⁴ Theoretical propositions are "statements concerned with the relationships among concepts" (Zikmund et al., 2009:42).

⁵ MNEs from O&G industries operate in enclaves around natural resource reserves. These agglomerations are called clusters, ecosystems, or networks, depending on the research field. In this research, the term "networks" is used for describing links between MNEs, local SMEs, and other actors.

³ Increasing productivity through technology adoption.

Greenwald & Stiglitz, 2006; Chang and Xu, 2008), wage inequality (Doh, 2019; Narula, 2019), or the fact that MNEs in O&G industries⁶ may have minimal interest in providing advanced training to their staff (Ovadia, 2016). At the same time, the sectoral structure of the FDI inflows into Kazakhstan was found to be a possible factor economy's diversification (Nauryzbayeva, 2012). Research also highlights that host countries with natural resources tend to implement policies supporting domestic development and diversification in new industries (Tordo et al., 2013). Some recent literature has also focused on MNEs as engines for sustainable development⁷ based on diversification from the O&G sector (Shapiro et al., 2018; Narula, 2018) but has not studied the effects of such a policy. However, researchers have demonstrated that such policies may have significant effects and may force multinationals to form a strategy complementary to the economic goals of the host country, especially if they contribute to sustainable development (Lubinski and Wadhwan, 2020). In resource-abundant host countries, sustainable development with regards to the extractive industry is understood to operate as follows: the depletion of natural capital can be replaced with an increase in other forms of capital, i.e., economic and social (Mutti et al., 2012). Therefore, the sustainable operations of MNEs in resource-abundant host countries can be viewed as a contribution to the development of economic and social capital in these countries.

Countries need specific capabilities when it comes to producing new products (Freire, 2019). For example, to develop an ICT product, they would require relevant technological capabilities. The previous literature has demonstrated that firms' location in networks with MNEs provides advantages, but does not directly create technological capabilities (Camison and Villar-López, 2012). Different factors related to the co-presence of other firms and institutions may impact the participants (Pandit et al., 2018). These factors take the form of spillovers between participants, reduced costs, infrastructure development, and the external environment. The external environment consists of the global markets for the goods or services provided, the industrial policy regimes that comprise the regulatory environment (such as standards, trade restrictions, etc.) within which the network operates, as well as competitors and collaborators (Martin and Sunley, 2011). Therefore, understanding the effects of policy regimes on organizational networks is crucial to understanding how technology transfer is induced through spillovers.

Despite consensus on the need for diversification in countries with natural resources (e.g., Rodriguez and Sachs, 1999; Bruno et al., 2015), there is no consensus regarding the way forward (Joya, 2015). For example, Guriev et al. (2009) suggest that modern diversification policy at the microeconomic level (industry and organizations) aims to raise private returns on investments in physical and human capital in the form of intellectual property rights protection, contract enforcement, and financial regulation, as well as investments in education and infrastructure, and broad support for financial development. Notwithstanding, Howie (2018) suggests that the diversification policy at the micro-economic level should support the development of effective institutions to promote, facilitate, and regulate economic activity and investment, encourage licensing, FDI, or technology transfer in targeted sectors, as well as connect linkages between foreign and domestic firms, and impel private investment in innovation and skills development. Diversification is a long-term project and cannot be achieved from one year to the next: it is suggested that: resource rent be re-invested to simultaneously support both private and public investments undertaken in the creation of industries other than O&G extraction (Ari et al., 2019;

⁶ For the purpose of this paper, MNEs exclusively refer to international companies operating in the O&G industry.

⁷ This permits the extraction of resources in a as sustainable manner as it does not compromise the ability of future generations to meet their needs (i.e., what industry will be the cornerstone of the Kazakhstani economy in the future when the natural resources are exhausted).

Joya, 2015). This also highlights the increasing role of public-private cooperation between these actors to promote and regulate linkages between MNEs and local companies, governments, and other actors in the O&G industry (Katz and Pietrobelli, 2018).

Cooperation is not a new phenomenon, and the concept is one which has been studied in different disciplines (e.g. Salvato et al., 2017). However, at present, patterns of cooperation are changing in the new digital economy (Banalieva and Dhanaraj, 2019). So, for example, due to the advent of new digital technologies and industry expansion, mining firms, service and engineering subcontractors, public sector regulatory agencies and local communities all engage in the exploitation of the natural resources, and all play major roles in conditioning the long-term growth path of the O&G industry (Katz and Pietrobelli, 2018). With resource extraction gradually being tertiarized, both the primary and tertiary sectors have become increasingly integrated and interactive (Cheng, 2013). In Kazakhstan, services have been found to contribute significantly to petroleum sector inputs, as an average of 42% of the industry's intermediate expenditure is on services (Atakhanova, 2021). At the same time, the role of public actors in terms of such cooperation is increasing, resulting in multisector multi-stakeholder partnerships to manage natural resources (Gray and Purdy, 2018). In this context, cooperation is becoming a new phenomenon for both the O&G and service sectors, where regulation, rather than collaboration, has been playing the dominant role (Smarzynska-Javorcik and Wei, 2002). This new type of cooperation, in contrast to well-researched cooperative forms of governance (e.g., Beamish and Lupton, 2016), does not assume forbearance towards common goals or involve non-business actors. Different fields of research have provided explanations with regard to the cooperative approach. The economic literature, for example, suggests that collaborative techniques must be combined with penalties (Shapiro and Rabinowitz, 1997). Konyukhovskiy and Malova (2013) presented a game theory explanation of the mechanisms of collaborative relations between the parties involved in public and private partnerships but having independent goals. More recent economic literature suggests that economic change and innovations are collective actions characterized by a system of heterogeneous public and private actors (Jacobs and Mazzucato, 2016). The traditional strategic view of competitive advantage (Barney, 1995; Porter, 1985) however, offers little insight into the processes in which two or more actors are involved. The IB stream of research studied R&D collaboration, alliances, and spillovers in depth, but the issues related to the role of MNEs in diversification and, in particular, the research question in this study are sparingly addressed by the previous research (Fu et al., 2021). Recent studies have concluded that knowledge-intensive sub-sectors, such as the ICT sector feeding into the O&G industry, can also serve other sectors and neighboring countries, creating backward linkages and providing the potential for spillovers (Adewuyi and Oyejide, 2012). This means that the O&G sector can nurture the service sector. Backward linkages between a company and its suppliers are generally relatively labor-intensive, and thus are an attractive source of diversification (Kaplinsky et al., 2011). Governments may therefore actively target linkages in their policies in the hope that complementary development of the national system of innovation results in a competitive, diversified economy in the future (Morris et al., 2012). Acheampong et al. (2016) show that successful economic diversification in resource-abundant countries should focus on the development of linkages, identifying clear measurements in terms of benchmarks and the industrial-supply base. Olawuyi (2017) suggests that governments should adopt a more collaborative approach built on a clear, transparent, and attractive policy, with adequate institutional support for MNEs when it comes to achieving those goals. Olawuyi (2018) also proposed that diversification can be mainstreamed into investment policies and legislation to incentivize/mandate government agencies and other economic actors to acquire locally made technologies. The evolving literature lacks a framework aimed at understanding the effects of integrated diversification policy on linkages and spillovers. Such research is important, not only because it may provide

decision-makers with a better understanding of the strategic and operational trade-offs related to diversification, but also because it might inform policymakers about the strategies and interests of organizations, thus allowing them to design policies that are better aligned with the interests of companies. A pervasive absence of policies to encourage foreign-local collaboration may prevent potential technological and knowledge transfers to local companies, representing an important limitation in terms of the diffusion of knowledge spillovers (Osabutey et al., 2014).

3. Data collection and methods

The research into technology spillovers from foreign to domestic firms usually involves the use of quantitative methods (e.g., Zhang et al., 2010; Driffill and Love, 2007; Marin and Sasidharan, 2010; Eapen et al., 2019). However, as demonstrated by Eapen (2013), quantitative datasets of firms often miss the data on small local firms in the economy, making the results of these studies incomplete. He suggested that a case study approach is a good way to identify the determinants of technological spillovers to local companies. Our research can also be better understood by placing it in the mezzo-economic and the macro-context context: consequently, we have adopted the use of the extended case study (Burawoy, 2009; Geary and Aguzzoli, 2016). The sensitivity of qualitative research to context makes it meaningful to IB study in emerging markets (Teagarden et al., 2018; Fletcher et al., 2018; Plakoyiannaki et al., 2019). In this paper, we have adopted a multi-level case study design (Pauwels and Matthysse, 2004; Siggelkow, 2007). In doing so, three levels became apparent, including international and local companies (in Almaty, Aktau and the technology center of an MNE in Dubai), industry organizations and industry experts based in Almaty. We used a case study approach because it is an effective tool for industrial network research (Dubois and Gadde, 2002). Case studies can also be used for inductive theory building (Welch et al., 2011).

Our study is positioned in pragmatism as the ontological research paradigm and interpretivism as epistemology, and it is a phenomenon-based study. Hence, we have applied abductive reasoning to the use of interdisciplinary research methods (Doh, 2015; Buckley et al., 2017; Paavilainen-Mäntymäki et al., 2020). The choice of methodology was guided by the research problem: explaining a phenomenon that stand-alone theories were unable to address adequately (Buckley et al., 2017). Since there is a lack of theory explaining the phenomena under investigation, and, overall, because the effects of the policy are difficult to codify, pure deductive reasoning could not be applied in this study (Mitchell, 2018). In the absence of a well-developed theory, exploratory research and case study methods are helpful (Birkinshaw et al., 2011). On the other hand, the environment of each country implementing a particular policy is unique. Therefore, the theory cannot be developed based on a set of country-level case studies since it must take into consideration the specifics of the industry in which MNEs operate.

Many studies have stressed the critical importance of focusing research on networks versus single organizations in a different context (Powell et al., 1996; Dyer and Singh, 1998). With the rise of digitalization, networks have started playing a dual (and even more extensive) role as both a governance mode and as a strategic resource (Banalieva and Dhanaraj, 2019). In this paper, we focus on the diversification from the O&G industry into other sectors of the economy through building linkages between MNEs and the local sector, and on the generation of spillovers. We analyze the strategies of multiple stakeholders affected by such a policy, with a particular focus on technological spillovers from MNEs to local companies, since effects such as technology sourcing via reverse spillovers (Driffill et al., 2014) are not observed in resource-abundant countries, as MNEs are technologically superior to local companies in an industry such as O&G. Dyer and Nobeoka (2000) argued that a network of firms as a unit of analysis is appropriate for understanding inter-organizational collaboration. The collection of primary data on networks usually requires a good deal of labor-intensive

methods (to conduct historical case analyses and review reports in addition to the use of more common data collection methods such as surveys and interviews) compared with common data collection (Hammervoll, 2016). Therefore, the rigorous use of secondary data methodologies based on archival information obtained directly in the field from industry sources, such as companies and government agencies, is of great value in providing insights (Rabinovich and Cheon, 2011). This study is based on multiple sources of evidence: secondary data, including records, company and government documents such as reviews, press articles and releases, legislative acts, etc; and primary data, including 24 in-depth interviews with experts from the O&G sector and the ICT industry in Kazakhstan.⁸ The interviews are conducted with different actors (see Table 1), including representatives of local companies, MNEs, and the wider O&G industry. Additional sources of secondary data were collected from the academic literature on management and economic and political dynamics in the O&G industry dating back to the 1960s.

The interview guide was developed based on the study of previous theoretical knowledge and the real-life phenomenon of diversification policy in resource-abundant countries (see Fig. 1). In 2016 and 2017, face-to-face interviews were conducted by the first author in person or by Skype in Almaty (Kazakhstan), Dubai (UAE), and Reading (with O&G experts based in the UK). The interviewees were selected using a mixed purposeful sampling technique which included a combination of two methods: maximum variation sampling and snowballing (Patton, 2002; Buchanan, 2012). For example, snowball sampling was used to identify industry experts who are highly valued by different stakeholders, which facilitated the identification of new cases (Poulis et al., 2013). Since the population of such experts is limited and can be difficult to access without being introduced by someone from their network, we selected 10 experts from about 100 participants in the initial field visit – all attendees of the thematic workshop held in April 2016 by the research center at the University of Reading (UK) and hosted by our research partner, a top university in Kazakhstan. According to the principles of maximum variation sampling, we selected the most knowledgeable, available, and willing participants who were able to articulate their experience clearly. These experts represented different stakeholders forming a network of organizations in the O&G industry (Patton, 2002). The interviews were arranged with policymakers, people in business, industrial and research organizations, and academics. Business interviewees included top managers from MNEs and the national oil companies, both public and private. We linked stakeholders of different types of economic activities (market, social and political) so that each interviewee could add a unique perspective. Additional follow-up interviews were conducted via Skype upon returning from Kazakhstan to the UK. In the UK, we interviewed an O&G specialist who had worked in Kazakhstan. In 2017, an interview was also conducted with an employee of a subsidiary of the MNE in the UAE. CNPC Richfit, the state-owned Chinese National Petroleum Corporation (CNPC), built the first technological center in Kazakhstan and the second one – in Dubai Internet City. During the next two field visits to Kazakhstan in June and August 2017, the first author taught entrepreneurs in the O&G-rich regions of Atyrau and Almaty and had an opportunity to interview business leaders of several small local companies operating in the O&G industry. The replication in this study is provided by collecting data more than once (Cuervo-Cazurra et al., 2016). All interviews were open-ended, but always included a set of prepared general questions; however, the answers often stretched beyond the list of initial inquiries. When studying MNEs, we focused on the local market strategies of three major O&G consortia in Kazakhstan: Tengiz, Kashagan, and Karachaganak, which between

⁸ Unfortunately, the account provided in this article is extremely limited due to space constraints, but we are happy to make further details available for those who are interested. When a case or a quotation is provided for illustration of the framework, it means that further evidence is available.

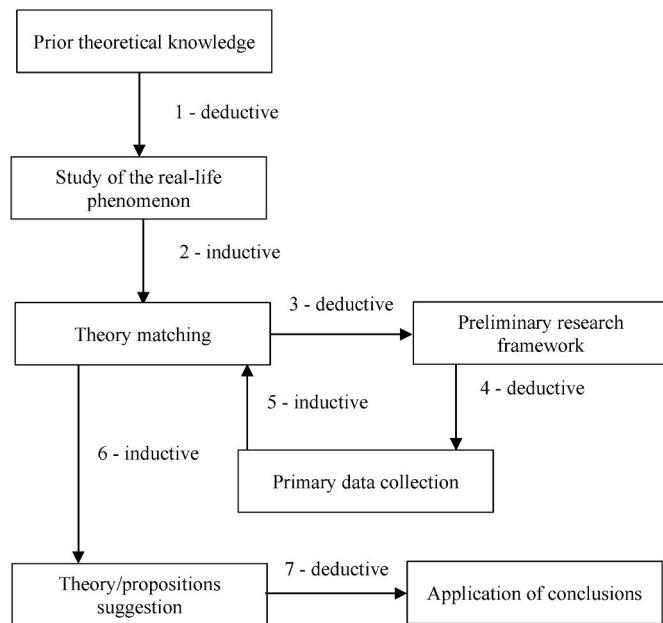


Fig. 1. Research methods.

them account for 65 percent of the market. The MNEs involved in these consortia include, for example, ENI (Italy), Total (France), Royal Dutch Shell (the UK and the Netherlands), INPEX (Japan), or CNPC (China). To take a broader perspective, we also interviewed experts and specialists representing industrial associations operating in the O&G industry, as well as experts from research and educational institutions. We shared the findings with policymakers from the Kazakh Centre for Industry and Exports or KazIndustry or QazIndustry⁹ (formerly the National Agency for Development of Local Content – NADLOC the founder of which is the Ministry of Industry and New Technologies of the Republic of Kazakhstan) and invited them to take part in the thematic workshop and produced a policy brief. Policymakers confirmed that research-informed measures from our research were adopted in the State Program of Industrial and Innovative Development of the Republic of Kazakhstan for 2020–2025.

The inductive primary data analysis adopted the three-step technique (Buchanan et al., 2007; Yin, 2009). The first step involved thematic category analysis, description, and formulation of constructs. The second step concerned building constructs that were more abstract and theory rich. The third step included generating propositions expressing causal patterns between attributes of the phenomenon and observed outcomes and suggesting links for further investigation (Zikmund et al., 2009; Buchanan, 2012). The structure of this paper reflects the steps in the abductive research process (see Fig. 1). Based on previous theoretical knowledge, it starts with the observation of a real-life phenomenon – in our case, the growing popularity of diversification policies among resource-abundant countries, the role of MNEs, and the purpose of relevant policies. The next step in the abductive process is theory matching. At this stage, we selected the value co-creation theory as appropriate for explaining how spillovers occur in the service-based economy in resource-abundant countries. The service management theory was selected because the major transactions in the O&G industry are becoming more service-related: digitalization of the core processes of drilling; service oil-field industry providing services to the petroleum exploration and extraction companies; oil pumping and transportation services comprising a major part of the oil extraction process (for more

details see Heim, 2019). Therefore, this research paper discusses the theory of spillovers and value co-creation. We then analyze case studies to corroborate our temporal theory and data to formulate plausible propositions. Finally, we provide recommendations for future research and practices.

4. Conceptual background

In this study, we simultaneously conducted fieldwork and developed a framework which enabled us to explain the effects of policy on the network of organizations. Parallel to the data collection, the search for theories complementary to the phenomenon, was ongoing, guided by the fact that the empirical observations and the existing theoretical frameworks did not match (Dubois and Gadde, 2002). Investigating theories that can be applied to the circumstances of the research questions at the mezzo-economic level has led to the selection of the following theories: the strategic marketing theory of value co-creation and the theory of FDI spillover from international business. A particularly useful theory that solved the problem of how to analyze the linkages between MNEs and local companies in the service economy was the theory of value co-creation (Vargo and Lusch, 2004; Vargo and Lusch, 2008; Gummesson and Mele, 2010; Vargo and Lusch, 2011; Aarikka-Stenroos & Jaakkola, 2012; Jaakkola & Hakanen, 2013; Vargo and Lusch, 2016; Vargo and Lusch, 2017). The single most important publication found during this process was “Institutions and axioms: an extension and update of service-dominant logic” (Vargo and Lusch, 2016). Concepts and models from this article contributed to a re-articulation of the research problem and the creation of a theoretical framework.

Based on these works, we propose that at the micro-economic levels, the effects of policy on technological spillovers can be defined in terms of the value co-creation theory suggesting that in a service-based economy, public policy modified to become more collaborative will lead to value co-creation (Vargo and Lusch, 2017). Previous literature suggests that linkages between companies will create technological spillovers (Dunning and Lundan, 2008; Eden, 2009; Kaplinsky et al., 2011; Heim et al., 2019): when ICT service companies are interacting with companies in the O&G sector, the spillover effect results from co-creation. Finally, technological upgrading will enable the long-term survival of local companies (Porter, 1985, 1990, 1998), resulting in innovations, as well as providing MNEs with a more stable local supply of both goods and services. This is relevant to the argument for the usefulness of the collaborative approach to technological development, enriching the conceptual discussion and the available evidence on networks, value co-creation, and spillovers, since technological upgrading based on collaboration is expected to improve the performance of companies. Therefore, we conclude that a collaborative diversification policy enables technological upgrades¹⁰ through spillovers, linking the actors in industrial networks in such a way as to provide a basis for value co-creation. The constructs of the framework will be discussed in detail in the next two subsections.

4.1. Value co-creation in networks

Economic diversification policy aims to support local businesses with access to international technological and managerial expertise in an attempt to increase competitiveness (Kalyuzhnova et al., 2016). In this respect, inter-organizational relationships and networks involving local and international companies are of paramount importance (Turkina and Van Assche, 2018). Different disciplines (economic geography – focus on

⁹ QAZAQSTAN – the name of the country after switching to the Latin alphabet.

¹⁰ Technological upgrades can be defined as the use of increasingly complex technologies in products and/or processes, and the development of the managerial and organizational capabilities needed to leverage those technologies optimally (Medcof, 2007).

location; international business – focus on MNEs; and organizational studies – focus on domestic firms) have contributed to understanding the nature of clusters and networks.¹¹ Porter (1990, 1998) emphasized their importance in achieving industrial competitiveness. Clusters and networks have also been associated with the knowledge economy, innovativeness, and economic development. For example, Norton (2001) argued that economic growth results from the development of innovative agglomerations. Technological spillover effects are also associated with activities with regard to which a large number of participants can be involved (Leibowitz and Margolis, 1994). MNEs are often located near other companies in the same industry, creating an industrial cluster or from the same country of origin, creating a country-of-origin agglomeration (Chang and Park, 2005; Nachum and Wymbs, 2005). The classification of clusters reflects the specific geographical-industrial structure of the national economy (Spencer et al., 2010). Some clusters consist primarily of small and medium-sized firms – e.g., Italian footwear clusters – while others contain both small and large firms – e.g., German chemical clusters (Breschi and Malerba, 2005). There are university-centric clusters and clusters with no university connections, as well as clusters of traditional industries or high-technology industries (Martin and Sunley, 2003). As discussed above, there is a gap in the literature in terms of understanding networks when explaining the effects of policy on how MNEs interact, and how it affects local companies in both primary and tertiary sectors of the economy in O&G industry clusters located in the regions near oilfields.

In this sense, O&G industries provide examples of both clusters and networks, often at the same time. In this research, we acknowledge that companies in the O&G industry are part of a network and part of clusters with a complex structure, but we focus on MNEs and local companies' interactions as part of these networks. The theory of value co-creation suggests that "value creation usually requires resources beyond a two-party system, often involving a firm, its customers, suppliers, employees, stockholders, and other network partners" (Vargo et al., 2008, p.149). As such, the value co-creation paradigm is proposed to theoretically ground diversification policy by referring to the concept of spillovers extended here in a new way that integrates it with the theory of value co-creation. The value co-creation theory emerged from the service management field of research, innovation management studies, and marketing and consumer research (Galvagno and Dalli, 2014). The co-creation view states that suppliers and customers interact with each other in search of new business opportunities. The marketing perspective considers value co-creation as interactions and integration within networks involving different actors in order to evaluate available and potential resources and to understand what they have and what they can do (Gummesson and Mele, 2010). Purposeful interaction creates benefits, such as driving dialogue, learning, and resource transfer. In such interactions, firms act as resource integrators because specialization forces them to access existing knowledge, skills, competencies, people, products, and available investment (Gummesson and Mele, 2010). From the innovation and technology management perspective of the theory of

value co-creation, the interaction between customers and companies, which technological platforms often mediate, leads to innovation, customer participation, and improved customer services (Galvagno and Dalli, 2014; Mele et al., 2010). Although the unit of analysis in this research is the network of actors in the O&G industry, in order to understand all details of the relationships, the particular focus taken was with regard to technological spillovers from MNEs to local companies (customers and suppliers). In this paper, we base our analysis on the innovation and technology management perspective of the theory of value co-creation, with particular emphasis on ICT companies as service providers for O&G companies.

The clusters/network perspective is increasingly used for the analysis of public policy (Moore, 2006). According to Vargo and Lusch (2017), research in this direction can also benefit from the theory of value co-creation. For example, they argue for attention to be paid to the question of how public policy might be modified to become more beneficial to society by encouraging collaboration and coopetition¹² among firms in national and global service networks, and to what governance (institutional) safeguards would be necessary to achieve that (Vargo and Lusch, 2017). Based on the above discussion on value co-creation in the O&G sector, we propose the following: first, inter-organizational networks between local and international companies working collaboratively on the development of service technological provisions in the O&G industry have the potential to co-create value. In this way, value co-creation continually occurs as a service if local companies and MNEs integrate value propositions and enact various practices to adapt to contextual requirements (Vargo et al., 2015). Second, policies – a specific type of institutional arrangement – need to be adjusted to encourage value co-creation (Vargo and Lusch, 2017).

4.2. Technological spillovers

The literature states that MNEs play a pivotal role in the O&G industry by creating positive FDI spillovers through collaboration with other actors to promote sustainable development (Oetzel and Doh, 2009; Meyer and Sinani, 2009; Narula, 2018). The role and impact of MNEs on sustainable development, however, still need further consideration because of growing concerns about both the role and responsibilities of MNEs regarding broader societal interests, and the controversy surrounding the behavior and conduct of MNEs in their foreign operations (Ghauri and Yamin, 2009; Buckley et al., 2017), especially in the O&G industry. Spillovers can be defined as the informal transfer of technological know-how from foreign to domestic firms (Eden et al., 1997; Liu et al., 2000; Eapen, 2012). Spillover effects are a type of network effect that can consist of a number of different categories. For example, agglomeration spillovers refer to the vertical, supplier-customer type, while technological spillovers¹³ arise from clusters and networks; the impact of these lead to intra- or inter-industry effects (Dunning and Lundan, 2008; Liu et al., 2000). An example of an agglomeration spillover is the knowledge spillover generated by geographically clustered

¹¹ In this research we adopt a definition of clusters and networks provided by UNIDO (Ceglie and Dini, 1999). The term *network* refers to a group of firms that cooperate on a joint development project in such a way as to complement each other and specialize in order to overcome common problems, achieve collective efficiency, and conquer markets beyond their individual reach. The term *cluster* is used to indicate a sectoral and geographical concentration of enterprises that produce and sell a range of related or complementary products and are, thus, faced with common challenges and opportunities. These concentrations give rise to external economies, such as the emergence of specialized suppliers of raw materials and components, or the growth of a pool of sector-specific skills, and favor the emergence of specialized services in technical, administrative, and financial matters. Clusters are also a conducive ground for the development of a network of public and private local institutions that support local economic development by promoting collective learning and innovation through implicit and explicit coordination.

¹² Coopetition implies that, rather than just competing, firms typically collaborate with other firms (Nalebuff & Brandenburger, 1996 in Vargo and Lusch, 2017).

¹³ Spillovers can exist within the extractive sector along the same value chain (intra-industrial or vertical spillovers), but they can also be horizontal or inter-industrial (Le and Pomfret, 2011). Horizontal spillovers where service SMEs supply to an MNE in the extractive industry are also called backward linkages while spillovers between MNEs and further SMEs are called forward spillovers. One major mechanism is knowledge gained during the process of the transfer of goods and services through both demand and supply linkages (Doring and Schnellenbach, 2006). When the customer is present during the process of production of a service, this opens up the possibility of the transmission of knowledge concerning both the production process and the nature of the service product (Bishop, 2009).

high-tech firms in Silicon Valley (Almeida and Kogut, 1999). The empirical focus of previous research has been mostly on technological spillovers (Görg and Greenaway, 2004). The literature on the technological upgrading of domestic firms has studied business process- and product-related spillovers (McDermott et al., 2009); however, service-related spillovers, i.e., effects on third parties related to the delivery of services, have not yet received sufficient attention. This is probably because it is difficult to measure knowledge spillovers exactly (Singh, 2007). Moreover, processes can be codified, i.e., arranged systematically, and products can be patented. However, because of a high level of knowledge tacitness, it may not always be possible to codify the services involved (Heirati and Siahtiri, 2019). Therefore, the transfer of such information or conversion into knowledge is difficult. Due to these differences, there is a growing appreciation that the nature and extent of spillovers may differ in the case of services (Bishop, 2009).

The literature on horizontal FDI spillovers in the same industry is inconclusive. Some research suggests that the presence of FDI seems to have no positive effects on the productivity of domestic firms in the same horizontal industry (Javorcik, 2004). However, other research proposes that local firms can learn about new technologies or about marketing and management techniques, thus, improving their performance.¹⁴ This may include the following learning processes: demonstrations effects, e.g., by observing a foreign firm's subsidiary; labor market impacts, e.g., by hiring workers trained by a subsidiary; and finally, technology-sharing impacts, e.g., by using technologies shared by a foreign firm (Blomström and Kokko, 1998). Competition resulting from the presence of international companies may force a local firm to improve performance; however, it may also negatively affect a local firm within the same industry in terms of reducing revenue (Aitken and Harrison, 1999; Javorcik, 2004; Spencer, 2008). Overall, the literature confirms the absence of positive productivity spillovers within the same industry, and the presence of positive effects between industries (Almonte and Pennings, 2009; Görg and Greenaway, 2004; Görg & Strobl, 2000, 2005; Javorcik and Spatareanu, 2008). In the O&G industry, production linkages can exist along the same value chain (intra- or inter-industry). These inter-industry linkages are essential for sustainable development and can lead to the building of new industries with multiple potential users across sectors, such as banking, transportation, or logistics companies (Kaplinsky et al., 2011). These horizontal effects initiate new value chains in other, non-O&G sectors (Kaplinsky et al., 2011). A technological transfer can also be voluntary and unintentional (Inkpen et al., 2019).

Based on the above discussion on technological spillovers in the O&G sector, it can be proposed that due to increasing digitalization, MNEs look for more knowledge co-creation opportunities through their networking interactions with local companies. It is consistent with Dantas and Bell (2009) findings of the close relationship between learning capabilities and the types of networks that prevail in Brazil's oil sector. In addition, it fits well with Santamaría et al.'s (2009) finding that particularly essential inputs to innovation in the case of O&G firms are non-R&D-based activities such as training, or the adoption of advanced machinery. In these projects, service-related spillovers can be induced. Due to the oligopolistic specifics of the O&G industry, MNEs do not have competitors in resource-abundant countries with the exception of other MNEs, and will tend to adopt a collaborative strategy. Technological knowledge protection is more likely to be an issue within consortia operating big O&G fields, rather than between MNEs and local firms. In the next section, two existing concepts – value co-creation and spillovers – combined with primary data from case studies allow the formulation of propositions, which will be explained in the sections below.

¹⁴ We define organizational performance as the long-term competitiveness of both MNEs and local companies that benefit from win-win strategies when both sides win and there is no loser or winner.

5. Findings

Kazakhstan is a major player in the Belt and Road Initiative (BRI), a program which is perceived as an opportunity to build a more diversified economy (Heim et al., 2022; Tjia, 2022). Thus, a study related to this country has strategic relevance to all the countries involved in this initiative (Panibratov et al., 2022a), as well as in relation to raising scholars' and policymakers' concerns regarding the state of de-globalization and global challenges such as pandemics, sanctions, carbon levels, etc. Kazakhstan is a post-socialist transition economy where state participation in O&G production and its bargaining power over MNEs is high. Consequently, economic interactions between different actors are common (Orazgaliyev, 2018). Research in the transition countries' context can shed light on unique aspects that can illuminate the nature of the phenomenon under investigation (Panibratov and Klishevich, 2020).

Kazakhstan is a relevant case study as the country is currently accelerating economic diversification and transforming its economy away from heavy dependence on extractive resources. Kazakhstan achieved strong economic growth between 2000 and 2014 and entered the upper-middle-income group of countries and almost broke into the high-income group in 2014. The oil rent exceeded 10% of GDP in 2014, averaged 15% between 2005 and 2014, and peaked at 21% in 2005. In recent years, more than 70% of export earnings have come from oil and gas. However, the downturn in the oil and other commodity prices from 2014 resulted in a decline in per capita income and in the share of oil and gas revenue of the country's GDP and exports. The same occurred in many resource-rich, primary product-exporting countries, including high-income ones such as Australia (Anderson et al., 2018; Heim, 2020; Lowe, 2015). According to the International Trade Administration, the ICT sector in Kazakhstan is the industrial with the best prospects. The total Kazakhstani ICT market in 2021 is estimated at USD 2.3 billion, which accounts for 3% of GDP (ITA, 2022).

To understand the effects of policy on spillovers, we collected primary data from case studies related to the pattern of spillovers and the effects of policy. First, we considered a network of different actors (for the list of stakeholders see Table 1) involved in the process of value co-creation in the O&G sector. Second, we analyzed the effects of diversification policy on foreign and local companies, as well as industry perspectives. Stakeholders and their activities are summarized in Table 1 below, which also provides a picture of the distribution of interviewees across stakeholder types. We identified the effects of policy through the interviewing process involving company representatives. For example, we asked the participants what the effects of the policy on their companies were. The causal effects were also identified through a comparison with seminal case studies in other countries (Kalyuzhnova et al., 2016). This allowed us to make a direct assessment of the representativeness of the different interests in the sample. As discussed in the introduction, understanding the context (the industry) is extremely important in this research. Therefore, we started by studying the environment. We observed that industrial clusters in the O&G industry are based on linkages in networks of interconnected international and local companies, specialized suppliers, service providers, firms in related industries, and associated institutions (e.g., universities, standard agencies, and trade associations), as well as the government and the citizens that co-create value and induce spillovers through interactions and the exchange of resources, technology, and management skills in a particular local environment.

Table 2 summarizes the findings of the interviews and illustrates how value is co-created between foreign and local companies, and how technological spillovers are induced. It matches the findings with the potential model and propositions (see Fig. 3).

We structure further discussion on the findings around three groups of stakeholders and their responses to the diversification policy identified during primary data analysis: foreign companies (MNEs), local companies, and the wider industry (all other actors). Together, this

explains the effects of the diversification policy on the development of local technological capabilities through the induction of service technological spillovers.

5.1. Responses of actors on policy and how it affects spillovers

5.1.1. Foreign-owned companies

Policy requirements with regard to cooperating with local companies are obligatory for generally every O&G consortium operating in Kazakhstan. However, to a certain extent, these strict rules do not apply to the three major O&G consortia as a result of agreements concluded more than 20 years ago (Sabirov and Shakulikova, 2020). These international consortia implement their own programs aiming at the development of local industrial capacity. At first glance, MNEs and governments in host countries may seem to have different interests; however, international companies may benefit from collaboration with local companies in both the short- and long-term run. Capacity-building of the labor force is a fundamental component of diversification strategies (Howie, 2018), together with in-country value chain development (Bamber et al., 2016; Bamber) and sustainable development (UNESCO, 2012). The workforce of O&G companies is aging, and these companies are currently facing a shortage in terms of engineering skills worldwide (ILO, 2012). In post-soviet countries like Kazakhstan – characterised by

Table 2
Strategic responses of firms with regard to diversification policy, co-creation relationships and potential spillovers.

Case	Domestic company	Value co-creation	Technological upgrades
1	Oil and gas service company	Local companies use high-tech import equipment and ICT products on their projects with customers (exMNEs) and designated ICT products suppliers such as Siemens, Schneider Electric, ABB Group. This requires training and certification from leading international producers	Development of a high-skilled labor force that can use advanced technology to deliver services
2	Manufacturer of oil and gas equipment	Use high-tech imported intermediate technologies to produce in cooperation with exMNEs domestically developed equipment and provide services for oil and gas rigs	Technological quality of the final product and ultimately, oilfield service
3	Chemical production, oil and gas downstream, processing of raw natural gas	Use international expertise for production technology (licences to operate are granted by the international O&G company), a foreign contractor for building a production facility, and financial resources from abroad	Technological production (processes) capabilities
4	Refinery, oil and gas downstream, refining of petroleum crude oil	With their customers (exMNEs), local companies adopt high safety standards, use imported software and act as contractors for management of technological processes	Technological production (processes) and service capabilities

significant market failures in labour markets reflected in high unemployment, high expectations with regard to social protection, and a lack of education in STEM disciplines – this can present a significant challenge for international O&G companies. The employment of expatriate is expensive, and the lack of resources, together with low local industrial capacity, leads to high costs and significant delays in projects delivery. Developing linkages to host country firms can be seen not only as a cost-saving opportunity, but also as a source of innovation for MNEs (Almeida and Phene, 2004), and is a prerequisite for sustainable operations for MNEs in host countries, especially if they want to secure their legitimacy and social license to operate there (Symeou et al., 2018). Non-government organizations, media, and the public in host countries are increasingly looking at how MNEs operate in terms of the extraction of resources. These companies are expected to provide opportunities not only for home nationals and suppliers, but also for local communities and the local economy. In recent years, O&G companies have been placing a stronger emphasis on developing local capabilities, and all major O&G companies have adopted a more structured approach to the creation of value in host countries (Aoun and Mathieu, 2015).

The data in this research show that large international O&G companies in Kazakhstan have responded strategically to the institutional requirements of public policy by cooperating with selected local companies. We will discuss two cases – an MNE and a local company – and their strategic responses to the policy below. Fig. 2 illustrates these cases. We apply the value co-creation view developed in strategic management theory and cooperative behavior to interpret win-win strategies in response to the diversification policy and then analyze the development of linkages and spillovers.

The horizontal axis in Fig. 2 evaluates the impact of policy on a company's choice of an appropriate degree of collaboration, i.e., ranging from positively responding to the policy (high collaboration) to demonstrating selfish behavior, particularly with regard to the MNE's decision not to comply with the policy requirements (low collaboration). Low complementary interests reflect conflicting interests between the MNE and the policy requirements. The vertical axis of Fig. 2 makes a distinction between high and low policy adoption (a company's adoption of responsible behaviour with regard to issues relating to the sustainable development of local industry in the host country). Companies may choose to act together (i.e., coordinated goals), despite having independent and uncoordinated systems of interests, compared with a focus on strategies that directly benefit themselves but not the other party (i.e., conflicting goals).

An example of an MNE is Karachaganak Petroleum Operations (KPO), an international consortium of the O&G companies Royal Dutch Shell, ENI, Chevron, Lukoil, and the national oil and gas company of Kazakhstan – KazMunayGas (NOC KMG). This consortium operates one of three major O&G fields and is a producer and marketer of crude oil. It is located near the town of Uralsk in the West Kazakhstan Oblast, a region in the north-west of Kazakhstan where the company operates gas condensate fields. This consortium is an example of an application of cooperative strategy based on value co-creation in the oilfield service industry, and one which has led to the development of technological expertise (automation, technical inspections, etc.) in the local company, KazBurGaz.

A director of service operations of JSC KazBurGas (<http://www.kazburgas.kz/>), a local company (Actor 2, Table 1) partnering with KPO, said the following: "... with the support of KPO, our company managed to implement several initiatives aimed at the development of the domestic oilfield services. For example, we have successfully mastered the work on automation of rigs in conjunction with our partners. We also started tubular inspection in partnership with Schlumberger, a global leader in the provision of oilfield services." (KPO, 2017).

Government policy was a driver for the creation of this local company, because it required international companies to procure from local suppliers. In the absence of such local suppliers, KPO had to create a partnership with potential suppliers, share technologies with them, and

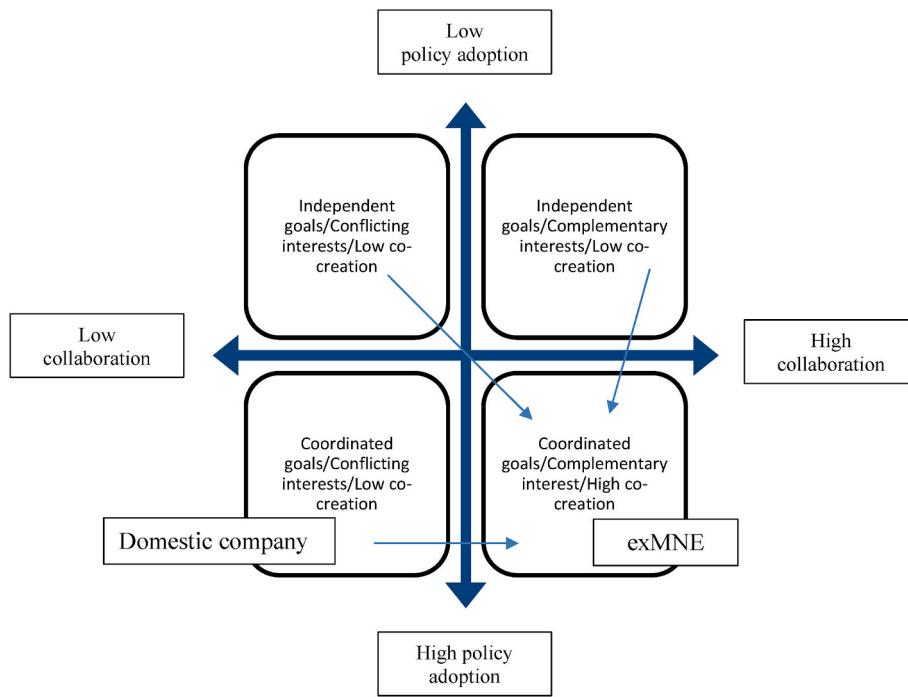


Fig. 2. The impact of the policy on a firm strategy.

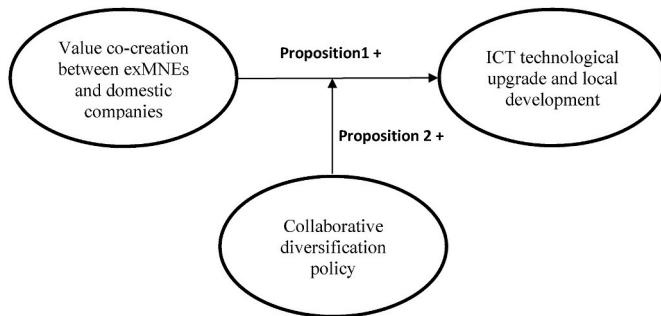


Fig. 3. Policy effects on service technological spillover.

increase their quality standards, so that a local company like KazBurGas could become a supplier instead the MNE relying on a foreign partner. The interest of KPO is to create a local value chain in the oilfield sector in Kazakhstan. Similar services provided by the foreign partner would be more expensive for KPO. The reason why KPO chose to comply with the host country requirements is twofold: both, regulatory compliance and market-based incentives drove value co-creation in the case study that we investigated. The role of the policy at the initial stage was to make the market mechanisms work.

The local company is benefiting in the form of technological spillovers and upgrades (the introduction of rigs automation, and tubular inspection services, with local staff learning how to deliver these services). In Fig. 2, KPO's business is located in the quadrant "Coordinated goals/Complimentary interests". International companies which comply with the government's diversification policy by adopting a cooperative approach, are placed in this quadrant. In this case both the local partners and the international company benefit from the policy. Therefore, win-win strategies exist for companies operating in this quadrant.

5.1.2. Local companies

The policy requirements are also applied to local companies, in that these are required to employ local citizens. Local companies in Kazakhstan did not benefit from the traditional policy based on quotas

and performance requirements, but they might benefit from the collaborative policy. An example of a case which illustrates this finding is that of *Lina Ltd*, one of the companies is from Aktau, Mangystau Oblast, an O&G-abundant region in the western part of Kazakhstan. The company provides construction and installation services in the field of electrical engineering to O&G companies. Among their clients are MNEs, consortia, and national oil companies (NOCs), such as *Agip*, *Tengizchevroil*, and *KazTransOil*. The company employs around 100 specialists, and all of whom are Kazakhstani citizens. Therefore, the share of local inputs in services provided by the company has reached 100 percent. As a result, the organization meets policy requirements. However, the effect of technological upgrades remains low, since the company does not collaborate with foreign companies or projects experts.

The policy conducted in Kazakhstan is intended to support companies such as *Lina Ltd* because it provides additional incentives and mechanisms for the tendering process. The policy does not however fully support technological knowledge transfer. In fact, the policy acts against local companies. Firstly, as a part of its services, *Lina Ltd* uses IT solutions to make oil wells for their clients pump automatically. This process is often still done manually, thus, the company receives orders to provide electric power supply solutions, including software equipment. Such equipment and software products are not currently produced in Kazakhstan; therefore, the company needs to import software, such as that developed by *Siemens* or *Scada Pro*. In this case, a local company does not need any policy to support development since they are benefiting from the spillovers when using the equipment in their work. However, the foreign expertise in the services component is not fully utilised – there is no active participation on the part of the local labor force in the collaboration with the foreign service provider or customer (See Fig. 2). *Lina Ltd* is located in the quadrant "Coordinated goals/Conflicting interests". Since *Lina Ltd* employs 100% local staff (the target required by the policy), and there is no chance of collaborating with foreign experts on projects, the spillover effect is very limited. Local companies located in the "Coordinated goals/Conflicting interests" quadrant do not fully benefit from cooperation with international companies, and the effects of the value co-creation are also low: the companies are not benefiting from service spillovers. The Deputy Managing Director of *Lina Ltd* (in an interview on 5 August 2017) stated:

"high-technology equipment ... [is] procured from foreign companies, like Siemens, Schneider Electric, ABB Group, but we import their products. The only thing they do in Kazakhstan is training and certification of specialists and the administration of examinations in information products. They have great training programs; the training process was moved to Kazakhstan, while production facilities are located abroad. Currently we cooperate with foreign suppliers of equipment for the O&G industry as a part of our training in information technologies".

From this answer, we can see that local service companies would like to cooperate more closely on projects with international partners. They understand that if even if the technological equipment they require for the delivery of their services is imported, the participation in the collaborative project is difficult, and the service spillovers are low. This confirms our findings that closer collaboration is desired by local partners, and just training is not enough.

Other interviewees confirmed that international expertise is crucially important to local companies in Kazakhstan. These interviews demonstrated that the current policy does not fully support the transfer of technological and managerial expertise. This is reinforced by other evidence which shows that both government and private companies in Kazakhstan would rather use international consultants and employees to secure immediate results (Howie, 2018) or to avoid risk of failure (Global Business Reports, 2016) rather than to focus on developing home-grown talent. It is clear that the production of goods in Kazakhstan induces higher spillovers than simple imports – but more importantly for the service companies, the policy must support value co-creation, i.e., opportunities for service companies to collaborate with foreign partners. This confirms the justification for the application of a service-dominant perspective with regard to technological upgrade. Since there is presently no domestic service expertise in Kazakhstan, the policy can only be successful if it stimulates value co-creation between local and foreign companies, not only through service technological spillovers induction, but also through interaction between headquarters, subsidiaries, employees, local subcontractors, and customers, as well as other actors from the O&G industry in order to develop new business opportunities.

5.1.3. Wider industry

Improving organizational performance and competitiveness in the O&G industry in the future will be based on increasing technological capabilities (Gartner, 2017) which can be achieved through technological upgrades. The literature suggests that currently, technological ICT capabilities in countries like Kazakhstan are low and need to be further developed, which will then lead to an increase in their share of ICT in-country value-added (Baldakov and Heim, 2020). Even though, Kazakhstan (in contrast to other post-soviet economies) has been the largest recipient of FDI in the last two decades (Han and Ghobadian, 2020), the level of R&D as a percentage of GDP is the lowest among the emerging economies. This is due to the nature of FDI, which is primarily in the O&G sector and is related to the exploration and production of crude minerals. There is not an environment that would attract R&D investment; therefore, technological upgrades and R&D expenditures in Kazakhstan remain below the world average (World Bank, 2016). With regards to the diversification policy a managing director of the Association of the Oilfield Service Companies of Kazakhstan (2017), said the following: "... due to the cooperation with foreign companies, the local companies keep the idea of the "local content" in the form of interaction with foreign companies that provide us with advanced technology ... and give us all the innovations [available] in the oilfield service industry".

The Kazakhstani government has attempted to implement an integrated micro-economic policy with regards to the development of ICT and of state management of the ICT infrastructure. In 2008, a joint-stock company *National ICT Holding Zerde* was established to implement the state program *Digital Kazakhstan* (Zerde, 2017). This program includes elements of digital transformation in all branches of the economy, as well as the widespread introduction of digital technology to enhance the

competitiveness of both the economy and of domestic firms. ICT is a part of the value chain in the O&G industry and thus should also comply with policy requirements related to O&G. ICT as a sector, however, is also subject to policy targets, but in this case, it is the policy related to the ICT sector. These two policies are not synchronized, and the role of international companies is not clear. Companies from both sectors would benefit from a single cooperative approach that would support investment and public-private projects. According to value co-creation theory, closer cooperation on service projects would lead to the exchange of resources and value, and therefore induce more spillovers.

6. Discussion and conclusions

6.1. Implications for theory

As a final step, through the application of abductive techniques, we offer a novel conceptual framework that helps to explain the effect of the policy on technological spillover. Based on the preliminary research framework, we derive propositions based on answers to the interview questions and the study of secondary sources in case studies, focusing for evidence that verifies how the theories match. The developed propositions lead to conclusions, and to the application of these conclusions to future practices and research opportunities.

First, we can summarize a concept of value co-creation and technological spillovers between MNEs and local companies. This leads to the formulation of propositions connecting two existing concepts – spillovers and value co-creation – linked into one model. A conceptual model of local technological development (Fig. 3) has emerged from the theories discussed above. This model is based on the three components general to the narrative of local content development, namely collaborative policy, value co-creation, and technological upgrading. Theoretical Propositions 1 and 2 are linked to existing theories of value co-creation and spillovers. We suggest that with the shift towards a service-based economy, collaborative policy provides better links and effects than traditional policy, based on performance measurements. Propositions emerging from this research explain the logical linkage between certain concepts by asserting a universal connection between concepts (Zikmund et al., 2009) but does not assume that it is possible to generate hypotheses, merely ideas (Buchanan, 2012).

Fig. 3 suggests that technological spillover is a function of collaborative diversification policy and value-co-creation and provides answers to the research questions in this study concerning the role of diversification policy in value co-creation between MNE in extractive industry and domestic companies leading to ICT technological upgrading and local development.

P1: Collaborative policy links the network of actors to provide a basis for *value co-creation* between them which leads to ICT technological upgrading and local development.

P2: Collaborative policy enables *technological upgrades* on the part of local industry through direct and indirect *effects* between international and local companies.

Although our findings are in line with previous research carried out in Kazakhstan (Howie, 2018), the innovation is that this research focuses on the new topic of diversification in the service sector of the economy and particularly in the ICT industry.

6.2. Contributions

This paper contributes to the debate which took place in the early literature on international business and resource sector studies, as well as economic and political science, on the impacts of MNEs on the welfare and development of resource-abundant host countries through the induction of service technological spillovers. However, the study of the developmental effects of MNEs still plays a minor role in the current

literature on resource policy (Hansen, 2017, 2019). This paper also contributes to the discussion about the uncertainty derived from government policies which require MNEs to adjust and adapt their corporate strategies (Brewer, 1993; Doh et al., 2012). From a theoretical perspective, we draw on the previous literature on the role of linkages in spillovers (e.g., Singh, 2007; Buckley et al., 2007; Altomonte and Pennings, 2009; Eapen et al., 2019). Although such research has recognized the role of institutions in host countries, the question of how institutional arrangements such as diversification policy affects MNEs and, therefore, local firms' ability to improve their technological capabilities through spillovers remains largely unexplored. Using the abductive approach based on a case study method, our paper has analyzed the strategic responses of MNEs to policy, and suggests theoretical explanations with regard to how these affect the technological capability of local companies through building linkages and benefiting from the spillover effects which result from such linkages.

Joint consideration of the concept of spillovers in international business and value co-creation theory from a strategic marketing perspective on services helps us to advance our theoretical understanding of the effects of the policy on service-related spillovers in the O&G industry. While previous research on MNEs has paid little attention to the strategies of either multinationals or local companies, understanding MNEs' local market strategies is becoming increasingly important with the internationalization of the O&G industry, as well as with the need for digitalization of the economy and diversification in new strategic industries (Petricevic and Teece, 2019). In this paper, we investigate value co-creation, the contemporary industrial strategies of MNEs and local companies, and service-related technological spillovers as a result of diversification policies in resource-abundant countries. Studying the effects of such policies on technological spillovers in Kazakhstan has allowed us to identify an emerging approach to collaboration between economic agents, including those in both the public and private sectors, as well as MNEs. These findings are in agreement with previous research which suggested that government participation in terms of such collaboration can promote local businesses (McDermott et al., 2009; Xing et al., 2018).

We found that the traditional approach to regulation in the O&G industry (based on performance requirements) failed to support technological spillovers in a service-based economy, with theories remaining grounded in the frameworks more appropriate for industrial economies rather than digital ones. We suggest that positive spillover effects arise due to several reasons. One of the reasons is that MNEs possess resources that local firms in the host country do not have (Spencer, 2008). Additionally, a more important factor is value co-creation and exchange, involving a wider, more comprehensive configuration of actors than a simple firm-firm configuration. As suggested by Vargo and Lusch (2016), this exchange includes institutional arrangements as a facilitator of value co-creation. We propose that the theory of value co-creation combined with the theory of spillovers, can serve as a theoretical ground for a collaborative policy providing a basis for value co-creation between local and international companies. This can lead to local technological upgrades based on the development of local absorptive capacity, the set of dynamic organizational routines and processes by which firms acquire, assimilate, transform and exploit new knowledge through spillovers (Bouguerra et al., 2020). We considered different policy stakeholders and their activities in their attempts to formulate win-win strategies, taking into account the concerns of MNEs with regard to regulation and the impact of government policy on both MNEs and local companies. The relationship between diversification policy and FDI spillovers reveals that it can be beneficial for both MNEs and local companies when it is based on cooperation.

The previous literature did not come to a consensus regarding the effects of MNE spillovers with regard to the host country. While early research highlighted possible negative outcomes resulting from MNEs in host countries (Dunning, 1994; Aitken and Harrison, 1999; Javorcik, 2004), in general the literature confirms both the absence of positive

effects within the same industries, as well as the presence of positive effects between industries (Görg & Strobl, 2000, 2005; Görg and Greenaway, 2004; Altomonte and Pennings, 2009; Javorcik and Spatareanu, 2008). Overall, the literature confirms the inability to objectively assess whether foreign investment has a net positive or negative effect (Narula and Pineli, 2017). We suggest that negative spillover is the result of market and institutional failures, as in a "perfectly designed" institutional matrix, generic spillover effects from MNEs should be positive, especially when based on increasing collaboration. In this sense, our research is in line with that of Oetzel and Doh (2009) who suggested that relationships in which MNEs and local non-governmental organizations pursue collaborative relationships lead to a positive, collective contribution to host country development. We go one step further and argue that collaborative relationships require the active participation of the public sector. In our study, we also observed that in the O&G industry MNEs do not intentionally try to prevent spillovers, since competition between MNEs and local companies in the O&G industry is virtually absent.

We see important implications for the local market strategy of MNEs and for local companies, as well as for policymakers. Our study suggests the need for more collaborative approaches towards policies supporting cooperation between MNEs and the host economy (Morris et al., 2012; Dietsche, 2014; Dietsche, 2018; Devenin, 2021; Fraser, 2021), conceptualizing the debate on how to build linkages and induce spillovers between mineral and other economic sectors, and how joint strategies could be developed. The findings at the firm level reveal support for Propositions 1 and 2, suggesting the need for more collaborative policy to link foreign and local actors. The current policy is not appropriate for the building of a digital economy based on the service sector rather than the industrial sector. Since the local service technological capabilities at the firm level are not sufficient in emerging economies such as Kazakhstan, there is a need for technological upgrades through value co-creation in the service sector of the economy. The theory of value co-creation provides a theoretical explanation of how spillovers are created in the service economy rather than in manufacturing-based economies. We argue that the effect of spillovers will be higher when co-creation is complemented by collaborative policies. The findings suggest that policy supporting collaboration between international and local companies will play a more critical role in the future. Even well-developed industrial capabilities do not allow the O&G industry to continue being a source of diversification without collaboration based on the creation of value between both foreign and local companies. Government policy can play a coordinating role in these activities due to the complexity and importance of the O&G industry for the whole economy of resource-abundant countries. Therefore, this research informs companies about the win-win strategies that provide the benefits of technological development for both MNEs and local industry. Under a collaborative approach, policymakers should work closely with MNEs to support development projects, collect information, and design a supportive regulatory and institutional environment. Our findings continue the discussion started by other studies on the O&G industry (Olawuyi, 2018; Devenin, 2021; Fraser, 2021) and resources, economic development and MNEs (Shapiro et al., 2018; Narula, 2018). The value co-creation perspective and spillovers have been combined in our study to explain the effects of policy on service technological spillovers. As was discussed in this paper, the role of policy is to promote diversification through the technological upgrade of local companies in emerging countries. Based on our findings, we conclude that to be effective, such a policy has to support co-operation and value co-creation.

6.3. Applications to future practices and research

This research creates a foundation for understanding the effects of the institutional environment on technological spillovers in the O&G industry and related service sectors, as well as for further investigation in this area. However, this is just the first step in an area that needs

significant further research contributions. New research should explore how a local technological development can be supported to validate the theoretical propositions suggested in this research. First, the role of the political component should be further explored. There are studies that emphasize the role of the “political advantage” of O&G firms, the benefits a firm obtains from being associated with political actors (Panibratov et al., 2022b). An interesting avenue for research would be the investigation of the relationship between diversification policy and the technological absorptive capacity of local companies. Rare studies targeting sectoral structures reveal that technological issues are influenced by institutional regimes such as national policies, path dependencies, and the vested interests of powerful constituencies, together with legal issues (Mirimoghadam and Ghazinoory, 2017). Furthermore, it would be interesting to investigate the network of relationships between the elements which serves to reduce transaction costs among the parties of public and private partnership in the O&G industry through increased trust, a common understanding of mutual interests, and independent goals (Heim et al., 2019). It would be worthwhile adding new countries to this study, especially African countries which are abundant in natural resources and starting to pursue policies aiming at the diversification and development of local companies. Although it is difficult to obtain datasets that are comparable in terms of policy effects, since diversification policies vary from country to country, future research could also benefit from quantitative studies if relevant data are available. Hence, this study, which resulted in the development of a conceptual model of technological upgrade, embracing the role of diversification policy by integrating the value co-creation perspective with spillovers, is potentially a foundation for an extensive future research agenda.

Authors statement

Irina Heim: Conceptualization, Methodology, Data Collection and Analysis, Writing - Original Draft and Reviewing.

Yelena Kalyuzhnova: Conceptualization, Methodology, Data Collection, Supervision.

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Declaration of competing interest

We have no relevant interest(s) to disclose.

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