University of Reading

Local content policy and value co-creation:

adopting information technologies in the oil and gas industry

Doctor of Philosophy in Management

Henley Business School, the Department of Leadership, Organisations and Behaviour

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Declaration

I confirm that this thesis I have presented for the examination for the PhD degree of Henley Business School, University of Reading is my own work, other than where I have clearly indicated that it is work of others (in which case the extent of any work carried out jointly by me and any other person is clearly identified in it). The use of all material from other sources has been properly and fully acknowledged.

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Statement of Conjoint work

I confirm that Paper 1 was written by me solely.

I confirm that Paper 2 was co-authored with my 1st supervisor Professor Yelena Kalyuzhnova and Professor Kecheng Liu. My overall contribution as a lead author is 80%. This included a literature review, data collection, data analysis, and interpretation and drafting of the article. Professor Kecheng Liu helped me to formulate the initial concept and design of the paper, and Professor Yelena Kalyuzhnova approved a final draft before submission to a conference.

I confirm that paper 3 is co-authored with Professor Abby Ghobadian, my 2nd supervisor, who provided critical guidance and revised my paper before submission to a journal and Tian Han who provided a part of literature review on mergers and acquisitions. My own contribution as a lead author is 80%.

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Papers included in the thesis

This thesis is presented as a collection of papers. It comprises of the following original works that have been published or are in review. The papers were all researched, developed and written during my enrolment in the PhD in Management at the Department of Leadership, Organisations and Behaviour, Henley Business School, University of Reading, 2016-2018.

Publications related to the Chapter 3

1. Heim, I. (2018). Local content policies: global versus national? In M. Munoz (Ed.), *Globalization alternatives* (pp. 73-84). Dallas, USA: Business Expert Press.

2. Heim, I (2018). Value co-creation and local content development: oil and gas industry in emerging countries.

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[A developmental paper is published in *Proceedings of the British Academy of Management Conference BAM2018* held in Bristol, United Kingdom 4th - 6th September 2018].

Publications related to the Chapter 4

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- *Proceedings of the Academy of International Business AIB2017 Annual Meeting* held in Dubai, UAE, July 2-5, 2017. Available at http://documents.aib.msu.edu/events/2017/AIB2017_Proceedings.pdf.
- *In Proceedings of the American Conference on the Information Systems AMCIS 2017*, held in Boston, USA, August 10-12, 2017. Available at http://aisel.aisnet.org/amcis2017/TREOs/Presentations/88/]

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Publications related to the Chapter 5

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Local content policy and value co-creation:

information technologies in the oil and gas industry

Abstract

This thesis contributes to the growing body of literature on economic development in oil and gas (O&G) emerging resource-rich countries (ERRC) where the energy sector dominates the economy. This gives rise to the question - how will these countries manage the economy when fossil resources are depleted? The service sector, including information and communication technologies (ICT) potentially are the likely a cornerstone of the world economy in the future. Therefore, ERRCs face the need to adopt strategies to invest and diversify their incomes from O&G industry to the growing service sector, namely the ICT industry, among others. This can be done using policy aimed at increasing domestic capacity, which is called in ERRC local content policy (LCP). The objective of this policy is therefore to achieve spillovers from extractive industry in order to diversify the economy.

The aim of this thesis is to examine the impact of LCP – a type of industrial policy - on the O&G industry explaining strategic responses of O&G companies to this policy. The thesis provides a theoretical explanation of the role LCP plays in the development of indigenous technological capabilities through value co-creation under conditions of the ongoing digitalization. This dissertation offers a new approach to how LCP in O&G industry of ERRC, namely Kazakhstan, can be adjusted to meet current global trends of digitalisation after Kazakhstan's accession to the World Trade Organisation (WTO). LCP was previously approached by researchers predominantly from the macro-economic and political economy perspective. The understanding of how companies are affected by this policy is missing. Therefore, this dissertation is aimed at focusing on expanding the existing academic research on LCP by analysing it from the micro-economic as well as from the industry perspective.

To deal with the complexity of this exploratory research, both a conceptual and qualitative analysis have been conducted, bringing together multiple complimentary case studies and value co-creation theory. Case studies, in turn, were built upon the interviews with industry experts, companies' representatives at top management level, and contain extensive document reviews conducted specifically for this research. Throughout three main chapters of the thesis, theoretical foundation is provided to demonstrate the application of value co-creation theory to the local content development (LCD). While building a strong theoretical background for the strategic perspective on LCP, the research is based on qualitative analysis, hence leaving space for further research based on quantitative data when such data is accumulated and made available to the researchers.

This thesis includes three main interconnected empirically based chapters which are centred on the O&G industry and LCP. The first chapter provides the theoretical background for the whole dissertation elaborating on the steps which lead to the LCD. A new strategic perspective on LCP is based on the value co-creation between various actors in the O&G industry in Kazakhstan. The second chapter explores how value co-creation leads to the technological upgrade in the indigenous industries. A model of value co-creation between different actors, including an ICT provider, is developed based on the case studies of China National Petroleum Corporation, National Oil Company KazMunayGas and indigenous small and medium-sized companies. The third chapter considers the value co-creation process to combine the value co-creation theory with the international business theory. This part of the research is focused on the example of the foreign-owned ICT provider in Russia. In combination, the case studies explore the core components of the framework of value co-creation and provide the foundation for a collaborative approach suggesting a new conceptional model for the LCD.

Keywords: local content, Kazakhstan, oil and gas industry, ICT technologies

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Abbreviations

BG or BG Kazakhstan - British Gas or British Gas Kazakhstan

CCSD – Columbia Centre for Sustainable Development

CNPC – China National Petroleum Corporation

EC – European Commission

EE - Emerging Economies

ERRC – Emerging Resource-Rich Countries

EEC - Eurasian Economic Commission

FDI – Foreign Direct Investments

EAEU - Eurasian Economic Union

HSE – Health, Safety and Environment

ICT – Information and Communication Technologies

IFC – Institutions for Collaboration

IIC - Industrial Internet Consortium

IMF – International Monetary Fund

IOC – International Oil Company

IP – Industrial Policy

IPR – Intellectual Property Rights

KPI - Kazakhstan Petrochemical Industries Inc

KPO – Karachaganak Petroleum Operating BV

KMG – KazMunayGas

KMG EP - KazMunayGas Exploration Production JSC

KMG PM – KazMunayGas PM JSC

LC or LCP – Local Content or Local Content Policy

LCD – Local Content Development

MNE – Multi-National Enterprise

M&A – Mergers and Acquisitions

NCOC – North Caspian Operating Company

NDE – New Digital Economy

NOC – National Oil Company

NSE – New Structural Economics

O&G – Oil and Gas

OECD - Organization for Economic Cooperation and Development

PPP – Public-Private Partnership

R&D – Research and Development

RK – Republic of Kazakhstan

RRC – Resource-Rich Countries

SMEs – Small and Medium-sized Enterprises

SOE - State-Owned Enterprises

TCO – TengizChevrOil

UN – United Nations

UNCTAD – United Nations Conference on Trade and Development

WB – World Bank

WEF – World Economic Forum

WTO – World Trade Organization

Chapter 1. Introduction

"…theory fails when a country wants to acquire more advanced technologies so that it can do more difficult things that few others can do – that is, when it wants to develop its economy. It takes time and experience to absorb new technologies, so technologically backward producers need a period of protection from international competition during this period of learning. Such protection is costly, because the country is giving up the chance to import better and cheaper products. However, it is a price that has to be paid if it wants to develop advanced industries" (Chang, 2008. Bad Samaritans: the myth of free trade and the secret history of capitalism", p. 47).

1.1 Introduction to research area

This section is aimed at providing an introduction to industrial development. I refer to the definitions of industrial competitiveness, stress the importance of local small and medium-sized companies (SMEs) development and mention the collaborative nature of industrial development. I explain why policy[1] is necessary for emerging resource-rich countries (ERRCs) and introduce existing definition of local content policy (LCP). I also provide the explanation for why the research will focus on Kazakhstan.

Countries place great emphasis on industrial development and competitiveness, due to the importance of these two factors in creating jobs and stimulating growth, and therefore contribution to the prosperity of a country and its citizens. Previous research stressed that nation's competitiveness depends on the capacity of its industry to innovate and upgrade (Porter, 1990) and is especially competitiveness of SMEs sector, the backbone of every economy. The development of SMEs is important in terms of job creation, especially for reducing urban poverty in developing countries, as SMEs account for around 70 percent of

[1] Policy is a strategic effort for setting a system of institutions to encourage development and growth.

employment, around 35 percent of exports, and the majority of national earnings in any economy (Navickas and Malakauskaite, 2009).

This is especially important for emerging resource-rich countries (ERRC) to move out of the middle-income trap[2] (Radosevic and Yoruk, 2018). In this study, I have adopted the definition of resource-rich countries given by IMF (2007, 2012): at least 20 percent of their total exports are natural resources, or at least 20 percent of their revenue are derived from the natural resource sector. I am particularly interested in the ERRC which are at least middle-income countries with GNI per capita greater than 5,000$, and have O&G as natural resources. Examples of such countries include Kazakhstan, Russia, and Mexico. However, this research is focused primarily on Kazakhstan with one case study developing and testing propositions in Russia. This is due to the fact, that the economies and the O&G industries of Kazakhstan and Russia are interconnected through a common Soviet past, as well as economically today through Eurasian Economic Union (EAEU). Kazakhstan itself represents an interesting case for research on emerging countries as its economy is one of the fastest growing among the developing economies of the world (Rumer, 2016). Kazakhstan has also managed to attract significant foreign investments, predominantly in the natural resource sector (Delevic and Heim, 2017). Overall, due to the energy sector dominating the economy with negative economic effects, ERRC face the need to foster strategies to diversify their incomes from the O&G industry to the other sectors of their economies – the manufacturing as well as growing service sector, predominantly to the ICT industry, a cornerstone of any economy in the future. This can be done using policies aimed at increasing domestic industrial competitiveness and economic development.

According to Porter (2005), economic development is a collaborative process involving governments at multiple levels, as well as companies, teaching and research

[2] The inability to sustain growth and transition from resource-driven growth based on low-cost labour and capital, to productivity-driven growth based on advanced technology, skills, quality of management, education, competition and cultural factors (Khakas and Kohli, 2011).

institutions, and institution for collaboration. It has been demonstrated that a wide variety of external actors may have significant effects on the competitiveness of such networks (or industries) including, for example, chambers of commerce, industry associations, professional associations, trade unions, technology transfer organisations, quality centres, think tanks, and university alumni organisations (Porter and Emmons, 2003). The competitiveness of such networks is often referred to as industrial competitiveness[3]. It is associated with the "industry's ability to obtain and utilize resources to participate in competition" (Zhao and Wen, 2004). Industrial competitiveness also indicates the capacity of a country to support the development of businesses and is especially important for small and medium-sized companies (SMEs), the backbone of every economy (Hobohm, 2001).

In order to boost industrial competitiveness, many resource-rich countries are, or have been, pursuing local content (LC) strategies aimed at maximising the impact of natural resources on the whole economy (Ramdoo, 2015b). Amongst others, LCP is one of the key policy instruments aimed at stimulating the long-term welfare effect (Ramdoo, 2016). However, since such policy designs differ substantially over time and across countries, the literature gives contradictory views towards answering the question of how collaboration between foreign and indigenous O&G companies can support SMEs in their technological development, taking into consideration the ongoing digitalisation of the O&G industry. In this thesis I suggest that the most recent definitions are the most relevant. Taking into consideration that each country has its specifics in designing and approaching this policy, in the first instance I will adopt a definition of the researchers on LCP in EERC, and particularly in Kazakhstan.

From a strategic perspective LCP can be defined as an industrial tool that can enable domestic producers to expand their activities, at least partially with domestic inputs, and gain access to international technological and managerial expertise in order to enhance their

[3] For the definition of industrial competitiveness, also see Chapter 4, p. 142.

competitiveness (Kalyuzhnova, Nygaard, Omarov and Saparbayev, 2016)[4]. Alternative systems of oil rent[5] distribution in the O&G industry, for instance royalties and taxes, do not create long-term economic effects on competitiveness as they do not lead to diversification, i.e. creation of jobs and new industries, but simply inject money into the economy on a yearly basis (Tordo, Tracy, and Arfaa, 2011) and therefore are not included in this research.

In the literature there has been a great deal of different definitions of what LCP is. As this type of policy is designed to support the transfer of international technological expertise, and therefore used to regulate foreign investments in the O&G sector, it is also viewed as an FDI-assisted developmental strategy (Dunning, 1981; Narula and Dunning, 2000). In particular, foreign-owned companies are often incentivised to procure intermediate goods produced by local subsidiaries. This is supposed to stimulate knowledge and technological spillovers from foreign to domestic businesses. As has been previously suggested in the literature, these positive effects of MNE activities in hosting developing countries are most likely to be found in countries where the operations of foreign-owned companies may influence local firms in the same industry, as well in other industries (Yu and Li-Hua, 2010). For example, requirements can be formulated so that in order to be considered as a local supplier in procurement in the O&G industry, foreign-owned companies have to set up the local subsidiary (i.e. make foreign investment in the country) instead of importing goods and services. This assumes the reinforcement of domestic industrial capacity through integration of foreign technologies and the domestic competitiveness of certain industries (Narula, 2015); therefore, it can also be defined as industrial policy (IP)[6].

[4] For the definitions of local content policies also see Chapter 2, p. 40.
[5] Oil rents refers to the profit before tax or royalties of oil exploration. Taxes and royalties are paid by oil companies to the state where the oil exploration takes place.
[6] For the definition of the industrial policy see Chapter 2, p.44.

Acheampong, Ashong and Svanikier (2016) also consider LCPs as a part of a broader category of policies known as "Productive Development Policies" or "IPs". However, in this dissertation I argue that in ERRC there is no aim just to build the industry and therefore to implement IP, but the aim is to *diversify* from the O&G sector to any other (not only industrial) sector. Therefore, the policy specific for the ERRC is not IP *per se*, but may include different inter-connected so-called "IPs" to support the main aim – diversification from the O&G industry. This is confirmed by the fact that IPs often exclude the O&G sector from their consideration. Thus, for example, in the recent Investment Report by UNCTAD (2018) entitled *Investment and New Industrial Policy* (Chapter IV) the word "oil" is not mentioned. This strengthens my argument that IP is not effective for the O&G sector, and in resource-rich economies a specific policy needs to be implemented. International business research in general has often excludes extractive industries and the service sector from its consideration, claiming for example that they are likely to be subject to restrictions on the extent of foreign ownership in those businesses (Smarzynska-Javorchik and Wei, 2002). That is why a number of question regarding policies in extractive industries still need to be addressed.

In its general approach, IP can comprise policies affecting "infant industry"[7] support of various kinds, but also trade policies, science and technology policies, public procurement, policies affecting foreign direct investments, intellectual property rights, the allocation of financial resources, LC requirements, trade balancing, technology transfer, local employment and so on (Lall, 2003; Cimoli, Dosi and Stiglitz, 2009). In this broad sense IPs come together with the process of policy design, shaping the very nature of the economic actors, the market mechanisms and rules under which they operate, and the boundaries between what is governed by market interactions, and what is not (Cimoli et al, 2009).

[7] There is no single definition of what makes an industry "infant." The term is generally applied to an industry in a country that is smaller and/or less productive than global best practice in that industry. In many countries such lagging performance is due to newness (Slaughter, 2004).

Taking into consideration the fact that the core industry in EERC is the O&G industry and therefore shifting the focus from manufacturing-oriented IP into O&G sector-oriented policy, it becomes difficult to separate LCP from other IPs aiming at local development as well as from multi-purpose institutions. Moreover, LCP becomes a central policy in ERRCs.

Nowadays, LCP has developed in a type of policy that is less insulated from international competition (it is focused on local industry development and not on limiting international competition through import control), and is conducted through policies that are more transparent and less distortionary (De Oliveira, 2015). However, initially many countries have adopted protectionist LCPs at some time in their history, which were later significantly constrained by supra-national organisations such as the World Trade Organisation (WTO), as one of the type of performance requirements. Therefore, the accession of a country to the WTO always raises the question as to how governments of the country can adjust their LCPs to the new requirements and changing environment of the industry's structure to enhance and support indigenous development. Second, industrial trends toward accelerated digital development and transformation in the whole economy, and particularly in the O&G industry, need to be taken into consideration when designing policies and expanding the focus from the manufacturing sectors to include adjacent service industries (UNCTAD, 2018). In case of LCP - from the O&G sector to include adjacent service industries.

Another recent trend is that nowadays scholars and public policy makers are increasingly understanding markets from a network and ecosystems perspective implying the need for change in public policy (Moore, 2006). According to Vargo and Lush (2017) research in this direction can benefit from the theory of value co-creation. They particularly argue for attention to the following research questions: how might public policy be modified to become more beneficial to society by encouraging collaboration and coopetition among firms in national and global service ecosystems, and what governance (institutional)

safeguards would be necessary? And are there any particular institutions that are more relevant or that may need to be developed for digitally based service ecosystems?

1.2 Background

This section is aimed at providing an overview of the development of the LC theory and explaining the reasons why regulation in the O&G industry has emerged.

The first attempts of the governments to improve the capabilities of local companies involved in the O&G industry can be traced back to the early 1900s in the USA (Kalyuzhnova, 2008). However, the topic of how O&G industry development affects the national economy attracted considerable attention from economists specifically throughout the 1970s. This was due to the negative economic outcomes related to the O&G industry such as the decline of the manufacturing sector after the discovery of the large Groningen natural gas field in Netherlands, which was observed and described in economic literature (Ellman, 1981). With time this economic phenomenon became known as the *Dutch disease*, defined in The Economist (1977) as "an increase in the economic development of a natural resources sector of the economy and the decline in the manufacturing sector and agriculture". The issue that some sectors of the economy, mainly manufacturing and agriculture, decline with the development of natural resources, has also been widely observed in other countries (Barker and Brailovski, 1981), notably oil exporters such as Kuwait (McKinnon, 1976), Australia (Gregory, 1976; Snape, 1977), the UK (Forsyth and Kay, 1980), and Norway (Enders and Herberg, 1983). The economic model explaining Dutch disease was orginally introduced by Corden and Neary (1982) and is based on his *Theory of Protection* developed in 1971. According to this theory, two tradable sectors exists: one of them, usually an extractive industry sector, is booming, while the other one, usually the manufacturing and agriculture sector, is lagging behind, i.e. not booming. The third sector involved is a non-

tradable service sector. Corden argued that when the boom in the O&G sector is expected to be temporary, policies should be adjusted in order to protect the lagging sector from the potential non-optimal decumulation of physical and human capital[8] during the boom period.

Another economic problem related to the O&G sector was observed and noted in the late 1990s. It had been discovered that the O&G industry dominating economy supress economic growth and often RRC are unable to use wealth to develop their economies, and have therefore a lower economic growth than expected, even lower than natural-resource-scarce economies (Sachs and Warner, 1995). This phenomenon has been called a "paradox of plenty" or "resource curse".

Further research has distinguished two main reasons for lower economic growth in RRC[9]. The first reason is economic - the existence of a booming natural resources sector of the economy and lagging manufacturing sector, a rise in the relative price of the non-traded good (services) corresponding to a real appreciation of the national currency, making investments in the national manufacturing sector less attractive than importing goods (Corden and Neary, 1982). This was a result of the phenomenon when the total economic costs of imported goods fell below the total economic costs of investing in domestic manufacturing of the same goods. The second reason is comprised of two non-economic factors - political and institutional – namely it is an inability of governments in RRC to effectively manage incomes from the natural resources. For instance, this includes government corruption, or governments managing wealth from natural resources in their own interests rather than in the interests of the whole society[10].

[8] Accumulation/decumulation of physical capital refers to an increase/decrease in the saving rate increase/decrease steady-state physical capital per worker and therefore increases/decreases output per worker. Accumulation/decumulation of human capital refers to an increase/decrease in how much society "saves"/"lose" in the form of human capital – through education, and on-the-job training – increases/decreases human capital per worker, which leads to an increase in output per worker (Blanchard, Amighini and Giavazzi, 2010).

[9] Literature review on this topic can be found in Stevens, Lahn and Kooroshy (2015).

[10] See for example: Karl, 1997; Ross, 1999; Auty, 1994 and 2002.

The history of the O&G industry governance and attempts to maximise the economic benefits of the energy sector for host countries, can be traced back to the establishment of the first O&G companies in various countries around the globe. The first observation was made during the growth of the USA oil industry in the second half of the 19th, until the beginning of the 20th century. The period of the first protectionist era begun in the 1930s, followed by the exploration of the of North Sea deposit by the Netherlands, the UK and Norway in the 1970s, which witnesses the first attempts to develop the concept of LC (Kalyuzhnova, 2008). At this time many recognised the National Oil Companies as the engine to develop the linkages[11] with other sectors of the economy and an instrument of capital accumulation, therefore also increasing the role of the state in O&G management (Fee, 1988; Auty, 1990; Stevens, 2008). The establishment of powerful state-owned NOCs in emerging countries in the 20th and 21st century, including Brazil, Mexico, Angola, Nigeria, Ghana, Uganda, Trinidad and Tobago, Kazakhstan, Indonesia, Oman, and Tanzania has given a new impetus to the O&G management through government interventions (Stevens, 2008).

Countries also applied LCPs in industries other than O&G. Veloso (2006) argued that throughout the 20th century, developed counties such as Canada used LC regulations in the auto industry, Australia - in the auto and tobacco industries and European countries - in the auto and electronics industries. If developed countries just have made some use of policies such as content requirements, or export performance to nurture their local industries, the emerging nations have applied these policies across most industries. For instance, China and Brazil introduced LC into the wind energy industry. At the country-regional level LCPs

[11] Linkages refer to the relationships created by companies with other actors, such as other companies as well as academic and research institutions. Typically policies aiming at linkages development attempt to enable increased interaction between local and international companies.

in the wind power industry have been also applied in the province of Quebec, Canada (Ado, 2013).

Throughout recent years, these attempts to regulate the O&G sector coincided with significant swings that oil prices have been undergoing. At the same time the forecast does not predict a significant rise in oil prices in the nearest upcoming years. Altogether this could lead to the stagnation of a few development projects in the O&G industry due to the budget pressure resulting from the increasing focus of organisations on the cost efficiency. This gave more attention to the question of how stakeholders in resource-rich countries will still be able to continue the increase of in-country value in the most effective manner for all stakeholders. Today, economic and investment cooperation is also being increasingly influenced by political agenda. This has resulted in policies to international regulations of capital investment, especially in the energy sector (Pichkov and Rakov, 2016).

This forced ERRC to increasingly insert requirements for LC into their legal framework for directing procurement processes, human resources practices, technology transfer and social projects of O&G companies in different countries across the globe (CCSD, 2014). At the same time the LC share in the upstream O&G industry remains high in different countries: 70% - in Brazil and Malaysia, and 50% in Norway (Heum, Quale, Karlsen, Kragha, and Osahon, 2003), but remains below 30% in countries such as Kazakhstan (Elubaev, 2018). As a result, LCPs policies have become recognised as a significant topic, especially in the O&G industry, currently attracting more academic focus and global attention than ever before (Ado, 2013).

Norway is considered to be one of the first successful countries in developing domestically based competencies in the upstream O&G sector. Norway managed to increase LC share through policy instruments to enhance LC (Heum, 2008). According to OECD (2007) since discovering O&G reserves in Norway, the national authorities have managed

the administration and gained control over the petroleum activity, as a fundamental requirement in order to maximise value for Norwegians. In this model, foreign companies started to carry out all petroleum activities on the Norwegian continental shelf. Subsequently, Norway launched a state-owned company - *Statoil*, and later - *Saga and Norsk*, which allowed Norway to secure substantial revenues from the O&G sector and develop its own skills and technological know-how. The current resource management model requires all oil companies to be responsible for the actual operation of petroleum activities on the Norwegian continental shelf, in a *competitive and cooperative framework* (OECD, 2007; Mitzner, 2016).

However, the approval of the authorities is required at all stages of the petroleum activity: exploration drilling, plans for development and decommissioning plans. Despite this, agreements and licenses are attributed in a very flexible and innovative way. The authorities award production licences to a group of companies instead of just one company. The Ministry of Petroleum and Energy established a licensee group, in which companies must exchange ideas and experience and share the cost and revenues associated with the production license. Major development projects or matters of great public importance must be discussed and approved by the National Parliament. The government holds executive power over petroleum policy. The Ministry of Petroleum and Energy is mainly responsible for the resource management and the sector as a whole (OECD, 2007).

As a result of this policy, Norway has achieved a high LC share: it is generally at the level of 50-60% (measured by value added), and it is more like 80% in connection with maintenance and operations (Heum, 2008). According to Heum (2008:4), the essential success factor in developing LC for any country including Norway is "to stay dedicated to the fundamental task which is to involve and enhance the domestic knowledge base through arrangements that allow for a dynamic industrial and technological development, that gradually expands domestic competences and capabilities to competitive levels".

However, even best practices should be taken with caution, as some researchers have noted; the approach that was successful in the past may not lead to success today in a different country (Guriev and Tsyvinski, 2011). Thus, with the exhaustion of the oil fields in developed countries in the 2000s, and the discovery of new oil reservoirs in emerging countries such as Brazil, Trinidad and Tobago, Kazakhstan and many other countries, the practice of LCP adoption has shifted to these regions. Research interest has reflected this trend (Ngoasong, 2014). Countries that have recently discovered O&G reserves, particularly on the African continent, are Angola, Nigeria, Ghana, Tanzania, Mozambique, Uganda, Madagascar and Kenya. In these countries significant progress towards commercial development has been made, often using LCPs as an instrument to enhance linkages between the O&G sector and other economic sectors (Nwapi, 2016).

In 2014, the O&G industry faced the prospect of a long-term low-price environment, and adopting information and communication technologies became essential for improving operational excellence of the O&G industry in the new market conditions (Rockwell Automation, 2015). Currently, international O&G companies are experiencing a new industrial revolution (NIR) based on convergence of new digital economy (NDE) – the economy based on new digital technologies (UNCTAD, 2017b). As ICT technologies, including digital, are considered to be at the cornerstone of a world economy in the future. That is why ERRCs face the need to adopt strategies to diversify their incomes from the O&G industry to the growing service sector, principally to the ICT industry. How local companies are able to respond to these trends is especially important for ERRCs where technological expertise is missing (for comparison of the knowledge intensity of economies see OECD, 2016).

Development of ICT technologies resulting from the energy sector (Hirschman, 1981; Fee, 1988; Auty, 1990) is extremely important for the ERRC. Kazakhstan is one example, as it strives to diversify its economy, even though the energy sector still plays a

dominating role. So, for example, at the beginning of 2000ss, this country embraced economic diversification as a "national idea" with the aim of co-financing a wide range of development projects from small businesses support to infrastructure, with a focus on LC in the O&G sector, high-technology industries and agriculture (Guriev, Plekhanov and Sonin, 2009). Recently, Kazakhstan has introduced the programme *Digital Kazakhstan* which includes four main parts: development of high-technology digital infrastructure, the establishment of a digital government, improving digital literacy of the people and advanced training of specialists in the field of information and communication technologies, and as a result - digital transformation in the economy sectors (Zerde, 2017a).

It can be observed that Russia is also taking steps in implementing development policies for the software industry based on an import substitution approach. Since 1 January 2016, foreign software in general is banned from public procurement. This also includes private entities with a significant government stake, such as *Sberbank* (a major bank) and *Rosneft* (a major O&G company). Recent research reported that in Russia, 65-95% of software is of foreign origin (Connolly and Hanson, 2016). As the Russian government is one of the leading purchaser of software in the financial and O&G sectors (major players in these industries are state-owned), the import substitution programme may consequently have a significant impact on imports and the economy as a whole. However, the countries of the Eurasian Economic Union with the rapidly developing information technologies sector, notably Kazakhstan and Belarus, are given preferences (EEC, 2015).

Research suggests that successful economic diversification can be defined as the rise of new industries (McMillan and Rodrik, 2011), which occurs when a substantial and sustained investment in activities that are close to a country's existing areas of comparative advantage exists (Gelb, 2010). Other research suggests defying the comparative advantage and miss out steps on the ladder (Lin and Chang, 2009; Rodrik, 2011) and suggest the FDI as an important component of policies for development (Buzdugan and Tüselmann, 2018).

Chakrabarti and Ramaswamy (2013) have argued that in the new creative economy comparative advantage is now tied to the context of value generated as a function of co-creation. Connolly (2012) and Connolly and Hanson (2016) argued that producing more outputs of high technological intensity can help to promote the expansion into knowledge-intensive activities, and can also lay the foundations for further structural transformation in the future.

This dissertation is based on this idea and further examines diversification policy in the O&G industry in the ERRC, focusing on building local ICT technological capacity through the digital transformation based on value co-creation between actors in the O&G industry network. The research explores how this can in turn be used for the diversification of the economy of Kazakhstan from the resource sector to the new industries, and finally how IPs should be adapted for further support of local industry development. This work provides a theoretical background on the strategic responses of O&G companies to LCPs set by the government, as well as elaborating on the local content development (LCD) in the ERRCs, with a focus on the strategic transition of the O&G industry toward digitalization[12]. This dissertation offers a new approach as to how LCP in Kazakhstan can be adjusted in order to meet current global trends in the economic and business environment in the context of new institutional circumstances. It further elaborates on how IPs in ERRC should be adapted in order to foster the support of local industry development in Kazakhstan; and suggests how these policies can be adjusted in order to support the LCD through value co-creation in the O&G sector and the technological upgrade.

[12] Digitalization is a process of digital transformation to improve performance.

1.3 Purpose and motivation of research

LCP was previously approached by researchers predominantly from the macro-economic and political economy perspective (i.e. Kolstad and Kinyondo, 2015), hence omitting a more profound analysis, and application of this policy at the micro-economic and industry levels. The overview of macro-economic theoretical perspectives will be given in Chapter 2. The main part of this dissertation (Chapters 3 to 5) is aimed at expanding the existing academic research on LCP by analysing it from the micro-economic as well as from the industry level, providing a new approach to LCD. This research is motivated by the question of how theory can explain the role of LCP in the development of indigenous technological capabilities in the O&G industry in resource-rich countries.

Blomström and Kokko (1997) suggested already 20 years ago that market size, LC regulations and technological capability of local firms are inter-connected. They proposed that if linkages between the owner of the technological expertise and local companies grow over time, the level of local entrepreneurs grows, new suppliers emerge and LC increases. However the discussion between supporters of businesses and government points of view on how such linkages may develop still continues. Nowadays, there is still a call for more policy-relevant research to complement business and government views that have dominated LC policymaking to date (OECD, 2014). With globalisation and digital transformation disrupting all sectors of the economy, as well as the recent oil price shock in the O&G sector, it has become evident that there is still a significant gap between advanced countries and ERRCs in terms of levels of their economic development (WEF, 2015a). It is now widely accepted that the market mechanism does not always effectively allocate resources, leading to "market failure"[13] (GLA Economics, 2006). This is the reason for different forms of government participation in wealth distribution in the oil and gas sector through creation of

[13] Market failure is an economic term covering all circumstances in which the market equilibrium is not efficient (Begg and Ward, 2013).

NOCs (Stevens, 2008) or diversification from primary industry sectors to the new, emerging industries such as, for example, information technologies, with the purpose of doing this effectively for future sustainable development (Barton, Horváth and Kipping, 2016). The aim of this research is therefore to explore a way in which different disciplinary approaches and views can be integrated for the development of local technological capabilities.

For this purpose, the theory of value co-creation is adopted (Gummesson and Mele, 2010; Vargo and Lusch, 2011; Aarikka-Stenroos and Jaakkola, 2012; Jaakkola and Hakanen, 2013) as a theoretical lens through which to explain local capabilities development at the micro-level. This theory appropriately explains why different actors, for example foreign-owned and indigenous companies in the O&G network, agglomerate and share resources. The reason is that they create value for each actor by sharing, exchanging resources and working together on the development of business opportunities in the host country. The research will contribute to three streams of the literature: to business strategy, applying the theory of value co-creation to the settings of the O&G sector; to strategic IT, focusing on the role of ICT technologies in value co-creation within the O&G sector network; and international business literature.

The main part of the thesis comprises of three chapters in the form of research papers of publishable quality.

1.4 Philosophical foundations of the study

Although LCP in the O&G sector originally emerged in resource-rich countries as a tool which was utilised by governments to maximise the gains of foreign direct investments, generate broader economic benefits for the local economy and develop other important sectors of their domestic economies (Richardson, 1993; Kalyuzhnova et al, 2016; Johnson, 2016), too little research has explored how the international companies strategically respond

to these policies and participate in cooperation with local stakeholders (Hansen, 2017). Moreover, Ngoasong (2014) argued that the role of LC in stimulating economic development of petroleum-producing countries critically depends on the business practices used by IOCs to respond to LCP. On the other hand, with the growth of the digital economy transforming the O&G industry, the importance of social and economic issues related to information technologies in the O&G industry has been increasingly recognised over the last decade (Devold, Graven and Halvorsrød, 2017). However, the fast pace of the digital revolution did not allow researchers to accumulate quantitative data yet. The need for new knowledge about this phenomenon in this situation, has led researchers to adopt empirical approaches that are based on qualitative studies. Vargo and Lusch (2017) suggested that exploratory, practice-driven case-based research, involving observation of practices of policies that could not be adequately explained by existing theory, could be based on the value co-creation framework. This research is positioned in pragmatism as the ontological research paradigm – practical way of thinking about things or dealing with problems and concerned with results.

Thus, to deal with the complexity of this exploratory research, in this thesis both conceptual and qualitative analysis have been used, bringing together multiple complementary case studies and theory. Case studies, in turn, have been built on the interviews with industry experts, company representatives at top management level, as well as comprised of the extensive secondary data review such as documents and web-sources conducted specifically for this research. The theoretical foundation is provided in order to demonstrate the application of value co-creation theory to the LCD. While building a strong theoretical background for the strategic perspective on LCP, the research is based on qualitative analysis, hence leaving space for further research based on quantitative data when such data is accumulated and made available to researchers.

Eisenhardt (1989) and Yin (2008) have legitimised the use of case studies as a scientific method and provided researchers with specific guidelines for conducting rigorous

Table 1. Research epistemologies in the case study method.

Positivist	Interpretive	Critical
Formal propositions	Assessment of meanings that participants assign to phenomena	Emphasizes the processual development of phenomena and assume that contradictions are inherent in existing social forms
Quantifiable measures of variables	Understanding the deeper structure of a phenomenon within cultural and context situations	Quantitative data collection and analysis are used, although to a lesser extent. Research tends to be longitudinal due to processual view of phenomena
Hypothesis testing	Hypothesis generation for further investigations	Hypothesis generation for potential enacting a change in social order
Generalization from sample to a stated population	Generalization from the settings to a population is not sought	Generalization towards regularities rather than cross-sectional differences

Source: Author, based on Orlikowski (1991).

case study research (Piekkari, Welch and Paavilainen, 2009). According to Piekkari et al. (2009) the case study is conceived as "a research strategy that examines, through the use of variety of data sources, a phenomenon in its naturalistic context, with the purpose of "confronting" theory with the empirical world". In current research this confrontation takes the form of identifying constructs (in Paper 1) for later theory building in Papers 2 and 3 (Ragin, 1992). Justification of the methodology can be found in the methodology chapter of each paper.

Chua (1986) classified research epistemologies into positivist, interpretive and critical stances. Therefore, a case study can be positivist, interpretive or critical (Orlikowski, 1991), depending on the underlying philosophical assumptions of the researcher (Myers, 1997). Eisenhardt (1989:546), adopted a positivist approach to case study research, namely "the development of testable hypotheses and theory which are generalizable across settings", focusing on case studies for theory building in management research, and Yin (2003) more

on practical concerns for application to policy making and consulting (Piekkari et al, 2009). Ragin (1992) defined two approaches related to how case study can be used for theorizing – namely, variable-oriented and case-oriented research. Variable-oriented case study research seeks to decompose the research subject into variables, whereas case-oriented case study research produces "holistic and particularized causal explanations for the outcomes of each case under investigation" (Piekkari et al., 2009:570). The focus of theorizing in a variable-oriented case study is on tracing the causal processes that generate outcomes, regardless of context. This type of research seeks to identify general causal laws that can predict the relationship between variables.

Case-oriented research often draws on critical realist theory. The focus of theorizing in this type of research is on tracing the causal processes that generate outcomes in a specific context. Critical realists advocated use of case studies for theory testing with cases that are most likely and least likely to confirm or disconfirm theory (Piekkari et al, 2009). Another kind of case-oriented research is grounded in the interpretivist tradition that reality is not a set of given data of facts, and that social reality does not exist outside of social context but is rather an interpretation of the constructs of reality individuals make. The researcher chooses between positivist and interpretive approaches based on the research question and the nature of phenomena (Orlikowski, 1991).

In this dissertation I use interpretive (Klein and Myers, 1999), or explanatory philosophical foundations in Yin's terminology, as the aim of this research is theory testing and the development of recommendations for policy makers, rather than theory development. Daft and Wiginton (1979) suggested that the positivist approach is not complex enough to reflect all of the inherent complexity, ambiguity, and instability of organizational systems. The interpretivist case study approach has been adopted in this thesis, as the phenomena under investigation are complex, dynamic, social phenomena that are both time and context dependent.

There is nascent literature on how LCPs can be implemented in an efficient way in the settings of certain national context, or how to optimise different forms of linkages within and outside the extractive sector using privately-led initiatives and collaborative partnerships. Linkages development requires policy design with collective efforts and responsibilities, as well as leadership from the private sector (Ramdoo, 2015a). We know little of the role of information technologies linkages within and outside of the O&G sector. The contribution of interpretive research philosophy in this study is that it reveals the underlying connections between different parts of the research phenomena by examining the social rules and meanings that can make particular social practice, such as policy implementation, successful.

1.5 Overview of papers

This thesis includes three main interconnected chapters which are centred on LCD in the O&G industry. The first chapter provides the theoretical background for the whole dissertation, elaborating on the steps which lead to the LCD. A new strategic perspective on LCP is based on the value co-creation between various actors in the O&G industry on the example of resource-rich emerging economy of Kazakhstan. The second chapter explores how value co-creation leads to the technological upgrade in the indigenous industries. A model of value co-creation is developed between different actors, including an ICT provider[14]. The focal study in this chapter examines the case of the China National Petroleum Corporation (CNPC). The third chapter considers the value co-creation process in order to combine value co-creation theory with international business theory. This part of the research is focused on the example of the foreign-owned ICT provider in Russia. In combination, the case studies explore the core components of the framework of value co-

[14] ICT provider is a department or an entity, supporting companies with ICT, including technologies and services.

creation and provide the foundation for a collaborative approach, suggesting new conceptional model for LCD.

The set of papers comprising this research intends to contribute to a central argument of the thesis: in order to achieve the development of indigenous technological capabilities and diversification, LCP should support value co-creation in the network environment of the O&G industry. Each paper advances the topic of the thesis as described below. While the thesis is focused on the type of IPs in the O&G industry, i.e. development economics at meso-level, the research is multidisciplinary in nature and has been sensitised by diverse research traditions and ideas from varied fields such as information systems strategy, developmental economics at micro-level and strategy in international business settings. The papers in this thesis further employ different foci to answer related questions.

Paper 1 (Chapter 3). "Value co-creation and local content development"

The first paper provides the foundation for the subsequent papers in this thesis by theorising about LCD through the lens of the value co-creation theory. The purpose of this paper is to provide an introduction to the empirical settings of the O&G industry in Kazakhstan. The main aim of the research is to introduce LCPs, and also to demonstrate how one of three major O&G consortiums, as well as local companies and other actors, responded to them. The paper in particular, discusses the significant success Kazakhstan achieved in attracting foreign direct investments into the O&G sector. However, some researchers, and especially policymakers, have expressed substantial scepticism toward foreign companies. So for example Penrose (1968:267) warned that foreign firm in international petroleum industry in some cases can choose the strategy "to take the cash and let the credit go" in developing countries. More recently the concerns in host countries are stemming from the fact that

international oil companies tend to procure intermediates from their global value chains, i.e. to import (Hansen, Buur, Mette Kjær and Therkildsen, 2015).

Nevertheless, in Kazakhstan, the major O&G exploratory projects are managed by international consortiums, and the share of the NOC "KazMunayGas" in these three projects is just 15.6%, unlike other countries for example Russia, China and Kuwait, where the O&G industry is dominated by domestic or state investors. Thus, there appears to be a low degree of domestic control on the sovereignty of natural resources in Kazakhstan. Therefore, the citizens of Kazakhstan have raised concerns, thus pushing the governments to enact IPs stimulating domestic development, so that international companies can procure more goods domestically instead of importing. From the point of view of the citizens, this will guarantee jobs, economic development for their country and more fair distribution of oil rents.

Following Kazakhstan's recent accession to the WTO in 2016 a number of questions have been raised:

- How at the strategic level, do foreign and local O&G companies, as well as other stakeholders, respond on LCP?
- What is the theoretical underpinning for LCP in the network industry's structure?

This paper considers the case study of Karachaganak Petroleum Operations (KPO) – an international consortium developing one of three major oilfield exploratory projects – as well as cases of other O&G companies, government institutions and industry associations in Kazakhstan. The unit of analysis in Paper 1 is an organizational network. An organisational network that includes a focus company in the settings of environment is a fundamental unit of analysis in the study of industrial societies (Benson, 1975). Rodrik (2013) concluded that the focus these days may need to be more on segments of industries rather than on entire industries, and more on foreign investors than local ones. But ultimately the principles of cooperative IP based on public-private partnerships (PPP) still apply.

This work demonstrates that the strategic response of O&G companies on LCP can be explained through the lens of the theory of value co-creation. The theory explains that organisations can co-create value and therefore gain a competitive advantage. This thesis fills the research gap in the literature, established in Chapter 2, explaining how organisations strategically respond to the LCP.

Value co-creation theory emphasises that value emerges when actors integrate and apply resources together with other actors (Gummesson and Mele, 2010; Jaakkola and Hakanen, 2013). Stakeholders participating in the O&G industry are international and local companies, the government, represented by national O&G company, development agencies, banks, and finally IFCs, for example industry associations. This paper applies a new, more collaborative approach to LCPs based on the theory of the value co-creation. The main contribution of the paper is to integrate the theory of value co-creation with development policies in the O&G industry.

Another main factor after liberalisation of the industry, associated in Kazakhstan with the creation of EAEU and accession to the World Trade Organisation (WTO) in 2015, is that the O&G industry is experiencing the convergence of NDE (IIC, 2015) and ongoing projects on ICT transformation towards accelerated digitalisation. O&G companies are restructuring their ICT departments and creating internal ICT providers. This technological disruption puts more pressure on domestic companies who do not have resources and knowledge to adopt new technologies, which encourages national policymakers in emerging countries to also include ICT in their developmental agendas, such as LCPs. For this reason, in Kazakhstan, ICT is not only the focus of LCPs for the O&G industry (as part of O&G procurement), but LC targets also exist for the ICT industry itself. Taking into consideration that digital transformation of the O&G companies is a top strategy for the O&G sector (Gartner, 2017) the research focus of Paper 2 is on how information technologies can enable local capability development, and also makes recommendations for policymakers in the light

of accession of the country to the WTO, prohibiting performance requirements such as LCP. This study will provide a deeper context for the conceptual model of LCD, examining how ICT technologies can enable local capability development, and proposing a model of ICT-enabled[15] value co-creation in the multiple stakeholder's environment of the O&G industry, which explains the role of IT in the value co-creation process in the network of multiple stakeholders. This is a conceptual qualitative case study research based on interviews with company managers[16], and industry experts (for list of interviewees see Appendix 1), conducted in Kazakhstan, as well as analysis of company and government documents (see examples in Appendices). Overall, Papers 2 and 3 focus on two main types of FDI, namely greenfield investment and acquisitions, as ways of enhancing indigenous capabilities and developing LC in the host country.

Paper 2 (Chapter 4). "The business value of IT in multiple-stakeholder's environment: the case study of the O&G industry"

If Paper 1 represents a picture of the stakeholders in the O&G industry, affected by LCPs, and proposes a conceptual model of LCD through value co-creation leading to technological upgrade. Paper 2 (Chapter 4) is focused on technological upgrade and explore how it occurs, presenting a view on how ICT technologies connect different actors in the O&G industry, and how they enable business value creation and therefore improve the competitiveness of indigenous companies. More specifically, the research questions in this paper are:

- What are the levels of technological capabilities development in the O&G industry of Kazakhstan?

[15] ICT-enabled product and services are business opportunities emerging from use of ICT.
[16] NOC KazMunayGas, Atyrau refinery, China National Petroleum corporation, Richfit International, MH Industries, Belkamit LLP, Lina Ltd, KazTechOil Services LLP, KPI Inc etc.

- How are indigenous technological capabilities co-created in the network of the O&G industry: within each company and between companies and sectors?
- What are possible spillovers between the O&G and IT sectors, and how can it provide potential for companies to improve competitiveness by creating inter-industrial clusters?

Paper 2 itself presents a multiple case study analysis of (1) an international O&G company from China operating in Kazakhstan, (2) the *National O&G company KazMunayGas (NOC KMG)* and (3) a local SMEs in the settings of their environment (other stakeholders in the O&G industry). This study is focused on ICT technologies, as Kazakhstan has implemented requirements to procure domestic ICT goods and services as part of LC requirements for the O&G industry, as well as LC requirements for the ICT industry itself. The case study is centred on the ICT provider of the Chinese O&G company (*CNPC*) as a result of greenfield investment in Kazakhstan. Currently, international O&G companies are experiencing convergence of NDE. How local companies and governments respond to these trends is especially important for their long-term survival. Development of ICT technologies which may result from the energy sector is also extremely important for resource-rich countries such as Kazakhstan, where the energy sector still plays a dominating role for the country in their attempt to diversify the economy. Adopting digital technologies, for example cloud computing, may allow implementation of standard ICT services in a network of organisations in a short period of time, and make it possible to respond in a timely manner to business strategy changes.

This paper aims to fill the gap in our understanding of how participants in the multiple stakeholder's ecosystem of the O&G industry align different IT resources to equitably partake in value co-creation. Companies agglomerate in network because by cooperating with each other and sharing resources they can create more value for each individual actor. Value co-creation theory considers specific theoretical and empirical occurrences in which

companies and customers generate value through cooperation, and defines co-creation as the interaction of suppliers and customers for the development of new business opportunities (Vargo and Lusch, 2008; Galvagno and Dalli, 2014). I apply this theory to the circumstances of the O&G industry in order to explain how actors in this network interact with each other for the development of new business opportunities. Built on the review of the literature in Chapter 2, and the guiding theory of value co-creation, this paper develops a model at the network level for the O&G industry, which describes the process of inter-company alignment between IT and organisational strategy, and explains how this leads to local industry development. This is a conceptual qualitative case study research based on interviews and analysis of secondary data sources (see Appendices).

Paper 3 (Chapter 5). "Value co-creation in ICT services company: a case study of a cross-border acquisition"

The exploratory study reported in Paper 2 demonstrates that international O&G companies, as well as national oil companies and local SMEs, can co-create value at network level, with ICT technology being the core enabler of the value co-creation process. The focus of this study is an ICT technological company, which was established as a subsidiary of the international O&G company CNPC. This foreign-owned company supplies O&G from Kazakhstan to China and the reason for investments is resource-seeking. In contrast to this study, I consider a case of value co-creation in the ICT provider – a subsidiary of the global ICT company operating in Russia. I explore transaction links between actors in the network of actors around the ICT provider and how the value is co-created in this network. The research questions in this paper are the following:

- How is value in the network of foreign-owned ICT provider and O&G customer co-created?

- How can value co-creation be affected in cross-border acquisitions?

This case study also represents another alternative way of entrance to foreign market, namely acquisition mode. For instance, according to UNCTAD (2017a), in 2016 cross-border M&A in extractive industries improved due to the second largest deal of the year, the acquisition of the *BG Group PLC* (UK) by *Royal Dutch Shell PLC* (Netherlands). Companies looked beyond frontiers to acquire targets, due also to the technological gap, poor sales of local firms, the improvement of human capital in many countries, as well as a part of the desire to expand regional trading blocs more easily (Marinescu and Constantin, 2008).

The Russian case study is of particular interest in my research for a number of reasons:

1) interviews with ICT executives from *NOC KMG*, which found that ICT industries in Kazakhstan in Russia are very connected, due to the common economic past, with O&G industries still dominating both economies;

2) Russia and Kazakhstan established the *Eurasian Custom Union* in 2010, and the *Eurasian Economic Union (EAEU)* in 2014. This would lead to the creation of a single entity in international trade deals including the WTO, and free migration of labour resources between countries;

3) the Russian and Kazakhstani economies are both heavily dependent on the O&G sectors and major customers for the ICT sector are O&G companies.

For instance, the principal customers for the company discussed in Paper 3 are domestic O&G companies such as *Lukoil, Rosneft, Gazprom, Tatneft, Surgutneftegas, TNK-BP* as well as *NOC KMG*.

According to ICT indicators in the Global Innovation Index 2017 (Cornell University, INSEAD and WIPO, 2017), the Russian ICT industry is more developed than

the Kazakhstani ICT industry due to the availability of highly-skilled human resources in technical disciplines, as well as advanced educational systems, along with the focus of both countries on industrial development policies. If Paper 2 develops the central argument made in the thesis, then Paper 3 develop the argument further by adopting an additional case study in a similar market and examining how value is co-created in a subsidiary of a global ICT company operating in Russia.

Paper 3 studies how post-acquisition integration can affect value co-creation in multinational organisations operating in emerging markets. This is especially important for ICT as a services industry, where value co-creation between actors plays an important role. This is the reason for considering the case study of a company from the information technology industry. This paper is a conceptual qualitative comparative case study of two consequent acquisitions within a global ICT company in Russia, based on interviews with managers of this company (for list of interviewees see Appendix 3). Interviews are conducted in Russia and Germany.

1.6 Central arguments

Two different approaches - *protectionism* and *laissez-faire* – have been used by countries to develop local industry. However, both of them led in the past to a number of crises: a protectionist approach has for example led to the debt crisis in developing countries in the mid 1980s, with subsequent rejection of protectionists import-substitution strategies, and laisse faire – to severe output losses in former Soviet Union and Easter European countries (Radosevic, 2009; Rodrik, 2009). At the same time, countries such as China, India and Vietnam that pursued more interventionists' policies demonstrated rapid growth under the

Washington Consensus (WC) approach[17]. However, in the period after the mid-2000s, emerging countries realised that both approaches had diminished their relevance. Economists agreed that the modern development policy should recognise the facilitating role of the state in the process of industrial upgrading; however, this should be based on the market as an allocation mechanism, taking into consideration the country's comparative advantages (Lin, 2012). Yet, the theoretic explanations supporting this new approach are missing. The aim of this thesis is to fill the gap in understanding of the new approach to development policy at micro-level. Previous research in international business, however, has also stressed that foreign MNEs tend not to agglomerate with local domestic companies, but are willing to agglomerate with other foreign MNEs (Mariotti, Piscitello and Elia, 2009). This is, in large part, why governments of resource-rich countries pursue policies aiming to develop their domestic industrial capacity to support links with indigenous firms, and not only with other foreign MNEs. As such, further research is necessary to make such initiatives as successful as possible, accepting that out knowledge about them will continue to evolve (Tirole, 2017).

The central argument of the thesis discussed in Paper 1 and explored more deeply in Papers 2 and 3, is opposed to both approaches to IP that have been abandoned in the past, namely:

1) protectionist approach, assuming that governments should adopt protections-style LCPs;

2) laissez-faire or WC approach, assuming that regulation is not necessary, and the development of the indigenous industry can be achieved through trade- and FDI-liberalisation, privatisation, and deregulation).

[17] A set of inter-related policies focused on macro-economic stabilisation in state-directed economies and based on fiscal discipline, tax reform, liberalisation of interest rates, competitive exchange rates, trade liberalisation, liberalisation if FDI, privatisation and deregulation (Radosevic, 2009).

My argument is however in line with the contemporary view, combining two approaches: the state needs to assist LCD facilitating value co-creation between foreign-owned and indigenous companies. Nowadays, the protection view to some extent is still often expressed by the governments of the resource-rich countries, and the more liberal approach is often defended by foreign investors.

Nowadays, it is also necessary to take into consideration the role of information technologies impacting all industries, including O&G. Information technologies can enable LCD, connecting different stakeholders such as IOCs and SMEs in networks where they can co-create value within the O&G value chain. Development of ICT technologies for the O&G sector can create backward, forward and horizontal linkages and therefore provide potential for spillovers and diversification, which is the aim of LCP. The process through which LCP facilitates LCD by means of ICT adoption in O&G networks is understood in this thesis as "value co-creation in the multiple stakeholder's environment and is theorised as follows:

- the O&G industry is a highly integrated environment where companies tend to create networks of organisations, including different stakeholders such as governmental bodies, banks, international O&G companies, indigenous SMEs, national oil companies, ICT providers, educational institutions and research organisations (Paper 1, Chapter 3);
- LCPs reinforce foreign investors to cooperate with different stakeholders on development of the domestic industrial capacity over the integration of foreign technologies and the domestic industry (Paper 1, Chapter 3);
- the reason why different stakeholders integrate is that in networks they can share different resources and co-create value through exchange of technologies and information (Paper 1, Chapter 3);

- digital technologies enable actors in the multiple-stakeholders' environment to co-create value through ICT technologies (Paper 2, Chapter 4);
- knowledge and technology spillovers from foreign investments reinforce the competitiveness of the indigenous companies and therefore support local industry development (Paper 2, Chapter 4);
- foreign companies can contribute to the development of ICT in the O&G sector through greenfield investments in ICT subsidiaries of international O&G companies, as well as through acquisition of indigenous ICT companies (Paper 2 and 3, Chapters 4 and 5);
- the value co-creation process is critical for maintenance of linkages and transfer of knowledge and technologies between foreign-owned and indigenous actors in knowledge-intensive environment (Paper 3, Chapter 5);
- LCPs should take a more collaborative approach in defining the expectations of the government, while providing the IOC with flexibility to develop its own LC plans and procurement procedures, in order to achieve greater results (Discussion, Chapter 6);
- LCPs should support the creation of inter-industrial linkages; among them, inter-industry linkages between ICT and the O&G industries play an important role, as the ICT industry will be the core of every economy of the future. Therefore, inter-industrial linkages are essential for sustainable development because of their capacity to develop new industries such as information technologies which have the potential to connect users across industries, including beyond the bounds of the O&G sector (Discussion, Chapter 6);
- LCPs should support public-private participation through development of an inter-sectoral project for the digitalization of the O&G sector with both foreign and domestic private and public participation (Discussion, Chapter 6).

1.7 Contributions

Each of the papers in this dissertation contributes to the relevant literature. Paper 1 contributes to business strategy, applying the theory of value co-creation to the settings of the O&G sector; Paper 2 contributes to strategic IT and international business literature on the role of ICT technologies in the competitiveness of the local O&G industry, and Paper 3 contributes to literature on cross-border mergers and acquisitions in a knowledge-intensive environment. This study is conducted at a time when LCPs are gaining global popularity in the O&G industry (CCSD, n/d), but still lack academic attention to underpin the theoretical models. The thesis overall makes a theoretical contribution through the application of value co-creation theory to local industry development practices, exploring the role of information technologies as enablers for indigenous industry development. The study built foundations for the development of the Business-ICT value co-creation model at network level in the multiple-stakeholders' environment of the O&G industry, which include IOCs, NOC, SMEs, ICT providers, government institutions, banks and IFCs. In these ways, the thesis contributes to an understanding of the role of digital technologies in development. The study explains how stakeholders can share resources, including digital platforms, in order to co-create value. It explains interaction between IOC and SME at the relationship and individual level, and shows how such interactions may lead to indigenous development. In these ways, the study contributes to theory at the meso-economic level. The study also considers the cases of FDI-led development as a result of greenfield investments or acquisition. The chosen approach reflects new views on local industry development due to cooperation between foreign investors, local companies and the government. This thesis also emphasises the role of digital technologies in creating linkages between the O&G and other sectors of the economy, resulting in diversification, economic development and related policies.

1.8 Conclusions

This chapter has presented the core themes of the thesis, the problem and purpose of research and driving forces behind it, as well as giving an overview of the papers. It has also outlined the main arguments of the thesis and their overarching narrative. The next chapters develop the theoretical foundations for the thesis by discussion of the role of LCP and value co-creation in the development of indigenous technological capacity. Chapter 3 to 5 present the main body of this thesis. Table 2 provides a systematic overview the thesis according to each chapter, summarising its main focus, original contribution and research implications. Although the three chapters complement each other as they all focus on O&G industry digitalization and LCP, through applying and expanding on value co-creation theory, each one is an independent study in its own right, and provides novel findings for the respective literature.

Chapter 2 gives an overview of the theories and research streams relating to the LCP in O&G-rich countries, and discusses the economic policies implication. It also introduces two opposite views on LCPs, namely the protection view, often represented by the governments of the resource-rich countries, and the laissez-faire view, often defended by international companies. Chapter 2 also discuss recent trends such as digitalization and LCPs, and presents the overarching narrative between innovations and development. This chapter creates foundations, and connects theoretical discussions presented in the papers, which are constrained by the editorial standards of the journal publications, with the extended theory.

The substantive papers are presented in the following order: the first paper is about the strategies that companies adopt in response to LC requirements (Chapter 3). The second paper discusses the role of digitalization and digital technologies in local industry development, the core strategy adopted by the O&G companies after the price shock in 2014.

It is based on three sub-cases in the O&G industry, including ICT within IOCs, NOC and SMEs and in the network of organisations (Chapter 4). The final paper considers value co-creation in the setting of the cross-border acquisition of the indigenous ICT provider by an international company (Chapter 5). The thesis then discusses the key findings from the papers to develop and further justify the central arguments on indigenous industry development through the lens of value co-creation theory applied to the settings of the multiple-stakeholders' environment in the O&G industry (Chapter 6).

Table 2. Overview of the thesis according to each chapter.

	Chapter 3	Chapter 4	Chapter 5
Title:	Value co-creation and LCD	Business value of IT in multiple-stakeholders' environment: the case study of the O&G industry	Value co-creation in ICT services company: a case study of a cross-border acquisition
Objectives of the study:	To examine strategic responses of O&G companies on LCP – a type of IP - and provide theoretical explanation of the role LCP plays in the development of indigenous technological capabilities through value co-creation under conditions of the ongoing digitalization. To expand the existing academic research on LCP, which is predominantly informed by the macro-economic and political economy perspective, analysing LCP from the micro-economic as well as from the industry level. The research will also allow practitioners and policy makers to develop understanding of a strategic approach to LCP in order be better informed on decisions and policies.		
Themes:	The role of LCP in linking the actors and providing a basis for value co-creation leading to ICT technological upgrade and LCD in the O&G industry	Value co-creation and an ICT technological upgrade in the O&G industry	Value co-creation in the network environment of the foreign-owned ICT company
Objectives and research questions by individual paper:	How do foreign and local O&G companies, as well as other stakeholders respond on LCP at the strategic level? What is the theoretical underpinning for LCP in the network industry's structure?	What are the levels of ICT technological capabilities development in the O&G industry of Kazakhstan? How are the indigenous ICT technological capabilities co-created in the network of the O&G industry? What are the possible spillovers between O&G and ICT sectors and potential for companies to improve competitiveness by creating inter-industrial clusters?	How is value in the network of the foreign-owned ICT provider and the O&G customer co-created? How can value co-creation be affected in cross-border acquisitions?

Table 2. Continued.

Geographical Coverage:	ERRC, Kazakhstan	ERRC, Kazakhstan	ERRC, Russia
Methodology:	Conceptual/Qualitative, multiple case studies	Conceptual/Qualitative, multiple case studies	Conceptual/Qualitative, comparative case study
Data Sources:	Interviews, analysis of documents	Interviews, analysis of documents	Interviews, analysis of documents
Original Contributions:	First application of the value co-creation theory to the settings of the O&G industry. First development of strategic perspectives on LCPs. A conceptual model of LCD is proposed	First time to consider ICT technological upgrade as a result of value co-creation in multiple-stakeholders' environment of the O&G industry, and develop a value co-creation model	First application of the value co-creation theory to the settings of a knowledge-intensive service provider with foreign ownership
Research implications for: ... Companies:	International O&G companies when taking part in exploratory projects in resource-rich countries should take a strategic approach to LCD and recognize the wider business benefits of sharing wealth and co-creating value in O&G industry beyond the payment of royalties and taxes.	The research extends our knowledge of how organisations can cooperate in order to co-create value from digitalization of the O&G industry. Information technology can create a value connecting SMEs and international O&G companies. This improves competitiveness of indigenous companies by transferring technologies.	Foreign-owned companies need to develop a value co-creation perspective on business networks environment in the knowledge-intensive services, acknowledging the important roles of external actors, such as indigenous customers and employees. This is especially important in strategic change settings, such as acquisitions.

Table 2. Continued.

...Academia:	Existing theories are looking at LC mostly from a theoretical or macro-economic point of view. This is because LCPs are supposed to regulate the whole economy in the first instance, but little is still known about how organisations are affected by the implementation of such policies. This research fills the gap, proposing strategic perspectives on how companies respond to LCPs and how these responses can lead to technological upgrade.	The proposed conceptual model contributes to previous theory and expands it by combining business ICT alignment in multiple-stakeholders' environment and value co-creation theory. This create the basis for further research on this topic.	Proposed conceptual model of value co-creation in knowledge-intensive services at MNE level expands the knowledge about main actors in the value co-creation process in international business settings.
...Policymakers and Regulators:	This research will help policymakers to formulate more collaborative policies when aiming to support indigenous development. Under this approach governments need to work closely with international O&G companies to set realistic LC targets, collect information and develop supportive regulatory and institutional environment.	Cooperation is only feasible if governments participate in collaboration. As for international O&G companies there is no strong economic incentives to contribute to the indigenous development. Policymakers should consider their participation in public-private project aiming to support ICT-based development in the O&G industry by raising awareness about the specifics of greenfield investments on indigenous development.	Raising awareness about the specific of effects of cross-border acquisitions on the indigenous development.

Chapter 2. Literature review

Introduction

The aim of this chapter is to further situate the central arguments of the thesis - that institutional arrangements such as LCP should facilitate the value co-creation process in the multiple-stakeholders' environment through ICT adoption in O&G networks - on extensive theoretical foundations, and to demonstrate the need for theoretical propositions implicit in the papers. Each of the Chapters 3 - 5 contains its own literature review, focused on the specific topic explored in the individual research pertaining to this chapter, to meet the standards of papers for publication. The literature review in this chapter gives an overview of the theories that have been previously used to explain the effects of LCPs and introduce a new theory, namely the theory of value co-creation. In the main part of the thesis (Chapters 3 – 5) the value co-creation theory is discussed to expand the knowledge on LCPs at mezzo-level. Paper 1 (Chapter 3) explains how this theory can be applied to LCD and is again discussed in Papers 2 and 3 (Chapters 4 and 5).

The literature review in this thesis will apply a traditional method for qualitative management studies narrative, the method of review, which considers cross-disciplinary perspectives of research problem. It is based on studies that appear relevant, giving an overview of debates surrounding the field of study. Following recommendations of Tranfield, Denyer and Mart (2003), I used an evidence-informed approach to the literature review process in management studies in order to integrate academic, practitioners and government views on the research topic. The purpose of the literature review was to develop research questions and inform empirical practice. Planning of the review included the informal process involving researcher, peers and the supervisor, which means supervisors and other peers could recommend some relevant literature related to research topic. Due to the heterogeneity of studies it was not appropriate to make a plan of the literature review as

this could inhibit the researcher's capacity to explore, discover and develop new ideas (Tranfield et al, 2003). The time horizon of the literature review has been guided by the literature on IP development and limited to after the 1950s (Bruno, Douarin, Korosteleva and Radosevic, 2015).

This literature review chapter first introduces the notion of LC – an IP which has its aim at diversification of the economy away from the O&G sector - used in different disciplines at a broad macro-economic level. The need for integrated definition of LCP is explained including micro- and industry views. Then the objectives, implications and outcomes of LCP are discussed. The implications of two different views on LCPs – protectionist and free-trade view - and the reasons why some countries introduce LCPs are discussed. However, the limitations of both these views are that in the course of economic history it was proved that both approaches resulted in economic problems, and in the post-globalisation economy that successful policy has to be based on the more cooperative approach toward the primacy of coordination and well-being of many, rather than being confrontational and conflictive. The participation of the government is essential in order to support for an otherwise market-driven process (Klueh, Pastor, Segura and Zarate (2007).

The main section of Chapter 2 considers theories that have been used to explain LCPs in different periods of economic history and why these theories cannot be used anymore to explain LCP. The point of discussion is that theories that previously applied to explain the phenomenon under study considered it mostly either from the very theoretical perspective and/or macro-economic and political economy perspective, and little is known about strategic responses of the actors in the O&G industry to such policies. Among the limitations of most of theories are: 1) that theory become outdated with the course of economic development and policy implications 2) theory became outdated in the post-globalisation period 3) theory became outdated with digitalisation of the economy and rise of the service sector or 4) theories explore the research topic from one specific theoretical angle. These

limitations are not critiques of theories in the absolute sense, rather an attempt of the thesis to look at the phenomenon from a different angle, and solve the puzzle of different perspectives on LCD – by developing appropriate middle-range theorisation of the specific empirical problem raised in the thesis.

The last sub-section of the literature review introduces the notion of ICT, the role of ICT innovations, and its implications for development and diversification opportunities. All three sub-sections are then synthesised, and the chapter concluded. Chapter 3 continues the discussion introducing the mid-range theory that can fill the gap in the theory, explaining how LCP can facilitate development at industry level.

2.1 Local Content in the O&G industry

Definitions

In this sub-chapter the definition of LC is considered. It is important to understand the definition of LC as different research streams interpret this term differently depending on the perspective they adopt, and there is no consensus among the research community on the question of what LCP actually is. Different interpretations depend on the focal country where the research has been conducted. Practitioners in these countries interpreted the policy in different ways depending on their stage of development of their economies (Azhgaliyeva and Kalyuzhnova, 2016).

As oil creates large economic rents, the core question of the O&G industry is distribution of rent among the participants in the supply chain, and between producing and consuming countries which has led to the contesting for wealth far beyond normal market competition. LCPs are focused on growing backward and forward linkages from the O&G value chain and with this, growth of the domestic economy (Goldthau, 2013). This specific

aspect of the petroleum industry guarantees persistent involvement of politics, and requires market players and governments to apply different forms of collaboration. These features have characterised the oil industry from its early beginnings (Fattouh and Van der Linde, 2011). According to Stiglitz (2007:23), "in their dealing with global extractive industries, national governments frequently fail to get full value for their resources. The key problem is that private-sector parties have interests to maximize their revenues and to minimize those accruing to the country". That is why resource-rich countries are looking for strategies which could maximise the outcomes from natural resource exploration.

Countries have implemented LCP differently depending to the industry, the availability of resources, local capabilities and the degree of economic development. and Often different companies and countries employ different measurements of LCP depending on the focus of the policy applied (Table 3). Therefore, country definitions and the focus of LCP can vary but it often goes further procurement plans and can include also development of local labour force, employment, and technology transfer and infrastructure investments.

Different definitions of LC have emerged not only from individual definitions given by the legislative system of different countries as was summarized in Table 3, but also from different streams of academic research. Thus, the literature review explored the following academic definitions of LC as listed below:

- micro-economists defined LC plans as requiring "that a firm use a certain "amount" of domestically produced inputs in producing its final output" Richardson (1993:103).

Table 3. Selected countries that applied LCPs in the O&G sector.

Country	Type of regulation	Year	Focus
UK	Policy	1970	In-country procurement
Norway	LC Law	1972	Indigenous participation
Malaysia	Petroleum Development Act	1974	Licensing
Australia	Australian Industry Participation National Framework Australian Job Act	2001	Participation, procurement, training and employment, technology transfer
Brazil	LC Legislation	2003	Oil Concession
Angola	LC Legislation	2003	Participation, all areas of local value addition
Trinidad and Tobago	LC & Local Participation Framework	2004	In-country fabrication
Kazakhstan	LC Legislation	2009	Procurement, employment, transfer of expertise, infrastructure investments
Indonesia	LC Rules	2009	Procurement
Nigeria	LC Act	2010	Indigenous participation and domiciliation
Ghana	LC Regulations	2013	Indigenous participation and industrialization
Uganda	The Petroleum Act	2013	Procurement, services, training and employment
Oman	In-country Value Blueprint Strategy	2013	Procurement, training and employment
Mexico	Hydrocarbons Act	2014	Procurement, training and employment, technology transfer, infrastructure investments
Russia	Law on Industrial Policy	2015	Import substitution and localisation
Tanzania	The Petroleum Act	2015	Procurement, training and employment, technology transfer
Iran	Iranian Petroleum Contract	2015	Procurement
Lebanon	Exploration and Production Agreement	2017	Procurement

Source: Author, data compiled from Taverne (1994), Ado (2013), CCSD (2016), Olawuyi (2017) and MIOGE (2018).

- policy-makers particularly understand "value-added activities in which local business compete or subcontracts or service contracts in the industry, as well as broader "social" participation by the foreign investors" (Kalyuzhnova, 2008:136).
- procurement research understood the term "local content" as the wealth shared with the national economy from the purchase of goods and services, including wages and benefits, materials, equipment and plant, subcontracts and taxes (Warner,

2011). This also includes: direct economic impact on the national legal entities and resident working labour and indirect impact on their suppliers and contractors in the case of legal entities, or the impact arising from spending in the wider domestic economy made by the country's residents.

- international business view assumes that LCPs are undertaken to enable countries "to maximize the welfare from foreign investments through the promotion of local participation in FDI and the use of local raw materials by investors" (Tordo, Warner, Manzano and Anouti, 2013:120).
- the strategic definition of LC is focused on the efficiency of domestic companies: "LC is an industrial tool that can enable domestic producers to expand their activities, at least partially with domestic inputs, and gain access to international technological and managerial expertise to enhance their competitiveness" (Kalyuzhnova et al, 2016:1).

Other research streams focus on the definition of LCP rather than on the definition of LC itself. For instance, the international business stream of research considers LCP as an instrument which is used to regulate foreign investments in the O&G sector. This assumes the reinforcement of "domestic industrial capacity" over an integration of foreign technologies and domestic competitiveness of certain industries (Narula, 2015).

Literature generally classifies LCP as a policy regulating a certain industry and therefore, consider it as IP (Cimoli et al, 2009). In turn, IP can be defined as the strategic efforts of a government to encourage structural changes and development leading to fostering competitiveness via growth in the manufacturing and related services sector (Aiginger, 2007; Altenburg, 2011). In this research some literature on IP will be relevant to the understanding of LCP as research does not always clearly distinguish between two

definitions. In practice, LCP cannot be separated from the other types of industrial policies, as one works only when the other is in place.

International organisations such as OECD formulated a general definition of LCPs which is given as "policies imposed by governments that require firms to use domestically manufactured goods or domestically supplied services in order to operate in an economy" (OECD, 2016). However, this definition considers LCP from one perspective and does not take into account the complexity and different levels of development policy design (Figure 1).

Local in this sense refers to national as opposed to international or foreign contributions. However, experts on LC in developing countries such as Uganda concluded that in a globalised industry a local subsidiary of a multinational company can be just as effective in using domestic inputs and developing capacity and competence as a company in which citizens of the country hold a majority of the shares (Mwakali and Byaruhanga, 2011). They argued that in Norway and Malaysia, where LC has been high, it has been defined as *value added to the host country* rather than in terms of ownership of the supplier. Therefore, the government of Uganda stated that "national content, measured as value added, should cover value generation in both indigenous and foreign-owned firms" (Ministry of Energy and Mineral development of Uganda, 2011). However, such a definition does not consider that products purchased from foreign-owned companies can actually be produced in another country, probably where the technological capacity is higher. In terms of technological capacity development, it is important to distinguish between indigenous and foreign firms as the technological spillovers between indigenous and foreign companies are important for development of the local industry (see the literature review below).

To conclude, as UNCTAD (2018) stated in the latest *World Investment Report Investment and New Industrial Policy:*

"For modern industrial policies to contribute to a sustainable development strategy, policymakers need to enhance their coherence and synergy with national and international investment policies and other policy areas, including social and environmental policies".

This appears to be inconsistent with a view on national policies as opposite to international.

The review of different definitions and classifications of LCPs confirms that there is no one single view on what it is and how it works in practice. As Rodrik (2008) noted, in reality the type of policy - whether of the traditional or the contemporary type - has to be applied in a second-best[18] setting, and in such a setting, nothing is all that straightforward anymore. Therefore, an integrated definition of LCP which explains the aim of the policy at diversification, include a strategic view at the meso-level of aggregation as well as acknowledge the role of institutions at different levels of regulatory requirements used to address the issue, with the focus on the process, is a necessary start-point in research on LCP.

Policy objectives

Definitions of LCP discussed in the previous section can also shed the light on its objectives. In Kazakhstan the objective of LC policy is to achieve a spill-over from the extractive industry to diversify the economy (Kalyuzhnova, Nygaard, Omarov and Saparbayev, 2014). In Kazakhstan, the primary mechanism for regulating LC in mining and O&G sectors is the Law "On Subsoil and Subsoil Use" of 2010 supported by a series of decrees regulating LC (the list of selected regulations can be found in the Table 13). Subsoil companies are set

[18] The variety of institutional forms suggests that the desirable outcomes can be achieved in a large variety of different ways (Rodrik, 2008). Second-best is an option that should be considered when an optimal (first-best) outcome cannot be attained.

minimal LC requirements in subsoil users' contracts, including procurement of goods, works and services from local producers, as well as targets for labour and training of local employees. With regards to the procurement, a legal framework defines producers of work and services as a legal entity established in accordance with the laws of the Republic of Kazakhstan and located on the territory of RK using no less that 95 percent of the citizens of RK in the total number of employees (Law on Subsoil and Subsoil Use, 2010). The definition of local producer of goods differs from the definition of local producer of works and services and requires the certificate of the local producer "CT-KZ" (see the Appendix 10 for an example of a certificate.

Literature on IPs states that successful economies have always relied on government policies that promote growth by accelerating structural transformation (Rodrik, 2010). Rodrik reviewed countries like China, which had LC requirements in the automotive and electronic industries and export incentives, and the United States where government support played a crucial role in accelerating growth in Silicon Valley. These countries benefited from IP, which later came into serious disfavour in other countries. Table 4 presents three periods in the history of IP implications – period of import substitution policies (protective type), so-called WC policies (*laissez-fair* type) and post-WC policies (mixed type) and reason why both protective and laissez-fair type of policies has been abandoned.

Rodrik (2004:1) in particular emphasized:

> "it is increasingly recognized that developing societies need to embed private initiative in a framework of public action that encourages restructuring, diversification, and technological dynamism beyond what market forces on their own would generate… incentives and subsidies have been refocused on exports and direct foreign investment, in the belief that these activities are the source of significant

positive spillovers. Therefore, the challenge in most developing countries is not to rediscover IP, but to redeploy it in a more effective manner".

Table 4. Changes in development thinking and the role of government policies.

Policy	Period	Policy implication	Reason for rejection
Import substitution	1950ss/mid 1980ss	Industrial targeting Subsidized credit for specific subsectors Detailed technology transfer regulations	Mid 1980ss debt crisis in developing countries (Latin American debt crisis)
WC	Mid 1980ss/ mid 2000s	Balanced budgets Liberalisation of interest rates Competitive exchange rates Trade- and FDI-liberalisation Privatisation Deregulation	Severe output losses in former Soviet Union and EE followed WC policy recommendations and rapid growth in China, India and Vietnam pursued more interventionist policies. The Asian financial collapse of 1997-98 and economic collapse of Russia in the summer of 1998
WC		Institutional reforms Corporate governance Anti-corruption Flexible labour markets WTO agreements	
Post-WC	Mid 2000s/ till now	Endogenous economic structure and structural change Industrial upgrading Combines structural and neo-classical economics Recognition of the facilitating role of state in the process of industrial upgrading	

Source: Author, adopted from Stevens (2008) and Bruno et al (2015).

The economic reasons mentioned above together with overall law participation of local indigenous firms in the distribution of wealth from the O&G industry have pushed governments in different countries to introduce LCP primarily aimed at enhancing increased participation of local firms, developing in-country capacity and indigenous capabilities (Ihua, 2010).

Traditional IPs of different types are tariffs (import substitution policy), subsidies (special economic zones) and LC requirements (local industry development). In contrast to early IPs such as import substitution which were heavily criticised, LCPs has paradoxically grown in different countries (Table 3 above). This is because LCPs are less insulated from international competition (it is focused on local industry development and not on limiting international competition through import control) and are conducted through less distortionary and more transparent policies (De Oliveira, 2015). That is why in the course of time these other measures including tariffs, taxes, pricing, licencing and concession systems have been skewed in favour of local incentives (Cimino, Hufbauer and Schott, 2014).

These reasons have driven stakeholders in resource-rich countries to implement policies and strategies that would help to minimise the negative economic effects mentioned above and maximize benefits from their oil resources, to stimulate other sectors of the economy through effective inter-sectoral linkages, and involve citizens in wealth distribution through the provision of employment. One of the most commonly used strategies for those benefits is the LC development policy.

Implications: protection vs free trade

As discussed in the previous section, there are different development reasons why countries implement IPs, particularly in the natural resource sectors. For example, Reinert (2007) has shown how rich countries have developed through a combination of government intervention, protectionism, and strategic investment - rather than through free trade. Others have argued for welfare gains from infant industry and economy protection (Greenwald and Stiglitz, 2006). At the same time, there are those who argued that government interventions may diminish social welfare or at least fail to achieve the optimal allocation of resources (Baldwin, 1969; Ray, 1998).

In the era of global multinational enterprises, some arguments for policies in the form of protection seems to be outdated. For example, Milner (1998) argued that the limited protectionist response of the 1970s in comparison with the protectionist period of the 1920s commences from the growth of firms' international economic connections, which reduces their interest in protection by increasing its cost. Thus, firms with greater international links are less protectionist than more domestically oriented firms. International institutions such as the General Agreement on Tariffs and Trade (GATT) Organisation, Trade-related investment measures (TRIMs) and WTO agreements are devoted to the expansion of free global trade (Spar, 2001). Although LCPs were adopted by many countries, adoption was later significantly constrained by WTO as one of the forms of performance requirement (about LCRs and WTO agreements see Ramdoo, 2015).

WTO agreements require governments to make their trade policies transparent by notifying the organisation about laws in force and measures adopted. WTO also seeks to ensure that these requirements are being followed and that the agreements are being properly implemented. All members must undergo a periodic scrutiny of their trade policies and practices, each review containing reports by the country concerned and the WTO Secretariat. Therefore, as a country accesses WTO, it should comply with its rules, and thus simultaneously changes its domestic environment for international trade and investments. However, the emerging countries are given permission to derogate temporarily requirements associated with LCRs for five years in accordance to rules on the protection of infant industries (Veloso, 2006). For example, in connection with Kazakhstan's accession to WTO since 2016, amendments to the legislation on subsoil use came into force and significantly altered the existing LCRs. There was a transitional period for subsoil use contracts signed before 1st of January 2015: in such contracts requirements regarding the LC partly will be effective until 2021.

The main argument in favor LCPs until now has been to support infant industry - domestic competitive industry experiencing dynamic learning effects external to firms, and competing with mature foreign industry producing imperfect substitutes for domestic goods. Imposed protection must be temporary and the emerging industry must then mature and become viable to survive on its own (Melitz, 2005; Enderwick, 2011). Historically, this argument was used by the United States as it sought to industrialize in the face of British dominance of world trade and, more recently, by both Japan and South Korea as they sought to become global competitors. The motive behind the recent rise in interest in LCPs – what has been termed "global protectionism" in the name of nations - and even nationalization of resource-based industries ("resource nationalism") such as oil in countries such as Russia (restrictions on foreign investment in the energy sector) and Venezuela (oil nationalization) at a time of record oil prices appears to be to capture a greater share of value in Venezuela or to use energy revenues to rebuild the broader economy in Russia (Enderwick, 2011; Mares, 2010).

Outcomes of LCP

Contemporary research on LC demonstrates that LCP can have a positive effect on the local economy and, for instance, is strongly associated with competitiveness and decision in firms on export, and thus LCP may foster competitiveness under a set of conditions in Kazakhstan (Azhgaliyeva, Belitski and Kalyuzhnova, 2016). Ihua (2010) found that LCP has not yet achieved significant success in enhancing higher indigenous participation, use of local technology, higher contract awards to local firms and stimulating cooperation between local and foreign oil firms. The barriers hindering the policy efficacy are cumbersome entry requirements and prequalification, "do-nothing" behaviour of multinational companies, ineffective monitoring and control by regulatory authorities, low investments in the educational sector and limited financing options for local SMEs. Adedeji, Sidique, Rahman

and Law (2016) demonstrated that there are benefits associated with the adoption and implementation of LC policy and local value creation in the O&G industry in Nigeria with particular reference to indigenous oil firms' participation, backward linkages and job creation.

Kinyondo and Villander (2016) studied the process of LCD in Tanzania from the perspective of different stakeholders. They found that although there is a positive view among domestic stakeholders on imposing such policies, there can be tension between different groups of stakeholders which can shape their recommendations of which policies to include in LCP. The rational for this can be a desire of the government to monopolize the policy development process and abstain from conducting a consultative process. These findings demonstrate that local policy development should include in-depth consultations with different stakeholders in order to maximize the decision maker's knowledge. This would also contribute to the transparency of the process, as well as manage expectations and lessen conflicts among stakeholder, thus contributing to the overall effective implementation of the LCPs.

Although the LCPs are considered to be the most powerful tool for extracting benefits from the O&G for local communities, and have been applied in most resource-rich countries, their developments can be controversial as they may lead to rent-seeking, corruption and lobbying (Hansen et al, 2015; Kolstad and Kinyondo, 2015; Tordo et al, 2013; Ovadia, 2016). The implementation of such policies can also be challenging, so that even successful countries such as Norway have experienced many difficulties (Bråthen, Hernes, Hippe and Svarlund, 2007). Ineffective implementation of LCPs can lead to minimal benefits being realised. For instance, although the Nigerian government has implemented LCPs in the O&G industry, most of the amounts realized from trade in this industry are repatriated abroad (Ihua, Ajayi and Eloji, 2009). Despite LCD in Nigeria proving to perhaps be disputable,

Ariweriokuma (2009) suggested that OPEC member countries including Kuwait, Venezuela, and Saudi Arabia have made significant progress in LCD in their respective O&G industries.

A country's WTO membership does not assume the use of trade-related investment measures such as LCPs. However, there are some limited exceptions for emerging countries in the application of this rule, and the WTO rules impeding the application LCPs are rarely enforced (Cimino et al, 2014).

2.2 Theories previously applied to explain LCP

LCP is a complex development instrument, which is related to a wider field of knowledge. This includes areas such as international investments and business, technology and innovation, macro- and meso-economic development, microeconomic growth and competitiveness, political economy and organisational development. All these disciplines looked at LCP from different perspectives and levels of aggregation. Some theories have explained how LCP is integrated into the political instruments and reflects the political will of the citizens. For example, the constitution of some ERRCs, including Kazakhstan, states that its natural resources belongs to its citizens. Russia has chosen the way of "reasonable import substitution" in technology, aiming at building in the future an export-oriented economy (Pichkov & Ulanov, 2018). Institutional level includes different formal and informal institutions, including laws and regulations on LCP reflecting the political will of the citizens in specific institutional arrangements. The macro-economic level includes macro-economic factors and theories that explain macro-economic development related to LCP effects on the whole economy, or on its sectors at aggregated level. Organisational and management theory are supposed to consider the effects of LCT on individual firms. Based on different literature sources, levels of development policy design can be represented as at the Figure 1 below.

Several theories of different level of aggregation have been proposed to explain LC, some focusing on institutions, others almost exclusively focused on macro-economic factors. The main theories will be discussed in this section of the literature review (see Table 5). A closer look at the literature on LCP, however, reveals that existing theories are looking at LC predominantly from a macro-economic perspective. This is because LCPs are supposed to regulate the whole economy in the first instance. However, little is known about how organisations are affected by the implementation of such policies. According to Shapiro, Hobdari and Oh (2018) much research related to the extractive sector, including O&G, has been in the domain of political science, development studies and economics: however, the research on extractive sector plays a limited role in mainstream international business and management literature. This research gap in the theory applied to LCPs will be elaborated below and the reason we need to apply a new theoretical lens to LCP at international business and strategy levels will be discussed.

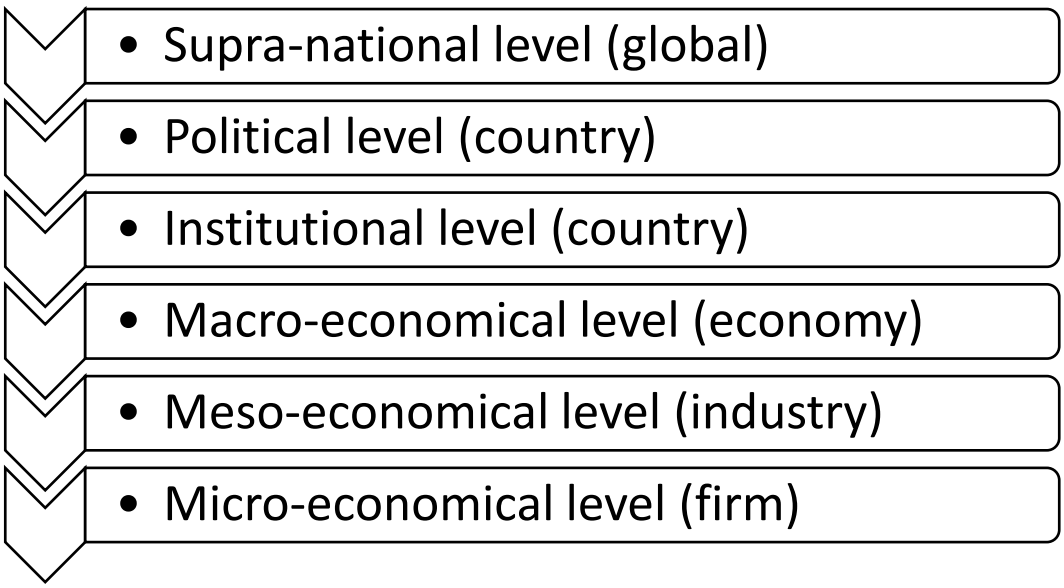

Figure 1. Levels of policy design. Source: Author's notes, based on the review of the literature.

Table 5. Explaining LCPs: prominent approaches.

Layer	Theory	Hypothesis	Indicative literature
Institutional	Institutional theory	Firm behaviour is determined by the external institutional environment which includes formal institutions such as law, regulations and rules, as well as informal institutions such as norms, cultures and ethics	Meyer and Rowan (1977, 1983); Zucker (1987); DiMaggio and Powell (1983); Tolbert and Zucker (1983); Meyer and Scott (1983); North (1990); Peng (2003); Peng and Meyer (2011); Scott (2014)
Macro-	Theory of content protection	Degree of protection is variable and difficult to predict Content protection "may fail to attain the noneconomic objectives of the policy maker"	Vousden (1987); Wonnacott and Wonacott (1967); Munk (1969); Johnson (1971); Corden (1971); Grossman (1981); Johnson (1960); Davidson, Matusz and Kreinin (1985); Richardson (1991, 1993); Lopez-de-Silanes et al (1996) Lahiri and Ono (1998, 2003)
Macro-	Theory of international trade	How export and import flows are related to the domestic characteristic of a country Effects of trade interventions, such as tariffs, on output and demand patterns, on factor allocations and on factor prices Gains from free trade versus closed economy Arguments for trade intervention, principles of optimal trade intervention	Corden (1974); Corden (1992)

Table 5. Continued.

Macro-	Market imperfections theory	Perfect competition does not exist in international markets; therefore, market equilibrium is not perfect, the Pareto-efficiency and well-being of society is not at a maximum Market imperfections theory states that various trade policies can correct for some market imperfections Examples of government corrections are: taxes, tariffs, quotas, licenses, and LC requirements	Hymer (1976); Kindleberger (1969); Caves (1971)
Macro-	Sector links	Each industry is connected to the others by means of backward and inward links Demand of the O&G industry is connected for the outputs of other industries Forward links relate to the output of the O&G industry as supplied to other industries Purchase inputs of the O&G industry includes labour and the outputs of other sectors and can be supplied domestically or imported	Rasmussen (1956); Chenery and Watanabe (1958); Hirschman (1958); Tordo et al. (2013)
Macro-economic levels	OLI framework	Companies take a decision to expand into international markets if they have one of three potential sources of advantage Firms establish a number of links with a local economy Institutional assets advantages refer to the codes of conduct, norms and corporate culture, incentive systems and appraisal, and leadership within the firm In emerging countries, increases in FDI negatively affect the productivity of domestically owned firms in the same industry	Dunning (1976); Dunning and Lundan (2008); Da Silva Lopes (2010); Aitken and Harrison (1999); Lahiri and Ono (2003)

Source: Author's notes, based on the review of the literature.

The Theory of Content Protection

The theory of content protection has been used by many researchers to explain why regulation is necessary. Initially, LCP was considered as one of the areas of the theory of protection (Vousden, 1987). Based on early theoretical analyses of content protection made by Wonnacott and Wonnacott (1967), Munk (1969), Johnson (1971), Corden (1971), Grossman (1981) proposed a content protection scheme (at this time the term "policy" was not yet being used) which "requires that a given percentage of domestic value added or domestic components be embodied in a specified final product". This model considers a domestic goods sector purchasing from an intermediate sector, either nationally or importing from abroad. Grossmann found, that the degree of protection is variable and difficult to predict and because of this, content protection "may fail to attain the noneconomic objectives of the policy maker". According to Johnson (1960:341) non-economic objectives are "objectives of various kinds, identified in one way or another with the effects of the tariff on domestic production and consumption of certain products". He identified five non-economic objectives: national self-sufficiency and independence is achieved through increase in the proportion of consumption supplied from domestic production; diversification, industrialisation, or agriculturalisation leads to an increase in production in the supported industries; promotion of farming as "a desirable way of life" implies subsidising employment in this sector; military preparedness expressed in maintaining a higher level of domestic production of certain strategic commodities; and bargaining, i.e. inflicting economic damage upon another country or countries in order to obtain advantageous tariff concessions. Since the research of these authors, limited theoretical literature on content protection has been developed: for example, Davidson et al. (1985) investigated the interrelation between the impact of foreign investments on welfare, output and employment in host country and the level of LC requirements. Other studies include: Richardson (1991, 1993); Lopez-de-Silanes, Markusen and Rutherford (1996); Lahiri and Ono (1998, 2003).

However, most of research studies had a number of limitations and did not consider LC as a policy instrument. Some authors has also argued that developed countries used protectionist economic policies in order to get rich then tried to forbid other countries from doing the same Chang (2002). He suggested that this is a fundamental obstacle to poverty alleviation in the developing world. However, the policies that were based on the theory of protection and tariffs have proved their ineffectiveness in practice and have led to severe crises (Bruno et al, 2015 and Stevens, 2008). Tariffs are also constrained by the WTO regulations which are compulsory for its member states.

The Theory of International Trade

Protection has often been considered in the context of international trade, multinational enterprises and foreign direct investments. According to Corden, the theory of international trade is concerned with the following questions: "Why do countries export and import the sort of products they do and how are these trade flows related to the domestic characteristic of a country? How does trade affect domestic factor prices? What are the effects of trade interventions, such as tariffs, on output and demand patterns and on factor allocations and on factor prices? What are the gains from trade (a closed economy compared with free trade)? What are valid arguments for trade intervention, and what are the principles of optimal trade intervention?" (Corden 1974:84).

The theory of international trade also takes some account of international capital movements and the role of the multinational enterprise and its effects on a country in terms of balance of payments, exchange rate variations and monetary policy. In this theory, instruments of trade interventions such as tariffs, quotas, and subsidies are examined with regards to their effects on welfare in microeconomic models. However, the normative trade theory of international trade does not provide criteria for goods that ought to be excluded from the market and those that should be included. Trade theorists also regard restriction on

trade as outcomes of rent-seeking and selfish lobbying by special interest groups (Lepenies, 2014). Interventions such as LCP's performance requirement for companies to buy a certain percentage of local goods instead of imports considers LCP from the economics point of view, and cannot serve as a theoretical foundation in the attempt to support the central argument of the thesis and fill the gap in the international business and strategic management literature.

Market Imperfections Theory

Market imperfections or market failure theory (Bator, 1958; Hymer, 1976) assumes that perfect competition does not exist in international markets. Market imperfections or market failures are scenarios in which market equilibrium is not perfect, the well-being of society is not at a maximum and therefore *Pareto efficiency*, as it is in perfectly competitive markets, is not achieved. Market failures can arise for example where individuals' (or organisations') pursuit of their own interest make society worse off. When markets do not achieve efficiency, government intervention can improve society's welfare (Krugman and Wells, 2006). Alternatively, if the supply of domestic goods in the market is low this can lead to an increase in importing these goods, and therefore to high unemployment.

Market imperfections are also considered to be a reason for the existence of the MNEs (Hymer, 1976; Kindleberger, 1969; Caves, 1971). The market imperfections they have studied were structural imperfections in markets for final products (Hennart, 2000). Hennart (2000) also discusses the role of the tariff as an instrument inducing FDI instead of exporting as a mode of entry (Dunning and Rugman, 1985). According to Hymer, imperfections arise from structural deviations from perfect competition in the final product market due to exclusive and permanent control of proprietary technology, privileged access to inputs, scale economies, control of distribution systems, product diversification, and credit advantages, but in their absence, markets are perfectly efficient (Bain; 1956; Hymer, 1976;

Dunning and Rugman, 1985, Hennart, 2000). MNEs exist for monopolistic reasons, that is, "to separate markets and prevent competition between units..." (Hymer, 1976:67). By contrast, the insight of transaction costs theories of the MNEs, developed by McManus (1972), Buckley and Casson (1976) and Hennart (1977, 1982), is that market imperfections are inherent attributes of markets, and MNEs are institutions to bypass these imperfections. Markets experience natural imperfections, i.e. imperfections that are due to the fact that the implicit neoclassical assumptions of perfect knowledge and perfect enforcement are not realised (Hennart, 2000).

Market imperfections theory holds that various trade policies can correct for some market imperfections. Examples of government corrections are: taxes, tariffs, quotas, licenses, and LC requirements. LC requirements, for example, prevent a market from being saturated with imports. Sector-specific IPs may be put in place to tackle key market failures that inhibit the overall development of the local economy. These may take the form of market failures associated with exports and FDI (use of subsidies and tax breaks); coordination failures at the level of specific sectors (use of competitiveness strategies); asymmetry of information; insufficient local capacity in R&D and innovation (support to innovation incubators), and so on (Ramdoo, 2015b). This theory is good in explaining why government intervention is necessary, however it fails to explain how exactly the market failure needs to be corrected.

OLI framework

The “OLI” (Ownership, Location, and Internalisation) or “eclectic” approach to the study of foreign direct investment (FDI) was developed by Dunning (1976). This framework explains that companies take a decision to become a multinational if they have one of three potential sources of advantage which allow them to compensate added costs of doing business in a

foreign country: they may own a particular product, technology, reputation or secret that gives them an advantage over their competitors (ownership advantage). Location advantages explains where a MNE chooses to locate; internalisation advantages focus on how a firm chooses to operate in a foreign country: to set up wholly-owned subsidiary or to use other entry modes such as exports, licensing, or joint venture. When investing in a new location, firms establish a number of links with a local economy: they employ local labour and purchase raw materials and supplies. In emerging countries through these linkages, a new technology and knowledge of the firm flows into the host economy creating spillovers and learning effects. In 2008 a new category of 'institutional assets advantages' (Oi) was introduced (Dunning and Lundan, 2008). 'Institutional assets advantages' (Oi) refer to the codes of conduct, norms and corporate culture, incentive systems and appraisal, and leadership within the firm (da Silva Lopes, 2010).

Research shows that the interrelation between FDI and LC can be conflicting, especially in emerging countries. For example, Aitken and Harrison (1999) have found that increases in FDI negatively affect the productivity of domestically owned firms in the same industry. FDIs in the host country crowd out the domestic firms, and thus consecutively have destructive effects on the level of employment and profits in that country. Foreign firms often import intermediate goods from their home countries and therefore the host country does not fully benefit from having foreign capital. For this reason, host countries tend to impose LC requirements. On the other hand, any restriction on the use of imported inputs[19] is clearly detrimental to the efficiency. Therefore, the level of LC restrictions should be negotiated with all stakeholders. The theoretical literature on this aspect of the FDI is quite

[19] In economics, factors of production or inputs (land, labour, capital and intermediate goods) are what is used in the production process to produce outputs.

plentiful. However, most of the literature analyses the problem from the viewpoint of the foreign firm (Lahiri and Ono, 2003).

To summarise, the OLI framework can be a helpful tool in explaining the reason why IOC expand in foreign markets in seek of natural resources (L advantages) however it fails to explain how companies respond on the policy implications, how the process of value co-creation in the network of actors, including MNE is organised, and therefore how advantages are redistributed between different actors.

Concept of sector links

LC analysis at the macro-economic level is based on the concept of sector links proposed by Hirschman (1958). He proposed three types of linkages: fiscal, consumption and production. The most basic (and least useful) set of linkages are fiscal linkages. Fiscal linkages are rents which the country accrues in the form of taxes, royalties, revenues, and local taxes on the incomes of employees. The second type are consumption linkages which derive from demand by the focal firm for the output of other actors in the same country, and these can be in the form of services provision and indirect demand for local goods and services. The third type are production linkages, which can be forward, where other actors adding value to the commodity by processing it, and backward, where producing inputs to be utilised in the extraction of the commodity, types (Narula, 2018). Production linkages can exist within the extractive sector along the same value chain (intra-industrial or vertical linkages), but they can also be horizontal or inter-industrial (Kaplinsky, Morris and Kaplan, 2011).

Thus, purchases inputs of the O&G industry, including labour and the outputs of other sectors (for example, ICT or oilfield service) can be supplied domestically or imported. Imported inputs constitute a leakage for the local economy, while domestic purchases provide further benefits. The measurement methodology of backward and forward links by sectors of economy across several countries based on the use of domestic input-output tables

was proposed by Rasmussen (1956) and Chenery and Watanabe (1958). Tordo et al. (2013) measured LC in the O&G sector of backward and forward links in 48 countries. This analysis has demonstrated that the direct input in the O&G industry is typically much smaller than for other industries. This result may explain in part why governments are so interested in policies that could increase LC in supplying industries. Potential for LC enhancement exists not only between industries, but also at each stage of the O&G value chain itself where different technologies and inputs are utilized, so that the potential for LC enhancement is likely to be different along the value chain. O&G industry encompasses a range of consecutive stages inherently linked to each other and are required to develop the product from exploration to the customer.

Institutional theory

Institutional theory is the prevalent approach to understanding organisational behaviour (Greenwood, Oliver, Sahin and Suddaby, 2008) and therefore it can be used to some extent to explain how LCP affects organisations. For this reason, it will be used as one of the guiding theories in this research. For this this purpose, an institutional theory with an organisational focus and new institutional economics are considered.

Institutional theory with an organisational focus has emerged from the works of Meyer and Rowan (1977), Zucker (1977), Meyer and Rowan (1983), DiMaggio and Powell (1983), Tolbert and Zucker (1983), and Meyer and Scott (1983). These works introduced the view on an organisation as an actor responding to environmental context. It explains that firm behaviour is determined by the external institutional environment which includes formal institutions such as law, regulations and rules, and informal institutions such as norms, cultures and ethics.

Before the emergence of organisational institutional theory, prevailing neo-classical theories assumed that the coordination and control of activity were the critical dimensions

on which formal organisations have succeeded in the modern world. Meyer and Rowan (1977) challenged this view and defined formal organisations as systems of coordinated and controlled activities that arise when work is embedded in complex networks of relations and boundary-spanning exchanges. They supposed that organisational structures arise in a highly institutionalized context, and as a response, organisations conform to this context by reflecting the myth of their institutional environments – i.e. become isomorphic with their institutional context – by incorporating the practices and procedures defined by prevailing rationalised concepts of organisational work, and institutionalised in society to increase their legitimacy and survival prospects. However, conformity to institutionalised rules may often conflict with efficiency criteria (Meyer and Rowan, 1977; Zucker, 1987) and therefore organisations coordination and control activity to promote efficiency, undermines an organisation's ceremonial conformity and sacrifices its support and legitimacy. In their later paper, Meyer and Rowan (1983:84) defined institutional context as "the rules, norms and ideology of the wider society". Table 6 outlines the main concepts of the institutional theory with an organisational focus.

Institutional theory in economics emerged from two streams of thoughts first, the idea that state defines the legal framework, which ensures that market economy functions (new institutional economics, or NIE) and second, transaction cost theory explaining that economic organisations manage by themselves to reduce costs associated with economic transactions which are influenced by the institutions governing the market (old institutionalism). In this research I refer to the new institutional theory in an attempt to explain how LCP should be designed. NIE considers answering the question of why economic institutions emerged the way they did and not otherwise, rather explaining the problem of resource allocation and utilisation (Vargo and Lusch, 2016). Coase (1937 and 1972) addressing the question of economic exchange based on transaction cost. Williamson (1981) aimed to explain how organisational forms are grounded in response to the ways in

which economic actors minimise transaction costs by managing their exchange activities. According to Williamson, these costs are incurred because the exchange activities of organisations are embedded in the institutional environment.

North (1990:3) defined institutions as "the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction." Without a stable institutional framework, transaction costs may become so high, that certain transactions are not undertaken at all (Peng and Meyer, 2011). Institutions develop over time, institutional transition is a "fundamental and comprehensive change introduced to the formal and informal rules of the game that affect organisations as players" (Peng, 2003:275). For instance, institutional transition in the emerging countries moving from central planning to market economy (to this group belong all transitional countries including Russia and Kazakhstan) create huge challenges for domestic and international firms due to the factor endowment structure of these countries.

However, as it will be discussed later, although institutional theory is not able to explain why organisations respond on the institutional arrangements in this or the other way, and therefore it is often linked with the other economic concept in order to be able to explain certain phenomenon. Selected contributions of the institutional theory in economics are given in Table 6 below. North (1994) pronounced that to understand economic change the following implications have to be considered: while the formal rules may be changed overnight, the informal norms usually change only gradually. Since it is the norms that provide "legitimacy" to a set of rules, a change is never as revolutionary as desired, and performance will be different from that anticipated. Different economies will have very different performance characteristics due to different in informal norms and enforcement. North also concluded that successful political-economic systems have evolved flexible

Table 6. Key concepts of institutional theory with organisational focus.

Notion	Definition	Indicative literature
Legitimacy	Congruence of an organisation with social laws, norms and values which provide survival benefits	Parsons (1956, 1960)
Institutional context	The rules, norms and ideologies of the wider society	Meyer and Rowan (1983)
Rationalized myth (rule)	Social understandings of appropriate organisational behaviour	Meyer and Rowan (1977)
Institutionalisation	The process by which social processes, obligations or actualities come to take on a rule-like status in social thought and action	Meyer and Rowan (1977)
Isomorphism	Conformity of organisations with institutions	DiMaggio and Powell (1983)
Organisational field	Community of organisations that shares a common meaning system and whose participants interact more frequently and close with one another than with actors outside the field	Scott (1991)

Table 6. Continued.

Notion	Definition	Indicative literature
Institutions	The cultural-cognitive, normative and regulative structures that provide stability and collective meaning to social behaviour	Scott (1995)
	The humanly devised constraints that structure human interaction made up of formal constraints (e.g., rules, laws, constitutions), informal constraints (e.g., norms of behaviour, conventions, self-imposed codes of conduct), and their enforcement characteristics. Together they define the incentive structure of societies and specifically economies	North (1994)
Institutional change	The interaction between institutions and organisations that shapes the institutional evolution of an economy. If institutions are the rules of the game, organisations and their entrepreneurs are the players	North (1994)
Organisations	Organisations are made up of groups of individuals bound together by some common purpose to achieve certain objectives. Organisations include political bodies (e.g., political parties, the Senate, a city council, regulatory bodies), economic bodies (e.g., firms, trade unions, family farms, cooperatives) social bodies (e.g., churches, dubs, athletic associations), and educational bodies (e.g., schools, universities, vocational training centers)	North (1994)

Source: Author's notes, based on review of the literature.

institutional structures that can survive the shocks and changes that are a part of successful evolution.

Table 7. Concepts in economics linked with neo-institutional theory.

Theory	Focus	Indicative literature
Transaction-cost economics	Rule and governance systems that develop to regulate or manage economic exchange	Coase (1972) Williamson (1981)
Game-theoretic perspective	Institutions as an equilibrium where outcomes depend on the choices made by another player	Ostrom (1990) Ostrom (2005)
Evolutionary economics	Routines (or capabilities) are made up of conscious and tacit knowledge and skills held by participants who carry out organisational tasks. To survive, a firm must be able to reproduce and modify its routines in the face of changes	Nelson and Winter (1982)
Resource-based theory (RBT)	RBT emphasizes the possibility of organisational actors to strategically manage resources and capabilities under their control. Some resources are not elastic in supply, developing over long period of time and difficult to be reproduces because based on tacit knowledge	Penrose (1959) Barney (1991)
Rational choice theory (RCT)	RCT views institutions as governance or rule system which represent deliberately constructions established by individuals seeking to promote or protect their interests	Moe (1984)

Source: Author, adapted from Scott (2014) and review of the literature.

Williamson (2000) proposed to consider the four levels of social analysis: social theory (informal institutions), political theory (institutional environment), transaction cost economics (governance) and neo-classical economics (resource allocation). The second level according to Williamson (2000) is referred to as the institutional environment. Here "formal rules" such as constitutions, laws, property rights and policies are introduced. Legislative, judicial and bureaucratic functions of government as well as distribution of power across different levels of government are included. At level two research is concerned

with normative design of better policies, the economics of property rights, changes in established economic and political procedures, breakdowns and development of the old and new political and economic systems etc. The institutions of governance are located in the third level. The concept of embeddedness helps to understand network relationships in society and business.

As this overview of the literature on institutional theory revealed, the focus of the analysis is an organisation or economy, both approached from the point of view of utility maximisation. Therefore, the institutional theory does not consider networks of different actors and value as a purpose of economic exchange. Of particular interest to understand the role of institutions in a multiple-stakeholders' environment is the implications of institutional theory for political science, particularly as seen in the works of Ostrom (1990, 2005) on the governance of common-pool resources. She studies the role of institutions in the complex and interrelated resource-integration and service-exchange collaborative management of natural ecosystems organised around shared purposes (as cited in Vargo and Lusch, 2016). This is a similar point of view on institutions to that which was adopted by the theory of value co-creation which will be discussed in the final section of the literature review. The purpose of institutions from the value co-creation perspective is to enable cooperation and coordination in ecosystems, as well as to reconcile conflict in the increasingly complex and inter-related integration of resources (Vargo and Lusch, 2016). These structures can be viewed at various levels of aggregation such as micro-, meso- and macro-levels (Lusch and Vargo, 2014). In these structures value flows from one actor to another and is created through multiple levels of interactions which are not fixed and evolve over time (Vargo, Wieland and Akaka, 2015).

To conclude, institutional theory holds that norms and values of a given country are used to formulate formal and legal aspects of Governments directives (Kraft and Furlong, 2007). For example, Kambi and Kambi (2017) applied institutional theory to the study of

local procurement practices and institutions to overcome challenges in the mining industry in Tanzania. However, institutional theory does not answer the question of why organisations respond to the policy in a certain way.

2.3 LCP and development of ICT technological capabilities in the O&G industry

This section reviews the literature related to development of ICT technological capabilities in the oil and gas industry. Recent studies have shown that the widespread diffusion of ICT and unrelenting waves of globalisation have become major drivers of growth, facilitating unprecedented access to information and knowledge, acquisition and accumulation of technology and know-how, and the development of human capital (Lin and Vu, 2017). LC rules are important and widely used: they are "instrument to induce domestic technological accumulation" (Di Magio, 2009:111). Digital development and digital transformation has become important drivers of IP (UNCTAD, 2018). Therefore, innovation and technological destruction in the industry may affect the policy-makers choices when designing IP aiming at diversification through development of technological capabilities. In this section a literature on ICT technologies in development with regards to transformation of O&G industry will be considered.

Development of technological capabilities

Innovation is one of three dimensions of technological capability development (Kim, 1999). A common assumption and major proposition motivating the field of innovation studies is that innovation matters for economic growth and competitiveness (Fagerberg, Mowery and Verspagen, 2008). The ability to create new technologies and to imitate foreign advanced technologies are considered to be a crucial factor in sustaining the international competitiveness of industries and the overall dynamics of a national system (Castellacci,

2008). The theoretical perspective of the innovation-and-growth literature has its roots in the works of Joseph Schumpeter (1934 and 1939), who provided important insights on the role of radical innovations that replace existing products or processes and their pervasive effects on the dynamics of the economic system (Schumpeter 1934 and 1939, as cited in Castellacci, 2008). He defined creative destruction as a process of industrial change that increasingly revolutionizes the economic structure from within, destroying the old one and creating a new structure (Schumpeter, 1934; 1939). Since the 1980s, these original ideas were refined and developed further by a strand of scholars, e.g. Freeman, Clark and Soete (1982); Dosi (1982), who basically shared with Schumpeter the focus on the paradigmatic and sector-specific view of the process of technological change and economic growth. The paradigmatic view emphasises the importance of a technological paradigm in the growth and transformation of economic system. The technological paradigm can be defined as a set of interrelated and pervasive radical innovations that are originally produced in a given branch of the economy but may subsequently have pervasive effects on many other sectors of the economic system for a prolonged period (Castellacci, 2008). Such a radical transformation, leading from traditional economies to economies driven by industrial activities and nowadays also advances services sector, entails a process of accumulation of technological capabilities (Cimoli et al, 2009).

The most recent technological paradigm in information and communications, including digital technologies, has created a set of interrelated radical innovations in software, telecommunications and semiconductor industry, and built the basis for an ICT digital paradigm (Smihula, 2009), which had an effect on many industrial sectors, including the O&G industry. It also appears that we could be at the beginning of a new disruptive technological wave (UNCTAD, 2017b). According to Freeman and Louçã (2001), the digital branch of the economy is characterised by the highest and most rapidly growing technological and economic opportunities. The core of the digital economy is the ICT sector

(OECD, 2015). The ICT sector is defined according to the classification of its products as follows: “ICT products must primarily be intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display” (UN, 2015). NDE includes 1) advanced production equipment, robotics and factory automation, 2) new sources of data from mobile and ubiquitous internet connectivity, 3) cloud computing, 4) big data analytics, and 5) artificial intelligence. These technologies and processes are based, in one way or another, on advanced ICT, so that the driver of the NDE is the continued exponential improvement in the cost-performance of information and communications technology (ICT), mainly microelectronics (UNCTAD, 2017b).

Research on the role of ICT in development (ICT4D) often is based on the concept of the *digital divide*, which can be defined as the “lack of technological access or ownership existing between individuals, households, companies and regions” (OECD, 2001; Dey and Ali, 2016). The digital divide has long been a significant concern of governments, the international community and researchers (UNCTAD, 2010). Most of the research has focused on reasons for the digital divide between individuals, households, regions, communities and countries; e.g. the infrastructural bottleneck (Rao, 2005), gender (Cooper, 2006), socio-economic development (Çılan et al, 2009) or skills and interests (Min, 2010). However, ICT can also help companies in emerging countries to better compete in the global economy (Salnikova, 2013). For instance, Rimmel and Diedrich (2000) claimed that in business-to-business operations, companies use internet technologies to integrate their value chains, where the largest impact can be achieved by SMEs. Levy and Powell (2003) studied the internet adoption strategies of SMEs in the UK Midlands and found little evidence that SMEs do more than develop websites and adopt email. Ntwoku, Negash and Meso (2017) studied personal computers’ and internet diffusion by SMEs in Cameroon, and similar studies were concocted for the environmental factors that negatively affect institutionalisation of e-commerce in Tanzania (Kabanda and Brown, 2017), the

determinants of ICT adoption SMEs within transition economies of Czech-Polish region (Hanclova, Rozehnal, Ministr and Tvrdikova, 2015), business performance monitoring software for SMEs in Chile (Lind, Sepúlveda and Nuñez, 2000), impact of initiatives to pursue a higher degree of ICT and e-technology adaptation by SMEs (Milis, 2008).

According to Qureshi (2015), the effect of ICT on development can be studied at the individual, organisation, country, region and the world level. Diga and May (2016) argued that ICT should be viewed as being embedded within the ecosystem which "encompasses the policies, strategies, processes, information, technologies, applications and stakeholders that together make up a technology environment of a country, government or an enterprise". Pichkov and Ulanov (2017) suggest that the scale of transformation that occurs under the influence of the information revolution makes it possible to speak about the emergence of a new economic model - the digital economy, in which the key factor of production is digital data. They propose that it is necessary to focus on building a model of the digital economy in which a person plays the main role. This model would make full use of the opportunities and the potential for human and social development in the digital economy it provides, taking into account the impact of digitalisation on production, consumption, employment and the social sphere. However, most research takes place at the organisational level, and research regarding diffusion and adaptation of ICT technologies in networks of organisations in emerging countries is limited. This latter research includes, for instance, Van Biljon, Marais and Platz (2017), who investigated ICT-enabled collaboration through the development of an open knowledge repository used to support knowledge sharing and collaboration, research undertaken by Molka-Danielsen, Thi Ngoc Le and Engelseth (2017) who studied networked data interexchange in supply chain collaboration and the effects the ICT strategy on the social and economic business relationship within a network structure. Ali and Kurnia (2011) found that companies in the grocery industry tend to share information systems with overseas partners but refuse to use it with their local trading partners. However,

as was noted by Walsham (2017), previous research often missed the development view. The focus on strategic policy with respect to ICTs would be a complement to the more usual implementation studies.

Avgerou (2017) argued that ICT4D research requires a combination of two types of theories – foundational (technology, context or development) and middle-range theory, explaining specific kind of phenomena. In this research, I adopt the socio-economic development theory of competitiveness, and value co-creation theory as a theory explaining in our particular case how ICT creates value affecting organisational performance and competitiveness in the long run. It has also been acknowledged that economic performance is not just accrued from ICT investments but also requires management and policy interventions (Avgerou, 2017; Brynjolfsson and Hitt, 2000; Dedrick, Gurbaxani and Kraemer, 2003), such as for example PPP policy. Avgerou (2003) argued that government institutions play an important role in collaboration between industry, government, and international organisations with respect to creating a link between ICT and development. Recently both governments and agencies in emerging countries have pushed ICT into the centre of their development agendas, shifting public and private funding away from traditional development programs such as agriculture and education, toward ICT-based projects (Brown and Grant, 2010). PPP has become a central approach of many governments' policy, where cross-sector partnership is viewed as an important tool in addressing problems of development (Brogaard and Petersen, 2017). PPP is "a model in which the private sector designs and builds new or refurbishes and expands existing infrastructure, provides project financing, manages the asset and operates the service" (OECD, 2008).

The research on the role of ICT in development has turned to the question of how the developmental benefits from ICT adoption can be maximised (Walsham and Sahay, 2006; Walsham, Robey and Sahay, 2007), and how ICT can potentially contribute to economic

growth through national and international policy initiatives (Avgerou, 2008). Following these trends, there has been growing research interest in technology-based PPPs, in which private companies cooperate with governments (Chataway and Smith, 2006). In such partnerships partners aim to share resources, knowledge and capabilities in such a way that there is joint value creation (Austin, 2000). Current research on PPP includes poverty alleviation studies (Spielman, Hartwich and Grebmer, 2010), global health (Barr, 2007; Widdus, 2001; Reich, 2002), women's empowerment (Bexell, 2012), climate change (Forsyth, 2010), and infrastructure development (Trebilcock and Rosenstock, 2015). To conclude, the conventional view on innovations based on the vision that value is created separately by producer (e.g., innovator) and customer as consumer (e.g. adopter) has limited the understanding of how multiple participants (e.g. stakeholders) contribute to value creation, as well as innovation (Vargo et al, 2015). The literature leans towards intra-organisational innovations, and inter-organisational innovations have not been thoroughly investigated (De Vries, Bekkers and Tummers, 2015). This indicates the need for a more unified and comprehensive framework that can provide a deeper understanding of the role of various participants and their contribution to technological capabilities development, through adoption of new technologies and innovation (Vargo and Lusch, 2016).

The business value of ICT technologies

The generation and sustaining of competitive advantage depends on the set of strategic resources and capabilities available to an organisation, with information and knowledge resources of particular significance and, arguably, the most important among these (Drucker, 1993). Information technologies play a crucial role in shaping organisational efforts for knowledge and information creation, acquisition, integration, and use for value creation (Sambamurthy and Subramani, 2005). However, only a relatively small set of publications have been concerned with the core issue of what precisely the *value of ICT* means (Nicolian,

Welch, Read and Roberts, 2015). Studies at the firm level have demonstrated that the impact of ICT investment on firm performance is significant and positive (Kohli and Devaraj, 2004; Melville, Gurbaxani and Kraemer, 2007). Melville, Kraemer and Gurbaxani, (2004:287) define the business value of ICT as:

> "…the organisational performance impacts of information technology at both the intermediate process level and the organisation-wide level, and comprising both efficiency impacts and competitive impacts".

They also point out the existence of two formulations of performance, namely efficiency and effectiveness, where efficiency includes internal performance metrics, and effectiveness includes organisational objectives toward improvement of a firm's external environment. Kohli and Grover (2008) define the business value of ICT as the ability to improve access to information and therefore the ability to improve the quality of information in order to generate value from it. The challenge in defining the business value of ICT is the difficulty in measuring the multiplicity of different factors. That is why quality dimensions have also been added to measure the impact of the IT function for an organisation. Scholars including Melville et al. (2004); Marshall, McKay and Pratanto, 2005); Ashurst, Doherty and Peppard (2008); Ward and Daniel (2012), all developed theoretical models that explain the interconnections between ICT and business value. Nowadays companies may also share resources and jointly make ICT investments. In this case ICT is used as an instrument of business value co-creation (Kohli and Grover, 2008).

Digitalisation of the O&G industry

After the oil price plunge in 2014, the O&G industry faced the likelihood of a long-term low-price environment, so that organisations began to look beyond short-term tactics and take more proactive and strategic approaches such as digitalisation. Now, they face a new disruption - new technologies disrupt existing industry value chains and entirely change how

companies operate in many industries, including O&G. Technological innovation - including the adoption of NDE - along with macroeconomic trends and changing consumer behaviour are transforming the way resources are consumed and produced (McKinsey, 2017). Harnessing new technologies is essential in enhancing the operational excellence of the companies in the new O&G market dynamics. They now have the opportunity to achieve further efficiencies through adopting new technologies. According to the Cisco report *A new reality for oil and gas* (2015), "integration IT-OT technologies[20] and business processes has become an imperative to boost operational effectiveness and ensure survival".

According to the IIC (2015), currently, the O&G industry is beginning to experience the convergence of new emerging technologies such as big data, analytics and intelligence systems, cloud computing and mobile technology, as well as social media (see Table 8). As a result, the industry is demonstrating a higher level of performance and optimisation that results in a higher return on investments for O&G companies, leveraging these new technologies. Digitalisation has been driven primarily by the emergence of NDE, new data available for analysis that were previously not possible to capture, as well as real-time data.

O&G companies created remote operations centres where operations with primarily large investments are analysed, but old technologies still dominate in the O&G ICT architecture. According to Accenture survey (2013), O&G companies struggle for complete and timely assessment of the impact of operational decisions on corporate performance. They have started to invest in the new technologies in order to achieve greater return on investments, but still much more needs to be done to realise these outcomes. These technology trends are: internet of things, mobility, cloud computing and big data analytics.

[20] Note: Operational technology (OT) – technology which is used in specific operational processes, such as supply chain, manufacturing, transportation. In the O&G, operational technology also referred to as industrial control systems (Cisco, 2015).

Table 8. The convergence of technologies in the O&G industry.

Technology	Current level of adoption
Communication	In the upstream sector telecommunications infrastructure is extremely limited or absent In the downstream sector communications are negatively impacted by large metal constructions
Central data and control systems (SCADA)	Old technology with many technical barriers still dominates
Historian systems	Cross-functional data transferred into a single centralized location. Built on outdated databases, dependent on quality of data from other outdated systems
Industrial internet (IoT)	Companies are replacing older equipment by IoT-enabled smart sensors. This gives O&G companies, much like any other industry, the potential to perform greater analytics and obtain business insights
Security infrastructure and industrial control systems	As the industrial internet becomes more and more embedded in the O&G technology ecosystem, the demand for security infrastructure will grow Security concerns are related to possible impact scenarios in interconnected ecosystem
Asset management systems	Nowadays, O&G companies have the opportunity to implement better asset management systems Limitations of these systems can include integration between procurement system and asset maintenance data, widely using Excel files stored on individual computers; no integration of this information is available With installation of IoT-enabled sensors, analytics can help to improve assets performance

Source: Author, adapted from IIC (2015).

The examples where analytical technologies can potentially drive better business outcomes are summarised in Table 9. To conclude, ICT is a tool that not only constitutes an industry but which also pervades all sectors of the economy, where it acts to integrate and enable technologies. ICT has a profound impact on society, and its' production and use have important effects on the development of economic, social and environmental areas (Caperna, 2010). The next section will give an overview of the developmental ICT programmes in Kazakhstan.

Table 9. The points where analytics can potentially drive better business outcomes in the O&G value chain.

Upstream operations	Downstream operations	Corporate operations
Forecast and production commitment	Optimise integrated value chain	Optimise cash flow to effectively meet planned capital expenditure commitments
Efficiently deliver unconventional plays	Configure the supply chain to enable cost reduction	Enable management of contingent labour
Improve working standards	N/A	Enable measurement and management of market risk at a commercial level
Manage equipment supply chain	Measure and manage market risk at commercial and logistics levels	Improve working standards
Execute capital projects to time, budget and scope	Improve working standards	Execute capital projects to time, budget and scope

Source: Author, adapted from Accenture (2013).

2.4 Value co-creation in complex ecosystems

Ostrom (1990; 2005) was one of the first researcher who raised the question of how cooperation and coordination in complex ecosystems, as well as reconciliation of conflict between them, in increasingly complex, and inter-related resource integration and service exchange activities such as management of common-pool resources must be governed. Although O&G are considered to be a type of common-pool resources, Ostrom's approach has been applied only to a study of the development of social and political institutions in small indigenous communities after discovering oil. The aim of the community was to negotiate a package of benefits including rent and royalties, jobs and training, subsistence and environmental oversights, and a supply of natural gas for local power generation (Haley, 2004). However, the specific focus of the research on governing the common-pool resources was resource management and therefore can hardly be applied to the settings of the O&G industry and aims of LCP.

After the recent financial crisis in 2008 and following a decrease in oil prices, many researchers such as Porter and Kramer (2011) raised the question of how to reinvent existing economic order and unleash a wave of innovation and growth. They noted that companies

are more and more often perceived to be prospering at the expenses of the broader community and the reason for this is an outdated approach to value creation. This approach results in optimisation of short-term financial performance while missing the most important factor of customers' needs, and ignoring broader factors that determine long-term success (Porter and Kramer, 2011). They proposed that both business and policymakers should follow the principle of shared value. This conceptual framework develops further a CSR concept based on corporate stakeholders' relationships perspective (Porter and Kramer, 2006). They argue that at the firm level it will not result in costs if a firm can innovate in new technologies, operating methods and management practices, enabling local cluster development by improving the external network (Porter, Hills, Pfitzer, Patscheke and Hawkins, 2012). However, these ideas based on number of case studies of large US-based MNEs were not developed any further.

In contrast, the theory of value co-creation has emerged over the past years applying three different perspectives: service science, innovation and technology management, and marketing and consumer research (Galvagno and Dalli, 2014). In this concept, the value co-creation process is not seen any more as a predetermined process of market exchange, but rather occurs in extended settings (Polese, Mele and Gummesson, 2017). In this research two perspectives on value co-creation are adopted: service science and innovations. However, these streams of research are strongly related to service logic (SL), originated from service marketing research (Vargo and Lusch, 2004; 2008; 2017). SL assumes that the purpose of economic exchange and source of value is service, and goods are just used in the transmission of the service, and second, that value is co-created, rather than created by one actor and subsequently delivered (Vargo and Lusch, 2017). The SL framework has implications for understanding the market-formation component of innovation introduced by Schumpeter (1934) and further developed by for example Abernathy and Clark (1985) in terms of the creation and recreating "integrative practices" (Vargo and Lusch, 2016). The

innovations stream of research on value co-creation includes study of technological platforms for customers engagement (Jonsson, Westergren and Holmström, 2008), as well as open innovation platforms (Westergreen, 2011). Recently, the research has focused on the complex innovation ecosystem which includes the variety and variability of actors, roles, resources and contexts (Mele and Russo-Spena, 2017; Russo-Spena, Mele and Nuutinen, 2017). According to Lusch and Vargo (2014), the networked process of innovations shed light on how the innovation network systems work and how many actors interact to use, develop and integrate resources with the aim of co-creating innovation (Polese et al, 2017). Moreover, the service ecosystem perspective allows institutional logic to be added to the concept, suggesting that "the process and the role of institutionalisation are the keys to understanding the structure and functioning of service ecosystem" (Vargo and Lusch, 2016:11). The major components of value co-creation, governed and evaluated through their institutional arrangements are presented in Figure 2.

From this point of view the changing social and economic configuration require a change also in perspective to overcome the limitations of a traditional approach based on the principle that it is possible to define ex ante model, able to influence – through a top-down approach – behaviours and perspectives of local actors, addressing them toward common pathways, ideas, and aims (Di Nauta, Merola, Caputo and Evangelista, 2018). Recently, when discussing a future research agenda for the value co-creation perspective, Vargo and Lusch (2017:63) argued for attention to the following research question: "How might public policy be modified to become more beneficial to society by encouraging collaboration and coopetition among firms in national and global service ecosystems and what governance (institutional) safeguards would be necessary?" They suggest that in the next research much

Figure 2. Value co-creation in service logic. Source: Vargo and Lusch (2016), p.7.
Reprinted by permission from Springer Nature: Journal of the Academy of Marketing Science, Institutions and axioms: an extension and update of service-dominant logic, Vargo S. L. and Lusch R. F. © (2016).

of the meta-theoretical works should be focused on the concept of service ecosystem and institutions. This will necessitate midrange theory development. At both meta- and midrange-theoretical levels they propose to address such questions as: "Are there particular institutions that are more relevant or that may need to be developed for a digitally based service economy?" (Vargo and Lusch (2017:50).

Potential areas of research

The literature review shows that governments of many resource-rich emerging countries are concerned about how they could extend the benefit potentials of their massive resources to their citizens and to every sector of their economies by boosting the local participation of the domestic firms at every stage of resource development and beyond. Following the recent trend toward liberalisation of the energy sector, including the O&G sector, Tordo et al. (2013) suggest conducting research on the topic of how new trade agreements impact the design of LCPs. On the other hand, the recent implementation of the digitalisation strategy approach in the O&G industry gave rise to the question of how this trend could be used to diversify the economy and create horizontal linkages between digital sector of the economy based, on ICT and NDE, and O&G industries. As UNCTAD (2008) stated, as a result of number of changes in the world economy, IPs have become more complex, with a shift from picking-the-winner approaches and the traditional IP tools of selective protection and import substitution towards more sophisticated methods such as facilitating technological innovation, bridging productivity gaps, building systems and coordination mechanisms to promote interlinked activities with horizontal impact.

The literature review of theories related to LCP explored the following potential research areas and questions:

1. International business/Management: Research on extractive sector plays a limited role in mainstream international business and management theories; strategic view on the LC development is missing.

2. Value co-creation/Innovations: Explanation of how multiple participants can contribute to value creation as well as innovations is missing; roles of various participants and their contributions in technological capabilities are not clear.

3. Value co-creation/Institutions: Answering the question of how public policy might be modified to become more beneficial to society by encouraging collaboration and cooperation among firms in national and global service ecosystems. Are there any particular institutions that are more relevant or that may need to be developed for digitally based service ecosystems?

In this dissertation I will make first attempt to explore some research questions relate to these research gaps. Based on the results of the literature we can conclude that current theory explains LCP from an economics perspective and the strategic view on how does LCP facilitate cooperation and collaboration in the multiple-stakeholders' environment of the O&G industry is missing. Shapiro and Rabinowitz (1997) provided an economics-based explanation for the cooperative approach to regulation, suggesting that the collaborative approach has to be mixed also with punishment. Recently, some research has made an attempt to examine the microeconomic industry effects of LCP. Acheampong et al. (2016) suggest that successful LCPs in O&G producing countries should focus on the development of linkages, clear measurements of benchmarks and industrial-supply base. Olawuyi (2017) suggests that governments need to adopt a more collaborative approach built on clear, transparent and attractive LCPs, with adequate institutional support for IOCs to achieve those goals. Rather than focusing only on specifying mandatory or quantitative LCP targets and thresholds for IOCs, a collaborative approach to LCPs is built on creating a supportive regulatory and business-friendly economic environment for IOCs to deliver greater value in the host country.

Olawuyi (2017) proposed that under this approach, governments can play the following roles in LC development:

- reducing regulatory and administrative barriers to domestic investments;

- providing fiscal incentives for IOCs to establish or support SMEs in the host country;
- developing intellectual property rights to provide greater protection for domestically produced technology;
- simplifying approval processes for licences and permits and providing coordination among governmental structures.

Recently UNCTAD (2018), in their World Investment Report entitled *Investments and Industrial policies,* also concluded that industrial policies need to adopt a collaborative approach, open to international productive-capacity cooperation, to avoid competitive outcomes. Under a collaborative approach, governments will work closely with IOCs to set realistic LCP targets, collect information and develop a supportive regulatory and institutional environment. This approach to LCPs has to define the expectations of the government, while providing the IOC with flexibility to develop its own LC plans and procurement procedures can achieve greater results.

The literature review reveals that a theoretical explanation of how LCPs can have an impact at the organisational networks level, taking into consideration recent liberalisation of the industry and the new role of ICT technologies in value creation in O&G industry, is missing. Therefore, the aim of this research is to fill these gaps in our understanding of the role of LCP in development of indigenous ICT capabilities in the new industry setting. This research will add a strategic perspective to the economic theories of LC. The microeconomic methodology will examine industry trends to better understand the broad macroeconomic forces affecting the business strategy and public policy.

Conclusions

This chapter has laid the theoretical foundation for my choice of the broad research problem and theory, specifically value co-creation theory, as an approach to developing a new view on LCP. The main theories that have been previously applied to explain LCP are discussed, and it is demonstrated that some of these theories have become outdated in course of economic development, whereas other theories cannot fully explain LCP. Most theories are looking at the policy design from the economic perspective. The strategic view on the policy implication in complex, multiple-stakeholders' environment is missing. It has been proposed that value co-creation theory can explain how the policy might be suitable in explaining the facilitating effect of its implication in the service ecosystem environment. These ideas will be further developed in Chapters 3 – 5, with case studies from ERRC, namely Kazakhstan and Russia.

Chapter 3. Paper 1. "Value co-creation and local content development".

Abstract

Concerns of countries regarding the consequences of globalisation have led to a reconfiguration of liberal order, with a greater focus on national interests versus global interests. In resource-rich countries these tendencies have led to adoption of LCPs, a type of industrial policy aiming at the development of local capabilities and diversification away from overreliance on the O&G industry.

Theoretical perspectives on LC development are predominantly informed by economic and political theories when a strategic perspective is virtually absent. This paper focuses on the strategies of international O&G consortiums, as well as local companies applied in response to LC requirements while participating in oil exploratory projects in Kazakhstan. It looks at types of strategies, and how activities are organized. Research on these issues aims to generate new insights into the relationship between firm-level decision-making by MNCs, in relation to governments, and the multi-actor environment they operate in. I define stakeholders in LC development, taking into consideration the increasing role of SMEs and local companies in a network that stakeholders create. I also formulate a conceptual model of LC development in these clusters. This model fills the research gap in theory embracing the role of LCPs in technological upgrade and diversification. This qualitative research which adopts a case study approach.

Keywords: *Local content, FDI, co-creation, oil and gas*

3.1 Introduction

Kazakhstan is an export-oriented country with the O&G industry increasingly dominating its economy. Therefore, a major part of inward foreign direct investments (FDI) is concentrated in this sector of the economy. As O&G projects can be investment-intensive, since obtaining independence the government of Kazakhstan has adopted a series of reforms to liberalize its economy and facilitate foreign investment, first of all in the O&G sector. However, in order to diversify its economic structure, Kazakhstan has recently embarked on an ambitious program of diversification, innovation, investment in human capital, international trade and attraction of FDI for job creation (UNCTAD, 2003).

It is now a widely accepted opinion that those countries which managed to catch-up[21] with developed, high-income countries are those whose governments proactively promoted domestic structural change, encouraging the search for new business models and markets, and channelling resources into promising new activities. Empirical evidence shows this in early Germany, the United States, Japan, Korea, Taiwan, and even China. None of the countries that strictly followed the WC demonstrated comparable success in terms of technological upgrade, economic growth, or poverty reduction (Altenburg, 2011). Rodrik (2004; 2006) found that Latin America, Eastern Europe and Sub-Saharan Africa countries that followed the conventional wisdom of what constituted good economic reform have performed relatively poorly compared to China and Vietnam, countries that pursued more interventionist policies (Radosevic, 2009). The motive of the recent rise in protectionism – what has been termed “global protectionism” in the name of nations - and even nationalisation of resource-based industries (“resource nationalism") such as oil in countries like Kazakhstan (“local or Kazakhstani content”) or Russia (restrictions on foreign investment in the energy sector, import substitution and localisation), appears to be an

[21] i.e. to overcome the disadvantages of a development “latecomer” turning it into sources of advantages by entering industries utilising the most advanced technologies (Mathews, 2002).

intention to capture a greater share of value, or to use energy revenues to rebuild the broader economy (Enderwick, 2011; Mares, 2010).

However, there are different views on how diversification can be achieved. Diversification may be defined in the context of structural transformation as moving out of natural resource-based sectors into the manufacturing and tertiary sectors. In this dissertation I will consider diversification as long-term change in economic structure driven by demand, production technologies and trade flows (Howie, 2018). Diversification strategies can be of two types – vertical and horizontal. The first type involves "picking winners"[22] through preferential treatment of specific non-resource industries in the form of lower taxes, subsidies, protection from foreign competitors, and from FDI. The latter type has as its aim the increase of private returns on investments in physical and human capital across the board, in the form of IPR protection, contract enforcement and financial regulation, as well as investments in education and infrastructure and broad support for financial development (Guriev et al, 2009). In the import substitution period in developing countries and in the period of national champions in developed countries, industrial policies were seen as a matter of 'picking the winners'. It has become part of the conventional wisdom among economists that as governments are bad at making these decisions, it is best to avoid government failures even at the price of market failures. However, during the WC period, this view of IP has become incompatible with logic, and the policy focus shifted to the business environment and horizontal (innovation) policy (Radosevic, 2009). Nowadays, there is a view that economic structure and structural change and industrial upgrading have again become important, but mixed with a neo-classical approach (Bruno et al, 2015). This view is based on an understanding of the comparative advantages determined by a country's endowment structure, a reliance on the market as an allocation mechanism, and the

[22] "Picking winners" strategy refers to the attempt by government to promote the growth of particular industrial sectors and companies (The Economist, 2010).

recognition of the facilitating role of the state in the process of industrial upgrading (Lin, 2012).

The reason for this change is the growing tension between the interests of owners and managers of internationally mobile capital and those who depend on domestic industry for their incomes. Wade (2013) suggests that as the more direct policies such as protection, export promotion, foreign investments controls, foreign exchange controls, and other are scaled back, governments should take the long-term measures which would allow countries to continue to rise while not impairing their competitiveness. He also proposes that these long-term measurers should focus on building up technological capacity within the national boundaries.

Howie (2018) suggests that in Kazakhstan diversification policy at micro-level should support effective institutions to promote, facilitate, and regulate economic activity and investment, thus encouraging licensing, FDI, or technology transfer in targeted sectors. This can also encourage linkages between foreign and domestic firms; and private investment in innovation and skills development. At the same time, Kazakhstan demonstrates awareness of the potential negative effects of FDI, especially as motives for FDI in Kazakhstan are resource-seeking (Tordo et al., 2013). The FDI in the host country may crowd out the domestic firms, and thus have destructive effects on the level of employment and profits in that country (Greenwald and Stiglitz, 2006). For example, Aitken and Harrison (1999) found that increases in resource-seeking FDI negatively affected the productivity of domestically owned firms in the same industry. This result may explain in part why governments in host countries are so interested in policies such as LC that can protect domestic industries. On the other hand, any restriction on the use of inputs is clearly detrimental to efficiency. Therefore, the level of LC restrictions should be negotiated with all stakeholders (Ado, 2013). The literature does not provide theoretical foundations for this legislation, as it is predominantly informed by economic and political theories, and strategic

management perspectives are virtually absent (Hansen, 2017). This is problematic as the reason why LCPs may fail is that they are based on the insufficient understanding of stakeholders' strategies and interests.

The aim of this paper is to develop the strategic management perspective on LCPs. Therefore, this study addresses the following research questions:

- At the strategic level, how do foreign and local O&G companies, as well as other stakeholders respond to LCPs?
- At the strategic level, how do foreign and local O&G companies, as well as other stakeholders respond to LCPs?
- What is theoretical underpinning of LCP in the network industry's structure?

This paper also defines stakeholders in LCD, gives a definition of the cluster, taking into account the increasing role of SMEs and local companies in a network that these stakeholders create. It also formulates a conceptual model for LCD in a multiple-stakeholders' environment and finally defines LCP from a value co-creation perspective. The main aim of this paper is to fill the research gap in theory embracing the role of LCPs in technological upgrade. A multiple case study of O&G companies in Kazakhstan is used to illustrate this aim.

3.2 Theoretical background

Local content policies in resource-rich countries

LCP relates to oil sector governance and sustainability, that aims to encourage participation of domestic companies, as well as re-distribute wealth between global value chain suppliers and local companies. It stimulates economic development in resource-rich countries and provides a basis for economic diversification in these countries. The early LC schemes referred to those of the areas of the theory of protection (Vousden, 1987), based on the early

theoretical analyses of content protection made by Wonnacott and Wonnacott (1967), and Munk (1969). Grossman (1981) proposed a content protection scheme which requires that a given percentage of domestic value added, or domestic components should be embodied in a specified final product. This model considers a domestic goods sector purchasing from an intermediate sector, either nationally or importing from abroad. Grossman (1981) found that the degree of protection is variable and difficult to predict and because of this, content protection "may fail to attain the noneconomic objectives of the policy maker".

Johnson (1960) suggested non-economic objectives behind content protection, i.e. "objectives of various kinds, identified in one way or another with the effects of the tariff on domestic production and consumption of certain products". He identified five non-economic objectives: 1. national self-sufficiency and independence achieved through an increase in the proportion of consumption supplied from domestic production. 2. diversification, industrialisation, or agriculturalisation leading to an increase in production in the supporting industries. 3. promotion of farming as - a desirable way of life implying subsidizing employment in this sector. 4. military preparedness expressed in maintaining a higher level of domestic production of certain strategic commodities. 5. Bargaining, i.e. inflicting economic damage upon another country or countries in order to obtain advantageous tariff concessions. Since this researcher, the limited theoretical literature on content protection has been developed: for example, Davidson et al. (1985) investigated the interrelation between the impact of foreign investments on welfare, output and employment in the host country and the level of LC requirements. They have argued that local requirements to some extent are the source of the host countries' welfare, output and employment.

However, despite their critique, LCPs have emerged over the past decades in resource-rich countries as a result of competition between main stakeholders such as O&G global and local companies, countries, governments, citizens and communities for the wealth created by the energy sector. It has also become popular in certain industries such as

the automotive, renewable energy, electronic, and pharmaceutical industries. It was used as a development model that protected these sectors from international competition in the early stage of industrialisation.

LCP is a type of IP alongside with the other types of policies such as policies affecting infant industry support of various kinds, trade policies, science and technology policies also called innovation policies, public procurement, policies affecting FDI, IPR, and allocation resources (Cimoli et al, 2009). Industrial policies of different types can also include tariffs (import substitution policy), subsidies (special economic zones) and LC requirements (local industry development). In contrast to traditional industrial policies such as import substitution which were heavily criticised, LCPs in the O&G sector have been adopted by different emerging countries such as Brazil, Kazakhstan, Kuwait, Nigeria, Indonesia, Uganda, Tanzania.

Definitions of a "LCP" may vary depending on the context and user. From the FDI-perspective, LCP can be defined as "a policy governing foreign investors or investments that aims to actively embed foreign investment in, and catalyse spillovers into and linkages with, the domestic economy. This definition includes, but is not limited to, measures expressly requiring or incentivizing use of local goods, services, and labour. It can also include measures such as those motivating foreign investors to incorporate firms in the host economy, or to make intra-firm expenditures in the host economy" (Johnson, 2016:5). The strategic definition given by Kalyuzhnova et al. (2016) was discussed in Chapter 1 (p. 4) and Chapter 2 (p. 44). There is also a procurement definition of LCP as well as definitions given by international organisations and individual countries. However, as noted by Rodrik (2011), in the practical settings of emerging countries the type of policy applied in a second-best setting where the outcome is difficult to predict, due to the coordination failure which arises in the case where actors do not achieve optimal results because they are not able to coordinate their actions with others (Cooper and John, 1988).

An initial economic explanation as to why protection schemes are necessary in the O&G sector focused on the phenomena of *Dutch disease*, or disproportional development of the country's economy, reflected in a decline in the manufacturing and agriculture sectors, while leading to a boom in the natural resource sector (Corden, 1984). A further explanation is *recourse course* expressed in the inability of resource-rich countries to use wealth to develop their economies, thus leading to low economic growth (Sachs and Warner, 1995). There are also different development objectives and reasons why countries implement performance requirements, and therefore arguments for protection. For example, Reinert (2007) has shown how rich countries have developed through a combination of government intervention, protectionism, and strategic investment - rather than through free trade. The main argument in favour of protection was support of infant industries – domestic competitive industry experiencing dynamic learning effects external to firms, and competing with mature foreign industry producing an imperfect substitute for the domestic goods. Imposed protection must be temporary and the emerging industry must then mature and become viable in order to survive on its own (Melitz, 2005; Enderwick, 2011). Historically, this argument was used for example by the United States as it sought to industrialize in the face of British dominance of world trade and, more recently, by both Japan and South Korea as they sought to become global competitors (Chang, 2002). In contrast, the open market economy, where there are few trade barriers, has led to the constant challenges faced by the SMEs due to the influx of competitors from across the globe. Such a scenario reflects poorly on the competitiveness of the SMEs in terms of their performance (Ellis and Mdoe, 2003; Kristiansen, Kimeme, Mbwambo, and Wahid, 2005).

Although many countries, including developed countries, have adopted LCPs at some time in their history, this was later significantly constrained by supra-national organisations such as WTO as one of the forms of performance requirements[23]. Kazakhstan's

[23] For historical overview on the development thinking, see Table 4.

accession to the WTO in 2016 and industrial trends toward accelerated digitalisation of the O&G industry in Kazakhstan and diversification, poses the question: how could the Government of Kazakhstan adjust its local development policies to the WTO requirements, which prohibit performance measurements, in order to enhance cooperation between international and local O&G companies, and as a result grow the economy?

Rodrik (2004) suggested that the right model for IP is a model of strategic collaboration between the private sector and the government, with the aim of uncovering where the most significant obstacles to restructuring lie, and the type of interventions which are most likely to remove them. Correspondingly, the analysis of IP needs to focus on getting the policy process right, i.e. design a setting in which private and public actors come together to solve problems in the productive sphere, each side learning about the opportunities and constraints faced by the other. The comparison of main dimensions for three types of policies are analysed by Radosevic (2009), and outlined in Table 10.

Table 10. Dimensions of three types of institutional policy.

Policy	Policy level	Nature of constraints	Policy focus	Institutional focus	Relationships to foreign actors
Import substitution	Micro-	Specific	Outcome	Administrative capacity	Autonomy
(Augmented) WC	Macro- and Micro-	General	Outcome	Business environment	Openness
Post-WC	Mezzo-	Scaling up	Process	Search networks	Coupling

Source: Radosevic (2009).

Radosevic (2009) proposed that contemporary policies are focused on the mezzo level (linkages and sectors), and are oriented towards the scaling up of individual success stories trying to replicate and enlarge them. They are focused on policy as a process, by setting up *search networks*, rather than being oriented to previously defined objectives.

These policies take account of the importance of the globalized context and hence recognize the need for the coupling or leveraging of domestic firms with foreign agents and capabilities. However, theoretical explanations of how contemporary industrial policies affect actors in the O&G industry of ERRCs remain to be addressed.

To summarize, the literature review shows that LCP emerged more as an empirical tool and theories fail to explain how organisations respond to such policies. Most of the theories explain LC from an aggregate macro-economic perspective on the barriers for growth or have become outdated in the course of economic development and globalisation of the world economy. In this paper I introduce a new view on LCD, based on the theory of value co-creation, introduced in the subsequent sections.

Concepts of industrial clusters and networks

As follows from the definition of LC (Chapter 1, p. 3) given by Kalyuzhnova et al (2017), LCPs are partly about access to international technological and managerial expertise, therefore it is about how international companies can contribute to the development of local companies, i.e. inter-organisational relationships or networks between local and international companies. Different streams of research such as economic geography (focus on location), international business (focus on MNEs) and organisational studies (focus on domestic firms) have contributed to the concept of clusters. In IB literature the concept of network firm is seen as combining the global vision of a powerful headquarters with the flexibility of autonomous subsidiaries (Casson, 2006). The significant contribution was made by Porter (1985; 1990; 1998a; 1998b) in the field of strategy (focus on competitiveness). This concept also became increasingly associated with the "knowledge economy" and innovative clusters. For example, Norton (2001) argued that the leadership of the US derives from the growth of clusters of innovative entrepreneurialism. MNEs often locate near other companies in the same industry, thus building an industrial cluster.

Alternatively, the same country of origin builds a country-of-origin agglomeration (Tan and Meyer, 2011; Chang and Park, 2005; Nachum and Wymbs, 2002). Definitions of cluster also vary depending on the stream of research it is adopted by, however, the definition given by Porter has become the most influential. He defines clusters as:

> "geographic concentration of interconnected companies, specialised suppliers, service providers, firms in related industries, and associated institutions (for example universities, standard agencies, and trade associations) in particular field that compete but also co-operate" (Porter, 1998a:197).

Some clusters consist primarily of SMEs (such as Italian footwear clusters); others contain both small and large firms (German chemical cluster). There are university-centric clusters and clusters with no university connections; clusters of traditional industries or high-technology industries (Martin and Sunley, 2003). However, there is a gap in the literature regarding the integration of the different streams of research when explaining how MNEs cooperate with indigenous industry in traditional and high-tech industries at the same time.

A network of organisations consists of a number of distinguishable organisations having a significant amount of interaction with each other. The organisations in a network may be linked directly or indirectly and be structured or self-organised (WEF, 2015b). Some networks, for example, may consist of a series of organisations linked by multiple, direct ties to each other. Others may be characterized by a clustering of linkages around one or a few mediating or controlling organisations. Inter-organisational networks may thus be quite varied and their characteristics should be objects of explanation (Benson, 1975). Analysis of network organisations is often concentrated on a focal organisation and its environment, including its organisation set (Evan, 1966).

From the literature review of inter-organisational network studies, it emerges that there is no single theory of inter-organisational networks; the research is embedded in

multiple yet distinct theoretical approaches (at times intertwined), to explain the phenomenon. The literature on inter organisational networks originally emerged from interest in the various benefits that relationships provide. Therefore, much of the work has borrowed from traditional theoretical frameworks (such as resource dependency), in order to explain the theoretical mechanisms that link network phenomena to organisational outcomes, often performance (Zaheer, Gözübüyük and Milanov, 2010; Bergenholtz and Waldstrøm, 2011).

Value co-creation process in multiple-stakeholders' networks

Value co-creation is a new paradigm in the management literature that emerged from several fields - service management, innovation management studies, and marketing and consumer research (Galvagno and Dalli, 2014) as follows. In the 1980s the focus of research was on the strategic role of ICT in a single company and how a firm could gain a strategic advantage through ICT, for example gaining a monopolistic position with respect to its customers by imposing high switching costs (Grover and Kohli, 2012). However, technological development has made it difficult to attain this in the circumstances of the contemporary business environment (D'Aveni, 1999). In the early 2000s, Dyer and Singh (1998) and Dyer (2000), proposed that a firm's resources could cross over firm boundaries and be shared with other firms. Later, the idea that companies and customers are able to create value through interaction became pervasive in the literature (Grover and Kohli, 2012; Galvagno and Dalli, 2014). In different studies, it was demonstrated that firms are increasingly looking to other firms to collaborate and co-create ICT-enabled products and services. Recent research also demonstrates the importance of the collaborative process of value co-creation in the context of knowledge-intensive business services (Gummesson and Mele, 2010; Vargo and Lusch, 2011; Aarikka-Stenroos and Jaakkola, 2012; Jaakkola and Hakanen, 2013). This approach

has challenged the view that value is usually determined before a market exchange takes place (Prahalad and Ramaswamy, 2000, 2004a, 2013; Vargo and Lusch, 2004).

The co-creation view states that suppliers and customers interact with each other for the development of new business opportunities. There is an ongoing debate in the literature about the differences between co-creation and co-production (Galvalgno and Dahli, 2014; Grönoos and Voima, 2013; Chathoth, Altinay, Harrington, Okumus and Chan, 2013). The marketing perspective considers value co-creation as a network of interactions between actors, evaluating the available and potential resources to understand what they have, and what they can do (Mele, Russo Spena and Colurcio, 2010). Purposeful interaction creates benefits, thereby driving dialogue, learning, and resource transfer. Firms act as resource integrators, as specialisation forces them to access existing knowledge, skills, competences, people, products, and available investment (Gummesson and Mele, 2010). According to the innovation and technology management perspective, the interaction between customers and companies, which technological platforms often mediate, leads to innovation, customer participation, and improved customer services (Galvagno and Dalli, 2014). In this research, I focus on the information research and the service science strand on the theory of value co-creation, as it fits best with the context of my research, with a focus on ICT service providers, and O&G companies as customers of services.

Grover and Kohli (2012) demonstrate that there are four components that determine value co-creation: relationship-specific assets, knowledge-sharing routines, complementary resources and capabilities, and finally effective governance. The assets layer includes ICT skills and assets which enable the enhancement of relationships between partnering firms. The knowledge-sharing layer includes sharing of information and knowledge which enables partnering firms to create better products; the complementary capability layer explores ICT-based resources of value not possessed by each single partner on its own. The effective

governance layer focuses on control structures which allow transaction costs to be reduced (see Table 11).

Table 11. Layers of ICT-enabled value co-creation.

	Hypothesis	Indicative literature
Assets	Relation-specific assets create value when safeguarded contractually or through long-term relational agreements based on trust. They provide transparency of assets and low transaction costs between partners	Dyer and Singh (1998) Grover and Kohli (2012)
Capabilities	ICT serves as a tool to identify and leverage complementary capabilities in co-creating value process	Grover and Kohli (2012)
Knowledge	A good ICT infrastructure and processes for sharing information and knowledge can enhance absorptive capacity.	Cohen and Levinthal (1990)
	Sharing of the information and expertise can inform decision-making and strategies for creating new products and therefore value	Dyer and Hatch (2006)
Governance	Lower transaction costs in the value co-creating process can create a competitive advantage through relational cost that is difficult for competitors to imitate.	Porter (1980)
	Governance plays a significant role when co-creation involves several firms.	Dhanaraj and Parkhe (2006)
	Social and informal controls can play a major role in facilitating value co-creation	Grover and Kohli (2012)

Source: Author, adapted from Grover and Kohli (2012).

Impact of FDI technology spillovers on local industry

The literature on international business highlights the fact that foreign investments bring a package of capital, technology and management skills to the host country, including those in the form of spillovers. Spillovers (or externalities) are impacts on third parties who are not directly involved in an economic transaction, that is, when a transaction between A and B affects C (Pigou, 1920 in Eden, 2009). For example, an agglomeration spillovers refer to

the vertical (buyer-supplier) and technological spillovers that arise from clusters and networks; these impacts can be intra-industry or inter-industry (Dunning and Lundan, 2008). The empirical focus of research has been focused mostly on technological spillovers (Eden, 2009). Technological spillovers are informal, involuntary, non-market transfers (Eden, Levitas, and Martinez, 1997). An example of an agglomeration spillovers is a knowledge spillovers generated by geographically clustered high-tech firms in Silicon Valley (Almeida and Kogut, 1999). Technological spillovers represent differences between social and private impacts that are not reflected in market prices and can therefore generate inefficiencies and as a result, public policy intervention may be needed for market prices to reflect social costs and benefits (Eden, 2009).

The extensive literature on horizontal FDI spillovers (in the same industry) is inconclusive; the results show that the presence of FDI seems more often than not to have no statistically significant productivity effects on domestic firms in the same (horizontal) industry (see, among others - Javorcik, 2004). FDI-induced performance (or productivity) spillovers take place when local firms learn about new technologies, marketing or management techniques by: observing a foreign firm subsidiaries (demonstration effects), by hiring workers trained by a foreign firm subsidiary (labour market impacts), or by using technologies shared by a foreign firm (technology-sharing impacts), and thereby improving their performance. Competition may force a local firm to improve performance; however, competition may also negatively affect a local firm, reducing revenue. For example, Aitken and Harrison (1999), and Javorcik (2004) demonstrated that FDI may have negative effects on the productivity of domestic firms within the same industry. Positive effects have been found in upstream industries and as such, reflect supplier linkage effects rather than intra-industry technology transfer and learning effects. In general, the literature generally confirms the absence of positive effects within the same industries, as well as the presence of positive effects between industries (Görg and Strobl, 2000; Görg and Greenaway, 2004; Görg and

Strobl, 2005; Altomonte and Pennings, 2009; Javorcik and Spatareanu, 2008). In the O&G industry, production linkages can exist along the same value chain or in intra-industry context, but they can also be inter-industry (horizontal). These latter linkages are essential for sustainable development. Inter-industry linkages are important for the generation of new industries (industries supporting O&G, such as banks, transportation, logistics and ICT companies), or industries outside of O&G that initiate new value chains in other, non-extractive sectors (Kaplinsky et al, 2011). As such, returns from extractive sectors (often referred to as 'rents') have the potential to create the basis for further economic activity in other (renewable) industries, therefore acting as drivers for sustainable development.

However, what is notably absent from the evolving literature is a strategic management view, i.e. a perspective that seeks to understand LC from the perspective of decision-makers in organisations affected by this policy. Such a perspective is important, not only because it may provide decision-makers with a better understanding of the strategic and operational trade-offs related to LCP, but also because it may inform policy-makers about the strategies and interests of organisations, thus allowing them to design policies that are better aligned with their interests. The aim of the paper is to fill this gap allowing policy-makers to make more effective decisions.

Conceptual model and theoretical propositions

For the purpose of this research first of all a definition of a cluster[24] (or a service ecosystem in terms of value co-creation perspective) is introduced. This definition is based on the most prominent definition given by Porter (1998a) but with a focus on increasing the role of links between indigenous SMEs, state-owned as well as private, and foreign-owned companies.

[24] Examples of such clusters are US Silicon Valley ICT cluster, US Houston O&G cluster, or Italian sport shoe cluster of Montebelluna.

This definition conceptualises a cluster (or a service ecosystem) as a network of interconnected:

- subsidiaries of international, foreign-owned companies,
- local companies, including state-owned and private SMEs,
- specialised suppliers,
- service providers,
- firms in related industries,
- associated institutions - universities, standard agencies, and trade associations,
- government and government agencies,
- citizens (employees),

that all together co-create value and influence LCD through interaction and exchange of resources, technology and management skills with each other in the settings of a certain local environment.

Exchange and use of technology in such networks can lead to the technological upgrade which is defined as increasing organisational performance and competitiveness based on the improved technology capabilities, where technological capability development refers to the activities, which enable firms to choose and use technology to create a competitive advantage. It has three dimensions: production, investment and innovation (Kim, 1999). In other words, technological capability refers to a firm's ability to employ various technologies (Afuah, 2002). It is the major determinant of industrial competitiveness (Lall, 1990; Kim, 1999).

In the case of clusters, not only does the external competitive environment impact on the participants within clusters, but also the activities of those participants can impact back on that competitive environment. That external environment consists of the global markets for the goods or services provided by the cluster, the various policy regimes (both national

and global) that comprise the regulatory environment (such as standards, trade restrictions etc.) within which the cluster operates, and competitors and collaborators in other clusters in the same or related industries (Martin and Sunley, 2011).

Secondly, a theoretical model is developed in order to analyse data in this research. The academic literature (Yin, 2014; Graue, 2016) suggests that data can be analysed in a more systematic, i.e. less subjective manner if the study is based on theoretical propositions or a conceptual model. A literature review and the investigation of theories that can be applied to the circumstances of LCP case at the level between industry and company (the theory of content protection, the theory of international trade, OLI framework, concept of sector links, institutional theory and value co-creation theory), have led to the selection of the following three theories: theory of competitiveness in clusters, value co-creation theory, and spillover effects from FDI. More specifically, the proposed LCD framework operationalises the key propositions of the value co-creation perspective by integrating some of the insights from the theory of competitiveness in clusters and concept of *spillovers*. Table 12 outlines the underlying assumptions of these three theories.

Table 12. Selected theories that can be applied to LCP at a network level.

Theory	Assumptions
Competitiveness in clusters	Cluster is a group of business enterprises and non-business organisations that lead to the high competitiveness Government create an environment in which companies can gain a competitive advantage
Value co creation	A company and its customers in the service networks co-create value by sharing resources – tangible and intangible
Spillover[25] effects	Foreign companies may have indirect positive effects on the local companies

Source: Author.

[25] Spillovers (or externalities) are impacts on third parties who are not directly involved in an economic transaction, that is, when a transaction between A and B affects C (Pigou, 1920 in Eden, 2009).

A conceptual framework itself represents itself the system of concepts, assumptions, expectations, beliefs, and theories supporting and informing the research conducted (Maxwell, 2013). Based on value co-creation theory as the guiding theory with elements from the other two frameworks, the theory of competitiveness in clusters and concept of spillovers, a conceptual model of LCD has been developed (Figure 3). The focus of this conceptual model is on one of the most important aims of LCP, namely the development of local technological capabilities.

Value co-creation theory (Vargo and Lusch, 2017) considers institutional arrangements such as public policy as mechanisms for facilitation and coordination of resource integration and exchange activities (Link 1, Figure 3). It also addresses technology through the role of *operant resources*, which are employed in the transactions on *operand resources* – transactions performed to produce effects. In this concept technology is considered both an enabler and a product of collective human action (Link 2, Figure 3). It also assumes that economic growth is contingent on innovations (Link 3, Figure 3), as a broader co-creation process (Vargo and Lusch, 2016). It is based on the premise that service is the application of one actor's resources (e.g. knowledge and skills) for the benefits of another, and is the basis for all economic and social exchange (Vargo et al, 2015).

International business literature adds to this model, suggesting that foreign investments bring a package of capital, technology and management skills to the host country, for example in the form of spillovers, including technological spillovers (Link 2, Figure 3) that are informal, involuntary, non-market transfers (Eden, Levitas, and Martinez, 1997). Therefore, when foreign-owned actors interact with indigenous actors this may create both market and non-market effects on the local industry. According to theory of competitiveness in clusters, economic development is a collaborative process involving governments at multiple levels, companies, teaching and research institutions, and institution on collaboration in clusters Porter (2005). International business literature has extended

Porter's framework to include the role of MNEs in the process of knowledge generation within localised clusters Rugman and Verbeke (2003a). This arrangement in the terms of value co-creation theory is called service ecosystem with focus on service as the basis of economic exchange. It also removes the distinction between producer and consumer of value, as well as between innovator and adopter of innovations of technology, and considers institutions as central to innovation because they guide how actors integrate resources and co-create value with other actors (Vargo et al, 2015). The theory of competitiveness (Porter, 2001) also suggests, technology is an important element of the firm's competitive strategy, aiming at creating a sustainable competitive advantage (Link 3, Figure 3).

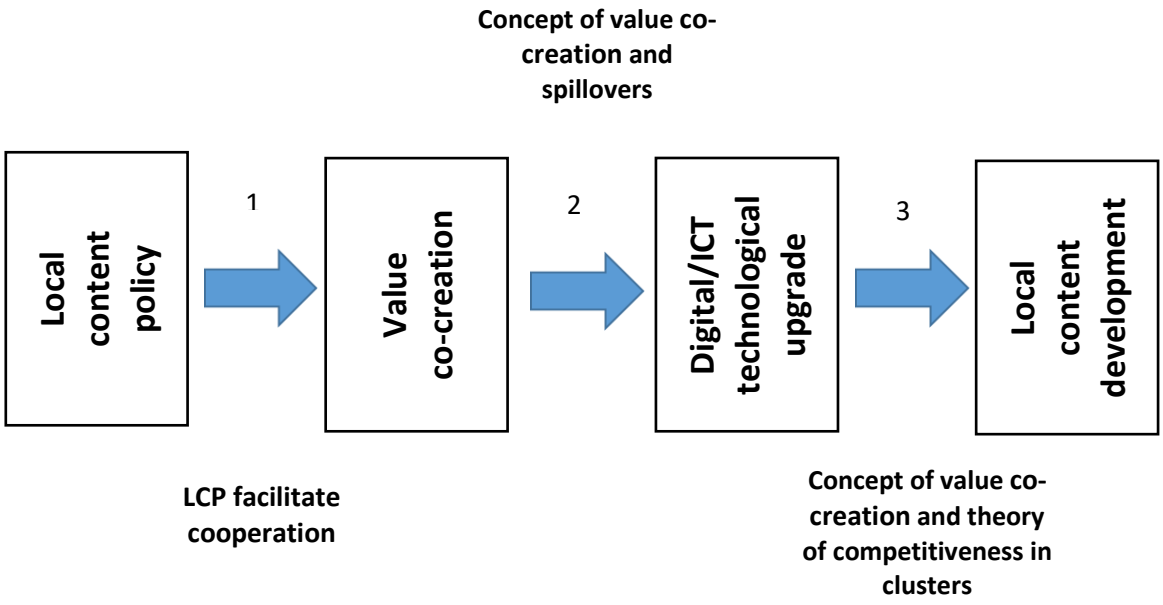

Figure 3. Conceptual model of local content development. Source: Author.

Based on the suggested model, I formulate two main propositions:

Theoretical proposition[26] 1: The role of LCP is to link the network of actors and facilitate value co-creation between them.

Theoretical proposition 2. Value co-creation leads to an ICT technological upgrade of the local industry through direct and indirect effects between international companies and local SMEs.

Finally, from the value co-creation perspective, the LCP can be defined as an institutional arrangement (set of inter-related formal and informal institutions) of different levels of aggregation (from micro- to political) that has as its aim the creation of balanced value propositions in the economy.

3.3 Research methodology

Case study is the research design adopted in this paper in order to explore the research question of how foreign and local O&G companies, as well as other stakeholders, respond on LCPs at the strategic level. The case study is an appropriate method of research design for investigating a contemporary phenomenon in the real-life context, especially in situations, where the boundaries between phenomena and context are not clearly evident (Yin, 2014). When an analyst begins with a definitive set of industries that constitute the policy interest, qualitative and labour-intensive research is needed to identify evidence of clustering behaviour. There are virtually no secondary quantitative sources of information on cooperative relationships between companies. Macro-level data, for example national input-output tables, can only provide hints of such relationships, or possibilities around which such relationships can be organized. Most research that informs about industry links originates in case studies (Bergman and Feser, 1999). In this research, "the white swan" is a

[26] Theoretical propositions are "statements concerned with the relationships among concepts" (Zikmund, 2009:42). A proposition explains the logical linkage among certain concepts by asserting a universal connection between concepts (Zikmund, Babin, Carr and Griffin, 2009).

LCP implementation within the context of the O&G industry, and the multiple stakeholders which are affected by this policy. This research explores a different view on this policy, challenging the theory that "all swans are black", to paraphrase Buchanan (2012). The unit of analysis in this research is a network of multiple stakeholders affected by the policy and taking part in its strategical implementation in practice. Many researchers have emphasised the critical importance of the network focus of research versus focus on a single organisation for research in different context (Powell, Kohut and Smith-Doerr, 1996; Dyer and Sigh, 1998). Dyer and Nobeoka (2000) argued that a network of firms as a unit of analysis is appropriate for understanding inter-organisational collaboration. They applied a case study to research a network of a Toyota group and its first-tier suppliers who collaborate to develop and manufacture a motor vehicle. In this study a deductive approach was used as the general aim of the research was to test an existing theory in a different field and a different context (Eisenhardt and Graebner, 2007). Although deductive theory testing is usually associated with a positivist paradigm of quantitative research, in the research context where adequate quantitative measures are absent, or it is not yet clear what to measure, research gaps can be addressed using a qualitative approach to theory testing (Bitektine, 2008).

Collecting primary data on networks usually requires more work-intensive methods than common data collection methods such as surveys and interviews with many key informants. Therefore, the researcher often has to rely more on secondary data sources and conduct a case analysis based on archival records and documents, corporate communications, as well as media and press reports (Hammervoll, 2016). 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, and provides insights that may be better targeted to address practical applications directly related to the information used in the research (Rabinovich and Cheon, 2011).

Based on the aforesaid, the present empirical part of this research is based on multiple sources of evidence: secondary data, including records (see Appendix 5), companies and government documents reviews, websites (see Appendix 9), media sources and newspapers, legislative acts (see Table 13), as well as primary data: 24 in-depths interviews with domain experts from the O&G industry, and from educational and research institutions (see Appendix 1). It is also based on academic literature on management, as well as economic and political dynamics in the O&G industry, and particularly LCPs. The interviews were conducted face-to-face or by Skype in 2016 and 2017 in Kazakhstan, the United Kingdom and Dubai. The sampling of interviewee was conducted using a snowball sampling technique, where every person interviewed was asked to provide the names of other people who could add a new perspective to the research. Contacts for the pilot study group of interviewees was provided by my supervisor Professor Yelena Kalyuzhnova during the conference on LC held in Almaty in April 2016.

The case selected for the case study research needs to be representative of the phenomenon under investigation (Buchanan, 2012). Thus, in this research I have focused on the strategies of three major O&G consortiums in Kazakhstan: Tengizchevroil, Kashagan and Karachaganak, accounting for 65 per cent of the market, as well as selected local companies. For data analysis the explanation building analytical technique is used (Buchanan et al, 2007; Yin, 2014). This includes generating propositions or hypotheses about casual patterns and links for further investigation (Buchanan, 2012). This does not assume the generation of a hypothesis in its classical way, but rather focuses on a general generation of ideas.

3.4 Case studies in Kazakhstan

This case study was conducted in order to examine the responses of international oil companies (IOCs) and domestic companies operating in Kazakhstan to LC practices applied

by the government, the *National Agency for Local Content Development (NADLOC)*, *NWF Samruk-Kazyna*, and the *NOC KMG*. The choice of Kazakhstan is particularly relevant given the large volumes of natural resources, as well as the geopolitical importance of Kazakhstan (geographical proximity to China, Russia and European Union).

Since obtaining independence in 1991, the country has attracted significant FDI (Delevic and Heim, 2017), with most investments in the natural resource sector (see Figure 4). FDI plays an important role in international relationships and has a substantial influence on the economies of countries. Under conditions of the imperfect international investment regulation regimes and uneven access of the states to the capital, FDI is often connected with the political and economic interests of the countries. This misbalance is reflected in the active intervention of the state in international cooperation (Pichkov and Rakov, 2016).

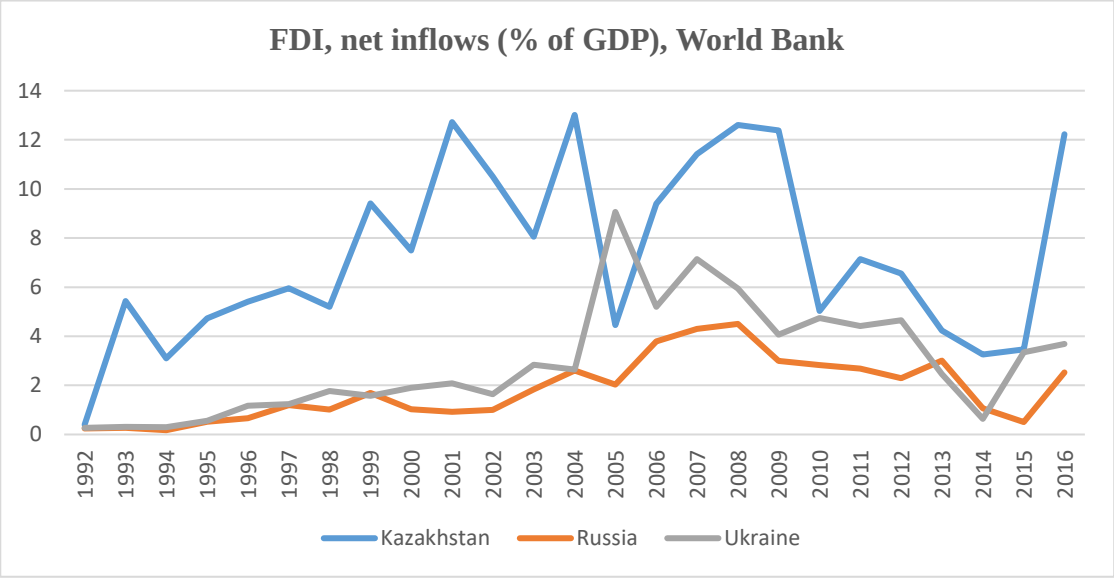

Figure 4. FDI, new inflows in Kazakhstan, Russia and Ukraine, 1992-2016 (as % of GDP). Source: own processed data based on WB.

The definition of the LC is given in the *Programme of LCD in RK in 2010-2014* (sometimes also called *Kazakhstani content*) as "an indicator of the share, by value and by percentage, of local goods, services and labour resources used by economic entities for their activities on the territory of the RK". LC requirements in the O&G sector, a major industry

in RK, include those for LC in goods, works, services and personnel, as well as participation in social initiatives.

Kazakhstan began to support and develop LC in the O&G industry since the declaration of its independence in 1991. The first version of the Subsoil Use Law which required applicants in tender proposals to set out their proposed obligations to engage a certain percentage of goods, works and services of Kazakhstan-origin and Kazakhstani personnel, was introduced in 1996. With the introduction of the Law of the Republic of Kazakhstan *On subsoil and subsoil use* in 2010, LCPs in Kazakhstan included procurement, labour and technology transfer policies, as well as social projects.

Special economic zones (SEZ) were created in 2011 in accordance with the Law of the Republic of Kazakhstan. Among 10 SEZ, three were created in the petro-chemical industry and one for the ICT industry. All these arrangements are considered to be a part of LCP, a type of IP *specific for a resource-rich country*. Financial support is provided by a number of organisations, including, for example the *JSC National Management Holding Baiterek* founded in 2013. The company offers financial and investment support for the non-O&G sector, cooperates with the private sector, and develops clusters. With the launch in 2010 of the State Programme *Business Road Map 2020*, the Entrepreneurship Development Fund *Damu* (established in 1997) has developed a range of tools to support SMEs. These include subsidisation of interest rates on loans, credit guarantees, training, and consulting services. The mission of the Development Bank of Kazakhstan (DBK) which was founded in 2001, is "to promote sustainable development of the national economy by investments into non-resource sector of the country" (DBK, n/d). The building blocks of LCP in Kazakhstan are presented in Figure 5.

Domestic industrial competitiveness and diversification from the O&G sector in Kazakhstan

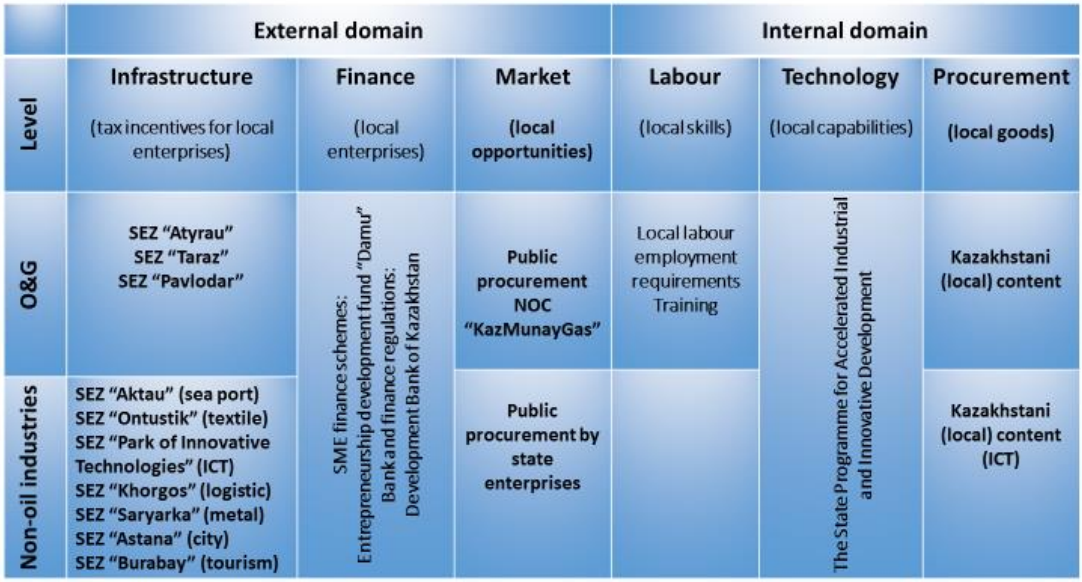

Figure 5. Building blocks of LCP in Kazakhstan. Source: Author.

First, the S*tate Program of local content development in the Republic of Kazakhstan in 2010-2014*, was launched for accelerated industrial and innovative development for the period of 2010 – 2014, and currently the *State Program of Forced Industrial and Innovative Development of the Republic of Kazakhstan for 2015 - 2019* is in operation. The measures to promote LC were also envisaged by the RK's sectoral development programs of the RK for 2010 – 2014. These are programs to promote LC in the chemical, nuclear and electric engineering industries, as well as in information and communication technologies, the O&G industry, mining and metallurgy, mechanical engineering, agricultural industry, tourism, light industry, construction industry and production of building materials. A list of the main legal regulations for LC in the O&G and ICT industries in RK can be found in Table 13.

Table 13. Selected regulations on LC in O&G and ICT industries of the RK.

Regulation	Number/Date	Title
Decree of the President of the RK	№922 01.02.2010	Strategic Plan for development of the RK until the year 2020
Decree of the President of the RK	№ 957 19.03.2010	List of State Programs
Decree of the President of the RK	№ 958 19.03.2010	The State Program of forced industrial and innovative development of the RK for 2010 - 2014
Law of the RK	№ 291-IV 24.06.2010	On Subsoil and Subsoil Use
Decree of the Government of the RK	№964 20.09.2010	Uniform accounting treatment to Kazakhstani LC by organisations when purchasing goods, works, and services
Decree of the Government of the RK	№ 1038 09.08.2012	Rules of conducting examination according to LC
Decree of the Government of the RK	№ 1418 31.12.2014	Map of industrialisation
Decree of the President of the RK	№ 874 01.08.2014	State Program of forced industrial and innovative development of the RK for 2015 – 2019
Decree of the Minister of Investments and Development of the RK	№ 87 30.01.2015	Single calculation procedure by the organisations of LC when purchasing goods, works and services
Joint Decree of the Minister of Investments and Development of the RK and the Minister of Energy of the RK	№ 538, № 330 30.04.2015	Forms and rules of creation and submission of annual, medium-term, long-term programs of purchase of goods, works and services, reports of subsoil users on goods purchased, works and services and on obligation fulfillment on LC in personnel
Decree of the Government of the RK	№ 827 12.12.2017	State Program "Digital Kazakhstan

Source: Own processed data based on Legal information system of Regulatory Legal Acts of the Republic of Kazakhstan available at http://adilet.zan.kz.

Despite of all these efforts, however, an analysis of technological capabilities in Kazakhstan shows that main technological capability indicators of Kazakhstan in comparison with other emerging countries remains too low (see Table 14). This is why emerging countries like Kazakhstan should be willing to encourage activities, that enable firms to choose and use technology from abroad (if it does not exist within the country) to create a competitive advantage, as well as to develop local technological capabilities (Yu and Li-Hua, 2010).

Table 14. Technological capability in selected emerging countries in 2016.

Indicator	Czech Republic	Hungary	Kazakhstan	Russian Federation	Ukraine	China
FDI stock, % of GDP	59.75	62.84	95.93	29.53	54.40	11.90
R&D expenditure, % of GDP	1.9	1.4	0.2	1.1	0.6	2.1
Researchers in R&D, per Mln people	3,249.9	2,522.8	734.1	3,073.1	1,165.2	1,089.2
Patent application, non-residents	47	49	231	14,792	1,862	133,522
Patent application, residents	792	616	993	26,795	2,233	1,204,981

Sources: Author, based on WB and UNCTAD statistical databases.

The aim of this case study is to explore the reason why technological capabilities remain low and how LCP can contribute in its development.

International O&G companies and consortiums

Industrial policies put pressure on international oil companies (IOCs) taking part in the O&G projects in RK, as IOC tends to import when exploring O&G projects in the host countries. Compared to the 1980s, where MNCs expanded to transitional economies due to the collapse of planned economics, the 2010's was characterized by increased scepticism towards global expansion. There is also an increased focus on the behaviour and strategies of MNCs in these new conditions. These issues are being addressed by governments, as well as international organisations (IOs). MNCs often raise concern about LCPs leading to increased cost. However, taking into consideration that most international O&G companies (IOCs), operating for example in Kazakhstan, represent home countries where natural resources are already exhausted (for example, *ENI* - Italy, *Total* - France, *Royal Dutch Shell* – the UK and the Netherlands, *INPEX* - Japan or *CNPC* - China), IOCs should take into consideration the concerns of the citizens of these emerging countries on the sovereignty of their natural

resources. For example, the Constitution of the Republic of Kazakhstan states, that its natural resources belong to its citizens. Therefore, society has the right to have control over how these resources are used and how the wealth from their sale is distributed. This agenda pushes the governments of emerging countries to enact industrial policies stimulating domestic development.

One of the forms of the representation of the interests of society is the industrial association. For example, one industrial association, *KazEnergy* is an institution of collaboration, an independent voluntary non-profit industrial organisation that accounts for 70 major international and national companies operating in the oil, gas and other energy business: extracting, transporting, and servicing and uranium producing. *KazEnergy* plays an active role in the development of local industry as a stakeholder of Aktau Declaration, a Memorandum of Understanding pertaining to the development of the domestic industry, signed by the operators of three major exploratory projects in Kazakhstan: *the North Caspian Operating Company, TengizChevroil, Karachaganak Petroleum Operating and NOC KazMunayGas.* However, the stakeholders of this initiative are not the only three major operators of the O&G projects and National O&G company, which also include:

- international O&G companies (IOCs): *BG Kazakhstan, Chevron, Exxon Mobil Kazakhstan, Shell Kazakhstan, Total;*
- main constructors: leading international service providers *Petrofac* and *Worley Parsons*;
- associations: *Atameken Union, KazEnergy.*

In their National Report (KazEnergy, 2015:340) the association explained that operators rely on local procurement only for basic goods, including fuels, electricity, building materials, metal, uniform and office furniture – instead of more technically advanced goods. The complex technological services are provided by foreign contractors. In

order to become competitive in these areas of expertise, local companies require further experience and technical knowledge gained through cooperation with highly qualified foreign firms:

> "Kazakhstan's three mage-projects were temporarily exempt from LC regulations, with Kazakh authorities reaching LC requirements as part of negotiations for next-phase expansions. For example, in 2013, TCO announced that it planned to use LC for 32% of all services involved in the $23-40 billion *Future Growth Project.* This was estimated to create about 20,000 new jobs for Kazakh service providers. *Kazakh engineering procurement and construction (EPC)* firms were created to design Tengiz modules: one was comprised of international contractors *FLUOR* and *Woodley Parsons,* working together with the *Kazakh Institute of Oil and Gas (KING)* and *KazGiproNefteTrans Engineering Company (KGNT EC). Tengiz* development also offered cooperative opportunities in drilling that would tie foreign contractors with local drillers".

With regards to the recent accession of Kazakhstan to the WTO and changes in perception of the LCPs, a managing director of the *Association of the Oilfield Service Companies of Kazakhstan* (2017), Dauyrzhan Augambai said the following[27]:

> "Thus, there is some transformation of the notion "Kazakhstani content and 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 high technology… and give us all the innovations [available] in the oilfield service industry"

[27] Full text of the citation can be found in Appendix 13.

The *KPO* documents show that large international O&G companies and consortiums respond strategically on institutional requirements of LCPs by setting up cooperation with selected local companies. For example, according to Zhalgas Kabylov (KPO, 2017), the president of *JSC KazBurGas (KBG)* (http://www.kazburgas.kz/), with the support of *KPO*, the company managed to implement a number of initiatives aimed at the development of the domestic oilfield services. For example, in cooperation with *KPO, KBG* have successfully mastered the work on automatic rigs. They also started tubular inspection in partnership with *Schlumberger*, a global leader in a provision of oilfield services.

The chairperson of the *Association of the Oilfield Service Companies of Kazakhstan* (2017) explained:

> "When there are tenders, Kazakhstani companies often can't get big. Why? Because they lack bank guarantees, equipment and human resources, and companies have no policies. As a result, Kazakhstani companies are often hired as subcontractors… [However], we see how we can involve Kazakhstani companies to such big projects... Via joint ventures and consortiums. Right now, the Association is working on establishhment of four consortiums that could take part in the expansion [of Tengiz oil field with estimated budget of 34billion] and execute the construction and assembly works on this project. A consortium is different from subcontract work due to the equality of Kazakhstani companies with foreign enterprises in a consortium"

As mentioned above, Kazakhstan has three major oilfield exploratory projects: *Karachaganak Petroleum Operations (KPO), Tengizchevroil (TCO)* and *North Caspian (NCOC).* One of them, the Karachaganak oilfield, is located near Uralsk, a town in West-Kazakhstan oblast (WKO) in the North-West of Kazakhstan. This field has one of the world's largest hydrocarbon reserves, with about 1.2 billion barrels of O&G condensate and 1.35 trillion cubic meters of gas. The field is of paramount importance to the economy of the

region and the country as it provides half of the gas produced in Kazakhstan and about 15 percent of liquid hydrocarbons. The international consortium responsible for its development and operation is *Karachaganak Petroleum Operating BV (KPO)* which includes IOCs *Royal Dutch Schell, ENI, Chevron, Lukoil* and *NOC KMG*.

*KP*O (2017) explained that the company is applying modern technology in the development of the Karachaganak field, one of the most complex reservoirs from a geological viewpoint. The goal is to provide a stable revenue for Kazakhstan and achieve sustainable development. The *Karachaganak* partners fully support the Republic of Kazakhstan's plans and initiatives aimed at LCD and industrialisation. A noteworthy initiative includes the *Kazakhstan 2050 Strategy* and *Industrial Innovative Programme (New Industrialisation).* Since February 2017, the parent company has invested nearly US$ 22 billion in the exploration of this field. The Government of Kazakhstan preferred that the financial resources would be spent in the country and not overseas, thus providing the basis for diversification. LCP was introduced in order to ensure that this would happen.

In order to meet these institutional requirements, *KPO* takes an active part in the development of LC through the implementation of the *Aktau Declaration*. In addition, *KPO* also cooperated with the local authority (*Akimat*) and took on a number of other activities.

> According to the head of West-Kazakhstan Oblast (KPO, 2017):
>
> "International companies as *Karachaganak consortium* open huge opportunities to our local companies. [Through the cooperation with international companies and adoption of higher quality standards], local companies cooperating with *KPO* project can improve their standards, the quality of producing goods and services. *Karachaganak* project invested in social infrastructure projects of the region more than $300 million. This is support for improving of our infrastructure and also life quality of our population."

KPO made local industry development an integral part of their strategy. The company contributed in the development of local suppliers, goods and services and implemented several projects in support of national manufacturing. The project focused on cooperation between the international and local manufacturers and enabled them to integrate and transfer their advanced technologies to the industrial sector of Kazakhstan.

KPO Vice-General Director reported (KPO, 2017):

> "We maintain LC database, where more than 3800 companies are registered. For the first half of 2016 the LC in our company reached about 49 percent or $280 million. Since the start of production sharing agreement, we have paid about $5.7 billion to local companies."

The implementation of large O&G projects such as *Karachaganak* had an impact on the development of the national economy. It created an environment where local companies could achieve competitiveness through the application of best practices from the world's leading firms. The new knowledge gained was transferred to the O&G industry and spilled over into other industries. The *KPO* consortium signed several joint agreements geared towards the development of production and service clusters for Karachaganak and other O&G projects in Kazakhstan. Examples of successful development of partnerships included cooperation with *Aksai industrial park, Tenaris* and *General Electric Oil & Gas*. In order to perform design and engineering work on complex production facilities, *KPO* established partnerships with major international engineering companies such as *Tecnomare (ENI group)* and the Kazakh company *Caspian Engineering*. Partnerships were also established with *Worley Parsons* and the *KGNT Kazgiproneftetrans* engineering company, a local Kazakh company. These joint ventures dealt with engineering and design for key projects, such as the *KPC* gas-debottlenecking project. Extensive operational cooperation facilitated the transfer of international best practices to the Kazakh partners. The cooperation agreement

strengthened the capacity of local suppliers, created new jobs and stimulated the development of the industrial sector of the region.

KPO local business development controller (KPO, 2017), explained that:

"*KPO* is making great efforts to promote development of partnership between foreign and local service companies and equipment manufacturers. *KPO* also signed a number of joint agreements in development of production and services clusters in the Republic of Kazakhstan. The result of this work incudes signing an agreement on technical cooperation between the world's leading manufacturer of power equipment *ABB* and *Ural Electric LLP* which aims at aligning the manufacturer of the electricity distribution and control equipment with the cutting-edge technology of ABB company. The total value of investment will amount 1.5 billion Tenge and implies creation of 150 jobs in Uralsk city."

In 2016, *KPO* played an active role in implementing a number of initiatives to increase LC. Together with other major international O&G companies as well as local and foreign engineering companies, the management of *KPO* met with representatives of various regions of Kazakhstan. During these meetings the international O&G companies had an opportunity to present their requirements relating to goods, services and technology. The *KPO* management visited industrial companies in Karaganda, North Kazakhstan, and Atyrau oblast and signed a number of joint agreements aimed at LCD. A memorandum of understanding was signed between *KPO* and the British company *William Hare Limited* which aimed to elevate work processes in Kazakhstan's manufacturing and steel industries. In June 2016, *KPO* representatives visited the facilities of the largest companies in the region and provided information on the company's procedures, registration and vendor's database, as well as on the process of pre-qualification and tender requirements.

According to *KPO* LC development manager (KPO, 2017):

> "In February 2016 … the participants of Aktau Declaration launched a single database of suppliers ALASH which will become a single window for Kazakhstani suppliers to the procurement process ..."

In May 2016, *KPO* held an informational workshop on a *KPC* gas-debottlenecking project for the representatives of Kazakh companies. The main objective was to provide domestic manufacturers and service providers with the opportunity to participate in the project through the establishment of joint ventures. The event was attended by representatives of more than 40 local enterprises, state authorised bodies and specialised associations, such as the *National Agency for Development of Local Content* (NADLOK agency) and the Union of service companies of Kazakhstan. The First Innovation forum of WKO *Akzhaiyk Invest 2016* was held in July 2016 in the new *KPO* office in Uralsk city. It was organised by Ural, WKO akimat, a social enterprise company and *KPO*. The forum was attended by the representatives of WKO and a number of national companies and associations, the national *Chamber of Entrepreneurs of Kazakhstan*, Kazakhstan Union of oilfield companies *Kazservice*, Entrepreneur development Fund *DAMU* as well as SMEs in the region. *KPO* and Karachaganak partners aimed to strengthen local capacity. Their goal was achieved through the implementation of sustainable development programmes and the transfer of innovative technologies and skills.

The objectives of the *KPO* LC programme coincided with the development and growth initiatives of the domestic industry and local O&G projects such as Karachaganak. *KPO* implemented several projects that developed manufacturing capabilities not only in the West Kazakhstan region but also in other regions of Kazakhstan. For example, *KPO* built threading facilities with a capacity of 45,000 tons per year in the city of Aktau. Additionally, *KPO* signed a contract with the international manufacturing company Tenaris Global Services for the provision of casing and tubing goods.

According to sales manager of *Tenaris Global services* (KPO, 2017):

"Our plant is located in specialised economic zone of Aktau city … This is the contribution of Tenaris company into development of LC and creation of new jobs in Kazakhstan. We are happy, we have been able to implement this project with support of *KPO*".

KPO implemented several large-scale projects to develop a social infrastructure in the WKO. Every year a budget of $20 million is provided for the purpose. Additionally, from 2014 to 2016, over $10 million was budgeted each year for the implementation of similar projects in WKO. From 1998 to the present, the volume of *KPO* investments in social infrastructure development projects has exceeded $300 million. Karachaganak investments had a positive effect on the social reconstruction of West Kazakhstan. The priorities for social infrastructure projects is determined by the WTO akimat.

This programme included the construction of health, education, culture and sport facilities. These projects were implemented with the participation of local Kazakh contractors. The constant attention to the *KPO* activities paid by the Republic of Kazakhstan Ministry of Energy and the authority under cooperation with WKO leadership has contributed to significant improvement in the implementation of the projects, as well as to the overall socio-economic situation in the region.

Another operator of a different major Kazakhstani exploratory project, *TCO*, considers its contribution to LCD as part of its corporate social responsibility strategy (see *TCO* website). However, it has also developed an extended LCD plan, which includes LCD in equipment and materials, logistic services, construction works, drilling wells and commissioning. Stakeholders of the LCPs and their activities around major project are summarised in Table 15.

Table 15. Actors in LC development and their activities.

Actor	Examples of activities
Major projects operators and major international O&G companies	Develop local industrial base in order to procure for their projects; develop social infrastructure Present their requirements relating to intermediate goods, services and technology Provide information on their procedures, registration and vendor's database, as well as the process of pre-qualification and tender requirements
Local engineering, constructors and service providers	Take part in the partnerships with international companies Upgrade their technological and managerial expertise
Foreign engineering, constructors and service providers	Perform design and engineering work on complex production facilities
Institutions of collaboration (associations, chambers, unions)	Represent interests of the local industry
Development agencies	Take part in development projects Distribute financial resources
Government	Take part in the social infrastructure projects, meetings and workshops
Citizens	Benefit from new jobs and knowledge transfer

Source: Author.

Local SMEs

The data in this dissertation show that when large international O&G companies such as *KPO* respond strategically to the institutional requirements of LCPs by setting up cooperation with selected local companies, most of the local SMEs do not benefit from LC requirements.

Lina Ltd is a SME from Aktau, Mangystau oblast, an O&G rich region in the West of Kazakhstan by the Caspian Sea. The company provides construction and installation services in the field of electrical engineering to O&G companies. Among their clients are IOCs, Consortiums and NOCs such as for example *Agip, Tengizchevroil, and KazTransOil.*

They employ around 100 specialists and all of them are citizens of Kazakhstan; the company has a 100% Kazakh content as far as their services are concerned. From this point of view, LCP promoted in Kazakhstan is highly advantageous to the company, because no foreign companies can be competitors, as LCP gives such companies preference over foreign-owned service companies. However, when a company needs to supply equipment, the situation is totally different, as a great part of supplied equipment is imported. The company also supply imported software solutions, such as those developed by *Siemens* or *Scada Pro*. These solutions are used to make oil wells pump oil in an automatic mode, rather than manually as before, and thus, companies often receive orders to supply electric power supply solutions, including software equipment. Such equipment and software products are not produced in Kazakhstan.

The deputy managing director of the company said[28]:

"…Oil companies require equipment which is not produced in Kazakhstan. Therefore, the focus of this policy should be on equipment, as the share of LC in services is already high. The goal of the policy should be relocation of equipment production from abroad to Kazakhstan… The only products that can be manufactured in Kazakhstan are low-technology products such as cables, stones, wires, insulators, and bearings… high-technology equipment has to be procured from foreign companies, like Siemens, Schneider Electric, ABB Group, but they import their products. The only thing they do in Kazakhstan is training and certification of specialists and 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 in part of training in information technologies".

[28] Full text of the citation can be found in Appendix 13.

*KazTechOil Services LLP i*s another SME from Aktau. This is a local manufacturer of special O&G rigs equipment examining wells. Such checks are needed because wells become warped and obstructed over time. The company has patented their own product, and produce and sell it to the *JSC OzenMunayGas (OMG)*, a subsidiary of *JSC KMG Exploration Production (KMG EP)*, a company of *NOC KMG.* The wells operated by OMG are more than 50 years old, so they have to be monitored.

A top-manager of the company said the following[29]:

"…A great part of raw materials for these products is imported, for example, from Germany. That is why for us it is difficult to meet the [LC] requirements… Accounting and reporting regarding the level of LC requirements can be retained, but purely for statistical purposes, without the need to submit relevant reports to government regulators. Using statistical data government decision-makers can come up with advice on how to promote the local manufacturing industry".

Kazakhstan Petrochemical Industries Inc. (KPI) is another local producer from the city Atyrau, another O&G capital city by the Caspian Sea, which specializes in gas processing. There are two major shareholders: *United Chemical Company LLP* (a company of *NWF Samruk-Kazyna)* which owns 51% of the shares and private investor, one of the largest private holding groups in Kazakhstan - a *JSC Holding group ALMEKS*. The main activity of *KPI* is petrochemical production and currently the company operates a project to construct the first phase of a gas and chemical complex. However, the major part of the project is subcontracted to the Chinese engineering company as the required technological capacity is missing in Kazakhstan.

[29] Full text of the citations can be found in Appendix 13

A LC manager of the company, explained the following[30]:

> "The plant has not been built yet, because this is an innovative and high-tech project, we cannot build it on our own, and there is a lack of specialists. We use foreign technologies. We have bought licenses. The grantor of the licenses is *Lummus Technologies Inc*., a subsidiary of *Chicago Bridge & Iron Company* headquartered in Texas, USA. The general contractor for building a plan is a Chinese company. *KPI* will operate the plant… Chinese contractor will choose the equipment, it should be companies like Siemens or Chinese companies…"

Atyrau Refinery LLP (Atyrau) is one of four major O&G refineries in Kazakhstan, built during World War II within two years, based on a complete set of equipment imported from the U.S. by land-lease, put into operation in September, 1945. Nowadays, the *NOC KMG* holds 99.53% equity in the *Atyrau Refinery LLP*. Model oil refining requires innovative technology, significantly improving safety levels and unique equipment.

I talked to the Head of Department of *Atyrau Refinery LLP*, who is responsible for industrial control system, sensors and measurement equipment as well for the operation of an oil processing facility. He said the following[31]:

> "We have few devices that were made in Kazakhstan. Among them are water measuring devices, however, locally manufactured equipment is represented by few devices, with no critical equipment produced in Kazakhstan. We support the LCP, but if equipment does not meet the requirements in terms of technical specifications, we do not buy it. We are especially dangerous industrial object[32], therefore, the number one priority is reliability and safety of equipment, not a low price or LC. The LCP should take into consideration the needs of an enterprise. The same situation is

[30] Full text of the citations can be found in Appendix 13.
[31] Full text of the citations can be found in Appendix 13.
[32] Is the industry where different kind of emergencies are possible.

with software – are there highly qualified specialists in the country? What would I suggest to local manufacturers? To establish contacts with Honeywell, examine their technologies, production and the way they cooperate, develop indigenous technology. It will be necessary to invest in equipment to produce similar goods locally. Honeywell does not have production facilities in Kazakhstan, it imports from America and Europe. Here localisation of production is possible… Localisation requires highly qualified engineers. It is imperative to invest in engineering education in Kazakhstan".

Findings in this study are summarised in Table 16. The table shows how value is co-created between different actors in the O&G value chain and how this leads to the development of indigenous technological capabilities and technological upgrade. Through the cooperative processes and exchange of resources between local and foreign companies, the technological production capabilities or the technological quality of the final product are developed. Diversification from the O&G industry in the oil service industry and ICT industry is achieved. From cooperation with foreign partners, indigenous companies develop a local industrial base, use high-tech intermediate products and use software to upgrade their technological processes.

3.5 Discussion

Kazakhstan had supported and developed LC in the O&G industry since the 1990's. In the new millennium, the government pursued LCD of the Kazakhstani economy through primary and secondary measures such as laws, decrees and quotas created by the legislative and executive branches of government. The international O&G companies in Kazakhstan used different approaches to assess LC and relied on various documents such as production-

sharing agreements (PSA), as well as local and international contracts and corporate social responsibility programmes. Overall, international O&G companies demonstrate understanding that they need to look beyond the narrow generation of profit, paying taxes and royalties in their activities. While European laws directly prescribe certain social duties for business, American discourse reflects obligations that companies accept voluntarily. For US O&G companies' social responsibility is embodied in their funding of programmes in education, healthcare and labour safety. In particular, oil giants give priority to the development of STEM-disciplines (Science, Technology, Engineering and Mathematics). Such expenditures are not based on pure altruism, as it facilitates the creation of a favourable climate for business operations. These corporate programmes represent successful examples of private-public partnerships in social areas (Pichkov, 2013). However, the concept of LCD goes beyond the concept of social responsibility, but often includes it.

> With introduction of the Law of the Republic of Kazakhstan *On subsoil and subsoil use* (*New Subsoil Use Law*) in 2010, LCPs in Kazakhstan included procurement, labour and technology transfer policies and social projects. It is considered to be the main development policy in the country. The country's recent accession to the WTO in 2016 limited use of LCPs, as WTO prohibits performance requirements, i.e. "stipulations, imposed on investors, requiring them to meet certain specified goals with respect to their operations in the host country" (UNCTAD, 2003:2). However, Kazakhstan managed to negotiate a five-year transition period for subsoil use contracts signed before January 1, 2015. Requirements in contracts regarding the LC in goods be in effect only until January 1, 2021. Newly concluded subsoil use contracts will not contain any requirements related to LC in goods or preferential treatment for Kazakhstani producers in competitive bids (for example, the existing requirement for Kazakh bids to be favoured if their bids are 20 percent of the foreign bids).

Some LC requirements in work and services as well as in personnel remain in effect. For example, the minimum LC of works and services in the newly concluded subsoil use contracts, states that in existing subsoil use, contracts signed from September 2011 to the date of Kazakhstan's accession to the WTO, LCP requirement must be decreased to 50 percent. In addition, Kazakhstani producers of works and services must be granted a 20% reduction in the price of their bids during the tender procedure. However, Kazakhstani producers are expected to meet the requirements of Kazakhstan law on all technical regulations.

International O&G companies, when taking part in exploratory projects in resource-rich countries, should take a strategic approach to LCD and recognize the wider business benefits of sharing wealth and co-creating value from O&G beyond the payment of royalties and taxes. International O&G companies can demonstrate commitment to the host country's LCPs through different documents such as internal LCPs, sustainability reports and memorandums signed with other O&G consortiums and local authorities. The strategic approach should focus on cooperation with local companies, enabling integration with the global value chain and the transfer of knowledge and technologies through partnership with local and foreign companies. Maintaining a local supplier's database and conducting "informational workshops" with the aim of advising local companies on business opportunities would be helpful. Participating in joint agreements on the development of local production and service clusters may lead to the enhancement of local capabilities.

Table 16. Strategic responses of indigenous enterprises on LC policies.

Company	Value co-creation	Technological upgrade
O&G service company	Develop local industrial base in order to procure for their projects Develop social infrastructure Present their requirements relating to intermediate goods, services and technology Provide information on their procedures, registration and vendor's database, as well as the process of pre-qualification and tender requirements	Technological production (processes) capabilities
Local manufacturer of the O&G equipment	Use high-tech intermediate products to produce domestically developed equipment for O&G rigs	Technological quality of the final product
Chemical production, O&G downstream, processing of raw natural gas	Require international patents for production technology, a contractor for building a production facility in Kazakhstan, and financial resources from abroad	Technological production (processes) capabilities
Refinery, O&G downstream, refining of petroleum crude oil	The share of imported equipment is high and cannot be replaced by local manufacturers as the production technology requires high safety standards Use imported software for management of the technological processes	Technological production (processes) capabilities

Source: Author.

Cooperation with international services and manufacturing companies who are interested in setting up their green-field operations may therefore lead to the inflow of FDI in the host countries, increase indigenous technological capabilities and improve the performance of indigenous companies. These cooperative transactions can be located in special economic zones. In order to attract foreign companies, the government needs to invest in the public-private projects with foreign participation aiming at the development of technological capabilities and improvement of institutional and political environment. All respondents in this case study mentioned FDI attraction and relocation of foreign production facilities to Kazakhstan as a key success factor for technological upgrade. Other problems are the overall low level of technological development, missing technological expertise, and difficulties in meeting LCP requirements in the absence of high technologies produced in Kazakhstan. The problems experienced by indigenous companies with regards to LCD are summarised in Table 17.

In conclusion, although there are some challenges associated with the development of local industry in Kazakhstan and local capacity remains low (Kalyuzhnova et al, 2016), recent research demonstrates that LCP has a positive effect on the local economy, links with firm competitiveness and decision on export, and fosters firm competitiveness under certain conditions (Azhgaliyeva et al, 2016). Alongside a growingly globalized and complex world, strategic localisation and a harmonious relationship with stakeholders can lead to international project success. Given that indigenous development is in the interest of all stakeholders in the O&G clusters on the one hand, and the importance of diversification from O&G industry in new technologies on the other hand, it is necessary to explain how strategic management theory can contribute to our understanding of interests of different participants and the role of technological upgrade through digitalisation of the O&G industry.

Table 17. Challenges experienced by local SMEs with regards to LCD and ways to overcome it.

Problem	Proposed way to overcome
LCP targets in goods are hard to meet	Attraction of foreign investors to produce in Kazakhstan
Reporting	Reporting for information asymmetry reason[33], not a target, blockchain technologies[34] introduced at industrial level
Overall low level of technology development	Cooperation with foreign partners
Missing technological expertise	Establishment of contacts with foreign companies, examination of technologies, cooperation and development indigenous technological capabilities; invest in engineering education
Political concerns	Development political system
Corruption	Re-designing of LCP
Transparency of tender bids	Development of tender information platforms, public control
Doing business	Support for entrepreneurship and competitiveness

Source: Author compiled from interviews.

In this research, three different theories were applied in the context of a multiple case studies of interactions in order to explain how LCPs can lead to technological upgrade and therefore improve organisational performance. A conceptual model of LCD suggests that in order to be effective, LCPs have to support co-operation and value co-creation. This conclusion confirms the findings on the role of alliances in leveraging LCP for firm competitiveness (Belitski, Kalyuzhnova and Azhgaliyeva, 2017). This study demonstrated that in international markets where competition is strong, firms that are part of a group may demonstrate a higher level of competitiveness. Analysis of Kazakhstani firms over two periods, 2009 and 2013, before and after implementation of LCP, outlines the importance of alliances as a conduit of knowledge and resources.

[33] Situations where one party has more or better information than the other.
[34] Blockchain is a new digital technology which refers to a public ledger system maintaining the integrity of transaction data (Swan, 2015 in Yli-Huumo, J., Ko, D., Choi, S., Park, S. and Smolander, K., 2016).

Further research needs to explore how local development and digitalisation of O&G industry can be linked, and the role of digital technologies in this process. This research has both managerial and theoretical implications, as well as helping policymakers to formulate more collaborative policies when aiming to support indigenous development. Rather than focusing only on specifying mandatory or quantitative LCP targets and thresholds for IOCs, a collaborative approach to LCPs is built on creating a supportive regulatory and business-friendly economic environment for international companies to deliver greater value in the host country. Under this approach, governments play a role in reducing regulatory and administrative barriers, providing fiscal incentives for IOCs to establish or support SMEs in the host country, and developing intellectual property rights to provide greater protection for domestically produced technology and innovations. Under a collaborative approach, governments need to work closely with IOCs to set realistic LCP targets, collect information, and develop supportive regulatory and institutional environment.

Chapter 4. "The business value of IT in multiple-stakeholders' environment: the case study of the O&G industry".

Abstract

Nowadays, when the O&G industry faces the prospect of a long-term low-price environment, adopting information and communication technologies is essential for improving the operational excellence of the O&G industry in the new market conditions. Currently, international O&G companies are experiencing convergence of new digital economies (NDE). How local companies can respond to these trends is especially important for emerging countries where technological expertise is missing. Development of ICT technologies which may result from the energy sector is also extremely important for emerging resource-rich countries such as Kazakhstan as they try to diversify their economies where the energy sector still plays a dominating role. The O&G sector's value network comprises different technological stages and represents a network of organisations including: development, exploration, production, processing, pipelines, refining/petrochemical, transport/storage, and marketing/distribution. Adopting digital technologies may allow implementation of standard ICT services in a network of organisations in a short period of time, and make it possible for a timely reaction to business strategy changes.

From the theoretical perspective there is a gap in our understanding of how participants in the multiple stakeholders' ecosystem align different IT resources to equitably partake in value co-creation. According to the strategic alignment model of Henderson and Venkatraman (1989; 1993), value from IT investments in a single organisation can be generated only if IT strategy is aligned with business strategy. However, this model does not explain how the value of IT can be used in the value network. Lately, a view that companies and customers are able to create value through interaction and sharing resources crossing over firm boundaries has emerged as a new paradigm in the management literature (Grover

and Kohli, 2012). Built on the review of the literature and three guiding theories – the strategic alignment model, the value co-creation perspective, and the theory of clusters – I develop a business–IT value co-creation model at the network level for the O&G industry, which describes the process of inter-company alignment between IT and organisational strategy in the ecosystem of organisations.

For this paper I conducted semi-structured interviews with Chief Information Officers and ICT experts from Kazakhstan's O&G sector and found that levels of ICT adoption are significantly different between international, large national O&G companies and local SMEs. The main contribution of this paper is the development of a model that explains how different actors can co-create value in the multiple-stakeholders' environment of the O&G industry through digital technologies. This paper proposes what companies and government could do to increase the competitiveness of the local economy, diversify from the O&G into high technological industries, and support industrial development through information technologies.

4.1 Introduction

Resource-rich place great emphasis on industrial competitiveness, because it is crucial to this sector of economy in creating jobs and growth, and therefore pivotal for the prosperity of a country and its citizens. Industrial competitiveness refers to:

> "a country's specific industry's ability to be able to provide the need to meet product demand of the international market and gain profits continuously, by its more advanced capacity and production efficiency compared with other countries in the free trade international market" (Zhang and London, 2013:96).

Industrial competitiveness also indicates the capacity of the country to support the development of local businesses. In this paper under the term "development" I understand ICT-related improvements in organisational performance (business value of ICT), and diversification into new industries through governmental initiatives and support.

Harnessing new technologies is essential in enhancing operational excellence of the companies in the new O&G market dynamics, as these companies now have the opportunity to achieve further efficiencies through adopting new technologies (Gartner, 2014). This is especially important for the energy sector in Kazakhstan in connection with Kazakhstan's accession to WTO as it puts more pressure on the local energy sector through increasing competition with global players. ICT innovations can also contribute to the improvement of socio-economic conditions in developing countries (Avgerou, 2010).

Information technology has been acknowledged as a strategic resource with potential for competitive advantage for the organisations by many researchers (Barney, 1991; Clemons and Row, 1991). From this stream of works has emerged the widely accepted conclusion that IT can be used to create a competitive advantage by increasing the bargaining power of the organisations, and through efficiency improvements (Bakos and Treacy, 1986; King and Gover, 1991). Judging from a topic search of articles published in major journals, research on IT in most transition countries are sparse (Roztocki and Weistroffer, 2008). In particular, limited research is available on the contribution of IT technologies in the competitiveness of the Kazakh energy sector, and especially on the role which international O&G companies can play in creating spillovers into the IT industry.

I have found one case study (Gartner, 2011) on ICT in the IOC in Kazakhstan. This study refers to the establishment and operation of a shared IT service for an international consortium operated by the North Caspian Operating Company formed in 2009 to exploit a huge new Kashagan oil field. The consortium was formed between seven independent IOCs to operate a new business model assuming that each entity would implement its own

processes and systems in order to maximise performance. Parent companies planned to establish their IT systems in Kazakhstan and find ways to share the information between members of the consortium. This would have meant effectively having several independent IT systems. An additional challenge was to build the culture of cooperation and trust between members of the ICT teams from different entities who continued to be competitors for other projects. At the same time, there was a clear business need to set up the IT system in the shortest time. As a result of discussions with stakeholders, a shared-service model was proposed as a solution for ICT organisations design. To the best of my knowledge there is no research on the level of ICT adoption in the O&G industry in Kazakhstan. In order to evaluate the business value of IT in the competitiveness of Kazakhstan energy sector, additional research needs to be conducted.

This paper aims to fill this gap in the literature as follows. The theoretical contribution of this research will be first, development and adaptation of a model of private-public collaboration in the O&G cluster; second, in addition to the theoretical framework presented, I will draw on empirical evidence from Kazakhstan's current energy sector's level of ICT adoption and develop recommendations for policy-makers on how IOC can create technological spillovers into the ICT industry.

4.2 Literature review

Business value of IT, competitiveness and LCD

Strategic management focuses on understanding the sources of an organisation's sustainable competitive advantages. According to Porter (1985), competitive advantage is characterised by low cost, as well as differentiation and sustainability. EC (2016) defines industrial competitiveness as on one side "the ability of companies to compete in domestic and global

markets" and on the other side the capacity of countries to support the development of the business, and it is a key determinant for growth and jobs, especially important for SMEs.

The most influential theory of the business strategy that was applied to the circumstances of the O&G industry is the theory of clusters developed by Porter (1998) as a microeconomic basis of the theory of local competitiveness put in a global economy. This theory explains that O&G companies tend to develop in industrial clusters. This term was introduced in the management literature by Porter (1990 and 1998) as key to industrial competitiveness and emphasized the importance of firm links with its supply chain and research. He originally defined clusters as "a geographical group of interconnected companies and associated institutions in a particular field, linked by similarities and complementarities" (Porter, 1998). A more recent definition of clusters devised by Möhring (2005:29) consider cluster as "an agglomeration of vertically and/or horizontally linked firms operating in the same line of business in conjunction with supporting institutions". Porter suggests that cluster is a new way of organising national, state and local economies, and assuming new roles of business, government and other institution to enhance competitiveness (Porter, 2000).

The advantages of clusters are based on external economies or interactions between businesses, industries and other institutions, where the formal and informal organisational mechanisms and cultural standards often play a role in the operation and development of clusters (Alexandros and Metaxas, 2016). This is because clusters are actually a combination of competition and cooperation between companies. Repeated interactions and informal contacts within the clusters that comes from work and life in one geographic area, promote trust and communications, while decreasing the cost of disruption and recombination of relations of markets (Delgado, Porter and Stern, 2011).

In each market, there is an initial supply split between domestic and foreign producers, depending on the relative import competitiveness of the domestic producers. The

competitiveness of the local information technology industry can be improved if the O&G sector invests in this industry. At some stage of the domestic industry development this only can be done by enacting a regulatory policy.

Kazakhstan used LCPs since 2010 intensively until the agreement on WTO accession was signed in 2015. One of the conditions for WTO accession is abandoning performance measurements, including LC requirements. Kazakhstan will be able to use LC requirements for existing contract until 2021 and after this only some LC requirements in employment and procurement, particularly for services, but not for goods. Therefore, it is still an open question as to how Kazakhstan can in the future stimulate international exchange in technology in order to enhance the competitiveness of the local economy.

First, I consider how ICT technologies in general can help companies to generate competitiveness and increase LC. The generation and sustaining of competitive advantages resides in the set of strategic resources and capabilities available to the organisation. Information and knowledge resources are particularly significant and arguably the most important among these (Drucker, 1993). Alignment between strategy and IT is a key factor in realising value from IT investments. This concept was formulated by Henderson and Venkatraman (1989; 1993) with the development of a strategic alignment model. The model is based on two assumptions: first, that economic performance is directly related to the ability of management to build a strategic fit between the strategic position of the organisation and an appropriate administrative structure; second, that strategic alignment is not static, but a process of continuous change. The Strategic Alignment Model specifies integration between business and IT at strategic and operational levels (Figure 6). The ICT-business alignment model describes a process of inter-company alignment between IT and organisational strategy.

What actually is the business value of IT? Although many journal papers, conference papers and books have been published on the subject of IT evaluation, only a relatively small

set of these publications have been concerned with the core issue of what precisely is meant by the term "value" (Nicolian et al, 2015). Business value of information technologies refers to the connection between IT investment and performance. Studies at the firm level have demonstrated that the impact of IT investment on firm performance is significant and positive (Kohli and Devaraj 2003; Melville et al. 2007). In one of the most-cited papers on this topic, Melville et al. (2004:287) define the business value of IT as "the organisational performance impacts of information technology at both the intermediate process level and the organisation-wide level, and comprising both efficiency impacts and competitive impacts". They also reveals the existence of two formulations of performance, i.e. efficiency and effectiveness, where

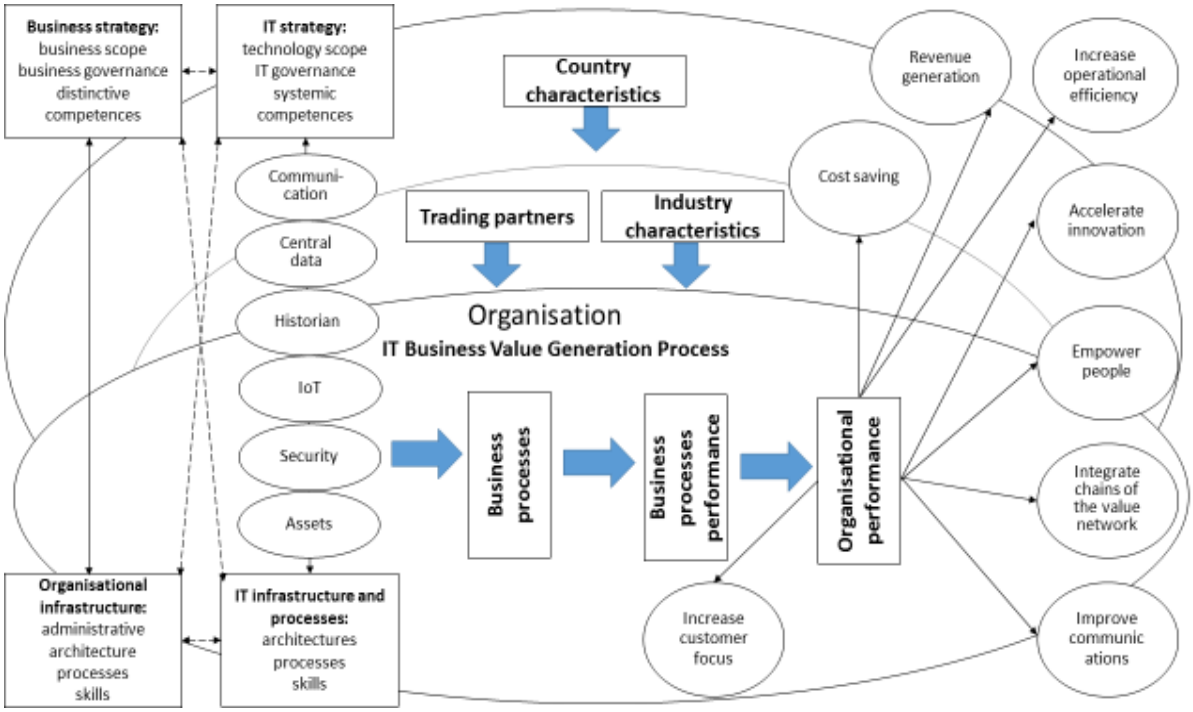

Figure 6. Business-ICT valuation model for a single company in the O&G industry based on Strategic Alignment Model. Source: Author, based on Henderson and Venkatraman (1989; 1993) and Melville at al. (2004).

efficiency includes internal performance metrics, and effectiveness includes organisational objectives toward improvement of a firm's external environment. Kohli and Grover (2008) have defined the business value of IT as the ability to improve access to information and therefore the ability to improve quality of information in order to generate value from it.

Table 18. Theoretical models tracing the relationship between IT investments and business value.

Approach		Hypothesis	Indicative literature
Process view,	provide an explanation for how IT create business value	IT value is delivered in increments, and each phase of the IT value proposition creates an intermediate outcome. IT value creation comprises of three major processes: IT conversion, IT use and competitive forces	Markus and Soh (1995)
		Revision of the previous model by adding the ICT-business strategy alignment process at the beginning of the IT value creation cycle. IT expenditures need to be linked back to the business strategy and business requirements in order to generate business benefits	Marshall et al. (2005)
		Process-driven model comprising of five major steps: identifying the objectives for investment, planning the realisation, execution, reviewing and evaluating the results, and establishing the potential for further benefits	Ward and Daniel (2006) Ward and Daniel (2012)
Variance view,	Explain why IT business value occurs and what variables moderate that outcome	Measurement of the effectiveness of organisational information use, comprising of three dimensions: information technology practices, information management practices and information behaviours and values which are linked to the organisational performance through information orientation	Marchand, Kettinger and Rollins (2000)
Hybrid models,	Combine both process and variance view	Extent and dimensions of business value of IT depends on external and internal factors, including complimentary organisational resources of the firm and its trading partners, as well as the competitive and macro environment. The model comprises three domains: focus firm, competitive environment and macro environment	Melville et al (2004)

Source: Author, compiled from Nicolian et al (2015).

The challenge in defining IT business value is the difficulty in measuring the multiplicity of different factors. That is why quality dimensions have also been added to measure the impact of the IT function on an organisation. Later, authors such as Melville et al (2004), Marshall et al (2005), Ashurst et al (2008) and Ward and Daniel (2012) developed

theoretical models that explain the interconnections between IT and business value (see Table 18). In recent times, companies also share and make IT investments together. In this case IT is used as an instrument of business value co-creation (Kohli and Grover, 2008).

Model derivation

Based on our analysis of how previous researchers have modelled ICT-enabled value co-creation in a single organisation and interviews with experts, I concluded that the locus of value co-creation in an environment of multiple stakeholders in the O&G industry is the ICT provider, which can be a subsidiary of an O&G international company (model constructs are given in the Table 19).

Table 19. Business–ICT Value Co-Creation Model Constructs.

Domain	Main Characteristics
ICT Integrator (IOC)	Financial resources ICT technologies and investments ICT skills and processes Managerial skills, business–ICT strategic alignment, performance
Industry (NOC, SMEs)	Competitiveness Industrial regulation (LCPs in O&G and ICT sectors) Level of the local industry development Available local and foreign specialists
Country (Government, Banks)	Infrastructure (roads, buildings, airports, optic cables etc.) Educational institutions Research and development investments Business culture Regulation (tax subsidies, law on PPPs)

Source: Author.

The ICT provider invests in and deploys ICT resources[35]. External factors also play a role in shaping the extent to which ICT business value can be generated and captured (Melville et al, 2004). The Business-ICT Value Co-creation Model consists of three domains:

[35] ICT resources are physical and intellectual assets related to ICT.

- ICT provider and its Tier 1 environment
- competitive environment, including industrial characteristics and multiple stakeholders such as national O&G company, international O&G companies, local SMEs, and banks
- macro-environment, including the government.

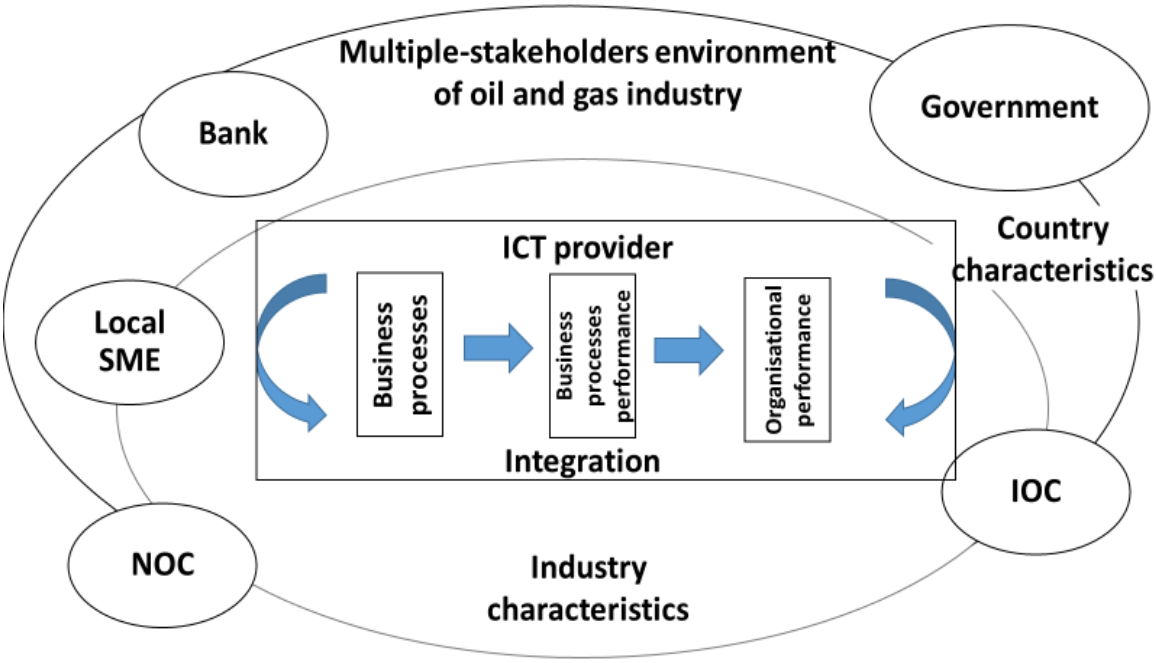

Figure 7. Business–ICT Value Co-Creation Model at the Network Level for the O&G Industry. Source: Author.

The first domain is the ICT integrator, which generates ICT business value through the deployment of ICT resources and sharing digital platforms with multiple stakeholders of *the second domain*, which includes regulation at industry level for example in government promotion and regulation of technology development. It also includes industrial policies, for instance, LC for the information and communication technologies and the O&G sectors. Information technology increasingly diffuses organisational boundaries, linking multiple firms via electronic networks and software applications and melding their business processes

(Basu and Blanning, 2003; Hammer, 2001; Mukhopadhyay and Kerke, 2002; Straub and Watson, 2001).

The application of ICT and complementary organisational resources by an ICT provider may result in the improvement of business processes, and impact performance in the multiple stakeholders' environment. *The final domain* is the macro environment, which includes regulation at the country level such as law on public-PPPs, special economic zones and tax subsidies, availability of ICT specialists, and finally, the information infrastructure. Including country characteristics in my model emphasizes the increasing role of public policies in shaping ICT business value in emerging countries, where organisations such as local SMEs may face constraints in their application of information technologies (see Figure 7).

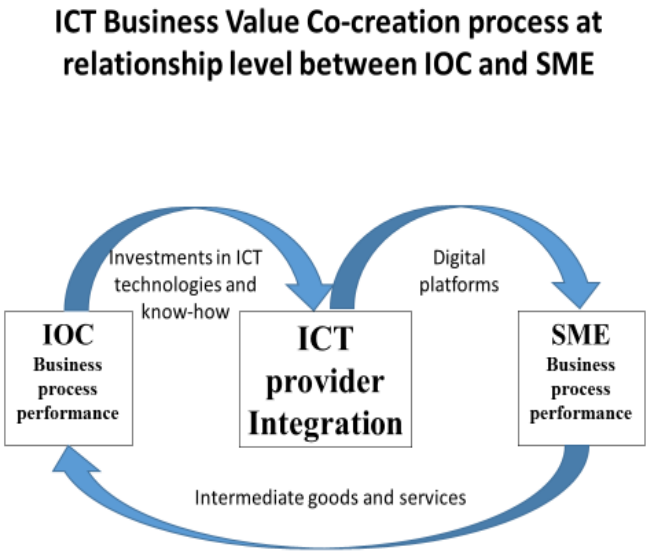

Figure 7a. Business–ICT value co-creation model at the individual level for the cases of IOC and SME. Source: Author.

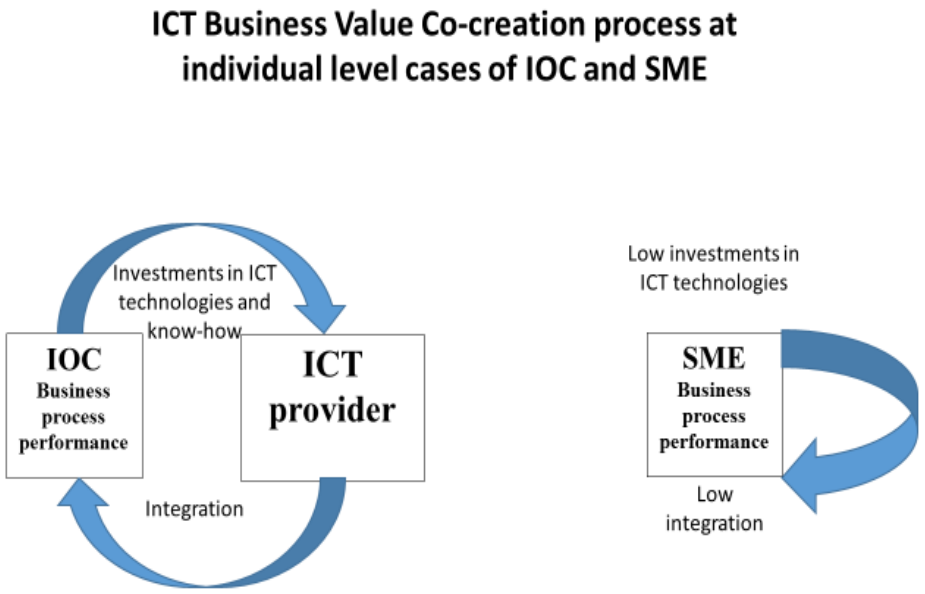

Figure 7b. Business–ICT value co-creation model at the relationship level f or the case of IOC and SME. Source: Author.

Value co-creation also occurs at three inter-related levels (Jaakkola and Hakanen, 2013): individual level (one actor), relationship level (two actors) and network level (Figures 7a, 7b and 7 respectively). Value creation at network level involves value processes within individual organisations as well as within the network of actors in the O&G industry.

4.3 Research settings and methods

Energy value network in Kazakhstan

It is necessary to grasp the complex structure of the energy sector in order to understand why the network relationship between actors are of high importance. The energy sector plays an important role in Kazakhstan's economy as it has significant O&G reserves and abundant natural resources. The petroleum and mining industries accounted for 33% of GDP in 2010 and 82% of exports. Kazakhstan has more than 200 O&G fields around the Caspian Sea with a total production in 2013 of 81.8 million tons. The biggest exploration fields are *Tengiz*,

Kashagan and *Karachaganak* with approximately 86% of Kazakhstan's oil production (see Table 20). There are also three major oil refineries (Karatayev and Clarke, 2016).

Segments of the O&G value network include different technological stages, such as: development, exploration, production, processing, pipeline, refining/petrochemical, transport/storage, and marketing/distribution (Figure 8).

Table 20. The major upstream projects of Kazakhstan run by consortiums of O&G companies.

Project	Developers	Participants
Karachaganak	Karachaganak Petroleum Operating BV (KPO)	BG Group 29.25% Eni 29.25% Chevron 18% Lukoil 13.5% KazMunaiGas (KMG) 10%
Tengiz	TengizChevroil (TCO)	Chevron (50%) Lukoil (5%) ExxonMobil (25%) KMG (20%)
Kashagan	North Caspian Operating Company (NCOC)	CNPC 8.33% KazMunaiGas (KMG) 16.88% Eni 16.81% Royal Dutch Shell (RDC) 16.81% ExxonMobil (EM) 16.81% Total 16.81% INPEX Corporation 7.56%

Source: Author, adapted from BMI Research (2015).

The process of oil production starts from the initial exploration activities. These activities are generally called *exploration and production* (E&P) or the *upstream* O&G sector. Oilfield services are an auxiliary industry to the exploration and production activities of the O&G industry which include seismic activities control, well-drilling, engineering projects, and supply of drilling rigs. The oilfield service industry has been classified as highly skilled. The people with the skills and expertise in this sub-industry are in high demand, which means that for an O&G company to have these people on staff all the time can be very expensive. For this reason, most oil service companies are simply contractors who are hired by O&G producers to do specific work on the contract basis.

Another part of the O&G industry value chain refers to *midstream* sector. This includes a transport infrastructure of pipelines, roads, rail, ports and storage. Oil refining from crude oil to the petrochemical products and gas processing and purifying, as well as marketing and distribution of the processed products to wholesale, retail or direct industrial customers is referred to as the *downstream* sector.

Figure 8. Stages of petroleum value chain. Source: Author.

Petroleum industry is known for its benefits from vertical and horizontal integration. Horizontal integration assumes that different firms are involved in the same stage of production and therefore integration allows them to share resources at that level. At the E&P stage particularly, it allows better access to funding of projects, to diversification of investment and reduce development risk, as well as serving as long-term assurance to host governments. Due to the high risk and investment intensity, O&G companies usually form consortiums to develop large projects, while continuing to compete at the corporate level. The competitive advantage lies in technical expertise and is therefore related research and development investments, broad operatorship experience, projects control and overall effectiveness of the business (Wolf, 2009).

ICT industry in Kazakhstan

What then is the interconnection between LCD in the O&G industry and ICT technologies? According to the internal document *Local content management framework* (2004) – an *Agip Kazakhstan North Caspian Operating Company NV*, or *Agip KCO* (since January 2009 -

North Caspian Operating Company BV, or *NCOC*), managers of the company see a number of potential barriers related to LCD. First of all, weak domestic skills and/or supplier base, with low domestic capacity levels, insufficient to meet business needs. In particular there is:

- Lack of an appropriate technical skills base in the labour force
- Inadequate or outdated equipment
- Weak technology base, i.e. limited IT infrastructure
- Lack of understanding of the international tender processes
- Insufficient awareness or poor practice in HSE
- Inadequate knowledge of international commercial practices in HSE
- Inadequate knowledge of international commercial practices e.g. financing
- Import laws

The ICT sector in Kazakhstan is currently underdeveloped in comparison with some other EEs (see Table 21). As a result, demand for ICT goods and services is mostly covered by imports. The share of LC is especially low for IT equipment and amounted to only 3% in 2010. For IT services, which are often considered to be more local, the share of LC was only 30% (Government of Kazakhstan, 2010). In the Programme, the Government had set ambitious targets to achieve a share of LC, 10% in equipment and 80% in services by 2014. Reaching these targets requires developing the infrastructure as well as a number of policy changes, including improving the business environment and ensuring skills development.

The internal document discussed above demonstrates that ICT can be a barrier not only in LCD, but also in competitiveness of Kazakhstan's O&G companies and the whole energy sector. This raises the question, as to how the level of ICT adoption in the energy sector can be effectively increased.

Table 21. The share of ICT goods as a percentage of total merchandise trade, 2010-2015.

Country/Year	2010	2011	2012	2013	2014	2015
Czech Republic	15	15	14	13	14	14
Hungary	25	21	17	15	12	12
Kazakhstan	0.05	0.14	0.44	0.33	0.84	0.19
Russian Federation	0.22	0.24	0.31	0.42	0.80	0.81
Ukraine	1.07	0.89	1.10	0.93	0.96	0.82
China	29	27	27	27	26	27

Source: Author, adapted from UNCTADstat.

The government of Kazakhstan has recognised the importance of technological change disrupting the economy, launching a *Programme of Information and Communication Technologies Development in the Republic of Kazakhstan in 2010-2014* (Beisenova, 2010), *Programme Information Kazakhstan – 2020 for 2013-2017 years* and end of year 2017 – *Programme Digital Kazakhstan*. All these programs which have their aim an acceleration of industrial development in Kazakhstan, and more specifically, transition of the Republic of Kazakhstan to an information and innovative economy, and the formation of a competitive, export oriented national ICT sector. This also assume development of local ICT capabilities (see Table 22). In order to implement an integrated state policy in ICT and state management of information and communication infrastructure, a joint stock company called the *National ICT Holding Zerde* was established in 2008. According to the information on the *Holding Zerde* web-site (2017a) the implementation of the State Program *Digital Kazakhstan* will focus on four key areas:

- creating a *Digital Silk Road* including the development of reliable, affordable, high-speed, secure digital infrastructure;

- shaping a "creative society", including the development of competences and skills for the digital economy, an upgrading of digital literacy, and training of ICT specialists;
- digital transformation in the economy assuming the widespread introduction of a digital technology to enhance the competitiveness of various branches of the economy;
- the formation of a *proactive digital government*, including improvement of electronic and mobile government platforms, and optimisation of the public services supply sphere.

Table 22. LC (or Kazakhstani content) in ICT technologies in Kazakhstan.

Indicators	2009	2014
Share of Kazakhstani content in overall ICT-market	7%	Not less than 32%
Share of Kazakhstani content in ICT services	30%	80%

Source: Author, compiled from Government of Kazakhstan (2010), the Programme for Development of Information and Communication Technologies in the Republic of Kazakhstan 2010-2014.

In Kazakhstan, reaching the LC objectives set by the government's 2010-14 ICT Programme requires enhancing skills through PPP in information technologies (OECD, 2013). As of December 2017, the list of investment programmes of the *Holding Zerde* (2017b) accounted for 8 projects including: 1) central provision of the IT services for state bodies; 2) data processing centres (data centres) in 14 regional centres and in Almaty to provide a set of information services (including collocation, dedicated, hosting) for all government agencies; 3) a unified notary information system; 4) a unified service monitoring system; 5) a consolidated computing platform for Civil Defence; 6) an information system

for technical inspection for motor vehicles; 7) a single contact centre of state bodies of Kazakhstan; 8) a unified e-mail system of state bodies of Kazakhstan.

The list of PPPs the *Holding Zerde* is taking part as of December 2017 (Zerde, 2017c) includes 5 projects: 1) the automation of crop production traceability; 2) the automation of monitoring of fish and fish products turnover; 3) an intelligent transport system; 4) the automation of traceability of farm animals and livestock products; and 5) a smart city. In September 2017 the Government of Kazakhstan introduced the state-initiated programme *Digital Kazakhstan* and in December 2017, the Government developed and presented the detailed plan to the programme to the President of Kazakhstan (KazInform, 2017a; 2017b).

ICT procurement comprises also a part of procurement in the O&G industry, and therefore is a subject of LC regulation in the O&G sector. However, these two policies are not synchronised, as LCP in the ICT industry is focused on this sector only, and investments and public-private projects target mostly ICT in the public services domain. However, according to Adewuyi and Oyejide (2012), knowledge-intensive sub-sectors such as control systems and the ICT sector, feeding into the O&G industry, can also serve other sectors and neighbouring countries, creating backward linkages and providing potential for spillovers. Backward linkages between a company and its suppliers, including the ICT supplier, are generally relatively labour-intensive in nature, and thus an attractive source of diversification for governments. These linkages can also increase GDP and therefore governments can actively target linkages in their IP in the hope that complementary development of the national system of innovation may result in a competitive diversified economy in the future (Kaplinsky, Morris and Kaplan, 2011).

The methodology and the empirical study

Based on the literature review and the Business-ICT Value Co-creation Model, the research questions in this paper are formulated as follows:

- What are the levels of technological capabilities development in the O&G industry of Kazakhstan?
- How are indigenous technological capabilities co-created in the network of the O&G industry: within each company and between companies and sectors?
- What are the possible spillovers between the O&G and IT sectors and potentials for companies to improve competitiveness?

My hypothesis is that the level of ICT adoption in the Kazakhstani O&G sector is different for the companies with foreign ownership and indigenous companies. The competitiveness of the local O&G industry in Kazakhstan can be significantly improved by further ICT adoption and development of indigenous capabilities in local O&G SMEs through interaction, resource exchange and value co-creation between different actors using PPP approach.

The focal phenomenon in this study is the under-investigated process of value co-creation in the ecosystem of public–private partnerships with an ICT provider. I adopt a multiple case study research method because this is the most appropriate for such exploratory research – especially when the boundaries between phenomena and context are not clearly evident (Eisenhardt, 1989). In the IB field, the research is categorized as a case study if they meet the definition proposed by Piekkari et al. (2009: 569): "a research strategy that examines, through the use of a variety of data sources, a phenomenon in its naturalistic context, with the purpose of 'confronting' theory with the empirical world". Yin (1994) argues that an industry may be investigated by using a case study design. In particular, Lee

and Baskerville (2003) demonstrated that it is possible to generalize from empirical evidence, even from a single case study, to wider theoretical constructs and structure. Pauwels & Matthyssens (2004) concluded that, in many IB studies, theoretical sampling for multiple case studies is complicated by its intrinsic multi-level character. Furthermore, while the multinational firms have to be sampled, cases within those firms' business units, foreign subsidiaries, and even individual managers or other actors also have to be selected. Lee and Baskerville (2003) demonstrated that it is possible to generalize from empirical evidence, even from a single case study, to wider theoretical constructs and structures. As an instrument to stricture the information from case studies based on interviews we use vignettes - systematically elaborated descriptions of concrete social situations that contain precise references to the most important factors in the decision-making processes of respondents (Alexander & Becker, 1978). Qualitative vignettes are particularly useful for exploring 'actions in context' (Barter & Renold, 1999). Recent examples of studies include public services (Rice, 2017). In IB research, use of qualitative illustrations, such as vignettes, to illustrate and emphasize the key elements and relationships in the theory make its communication to the management audience easier (Doz, 2011).

As the focus of this research is on collaboration between foreign and indigenous companies in the ecosystem of PPP, we have focused on firm-level (primary) cases, such as: international companies (MNEs), state-owned National Oil Companies (NOC[36]s), and SMEs. The selection of cases in the O&G industry is very limited; although the Kazakhstani O&G sector is open for foreign investments, and almost all of the largest global international O&G companies are operating there[37], the number of companies is limited due to an oligopolic market structure. Overseas state-owned NOCs (so-called SOEs) act as

[36] NOC – National Oil Company, a major, often state-owned, company operating only in the domestic market (KazMunayGas, Kazakhstan), IOC – International Oil Company, global company operating in international markets (China).

[37] Major international O&G companies operating in Kazakhstan are Eni, Chevron, Lukoil, Exxon-Mobil, CNPC, Royal Dutch Shell, Total and INPEX.

international firms, as they have to comply with the host country's legislative requirements. Although SOEs' strategies can be led by non-commercial motives, this is out of the interest of this research, and therefore not included in the scope of this study. Overall, international O&G companies demonstrate understanding that they need to look beyond the narrow generation of profit and paying taxes and royalties in their activities. However, while European laws directly prescribe certain social duties to business, American discourse reflects obligations that companies accept voluntarily. US O&G companies' social responsibility is embodied in their funding of programmes in education, healthcare and labour safety. In particular, oil giants give priority to development of STEM-disciplines (Science, Technology, Engineering and Mathematics). Such expenditures are not based on pure altruism, as they facilitate the creation of a favourable climate for business operations. Such corporate programmes represent successful examples of private-public partnerships in social areas (Pichkov, 2013).

The aim of this research is to find a way to turn these strategies into advantages for the host-country economy. To address this methodological issue, we used triangulation to integrate multiple data sources. For this purpose, we conducted interviews with industry experts and studied secondary cases, such as educational, research, and industry institutions (see Appendix 1), as well as consulted extensive secondary and web-data sources and described the vignette case studies. The research methodology depicted in Figure 9.

In total, 24 semi-structured 60-minutes interviews with the top-managers and experts from O&G industry were conducted (see Appendix 1). Interviews were negotiated through the second author, who is a reputable academic and researcher in Kazakhstan's energy sector, and also the Director of the Kazakh-British Centre for Competitiveness. These credentials granted the researcher an immediate legitimacy and credibility (Patton, 1990).

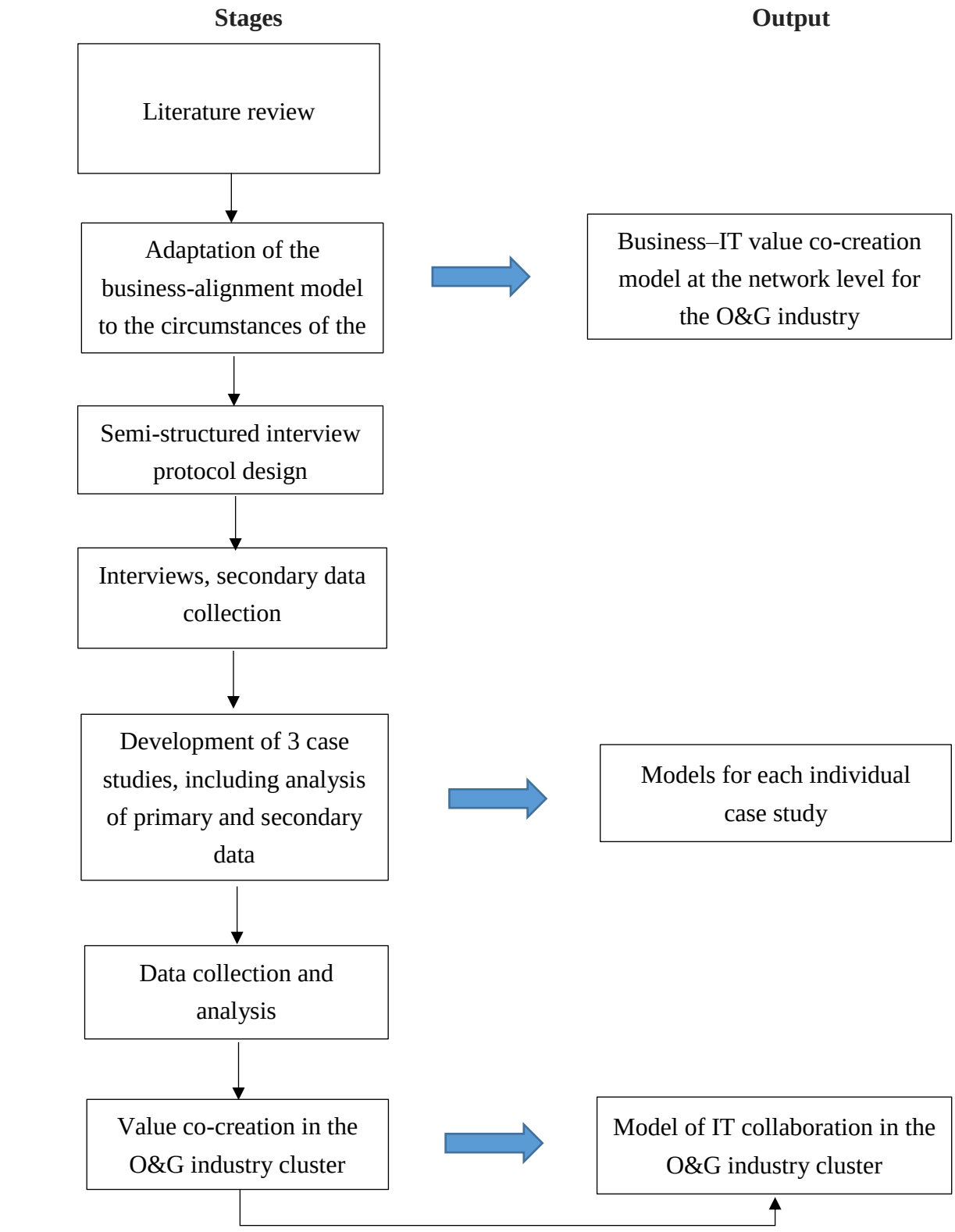

Figure 9. The research methodology. Source: Author.

The interviews were conducted with a mixture of top management personnel within different types of O&G organisations, including the chief information officer of the O&G company, a number of managers and engineers, managing director of the oil services industry SME, the Dean of the IT department of the leading University offering degrees in the field of O&G, the director of IT consulting department of the major international consulting company, and managers of the National O&G research institute. This selection of interviewees represents top-level experts from the energy sector allowed to achieve theoretical saturation in data with this sample size, which is occurs at the point in data collection and analysis when new information produces little or no change to the data (Guest, Bunce and Johnson (2006). According to recommendations given by qualitative methodologists, for case studies at least three to six sources of evidence (in this case interviews) are recommended (Creswell, 2007). I stopped my interviews at the twenty fourth person as no new themes were emerging and I believe that theoretical saturation had been achieved. This can be explained by the fact that all out interviewees are top experts in O&G information technologies and can exclusively share rich information about the industry. The interview format was semi-structured and used open-ended questions, questions which were developed from the literature. The interviews provide primary data on the level of ICT adoption in the Kazakhstani O&G sector. This stage also involved deductive advancement through in-depth interviews to identify the level of ICT adoption in the Kazakhstan's O&G sector, analysis of three selected case studies and construction of a model for each type of O&G organisation. The outcome of the cases analysis results in a model of ICT collaboration in the O&G industry cluster.

In order to analyse the level of local ICT procurement, secondary data supplied by *NOC KMG* (Tables 23 and 24) were collected from the website of NOC *KMG* www.kmg.kz/en/kaz_content/. These data were analysed by 30-digit nomenclature code (ENS TRU) developed for public procurement purposes by public institutions of the Republic of Kazakhstan for planning, accounting and analysis of purchasing processes

available from www.enstru.kz, a web-site developed by *NWF Samruk-Kazyna*. I analysed IT goods and services procurement of the *NOC KMG* using the first two digits of a nomenclature code – 26 "Computers, electronic and optic goods", second two digits of a nomenclature code – 20 "Computers and equipment", and services first two digits of a nomenclature code – 62 "Information technologies services, computer systems and networks", and the nomenclature code 3299 – Licences for IT programme for after 2015.

The value co-creation framework, an existing theory is used to make theoretical propositions in this study. The rationale for choosing this approach is that ICT can be used as an enabler for value creation by companies with different levels of ICT adoption in one industry, while companies that are more advanced in terms of ICT adoption can share their ICT resources with companies of lower levels of adoption. The latter would use ICT technologies for the improvement of business processes, which would lead to better business processes and better overall organisational performance. As both companies are inter-connected in the oil and gas value chain, as are their customers and suppliers, this would allow them to co-create value within their industry.

To meet the aims of the research, while recognising the fact that there is no established theoretical model applicable for a value co-creation process using ICT technologies in the O&G industry, I use a three-stage qualitative–interpretive research method (Klein and Myers, 1999). Most studies exploring the role of ICT in development are interpretive, with very few positivist or critical research studies (Lin et al, 2015). According to Klein and Myers (1999), case study research in information systems can be positivist, interpretive or critical. Interpretive research is "aimed at producing an understanding of the context of the information system, and the process whereby the information system influences and is influenced by its context" (Walsham, 1993:4-5). Critical research is "concerned with social issues such as freedom, power, social control, and values with respect to the development, use, and impact of information technology" (Myers and Klein, 2011:17).

Finally, the research can be classified as positivist if "there is evidence of formal propositions, quantifiable measures of variables, hypothesis testing, and the drawing of inferences about phenomenon from a representative sample to a stated population" (Klein and Myers, 1999).

As I am aiming to explore how information systems influence value co-creation in the context of the O&G industry, and how industry influences the adoption of the information systems, I believe that this approach best suits this research. This will help to further our knowledge of how the adoption of ICT technologies in networks of organisations can support local industry development. First, I conduct a literature review to identify relevant theories which will be used as an initial guide to inform the topics of research and data collection (Walsham, 1995). Second, I adopt the theory to the circumstances of the O&G industry in order to identify key domains for interviewing. This leads to the inductive development of the business-ICT value co-creation model at the network level for the O&G industry (Figure 7). This model, the result of the preliminary stage of theorizing, is the construction of an initial theoretical lens using the constructs and propositions from an appropriate theory that is meant as a "sensitising device" to guide subsequent data collection and analysis (Pan and Tan, 2011). It was developed by the author as a theoretical framework for testing in the circumstances of the O&G industry in Kazakhstan. Third, I conducted semi-structured interviews and examined the data from secondary sources such as policies and the companies' websites. To limit bias, I used an approach proposed by Eisenhardt and Graebner (2007) and have selected highly knowledgeable informants who view the focal phenomena from diverse perspectives.

The criteria for the vignette case study selection were the following: for a local private company I wanted to select a large enterprise, defined by the WB (2015) as accounting for more than 100 but fewer than 250 employees, operating in the O&G industry for a minimum of 20 years and covering all regions at national level. For the National O&G

Company (operating predominantly in one country) I selected a major SOE operating in the O&G industry. For the International O&G company (operating in more than one country) I selected a subsidiary of the foreign-owned major international O&G Company with more than 10 years of business experience in Kazakhstan. This likely allows the company to overcome the competitive disadvantages of operating in a foreign environment as the organisational learning process of EEs can take a minimum of five years (i.e. Wei and Clegg, 2015). China is also one of the top investors in Kazakhstan. According to data from the *National Bank of Kazakhstan* for FDI inflows to Kazakhstan by country, China occupies fourth place behind Netherlands, USA and Switzerland. Apart from the FDI, Chinese companies actively invest through M&As. According to the Thomson One Banker database, which provides historical data of global M&As, China had acquired 26 Kazakhstani firms in energy sector, 7 of them are acquired by CNPC.

4.4 Data analysis and results

For data analysis, I used cross-case synthesis analytical techniques including comparing data from different cases across the uniform framework (Buchanan et al, 2007; Yin, 2014). Interviews were structured to facilitate a comparison between cases, and covered similar topics. I identified three main cases within the oil and gas industry through theoretical sampling (Silverman, 2006; Eisenhardt and Graebner, 2007): SMEs, a national oil and gas company (NOC – a major company operating only in the domestic market), and an international oil and gas company (IOC - global company operating in international markets). The main characteristics of ICT adoption for these three case studies are summarised in Table 23.

These three case studies will be discussed in detail in the next section.

Table 23. Summary of findings by cases.

Case	Main characteristics of ICT adoption
SME	Lack of financial resources No evidence of long-term financial stability can be provided Lack of modern technologies ICT investments are mostly available in the form of hardware Skills gap, no ICT manager No business–ICT strategy alignment in place ICT is not used for efficiency, reliability, or cost-saving improvements
NOC	Financial resources are available Government guarantee long-term financial stability Modern technologies are partly available ICT investments in enterprise systems, hardware, and services. The share of local content is high in services but very low in hardware and software. Skills gap in some ICT areas, CIO has been recently appointed A project on business–ICT alignment transformation has recently started
IOC	Financial resources are available upon approval from the headquarters Long-term financial stability is guaranteed by the headquarters When taking decisions on budget, in most of cases the ICT department act as a driver of innovations A subsidiary in Kazakhstan can use technologies that are available at international level, such as single-enterprise ("private") cloud data center in Asia, as well as facilities in China and Dubai ICT investments in ERP systems, cloud computing, infrastructure, provides services, construction plans, consulting, support, and technical service business for the petroleum industry and large enterprises and public institutions, ICT solutions developed by the headquarters in China Skill gaps in some ICT areas, expatriate specialists as well as headquarters transfer knowledge to local employees

Source: Authors.

4.4.1 Vignette study 1: Privately owned SME

My findings demonstrate that ICT is relatively undeveloped in Kazakhstan, and in SMEs the level of adoption is especially low (level one). The main gaps are lack of financial resources for investments in ICT equipment and services, which leads to a lack of modern technologies, as well gaps in skills. The reason why SMEs cannot get financial resources is

their inability to provide evidence of long-term financial stability and inability to pay back loans. For example, one of the interviewees was recently working as a managing director for the national (in terms of geographical coverage) machinery building plant which has been producing equipment for the O&G industry in Kazakhstan for more than 20 years. The company is one of the ten leading machinery plants in Kazakhstan, and currently employs about 200 peoples but there is no one responsible for IT.

He said in particular the following:

> "The main initiative in the company is regulatory compliance, namely product certification according to international standards. The organisation has no informal or formal ICT or digitalisation strategy. ICT is not used to increase efficiency, reliability, or keeps costs low (no ERP[38]). Nor is it used in customer services or product innovation (no CRM system). The only ICT technologies available are hardware (computers with installed applications such as operative system and office solutions (company sometimes use illegal copies of programmes) and basic accounting programme. There are no plans to implement new technologies, nor any strategic plans. New technologies such as cloud and mobile are not available. The reason is that there is limited availability of such services even from major national telecom companies, namely Kazakhtelecom".

[38] Enterprise resource planning (ERP), customer relationships management (CRM) and business intelligence (BI).

Level of ICT Development

The overall level of ICT adoption in the organisation corresponds to level 1 in the five-level ICT adoption model, as activities and processes are not even defined by individual managers, rather one person who has interest to ICT, no controls are established.

The main gaps are a lack of the financial resources needed for investment in ICT equipment and services, which leads to a lack of modern technologies; and a gap in skills. The reason that SMEs cannot get financial resources is their inability to provide evidence of their long-term financial stability and the ability to repay the loans. For example, one of the interviewees, recently working as a managing director, explained that the main initiative in the company is regulatory compliance, namely product certification according to international standards, but there are no financial resources to develop ICT further.

Skills available

ICT skills in the O&G SMEs in Kazakhstan are underdeveloped. Organisations often report a number of gaps between the skills they require and the skills available on the job market or through their employees. The major gaps include a culture of communications, formal ICT qualifications, problem-solving skills, communication and learning skills, initiative and leadership skills. Often in SMEs there is no one responsible for ICT.

Structure of ICT investments

The organisation has no informal or formal ICT or digitalisation strategy. ICT is not used to increase efficiency, reliability, or to keep costs low (there is no enterprise research planning or ERP); ICT is not used in customer services or product innovation (there is no customer relationship management or CRM system). The only ICT available is in the form of hardware

(computers installed with applications such as an operating system), office solutions (the company sometimes uses illegal copies of programs), and a basic accounting program. There are no plans to implement new technologies and there are no strategic plans. New technologies, such as cloud and mobile, are not available. The reason is that there is limited availability of such services even from major national telecom companies, such as Kazakhtelecom. The overall level of ICT adoption in the organisation corresponds to the lowest level of the ICT adoption model: efficiency of processes is chosen by individual managers who do just anything to get the job done, without systematic methods of selection. Activities and processes are not even defined by individual managers, and for individual members of staff when ICT development is not included in their job descriptions.

Development of Kazakhstan's O&G SMEs would benefit its economy directly through new job creation, and also indirectly through productivity growth and attraction of FDI. Adoption of ICT by local O&G SMEs in Kazakhstan would also affect the economy in an indirect way through increased labour productivity, capital investment in ICT infrastructure and equipment, and overall competitiveness of the O&G sector.

The empirical findings above are summarized in the framework (Figure 10), which shows how SME can benefit from the public–private partnership for an SME in the O&G industry.

Development of the O&G SMEs would benefit the economy of Kazakhstan directly through new job creation and also indirectly through productivity growth and foreign direct investments attraction. Adoption of ICT by local O&G SMEs in Kazakhstan would also affect the economy in an indirect way through increasing labour productivity, capital investments in ICT infrastructure and equipment and overall competitiveness of the O&G sector.

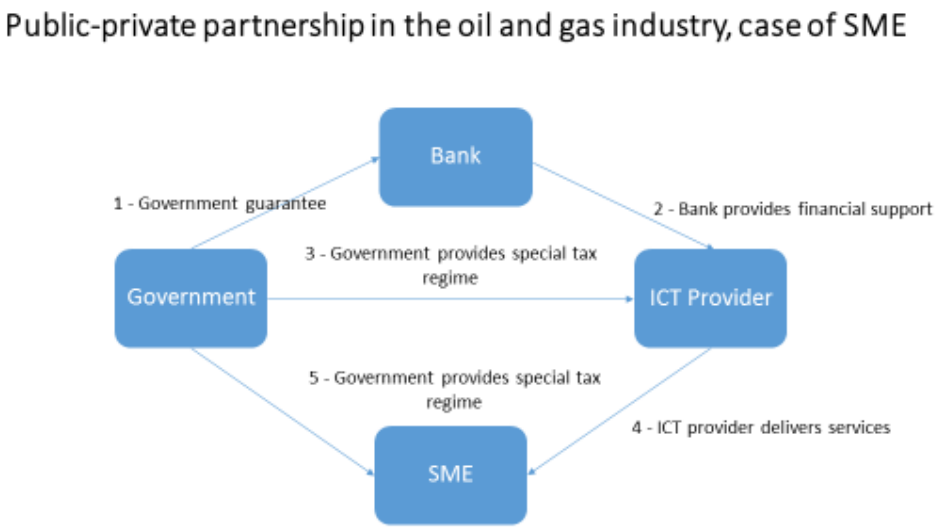

Figure 10. ICT Collaboration in the O&G Industry: case of a single SME. Source: Author.

4.4.2 Vignette study 2: National O&G company (SOE)

In the case of the national O&G company (*KazMunayGa*s or *KMG*) the level of ICT adoption can be described as half-way between the SME discussed in the previous section, and an MNE which will be discussed in the next section. Kazakhstan's *NOC KMG* is owned by the *NWF Samruk-Kazyna* (which is actually is a group of state owned companies), a sovereign wealth fund and joint stock company in Kazakhstan. *Samruk-Kazyna* also owns, either fully or in part, many major companies in the country, including the national rail and postal services, the telecommunication company *Kazakhtelecom*, the state uranium company *Kazatomprom*, *Air Astana*, as well as numerous financial groups. The state is the sole shareholder of the fund.

A Deputy General Manager Strategy and Development at *KMG Solutions B.V.* said the following:

> "The common problem of all developing countries is under-investment in ICT, and particularly in ICT in O&G industry in Kazakhstan and particularly in KazMunayGas. Now we need to invest much more in order to achieve an acceptable level of digitalisation… Second, is the problem of local ICT industry development. The slogan of local producer protection is not a factor of development, but the factor of protectionism, which leads to the deterioration in quality, increase in prices and does not lead to the expected development of labour force… the solution is not to substitute… you know import substitution… but to complement import with local development".

Level of ICT development

The IT services for KMG are centrally provided by *NWF Samruk-Kazyna* to the group of companies they own. In 2015, *Samruk-Kazyna* started a project on business and IT transformation, and in 2016, *NOC KMG* – a project on a shared service centre (SSC) creation. The main idea behind this is to redesign business processes and to align the ICT strategy with a business strategy, and thus to transform the ICT function of the organisation from service provider to partner, for the business. At the moment, the level of ICT technologies does not allow a business to develop its full potential, i.e. not only just to save costs but also to generate income and develop new businesses. The reason is that managers view ICT technologies as a cost-generating service. Management still does not pay enough attention to ICT, innovation or digitalisation. For example, until recent times there was no position of Chief Information Offices in the C-teams of group companies (apart from *Kazakhtelecom* and *Air Astana*), i.e. there was no CIO position in *KMG* (he was appointed in March 2014 only). If there is no representative of the ICT department at C-level it is very difficult for ICT to become a business partner. In a contrast, in organisations CIO is

responsible for ICT as a strategy: innovations, digitalisation and ICT as a driver of a business.

Skills available

The IT Transformation Team (TT) in *NWF Samruk-Kazyna* includes the following departments: Business processes, IT, Change Management and Project Management. In *KMG* it accounts for more than 100 people and is built from the best representatives of the operational departments in order to transform business from the inside. Since their appointment, members of TT work only on transformation and not on operational tasks. In *NWF Samruk-Kazyna* there was no IT architect job before, now in the transformation teams a minimum of five architect jobs has been created: application architect, data architect, infrastructure and security architect, processes architect and head of IT as chief architect. The problem here is that there are no specialists in Kazakhstan in areas such as data governance or master data management. *NWF Samruk-Kazyna* has hired specialists from Russia, who transfer knowledge from previous projects, such as *Lukoil* and *Gazprom* in Russian O&G industry. *NWF Samruk-Kazyna* has also established an IT academy where IT specialists can fill gaps in knowledge in the area of IT processes, corporate governance in IT, project management, data management and business architecture management. Unfortunately, an IT academy cannot solve all problems. The main challenge here is that universities is Kazakhstan educate IT specialists with no focus on business needs. According to my interviewee, an ICT specialist who is currently working for a major international O&G company and did an internship at the company her future employer “the internship was too short, only one month and in this period of time she could not get sufficient practical information but only general knowledge about her potential working place”. She suggested that such internship should be a minimum of 6 months in order to get more professionally-focused knowledge. *NWF Samruk-Kazyna* has contacted major Kazakhstani universities

with proposals on how to adjust their educational programmes to business needs. Thirty students participated in 3-month summer practice in six transformations teams in *NWF Samruk-Kazyna* in 2015. In 2016, more summer internships are expected. Professional development standards have been developed in order to describe a career pass for IT specialists, i.e. how the IT staff can progress in their career and which training and certification has to be undertaken and at which career stage. The transformation team in *NWF Samruk-Kazyna* also organises workshops on business and IT strategy alignment and IT courses in the IT Academy at corporate University at *NWF Samruk-Kazyna*.

Structure of ICT investments

I analysed the IT expenditure of the NOC, KMG (Tables 23 and 24). We can see that it looks more like ICT, in that KMG creates expenses rather than drives value, because the company

Table 24. Plan of IT procurement of NOC KMG.

Year	Goods, Thousands Tenge	LC, %	Services[39], Thousands Tenge	LC, %	IT programmes, Thousands Tenge	LC, %
2015	309,906	1	1,581,034	96	117,354	0
2014	2,189,805	0	1,904,774	93	575,960	0
2013	157,314	0	963,468	84	314,730	0
2012	103,679	1	1,668,169	83	2,260,453	12

Source: Author, compilation from www.kmg.kz/procurement

procures mostly hardware and less is spent on the implementation of ERP, CRM and BI (business intelligence) systems. Such systems have been in existence as technology for decades, and are now using new technologies such as cloud, mobile, and big data, which can

[39] Prices are not available for all positions.

Table 25. IT procurement of NOC KMG according to type of goods.

Type of goods/ Year	2012	2013	2014	2015
Notebooks	381		32,844	32,254
Admission system			63,123	
Server	1,568		855,811	3,826
Computer	6,639		10,394	22,273
Workstation		49,383	271,834	34,760
Printer		11,952	93,956	
Keyboard			134	
Printer	672		93,956	77,223
Scanner			14,515	6,362
Plotter				22,294
Monitor				4,888
Cartridge	3,146		0	1,391
Mouse			90	
Projector			1,351	76
Fax			46	129
Printer and copy machine			94,095	
Hard-disk			1,449	332
Disk-set		68,638	742,982	
Hard-disk external			504	
USB	3,904	880	2,323	1,610
Proximity card			220	157
Driver			92	
Shredder	157		120	810
Uninterruptible power supply	85,913	532,224	2,425	97,220
Module of printing and copy machine			179	
Proxy RFID		248	1,313	328
Information leakage protection device	880			
Interactive whiteboard				3,640
Robotic tape libraries		25,681		
Total:	**103,679**	**157,314**	**2,178,857**	**309,906**

Source: Author, compilation from www.kmg.kz/procurement.

have a great impact on business. The problem is that *KMG* still does not understand how these newer technologies can be integrated in its business models and therefore the effects that it can provide. From my point of view, the situation described above corresponds to the

middle of ICT adoption: basic management processes and controls are in the process of establishment and transformation.

The data in the Table 24 particularly shows that the local value added in IT goods and programmes is very low, with services achieving nearly full localisation.

The empirical findings above are summarized in the framework shown in Figure 11. This figure shows the public–private partnership for a NOC cooperating on projects with an indigenous SME in the O&G industry:

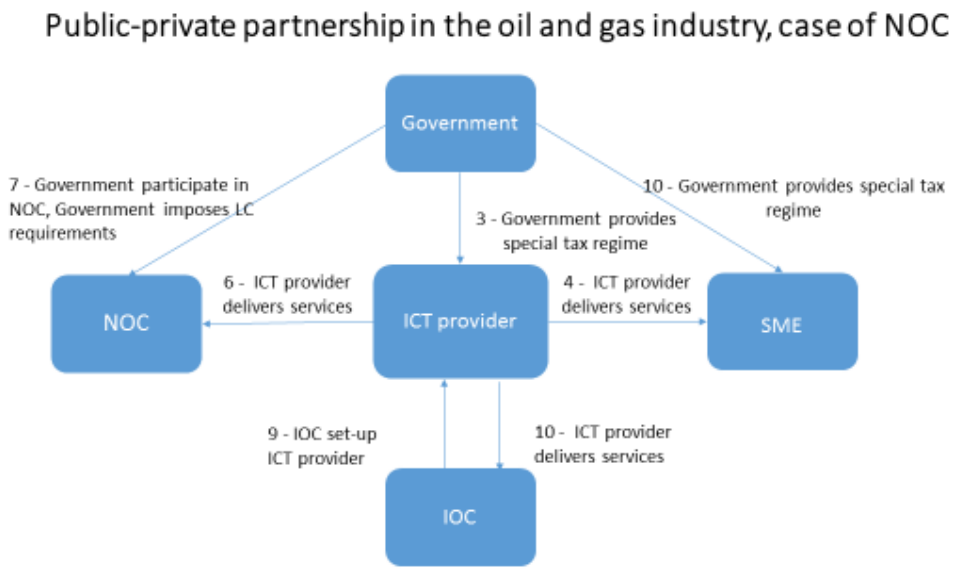

Figure 11. ICT Collaboration in the O&G Industry: Case of a NOC. Source: Author.

4.4.3 Vignette study 3: International O&G Company (MNE)

International O&G companies operating in Kazakhstan have the most developed level of IT in the whole O&G value network in Kazakhstan. For example, *Richfit Information Technology Company Limited (Richfit)* is the wholly-owned subsidiary of *the China National Petroleum Corporation (CNPC)*, number 4 in the global top 50 oil companies, and number 5 on the Fortune 500 list, which provides IT services mainly for *CNPC*

International. These include 12 companies in Kazakhstan: *PetroKazakhstan*, *CNPC-AktobeMunaiGas*, *MangystauMunaiGas* etc. as well as other Chinese companies including *Sinopec Corporation* (9 companies in Kazakhstan), and *Sinooil* (down-stream operations), mostly in Kazakhstan and Central Asia. *Richfit* also participates in some IT projects in Africa, Venezuela and Russia but Kazakhstan is the priority market for SNPC: it is the closest geographically, and where the highest number of foreign entities are owned.

I interviewed the Managing Director of *Richfit* and he said the following:

> "Integration and sharing of ICT digital resources allowed the company to save significant financial resources and improve the competitiveness of the group companies. We are also ready to deliver our services to any external companies from the oil and gas industry. Our headquarters in their home market delivers about 30% of services to the companies which do not belong to the group. This allows us to co-create value within the oil and gas industry between companies of different sizes and parts of the oil and gas value chain".

This quotation demonstrate that common use of ICT resources with foreign companies will allow indigenous companies in the O&G industry to improve competitiveness and to co-create value.

Level of ICT Development

Some of the companies in the oil and gas industry are advanced from the ICT development standpoint; however, there are others where ICT does not exist and where it is only possible to speak about basic technologies. According to managing director of *Richfit*:

> "Customers have different levels of ICT adoption. The level of adoption depends on the history of the organisation. Through deployment of modern digital solutions within the network of our organisations, we improve the availability of ICT

technologies. For example, we implemented cloud ERP in the down-stream company and improved its performance".

Often customers do not even know what ICT services they do have – and so they have no idea about what and how to implement further. In the more advanced companies, from the Kazakhstani perspective, the focus is on ERP systems, but even ERPs do not exist in all the companies. There is also an interest in rig maintenance and repair automation, as well as the industrial automation of rigs and timely data transmission. The aim is real-time data transmission but if there is no automation of this process companies transmit data manually – often on a daily basis but sometimes, in extreme cases, only on a weekly basis.

Another expert expressed the opinion that about 30 percent of O&G companies in Kazakhstan have a relatively high level of ICT adoption. However, about 60 percent still have a low level, and 10 percent have a very low level. Oil and gas companies in Kazakhstan used to spend only 1.5 percent of their revenue on ICT; since the downturn in oil price this has decreased to 1 percent or less. In most companies, the ICT function reports to the chief financial officer (CFO), so there is no CIO position at the C-level. In *Richfit*, about 20 percent of the ICT budget is spent on innovations and 80 percent on maintenance.

Skills Available

Richfit also participates in some ICT projects in Africa, Venezuela, and Russia – but Kazakhstan is one of the priority markets for *CNPC*, as it is the closest geographically, and is where the highest number of foreign entities is owned. *Richfit* supplies information construction plans, consulting, support, and technical services for the petroleum industry, large enterprises, and public institutions. The total number of ICT employees in headquarters is 3,000, and *Richfit* in Kazakhstan accounts for about 50 employees. The company has carried out its business activities in Kazakhstan for three years. Business activities include

outsourcing and implementation of ERP systems, outsourcing of ICT services, infrastructure outsourcing, and implementation of ICT solutions developed by the headquarters in the home country (e.g., office automation systems, digital control systems, and production of temperature and pressure sensors for these systems). The company employs local specialists as well as expatriates who transfer the knowledge available at the corporate level to the local employees.

However, as one of top managers explained:

> "There is a shortage of ICT specialists in Kazakhstan, which is why expatriate specialists would be very helpful as local staff report skills gaps in some ICT areas; however, the local content requirements for the share of local labour are very high, and obtaining a working permit is extremely expensive. This makes transfer of knowledge difficult; therefore, headquarters supports us with knowledge available at the corporate level".

This quotation shows that transfer of knowledge from the headquarters is important for the development of indigenous technological capability.

Structure of ICT Investments

When taking decisions on budget, in most cases the ICT department acts as a driver of innovation. Technologies such as the IoT and cloud computing are being adopted by companies. For example, MIPC has recently built the largest single-enterprise ("private") cloud data center in Asia. The reason for this was that the operating environment, which included hundreds of ICT applications, had become too complex and lacked the ability to perform its critical functions, and so it was necessary to integrate the architectures to enable the company to centrally manage its services. ITC Ltd can also use cloud facilities from headquarters and already has customers in Kazakhstan who use MIPC's cloud.

The main characteristics of ICT adoption by organisations in Kazakhstan's O&G industry are summarised in Table 26.

Table 26. Main characteristics of ICT adoption by O&G companies in Kazakhstan.

Actor	Main characteristics of ICT adoption
SME	Lack of financial resources No evidence of long-term financial stability can be provided Lack of modern technologies ICT investments are mostly available in the form of hardware Skills gap, no ICT manager No business–ICT strategy alignment in place ICT is not used for efficiency, reliability, or cost-saving improvements
NOC	Financial resources are available Government guarantee long-term financial stability Modern technologies are partly available ICT investments in enterprise systems, hardware, and services. The share of LC is high in services but very low in hardware and software. Skills gap in some ICT areas, CIO has been recently appointed A project on business–ICT alignment transformation has recently started
IOC	Financial resources are available upon approval from the headquarters Long-term financial stability is guaranteed by the headquarters When taking decisions on budget, in most of cases the ICT department act as a driver of innovations A subsidiary in Kazakhstan can use technologies that are available at international level, such as single-enterprise ("private") cloud data center in Asia, as well as facilities in China and Dubai ICT investments in ERP systems, cloud computing, infrastructure, provides services, construction plans, consulting, support, and technical service business for the petroleum industry and large enterprises and public institutions, ICT solutions developed by the headquarters in China Skill gaps in some ICT areas, expatriate specialists as well as headquarters transfer knowledge to local employees

Source: Author.

According to the managing director of *Richfit*:

"Only 10 percent of energy companies in Kazakhstan use new ICT technologies such as the Cloud and Internet of Things. ITC Ltd can offer to customers in Kazakhstan its cloud facilities in the home country and Dubai. The data of our customers will be

safe - the MIPC, as with many other private and government organisations, is paying close attention to cyber security and has decided not to use vendor solutions for its cloud services but to build its own. However, constraints on the use of modern technologies for other companies include a general low level of ICT adoption in Kazakhstan, and also legislation that restricts the storage of personal and some other data outside of Kazakhstan."

4.5 Discussion

Optimising business value of IT for competitiveness of Kazakhstan's energy sector

According to my empirical data, the level of ICT adoption in Kazakhstan's energy sector varies depending on the type of organisation (SME, national companies and international O&G companies which can be qualified as multinational-national organisations) with the very low level of adoption by SMEs, medium level by national companies and highest level of adoption by multinational companies operating in the Kazakhstani energy sector. This is a predictable result taking into consideration technology transfer within MNEs from technologically advanced countries such as the US, China and the UK. The Russian MNEs are also more technologically developed than local Kazakhstani O&G companies due to the historical origin of the Kazakhstani energy sector as part of the former Soviet O&G industry, with a centre of competences in the territory of the Russian Federation. NOC KMG has recently started an ambitious IT and business processes transformation project which is financed by Kazakhstan's state, although the LC in the IT products and services procured by *NOC KMG* remains very low, so that it does not use the full potential which can be created by the energy sector for the IT sectors of the economy. But SMEs did not get enough attention or resources from the state or from policymakers to be able to develop their level

of ICT technologies. Where can these companies seek knowledge and resources in order to develop their ICT adoption? How can policy makers use the potential of MNEs to strengthen the domestic SME sector?

Contemporary views on the value-creation process suggest that it is created when actors apply resources and integrate with other actors. The value-creation process involves different stakeholders who form networks in which resources are integrated and applied through interaction (Gummesson and Mele, 2010, Vagro and Lusch, 2011, Jaakkola and Hakanen, 2013). Therefore, my policy advice to the government is to engage the international O&G companies in the development of the local O&G industry and incentivise them to undertake such activities. According to Porter (2005), economic development is a collaborative process involving governments at multiple levels, as well as companies, teaching and research institutions, and institutions on collaboration. This aim can be achieved by seeding industrial clusters, creating "geographic concentrations of interconnected companies and institutions in a particular field" (Porter, 1998).

The most well-known O&G clusters are two regions in the North Sea O&G province: the Stavanger region in Norway and Aberdeen in Scotland, as well as the Houston cluster in the USA. Such agglomerations can include not only drilling, exploration and service companies, but also transport, including maritime, catering, information technology providers and other services. The development of local technological and industrial capabilities can follow different paths in the different locations and are characterised by very different local innovation systems. But the available evidence suggests that outcomes have been similar across significant dimensions of industry performance so that they do not appear to have led to significantly different levels of international competitiveness (Hatakenaka et al, 2011). Korosteleva and Belitski (2017) found that in post-communist countries it is especially important to promote strategic entrepreneurship and the local authorities should concentrate on encouraging cluster development between universities and local businesses.

That is why clusters in these countries should include not only international and national O&G companies and SMEs, but also governmental and other institutions – such as universities, think tanks, agencies and associations which provide supportive functions, including training, education, research and information.

According to Cumbers (2000), the O&G cluster in Aberdeen in Scotland became an important centre of expertise and knowledge within the international O&G industry where the products, services and processes were first developed and tested in the North Sea before new markets overseas were found. This also resulted in spin-off effects through new firm start-ups. However, while there is some evidence of indigenous firms being involved in niche areas of offshore technology development, the connections between foreign oil companies and the local economy remained limited. No major oil company or contractor made Aberdeen its head-office and in the new growing projects such as Brazil, UK local firms are unable to translate their expertise and knowledge into global advantage. The mission of the cluster is therefore to provide a link between industry, universities and government, with the latter as a facilitator of the business environment where business can develop and increase its competitiveness. One of the aims of the cluster is to support GDP growth both organically and through new investments.

Scandinavian countries such as Norway have succeeded in developing specific know-how linked to their natural resources, and have become producers of machinery, technology and consulting services related to the different stages of the O&G value chain (Meller, 2008). To achieve this, they created links between the private sector, universities and public bodies to develop knowledge clusters (De Ferranti, Perry, Lederman, and Maloney, 2002). However, it is important to foster a more collaborative culture in such clusters, as research shows that the extent of collaboration between SMEs can be low. Their activity should not only be embedded within the local context but also plugged into more global knowledge pipelines and networks. The most dynamic firms are able to capitalise on

the local support environment, but also to access non-local sources of information and knowledge about new developments and processes in their markets (Marchese and Potter, 2011).

According to UNCTAD (2010) the business linkage represents one of the best ways for SMEs to enhance their competitiveness and acquire critical assets such as access to international markets, finance, technology, management skills and specialised knowledge. I propose that policymakers in Kazakhstan consider the possibility of seeding an inter-industrial O&G-information technology cluster which will focus the activity on the transfer of technological expertise from international O&G companies to the local industry and also foster information technology education and products development (see Figure 12).

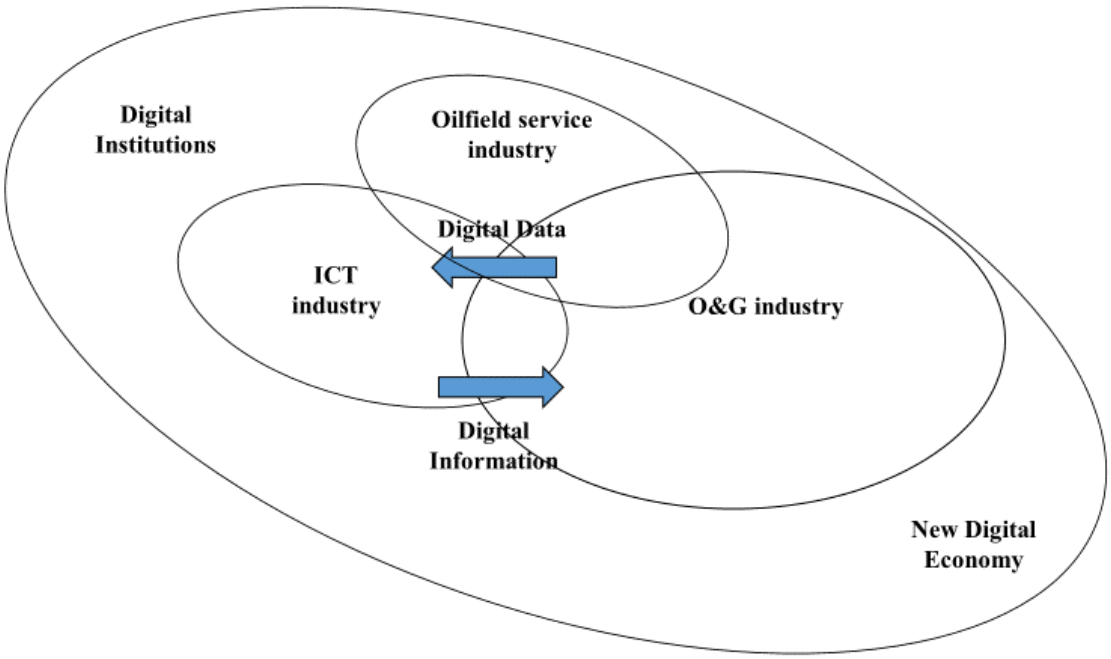

Figure 12. Digitalisation and diversification of the O&G industry. Source: Author.

Initial endowments can be given by international O&G companies operating in Kazakhstan. In order to incentivise O&G companies the government may choose to consider

a tax incentive for endowments to the cluster. Location can be a critical success-factor for a cluster location and so it should provide easy access to the qualified personnel, as information technology is a knowledge-intensive industry. This type of collaboration includes relationships between the ICT provider, NOC, IOC and SME, as well as the government as an initiator of new technology implementation and the bank as a source and again the government as a guarantor of funding.

The process of ICT-business alignment between O&G companies and IT provider can include the following steps:

1 – The government imposes LCPs as its aim is to develop local industry. It may also provide guarantees to SME or ICT provider (Marchese and Potter, 2011). The government defines tax legislation.

2 and 8 – Lack of financial resources for investments in ICT equipment and services (Author). The development bank provides financial support to the ICT provider for infrastructure investment and operational needs (Marchese and Potter, 2011).

3 – The government provides a special tax regime for ICT providers. In order to set up knowledge clusters, appropriate incentives would have to be coordinated, financed and provided (Meller, 2008).

4, 5 and 6 – ICT provider delivers services to different companies of the O&G cluster: SMEs, IOC and NOC. The value of ICT to users may rise due to network externalities from a community of users. Thus, one firm's ICT investment could increase the productivity of others, which means a classical spillover effect (Lee and Guo, 2004).

7 – The government participates in NOC. State participation in the O&G sector via NOC provides the government with better control along the value chain. The

presence of NOC benefits overall efficiency levels in the industry and thus improves value creation (Tordo et al, 2011).

9 – IOC set-up ICT provider and transfer knowledge and know-how. Acquiring ICT technologies through foreign investments is another opportunity to develop technology (Meller, 2008).

The empirical findings above form the basis for the operational framework (Figure 13), showing the PPP collaboration in the O&G cluster.

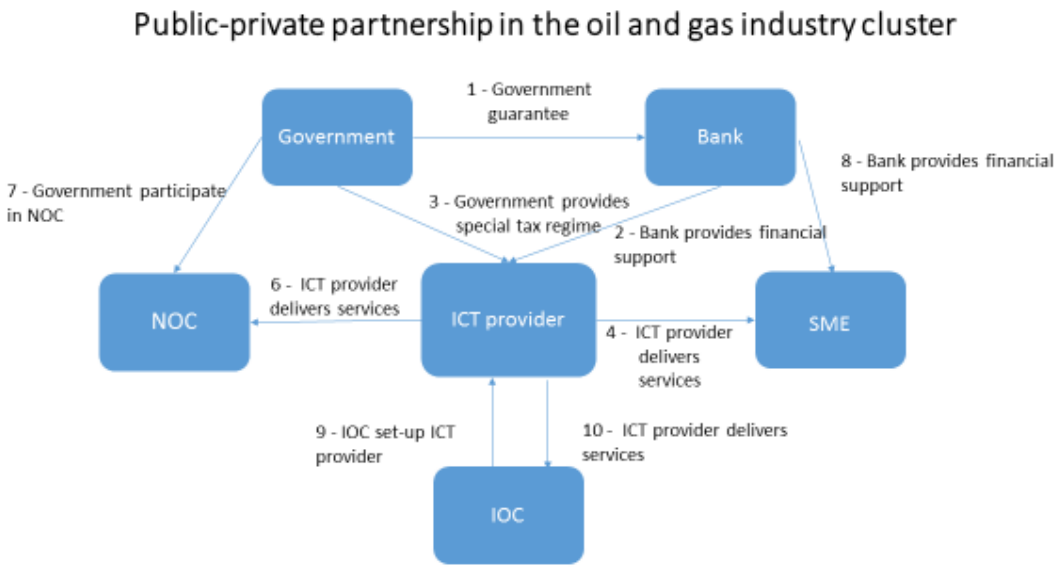

Figure 13. IT collaboration in the O&G industry cluster. Source: Author.

The framework extends our knowledge about how organisations can cooperate in order to co-create value from ICT in the O&G industry. Such cooperation is only feasible if government participate in this collaboration. These relationships can be interpreted in terms of improvement of competitiveness of the organisations participating in it by reducing some of the administrative costs and transferring of technologies and know how. This should results in the development of the local industry. The conceptual framework provides better understanding of the mechanisms for maximising private and public benefits of

sustainability by creating value from IT. This study contributes to previous theory by the application of the value co-creation framework, the theory of competitiveness, cooperation and knowledge transfer in clusters to the development of the local O&G industry.

4.6 Conclusions and Future Work

With the digital revolution, the ICT industry has started to play a crucial role in the economies of all countries. The advantage of such technologies, for example cloud computing, is that they allow implementation of standard services in a number of companies in a short period of time, and make it possible to react in a timely way to business strategy changes. For example, if we want to implement an HR solution in a hundred separate companies it could take years; however, with a cloud solution this can be done in months. On the other hand, in developing resource-rich countries it is important to use a share of the wealth created by the energy sector to boost the domestic ICT industry. The key challenge here is that many developing countries have no financial resources of their own to invest in the domestic O&G industry, and so they have to attract FDI in order to develop their O&G reserves. Because international O&G companies tend to use global procurement opportunities, also in relation to ICT procurement, these expenditures create low knowledge spillovers in the national economy, and therefore create inequalities in the distribution of O&G wealth between the host and home countries. That is why effort from the state is necessary in order to develop local industry.

This study helps us to understand how IT can create value in the O&G industry and offers insight into the value co-creation process. The existing studies do not offer a vigorous model or guidelines on how to create business value from IT through a co-creation process within a network of organisations. This is pertinent to the O&G industry as it starts to perceive the convergence of new emerging technologies and the consequences of digital disruption. The main contribution of this paper is the theoretical development of my model,

which explains the role of IT in the value co-creation process in a network with different stakeholders. It fills a research gap in our understanding of how multiple participants in the ecosystem of the O&G industry align different IT resources to co-create value. I move the focus of business–IT alignment from one company only to a network of organisations – explaining the type of alignment with the external environment. To the best of my knowledge, this is a first model that attempts to explain how IT can co-create value in a network of organisations.

I adapt the business–IT value co-creation model to construct the models of public–private partnership advancing the current theoretical understanding of the business–IT value co-creation process. The inductive part of my research was augmented by deductive empirical testing. Hence practitioners will benefit because the proposed models enable leaders and policymakers to more effectively establish business and digital strategies, and policymakers to adapt their policies to the needs of business support and development.

I contribute to the literature by developing a theoretical foundation for business–ICT value co-creation – drawing on a widely accepted new paradigm in the management literature, namely the value co-creation framework, and the theory of competitiveness. Moreover, I extend this perspective by linking it with the strategic use of ICT and outline the possible advantages for local ICT industry integration into the O&G value network through the development of local capabilities via integration with international O&G companies. Furthermore, apart from the general theoretical contribution my research identifies detailed constructs of the value co-creation process that are strongly supported by empirical evidence. These constructs are summarized in Figure 7. This is the first time that these constructs have been incorporated with a strong empirical grounding in a value co-creation model in the O&G industry. It demonstrates how ICT can integrate different public and private actors in the network to co-create value. I maintain that my research will help practitioners as well as policymakers to adopt their businesses in the digital age. Practitioners

such as managers and SME leaders will benefit from this model by guiding their enterprises toward business competitiveness. However, this study is not without limitations. I acknowledge that this study is confined to one industry in one country and my results need be tested on a large sample. However, I believe that the model developed offers a promising basis for future research on value co-creation in the O&G industry. To improve the generalizability of my findings I will test my framework in the setting of other O&G-rich countries. Such case studies will be the scope of my upcoming research in the O&G industry in Russia presented in the Chapter 5.

Chapter 5. Paper 3. “Value co-creation in an ICT services company: a case study of a cross-border acquisition”.

Abstract

Post-merger and acquisition (M&A) integration is especially important for the services industry, where value co-creation between actors plays an important role. This paper is a qualitative single case study of a multinational IT company and the post-acquisition processes of its subsidiary in Russia. The main contribution of this article is the application of a value co-creation framework to the settings of international business, which until now has only been applied in the field of service industry research. I also identify the actors and their roles and activities in the value co-creation in the Russian context.

5.1 Introduction

Globalisation of the world economy has resulted in an increase of FDI flows in emerging countries, thus shifting the focus of studies from developed countries to the new EEs. Despite this, the empirical research into the MNE’s subsidiaries operating in ERRC such as Kazakhstan and Russia are seldom discussed, and research into the acquisition in the service industries is rarely conducted. However, in the condition of the downturn of the home market, MNEs from developed countries often look for ways to grow their businesses in other markets such as Brazil, Asian countries and Russia. In this case MNEs choose a strategy to increase revenue through mergers and acquisitions, but execution of this strategy is often problematic in emerging markets for both internal and external reasons. For Russian O&G companies Kazakhstan, as a member of the Eurasian Union, is often a main destination for investments taking into consideration geographical, cultural and institutional proximity. In Kazakhstan, Russian O&G MNEs have to effectively compete with MNEs from different

countries, e.g. from China in the O&G sector and from European countries – as suppliers of technology (Pichkov and Rakov, 2016). Russia represents itself dynamically developing ERRC, so for example in 2016 it overtook China in Bank of America Merrill Lynch ranking of top emerging markets (Doff, 2016).

Firms in the service industry frequently use cross-border acquisitions as a tool to expand business to the international stage in order to generate higher value and profit (Ahlstrom, 2010). However, no simplistic linear relationship has been found between cross-border M&As and value creation. While some studies (Zhou, Xie and Wang, 2016) indicate that cross-border acquisitions come with considerable risk of failure, others (Collin et al, 2009) show that cross-border acquisitions do create value in certain settings. Factors such as the cultural difference (Björkman, Stahl and Vaara, 2007), institutional regimes (Acemoglu and Robinson, 2012), and the target autonomy (Puranam, Singh and Zollo, 2006), can significantly affect acquisition performance. Still there is a theoretical gap in our understanding of what is particularly important for the success of acquisitions in the knowledge-intensive industries of emerging countries. As international business research is explicitly multidisciplinary, it can benefit from the complementary insights provided by theories from other fields (Doz, 2011). This paper aims to integrate the value co-creation view which has been widely discussed in the marketing and IT business services disciplines (e.g. Gummesson and Mele, 2010; Jaakkola and Hakanen, 2013), to the discussion of post-merger performance of MNE's subsidiary in the information technology industry. It can thus contribute to the international business literature through the application of value co-creation theory to international business settings in emerging markets. The network view on MNEs suggests that the strategic development of the subsidiary is affected by the quantity, quality and scope of these linkages and performance effects (Gammelgaard et al, 2012).

In this paper I discuss a comparative case study of two consequent acquisitions within one company. I explain why the first acquisition was successful, when the second one failed

using a theory of value co-creation. I elaborate on a value co-creation framework, adding that actors in the network participate in the process of value co-creation. Moreover, given the fact that the integration process of cross-border acquisitions is a highly complicated activity which involves numerous participants and complex interactions, value co-creation theory (Jaakkola and Hakanen, 2013), provides important explanations on how to achieve a higher performance, and will be critically discussed in this paper.

From my point of view the value creation process in the service sector of the economy differs significantly in comparison to the manufacturing sector, as the main assets of service companies, namely people and customers. The rights of parties in these relationships are intangible by their nature. In contrast to goods in manufacturing sector, customers and people are not bound by the mechanism of property right and therefore can easily move to competitors, thus leading to competitive disadvantages. In these transactions co-operation between *the headquarters, subsidiary, employees, local market (suppliers) and customers* can play a crucial role. In contrast, with acquisition in the manufacturing sector, MNEs gain mostly tangible assets in the form of production facilities, and equipment etc. These specific features of the service sector make management of ICT companies riskier in terms of post-acquisition integration, and management of the process of value co-creation becomes a key success factor in performance management. This research is relevant to subsidiary management, offering a new view on why different factors can lead to the failure of the acquisition. I demonstrate that in the post-acquisition integration phase the value co-creation process can be unbalanced. I also identify the main actors in this process in the subsidiary. A case study of the acquisition in ICT industry in Russia is used as an example to illustrate this.

5.2 Literature review

5.2.1 Subsidiary in emerging markets and its evolution through acquisitions

The economic growth of emerging markets, as well as the growing interest from academia (Ramamurti, 2012) stimulates research into cross-border acquisitions. Meglio (2009) categorised research on M&As in high-tech settings into three groups: strategic decision making (target selection), integration process and acquisition performance. A more important research field could be *post-acquisition integration and performance* (Björkman et al, 2006). Therefore, below I consider key factors within the integration process-performance domain, which help to identify the research gap. Current findings have covered country-, firm- and individual-specific determinants, including factors such as *national culture distance* (Moore, 2011), *institutional and regulatory environment* (Dikova and Rao Sahib, 2013; Dutta, Malhotra and Zhu, 2016), *organisational culture differences* (Stahl and Voigt, 2008), *headquarters control/autonomy/subsidiary role* (Young and Tavares, 2004; Birkinshaw, Hood and Young, 2005; Johnston and Menguc, 2007; Kostova, Marano, Tallman, 2016; Lazarova, Peretz and Fried, 2017), *prior acquisition experience* (Haleblian, Kim and Rajagopalan, 2006), *dedicated learning mechanism* (Trichterborn, Knyphausen-Aufseß and Schweizer, 2015), *motivation* (Luo and Tung, 2007; Lin et al, 2009), *human factor/key inventors/ employee retention* (Ernst and Vitt, 2000; Graebner, 2004; Kappor and Lim, 2007), *target selection* (Aybar and Ficici, 2009), and *liability of foreignness* (Panibratov, 2015).

In order to achieve the best outcome of performance, acquirers need to shift their focus on the subsidiary integration into the structure of MNEs. Based on the direction of deals, cross-border acquisitions can be divided into two groups: inbound and outbound. Defined by Zhou et al (2016), inbound acquisitions refer to the deals involving bidders from developed economies and target from EEs. In the literature on studying both types of

acquisitions (Kumar, 2009; Chari, Chen and Dominguez, 2012; Zhu, Jog and Otchere, 2011; De Beule, Elia and Piscitello, 2014), an important finding was made by Zhou et al (2016) who argue that the organisational differences in terms of the understanding of the legal, political and cultural environment play a major role in determining the success of inbound M&A, while acquisition experience has greater impact on outbound M&A.

Given the crucial place of *knowledge of the local environment* for inbound acquisitions, as indicated by Zhou et al (2016), the knowledge gap between headquarters and subsidiaries and the way that headquarters deal with the newly acquired subsidiaries, are potentially the keys for achieving synergy. The post-acquisition integration process requires cooperation and learning, as well as resources re-allocation for both parties. However, the clash between culture, values and practices can widen the gap between headquarters and subsidiaries significantly (Björkman et al, 2006). As a consequence, resistance to change and adapting a new culture, new values and practices, are obstacles in achieving collaboration within the organisation, thereby hindering the whole integration process (Jemison and Sitkin, 1986). Also, greater resistance would be expected from those customed to a high degree of autonomy, but controlled by another organisation at a higher level (Brock, 2005; Lazarova et al, 2017), encouraging more discussion on *headquarters control and subsidiary autonomy.*

Despite the efforts and attention to the topic of acquisitions performance, empirical research has not completely identified the variables that impact post-acquisition performance and most of the research factors are not significant in explaining acquisitions outcomes (Riviezzo, 2013), especially in the information technology service industry. Previous research suggests that in high-tech industries, specific indicators need to be adopted, such as the retention rate of key professionals (Graebner, 2004), technological relatedness (Cassiman et al, 2003; Cloodt et al, 2006) as well as the management perceptions and strategic and organisational fit (Hagedoorn and Duyster, 2002). Based on the literature

review I conclude that research on M&A outcomes in the technology sector is extremely fragmented and focused on many different factors that are often are not related to each other. I am aiming to fil the gap in the literature by offering a new perspective on the post-merger integration process and performance through the lens of value co-creation theory and a network view of MNEs.

5.2.2 Network theory and value co-creation in knowledge-intensive industries

Integrating the post-acquisition process in the cases of cross-border deals also involves the issue of MNE management, leading the focus of researchers to that of understanding MNEs, through for example, understanding the factors affecting post-merger survival of the subsidiary in the long-term perspective.

Previously proposed frameworks such as the *heterarchy perspective* (Hedlund, 1986), the MNE's *inter- and intra-organisational relationships perspective* (Ghoshal and Bartlett, 1990), and the *network view* on MNE (Nohria and Ghoshal, 1997), provided the basis for the development of the network theory. Instead of the view assuming that MNEs are hierarchically structured entities with headquarters at the top and a number of dependent subsidiaries with similar roles, network theory regards the MNE as an internally differentiated inter-organisational network (Ghoshal and Bartlett, 1990). Based on the network theory, the subsidiary is no longer a subordinate identity; rather, it should be the node in a greater network, through which it builds relationships with the internal and external actors (Rugman and Verbeke, 2003b). Recent studies extend the research stream, trying to identify how the between the factors of autonomy, and inter- and intra-organisational relationships affect performance (Gammelgaard et al, 2012).

The concept of heterarchy, which contrasts with the concept of hierarchy, provides an essential basis for the prevalence of the network and embeddedness studies in the field of

MNE strategy and structure (Hedlund, 1986; Forsgren and Johanson, 1992; Hedlund and Ridderstråle, 1995; Young and Tavares, 2004). Arguing that the MNE structure is evolving toward a network-based system, Hedlund (1986) believes that the new system is a source for generating new ideas, new opportunities and thereby, more value. The argument also comes with the notion of embeddedness, which refers to the relationships between partners within the organisational network. On the one hand, through the embeddedness between partners including suppliers, customers and research institutions, MNEs are able to integrate the sources of innovation and create more value for the organisation (Young and Tavares, 2004). On the other hand, it is a challenge for headquarters to control knowledge acquisition directly, due to information deficiencies, and this encourages the subsidiaries to be given more autonomy (Young and Tavares, 2004). In conclusion, the international business literature and particularly the network theory apply an inter-organisational approach in investigating organisational characteristics of MNEs, explaining the resource structure and different level of connectedness in different national environments. However, it fails to explain how exactly value is co-created by a sharing of resources in such networks in the service industries.

At the same time, the service industry perceives significant growth worldwide with most advanced economies dominated by the services sector. Even countries that have traditionally focused on manufacturing are experiencing growth of the service industries. Service science is an emerging interdisciplinary research area that focuses on "fundamental science, models, theories, and applications to drive service innovation, competition, and well-being through co-creation of value" (Ostrom et al, 2010:5). Service science is the study of "service systems and of the co-creation of value within complex configuration of resources", where value creation is seen as a core purpose and central process of economic exchange (Vargo et al, 2008). Gummesson and Mele (2010) discuss the role of value co-creation in the resource integration process, where actors access their resources, stimulating

the formulation of a dynamically interactive network. Firstly, it is necessary to distinguish between co-creation and co-production. Co-creation is a more general concept that "encompasses all the specific theoretical and empirical occurrences in which companies and customers generate value through interaction" (Vargo and Lusch, 2008). Galvagno and Dalli (2014) define co-creation as the interaction of suppliers and customers for the development of new business opportunities. In contrast, co-production is a component of the co-creation of value, and captures "participation in the development of the core offering itself" (Lusch and Vargo, 2006:284).

Recent research has also explored the importance of the collaborative process of value co-creation in the context of knowledge-intensive business services (Gummesson and Mele, 2010; Vargo and Lusch, 2011; Aarikka-Stenroos and Jaakkola, 2012; Jaakkola and Hakanen, 2013). For instance, in the context of solution network, Jaakkola and Hakanen (2013) provided a novel conceptual framework that explains value co-creation during the interaction between actors, resources and activities. However, value co-creation has rarely been discussed in MNE management, where a considerable number of actors including headquarters, subsidiaries, local markets and their customers, are involved. Based on the network and value co-creation views, I define actors as the node in the MNE network, including the headquarters, subsidiaries, employees, local market (suppliers) and customers. I define co-creation in MNE settings as the interaction of these actors with each other for the development of new business opportunities. In this research I adopt a model of value co-creation in knowledge-intensive industries (Jaakkola and Hakanen, 2013), and apply it to the circumstances of the MNE.

This model considers the value co-creation process from the subsidiary's perspective as MNE's activities in the host country are organized around the subsidiary. Business value is "co-created by economic actors who exchange a variety of resources that go beyond goods and money" (Michel, Brown and Gallan, 2008:154). The actors in such a model are linked

through value propositions, seeking equitable exchange from the mutually connected relationship (Gummesson and Mele, 2010; Jaakkola and Hakanen, 2013).

The actors in my model are of two types:

The intra-organisational context includes relationships within MNE structure, i.e. between headquarters, a subsidiary and its employees.

- Headquarters and a subsidiary: headquarters provides a subsidiary with knowledge about their global products and services; the subsidiary provides headquarters with knowledge about local markets;
- Employees and a subsidiary: employees provide a subsidiary with their knowledge and skills; a subsidiary provides employees with training, projects and work;

The inter-organisational context includes relationships between a subsidiary, its customers and subcontractors. These actors are also placed in the settings of a local context which is defined by the local institutional context of the specific country.

- Customers and a subsidiary: customers provide the subsidiary with knowledge about their business processes, participating in projects with their internal teams working in coordination with the subsidiary; the subsidiary provides customers with know-how and services;
- A Subsidiary – Subcontractors: for some projects a subsidiary may not possess all the necessary resources and therefore needs to subcontract a local company. In this case a subcontractor provides a subsidiary with specific knowledge that is required for delivering services; a subsidiary provides the subcontractor with access to the world-leading expertise and participation in the project.

In business networks, all the actors are both provider and user of resources at the same time, as each of them absorbs and contributes resources through their embeddedness (Cantú,

Corsaro and Snehota, 2012). Meanwhile, actors are bonded by "closeness, appreciation and perceived commitment, that influence and are influenced by resources and the activities through which the resources are integrated" (Jaakkola and Hakanen, 2013). Therefore, from the value co-creation perspective, I make two assumptions.

Firstly, the value network is dynamic and heterarchical, which means each actor also occupies a dynamic position in the network (Jaakkola and Hakanen, 2013). The position will be perceived differently depending on the position of actors who observe. Since each actor has several unique relationships with others, known as the portfolio of relationships, actors will strive to improve their position by strengthening or expanding their temporary portfolio of relationships (Abrahamsen, Henneberg and Naudé, 2012). This also indicates that the organisations which insist on a fixed and hierarchically organized system can hardly achieve value co-creation, as they are not flexible enough to adopt the dynamic changes across the network.

Secondly, the position will affect or determine the resources accessed by actors, which is why all actors strive to improve their positions (Abrahamsen et al, 2012; Mattson and Johanson, 1992), since the bond is determined by the closeness between actors. Closeness, or in some cases, knowledge, also represents the power the actor has. Concerning autonomy for example, in the network of headquarters, subsidiaries, and local markets, customers are naturally connected with the respective subsidiaries, sometimes, directly with the headquarters (see Figure 14), where the actors strive to improve their positions, in order to access better resources and affect others. In the post-acquisition integration process for cross-border deals, acquirers have to clearly understand their network and the network owned by the acquired subsidiaries, and cautiously integrate the network without destroying the opportunities for achieving value co-creation. This also means acquirers have to adapt a dynamic approach regarding the network and the actors within it, keep the balance of positions, as well as grant appropriate autonomy to their subsidiaries.

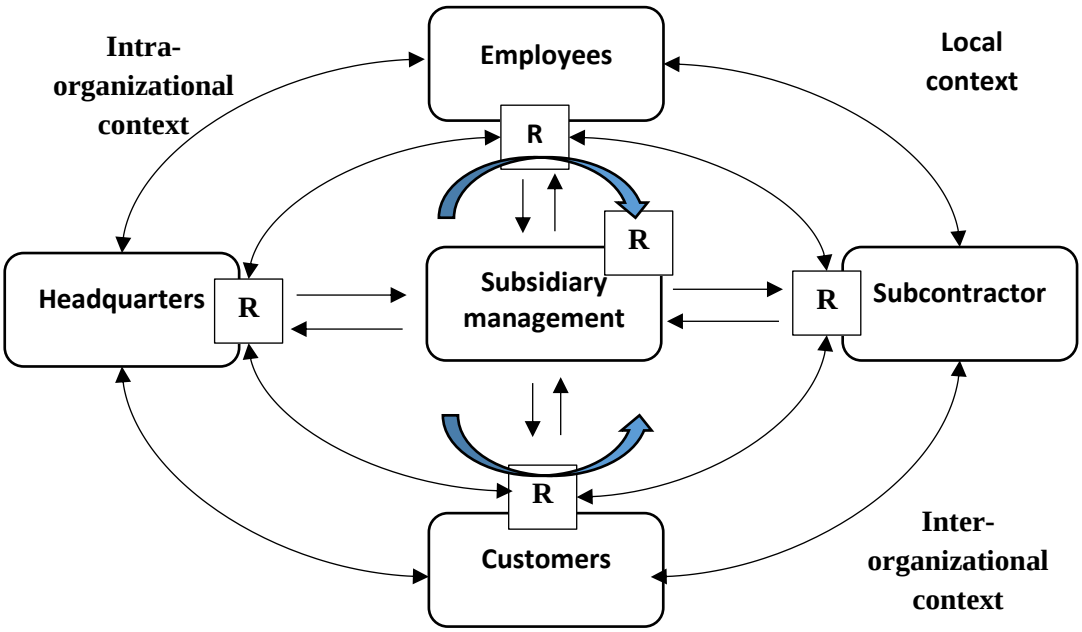

Figure 14. Value co-creation model for a knowledge-intensive industry at MNE network level. Source: Author.

Based on the literature review and value co-creation process in the MNE network (Figure 14), the research questions in this case study are the following:

- How is value in the network of foreign-owned ICT provider and O&G customer co-created?
- How can value co-creation be affected in cross-border acquisitions?

5.3 Method

My research is based on a single-site qualitative case study exploring a phenomenon within the real-business context where the boundaries between phenomena and context are not clearly evident (Eisenhardt, 1989; Ellet, 2007; Yin, 2014; Ghauri and Gronhaug, 2010). It explores strategic change in the form of two consequent acquisitions in the MNC and its

influence on the value co-creation process in a knowledge-intensive industry and therefore subsidiary performance, i.e. focuses on collecting information about specific objects, events or activities, such as a particular business unit or organisation (Sekaran and Bougie, 2013). This case study examines the post-acquisition integration process, the value co-creation process and subsidiary performance in the Russian ICT market, and considers which internal factors can negatively influence it. This case is of particular interest because service companies have received significantly less academic attention in terms of their internationalisation process (Panibratov and Latukha, 2014). The case was selected first because it considers cases of both success and failure at the same time, and is of particular interest as managers acquired business knowledge from the mistakes they make (Bledow et al., 2017).

I believe that a single case study is an appropriate design for the research as this case is unique: two subsequent acquisitions by the companies headquartered in the same country allow us to exclude the factor of national culture, and the factor of resistance to change on the side of subsidiary. As the first acquisition went successfully, I can assume that employees' resistance to change was at a minimal level to the date when the second acquisition took place. As it is very difficult to find similar cases in the same country settings, I want to report my findings in a single case study research design. According to Doz (2011) qualitative research can contribute to the field of international business by borrowing and adapting theories from other fields. Indeed, in this paper I apply a value co-creation framework from the field of marketing and information technology services to the circumstances of the MNE in the information technology industry. The aim of this research is to answer the research questions of how the value co-creation process can be affected in cross-border acquisitions and how unbalance in the process of value co-creation can affect subsidiary performance in the post-acquisition integration phase. This will lead to the development of the model: explaining how value co-creation can be affected in the post-

acquisition integration phase. In other words, I use an "explanatory "case study approach to test out propositions, revise existing theories and establish causal relationships, as well as for verification of the theory in different settings (Welch et al, 2011).

I adopted a single comparative longitudinal exploratory case study approach which has been used in a number of previous studies (Balogun, Bartunek and Do, 2015). It is appropriate for my research questions, since it enables the in-depth focus required for interviewing key employees from both the subsidiary and headquarters, about events which happened over time. This approach also allows us to appreciate the organisational context in which a subsidiary operates, and its specific local context, together with the external environment. According to Eisenhardt (1989), case studies also enable understanding of the dynamics present within single settings and to test theory.

The case study research method is particularly suited for testing and communicating a theory by showing its applicability in real business settings (Ulriksen and Dadalauri, 2016). Two comparative case studies involved data collection through multiple sources including personal interviews, written reports, and market reports, as well as financial and operating statements. A comparative historical and more longitudinal perspective allowed us to compare the effects of different management practices Jones and Khanna (2007). I used triangulation in order to facilitate validation of data received from different sources (Ghauri, 2004; Ghauri and Gronhaug, 2010), by checking the performance of a subsidiary claimed by the interviewee, checking annual accounts, or archives, or by interviewing another manager or company representative. The lead author conducted seventeen in-depth, face-to-face interviews with key managers from the subsidiary and the headquarters (see Appendix 3). The persons interviewed were selected from the group of former middle management employees of the subsidiary and headquarters.

5.3.1 Context of research

In this research I first studied organisational and external context related to the settings of the phenomenon under investigation.

5.3.1.1 Organisational context

COMPANY 1 is a global IT services company with its headquarters in Germany, listed at the stock exchange as a multinational software company with an annual revenue reaching 400 thousand Euro, and at its peak with about 2500 employees. Before being acquired, COMPANY 1 was among the top five IT companies in Germany. The company's degree of internationalisation was high, and the second biggest market after Germany was the USA. The company had an external net of subsidiaries in Eastern Europe, and the Russian subsidiary was one of the leading subsidiaries within the European market (second by turnover and employees' headcount). The Russian market was recognised as one of the key markets for the whole company.

COMPANY 2 is a global IT services company with its headquarters also in Germany, listed at the stock exchange as a multinational software company with an annual revenue reaching 1 billion Euro, and at its peak with more than 5000 employees. COMPANY 2 is among the world top twenty-five IT companies. The company operates in 70 countries with about 80% of revenue comes from international operations, the biggest foreign market is the USA with about quarter of the total revenue. Before the acquisition of COMPANY 1, the COMPANY 2 had no access to the Eastern European market and particularly, the Russian market. COMPANY 2 is ranked as a leader in certain sectors of the IT market with the worldwide share up to 10 percent in some market segments. In the last decade COMPANY 2 has adopted acquisitions as a dominant business strategy for its products and geographical expansion. This has led to the strategic renewal through market expansion and revenue

growth. The main acquisitions were made in the US (2007) and in Germany (2009). The latter acquisition included international expansion and subsequent integration of a number of subsidiaries in the new markets of the Eastern Europe and Russia. However, since this time, a decline of 20%in COMPANY 2's revenue has been observed.

For this reason, the company considered opportunities to improve its financial performance through internationalisation in emerging markets, including Russia. However, in the post-acquisition integration phase the performance of the subsidiary in Russia has declined dramatically. This comparative case study explore the reasons behind this failure.

5.3.1.2 External context

I studied the external context, including the economic and industry competitive environment in which the organisation operates, as it was important to exclude market factors which could affect subsidiary performance. According to the WB (2013), the Russian economy was ranked within the top 10 largest economy in the world. However, since 2012 the economy has been negatively influenced by political factors such as the confrontation between Russia and the US, as well as the EU/Ukraine crises, which led to economic sanctions. Furthermore the economy has been affected by the decline of energy prices on the global market. In this research I consider the external context in order to demonstrate that market factors such as the political and macro-economic situation in Russia had no influence on the phenomenon being researched. Thus, since the time period for this study is limited to the financial year 2013, these factors had no serious impact on the research settings.

The Russian ICT market also remained stable in the period for this study and (PMR, 2013). Since 70-90% of software products in Russia are imported RBC (2016), this created the basis for a stable customer demand for the company's products. The company was a

market leader along with other foreign software suppliers such as IBM, Oracle, Microsoft and SAP.

5.4 Findings

I reviewed company documentation on subsidiary development in Russia, including documents in the information database, intranet, and the information from interviews, and found the following. The subsidiary in Russia was acquired as a privately-owned company as follows:

- in 2005, cross-border acquisition 1 (Figure 15): 75% of stock was acquired by COMPANY 1 (Germany) with subsequent transformation of the indigenous company in the subsidiary;
- in 2008 – cross-border acquisition 2 (Figure 15): the remaining 25% of stock was acquired by COMPANY 1 (Germany);
- in 2009 – domestic acquisition 3 (Figure 15): COMPANY 1 (Germany) was subsequently acquired by COMPANY 2 (Germany),

I consider these two consequent acquisitions as cross-border in relation to the subsidiary in Russia (Figure 15). Before the acquisition, this privately-owned company served as a partner in the local market of Russia and CIS. The partner had about 150 full-time employees and after acquisition became the second biggest subsidiary within COMPANY 1 in Eastern Europe. The subsidiary's main functions included the sale of software licenses, consultation in the local market, and cooperation with other subsidiaries on global projects which took place in Russia. The principal customers for the company were O&G companies such as Lukoil, Rosneft, Gazprom, Tatneft, Surgutneftegas, TNK-BP as well as KazMunayGas, the

Kazakhstani National O&G company, as well as the other major companies from different sectors such as energy and banking.

From the performance development point of view, I found that subsidiary development could be separated into two periods: development (2005–2008) and decline (2010–2013) which clearly correlates with a change of ownership at headquarters level. I asked respondents about their experience in this period of time (before and after change of ownership in 2009), in order to identify which practices and management decisions had influenced the performance of the subsidiary from their point of view. The interviews were focused on the intra-organisational context (Figure 14, links between headquarters, employees and subsidiary management). Analysis of the interview data included creating two kinds of documents: a set of spreadsheets and a list of quotations. There was one spreadsheet for each issue or question discussed; the rows corresponded to interviewees and columns corresponded to the opinion about the issue. This made it possible to instantly compute the percentage of respondents expressing a particular view. The list of quotations expressed the type of response with reference to the interview transcript where the quotation was found. This analysis of the interview data explored several reasons behind the performance development which all participants mentioned as critical. These findings are discussed below.

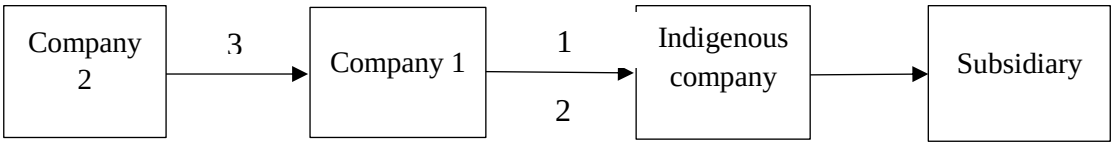

Figure 15. Steps toward the acquisitions. Source: Author.

5.4.1 Subsidiary – Employees links

Data show that in the post-acquisition integration it is important to retain employees as they are the key actors in the process of value co-creation in knowledge-based industries.

Since the second acquisition was announced in 2009, the subsidiary's managing director confirmed the intention to work further with the new owner, but as a result of many disagreements on how the business should be organized she finally decided to leave the subsidiary at the end of 2011 and set up her own company. Three months later, headquarters hired a new managing director. This appointment was not successful due to his bad relationships with the subsidiary team. As a result, a large section of employees (about 60 %) decided to leave the subsidiary at the beginning of 2012. The new managing director resigned from the subsidiary seven months after he started, and since then there has been no fulltime managing director. These changes resulted in a dramatic decline in revenue.

This analysis shows that the subsidiary management and employees had close relationships, creating high intensity and speed of value co-creation: the role of the local management at intra-organisational level was to coordinate activities between departments and between employees and headquarters. However, after the second acquisition the relationships with employees became more distant as management team was deprived of power, which resulted in slow moving development of value co-creation. Interdepartmental activities were not coordinated, and this resulted in the conflict of interests between sales and delivery team - sales team wanted to sale the projects which were not feasible (see Table 26, Link 1).

5.4.2 Headquarters – Subsidiary links

Data show that in the post-acquisition integration phase it is important to keep the balance between autonomy and centralisation as this may influence the process of value co-creation in knowledge-intensive industries.

Hewett et al (2003) suggested that is important for the MNE to define the proper balance between centralisation and autonomy under which the foreign subsidiary can maximize its value creation. Before the acquisition at headquarters level, and following the change in the headquarters team, the Russian subsidiary possessed considerable autonomy. The degree of autonomy changed considerably since the time the new HQ management team was appointed, with a clear trend towards more centralisation and bureaucratisation.

The following quotation from the subsidiary managers' interviews illustrates these findings:

> "Everything had to be approved in the headquarters, these bureaucratic procedures have made our life difficult... we had to wait for approvals of the contract, but often start projects without having the contract, as customer did not want to wait" (a Head of the project office).

The interviews show that there was a shift from strategic control to operational control of the subsidiary, whereas in the area of strategy it was not necessarily to make any decisions concerning the subsidiary's strategy. All the interviewees mentioned that cooperation in general worsened, the extent of control by the headquarters dramatically increased, and that performance was negatively influenced by these factors.

5.4.2.1 Distance between headquarters and the subsidiary

Data show that in the post-acquisition phase it is important to maintain embeddedness of the subsidiary with external actors, such as for example customers and subcontractors, in order to maintain the value co-creation process.

In the interview conducted with a sales manager, he explains that after the second acquisition, centralisation had increased and this had a negative influence on business performance:

> "with new owner everything had to be approved in the headquarters… for example, project teams… they insisted that projects have to be done by smaller teams, but it was not possible… at the end, contracts with customers were not signed" (a Head of the sales).

This interview illustrates that after the second acquisition, headquarters was not flexible enough in terms of its ability to combine firm-specific capabilities with local knowledge in order to co-create value on a particular developing market. The embeddedness in the MNE network increased, whereas embeddedness in the inter-organisational context with subcontractors and customers had decreased. This had a negative influence on subsidiary outcomes (see Table 26 links 2, 3 and 4). Factors such as bureaucratic procedures, changes in subsidiary role and resignation of the managing director slowed down the operational processes and unbalanced the coordination of customers' and subcontractors' expectations of projects.

5.4.2.2 Knowledge exchange between actors in the network

Data show that in the post-acquisition integration phase it is important to maintain knowledge exchange as this may influence the process of value co-creation in knowledge-intensive industries.

In the following quotation, a subsidiary finance employee is comments on the importance of knowledge of the local market is illustrated:

> "they did not know the market, even the prices for services… they decided to contract international consulting company as we has many discussions related to the knowledge of the local market, however it would be just enough to hire a local consulting company. An international company is not really helpful, and they had to approve their responses in the headquarters what made their services even more expensive» (a head of finance).

However, the opinion of the headquarter manager on the question of why knowledge of the local market is extremely important for good subsidiary performance, expressed below was quite different from those on the subsidiary side:

> "In countries such as Russia a managing director has to be an important trusting partner and the owner of key business-processes responsible for coordination and organisation of local employees. In absence of such person, the subsidiary would not be able to function. This person provides a motivational and organisational link with local employees and resolves conflicts of interests within the subsidiary"

These two quotations give an overview of how the relationships between headquarters and the subsidiary were organized before and after the acquisition. In quotation 1 a subsidiary employee is talking about subsidiary-headquarters relationships after the

second acquisition and in quotation 2 – before it. So, we can see how the approach has changed and more tight relationships have influenced the process of value co-creation (Figure 14). Factors such as understanding of the local market and particularly customers' expectations on the one hand, and trusting relationships between headquarters and local management can improve interactions between actors and therefore facilitate development of new business opportunities.

The findings in this study are summarised in Table 27 using the lens of the model presented in Figure 14.

5.5 Discussion

This study set out to investigate how value-co-creation can be affected in cross-border acquisitions and how a lack of balance in value co-creation affects subsidiary performance in the post-acquisition integration phase. The framework presented in Figure 14 was useful to organise a case study and therefore served its purpose. The research outcomes indicated that understanding and interpretation of theorising was credible. As the findings shows, the main actors – *headquarters, subsidiary management, employees, customers* and *subcontractors* interact in order to meet the requirements and expectations of Customers with regards to the quality of services delivered. This is achieved through the different levels of interactions in network of relationships of multiple stakeholders. Interactions between actors are managed by the subsidiary management to which a Headquarters delegates responsibility. Although a value is added at each stage of resource exchange, it is created only if it is transferred to the next actor. In these conditions the subsidiary could co-create a value and improve performance if destructive processes did not affect the resources. These effects depend on the intellectual capacity of the network and are related to the personnel as an owner and user of knowledge capital.

Table 27. Actors in the value co-creation process and their roles.

Intra-organisational context			
Link	**Actors relationships**	**Activities, Acquisition 1**	**Activities, Acquisition 2**
1	**Subsidiary - Employees**	Close relationships with the local management, high intensity and speed of value co-creation: local management coordinates department activities	Distant relationship with customers, low speed of the value co-creation: department activities are not well coordinated, conflict of interests between sales and delivery departments
2	**Subsidiary - Headquarters**	Distant relationships, high autonomy, the intensity of interactions for development of new business opportunities high, headquarters is represented at the regional level, global headquarters does not participate in the value co-creation process	Close relationships directly with global headquarters, however, the development of new business opportunities is low, global headquarters does not participate in the value co-creation, the relationships with the subsidiary have more control function
Inter-organisational context			
3	**Subsidiary - Customers**	Close relationships with customers, local management maintain resource exchange with customers on projects and resolve disputes on quality of services delivered	Distant relationships with customers, local management is excluded from value co-creation process, however headquarters did not replace this function of local management, development of the new business opportunities is slow
4	**Subsidiary - Subcontractors**	Close relationships with subcontractors, local management together with delivery team ensure that all necessary resources are subcontracted if the subsidiary and headquarters have no resources available	Distant relationships with subcontractors, headquarter fill the knowledge gap with their own resources that are too expensive, projects run out of budget, development of new business opportunities is limited

Source: Author.

The knowledge flows define the performance of the subsidiary in the knowledge-intensive environment. Based on the findings in this case study I propose a framework explaining how value co-creation may be affected in the network of the MNE (Figure 16).

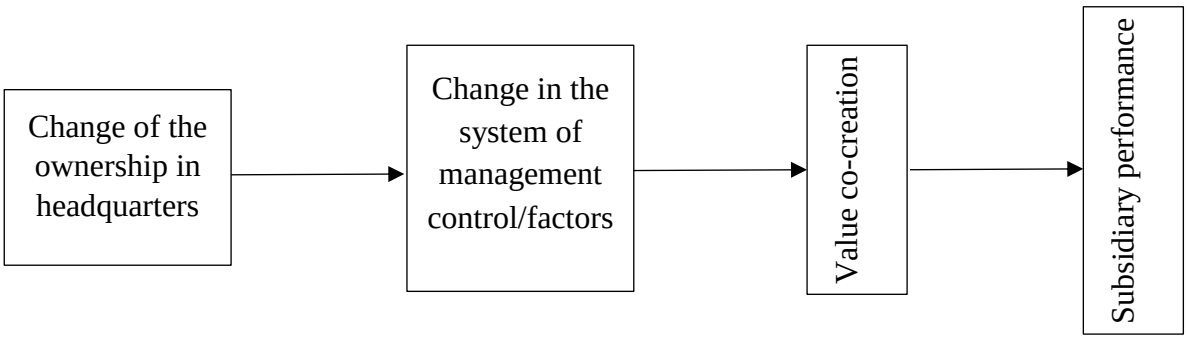

Figure 16. Value co-creation in post-acquisition integration phase. Source: Author.

This model explains how changes in ownership at the headquarters level can lead to changes in the system of management control, the subsidiary role and the knowledge sharing process between *the headquarters, subsidiaries, employees, local market (suppliers) and customers*. This may negatively affect the performance of the subsidiary.

Given the new ideas about how the value co-creation process and subsidiary performance can be affected in the post-acquisition phase, the findings in this paper have managerial and academic relevance. From a *theoretical perspective*, they give insight into post-acquisitions processes and the process of value co-creation between the headquarters, subsidiary, employees, local market (suppliers) and customers. The findings show the applicability of the theory of value co-creation to the circumstances of the high technological service industry in international business settings. From a *managerial perspective*, the current research helps to understand how to effectively manage the subsidiary and to improve business performance in the post-acquisition phase. I recommend managers consider how their choices affect interaction between actors when creating new business opportunities when taking strategic decisions on acquisitions.

In this paper, the development of the subsidiary in Russia was analysed, in order to explain its performance before and after post-acquisition integration. It was found that the reasons for negative development were caused by the changes within the MNE: poor cooperation between the headquarters and the subsidiary, an increase in centralisation and control, less autonomy for the subsidiary, increasing embeddedness in the corporate network and a decrease in responsiveness to local demands. I demonstrated that lack of balance between the extent and type of control, within a given environment and business context, impacted the subsidiary performance and led to an imbalance in the process of value co-creation between the headquarters, subsidiary, employees, local market (suppliers) and customers. Contextual variations are particularly relevant for MNEs entering large countries such as Russia. Knowledge about local context refers here to the understanding of customers' expectations and the mentality of employees, i.e. their knowledge of how to sell more and how to motivate people. These findings also show that in the new local context, knowledge transfer from the subsidiary to the headquarters plays a crucial role in the existing and future performance of the subsidiary. Balancing conflicting forces of local responsiveness and global integration was a major challenge for the headquarters in this case study. Change in the system of management control as a result of change in the ownership in headquarters destroyed value the co-creation process at the subsidiary level, and this led to poor performance as outlined in this case study.

The empirical findings of this case study analysis can be summarized as follows. Since 2005, headquarters had implemented its gradual expansion strategy in the Russian market by combining local and global know-how in the consulting and software business at the subsidiary level. This strategy implementation, however, changed radically when COMPANY 1 was acquired by another German-headquartered IT company. The key global competences of the MNE included a strong brand and the fact that global organisational practices and marketing strategies had been adequately implemented. After the second

acquisition, from my point of view, it was not necessary to transfer knowledge to the subsidiary. However, it *was* necessary to provide knowledge transfer about the local market to the headquarters, but this did not in fact happen (Figure 14, the outward link between Subsidiary and Headquarters). As a consequence of poor understanding of the local market circumstances, more attention was given to the sales of software products than to consulting, as sale of software is a more profitable business. However, there was no consideration of the fact that most customers buy certain types of software only together with consulting (Figure 14, the link between Subsidiary, Employees, Customers and Subcontractors). This means that the software vendor needs to provide such services their self, otherwise customers will buy a competitor's product (Figure 14, the links between Subsidiary and Customers and Headquarters and Customers). At the same time, headquarters decreased the degree of subsidiary autonomy through limiting the kind of decisions taken by the subsidiary itself. Even operational decisions had to be taken at headquarters level in each functional area. This led to the de-synchronisation of decisions which related to all functional areas, and an increase in bureaucratic procedures. In a situation where knowledge about the peculiarities of the Russian business environment was scarce, headquarters managers were not able to find reasonable solutions for dealing with the increasing business challenges (Figure 14, the backward link between Headquarters and Subsidiary). These factors put pressure on subsidiary revenues. Since revenue was in decline, headquarters had to look for ways to reduce costs. As the main portion of subsidiary costs were personnel costs, this had led to pressure on subsidiary resources. The scarcity of highly-qualified human resources in the Russian labour market had allowed the key personnel of the subsidiary to find a job very quickly (Figure 14, the links between Subsidiary and Employees and Headquarters and Employees). As a result, the loss of experienced staff again put pressure on subsidiary revenue as this meant a loss of local competencies which were highly personalised for the Russian subsidiary's CEO and key employees. This included good personal relationships

between customers and subsidiary staff. These competencies were applied in order to manage and engage subsidiary personnel and to maintain the contacts with customers. With the example of subsidiary development over time, I have illustrated how the subsidiary's capabilities declined over time and that this was due to headquarters managing the subsidiary functions by trial and error. A decline of revenue in the subsidiary meant that the know-how accumulated during the first three years of its operation in Russia was later lost.

5.6 Conclusions

This case study shows the application of the value co-creation view, to the MNE network. It is first of all an illustration of the concept of subsidiary evolution. According to this model, the post-acquisition development of the subsidiary in Russia represents a combination of all three factors: first, a head-office-driven process, second, a local environment response, and third, subsidiary choice. These factors led to an imbalance in the value co-creation process and subsequently, atrophy of the subsidiary. The head-office assignment perspective considers that the subsidiary is an instrument of the MNE and, consequently, that it acts solely with regard to head-office-determined imperatives. The subsidiary choice perspective employs the network model, which allows the subsidiary to be considered from the position of equality with headquarters or even leadership. The network model recognizes that some ownership-specific advantages belong to the subsidiary itself.

The value co-creation framework (Lusch and Vargo, 2006; Vargo and Lusch, 2008) adds to this model by explaining how this network works and how the value is co-created. The decline of the subsidiary from this point of view is a process built along with the decline of the subsidiary's value co-creation. For example, it was demonstrated that key human resources are critical for subsidiary development in Russia because the labour market is

different from, for example, European countries. It is not possible to find free resources; therefore, companies develop and retain their own. The case analysis reveals that the high capabilities held by the subsidiary did not match with the loss in the subsidiary charter assigned by the headquarters. This can be viewed as an example of subsidiary decline through parent-driven de-investment (Birkinshaw and Hood, 1998). In this case, the capabilities that were associated with the old charter were drastically reduced, as a group of employees left the subsidiary. The subsidiary had superior local capabilities which were not valued by the headquarters. From this point of view, the declared growth strategy in Russia did not match with the strategy implementation: the decision of headquarters to reduce the subsidiary charter. The changes in the subsidiary's charter after the acquisition of its mother company show that the capabilities developed in the subsidiary suddenly became obsolete. Therefore, subsidiary decline was also partly driven by contextual host country factors, including constriction of the local labour market and more personalized customer relationships.

Emerging markets such as Russia remain attractive for foreign MNEs. In these markets, the organisation needs to develop local responsiveness by differentiating and increasing the subsidiary's role. In order to achieve this, the subsidiary should be given a more autonomous role and managed in a less centralized way. Subsidiary development should include gradual charter establishment and capability enhancement. In this process the subsidiary' management team should play an important role in building the local team, and in local market knowledge transfer from the subsidiary to the headquarters. Trusting relationships with the local management team and key local sales managers should be developed. In the MNE's system of management control between headquarters and the subsidiary, a shift towards social control rather than bureaucratic and personal control should be the focus.

The MNE strategy determines the organisational design and control system. An effective organisation is one where structure, management practices, rewards and people fit its strategy. Organisational design, strategy, organisational culture and control must also fit the environment. The strategy to grow via acquisitions rather than by the gradual development of operations meets the challenges of both integration and responsiveness. It was necessary for the organisation to re-conceptualise the strategy implementation in the second post-acquisition period (after year 2009). In this regard, a view of MNE as a network of partly autonomous subsidiaries, with links between each other and to external actors, where participants share their resources in order to co-create value needs to be developed within the organisation.

5.7 Limitations of the research

The limitations of this research provide opportunities for future research. First, the findings must be interpreted with caution as the analysis is based on a single comparative case study. Although this study applied the theory of value co-creation to the settings of one country and I identified the actors and, their roles and activities in the Russian context, I expect that identical relationships can be found in any subsidiary in the service industry, irrespective of the national context, as in the knowledge intensive industries the industry specific prevail over country specific. However, in order to confirm this more studies on how value is co-created within the MNE network need to be conducted. This is a qualitative study of *one* industry in *one* country and future research need to seek to explore cases in different industries and different countries in order to generate a solid theory.

Chapter 6. Discussion

This chapter highlights and discusses key findings from the three studies reported in Chapters 4 – 6. The key findings are discussed in conjunction with theoretical and empirical problems considered in the introduction (Chapter 1) and the literature review (Chapter 2). The goals of this chapter are to connect ideas across the papers presented, to elaborate answers to the research questions, and thus to validate the central arguments laid out in the introduction to the thesis. The chapter will also discuss the broader implications of the findings for theory, method and practical implications.

6.1 Research highlights

Through the case studies of the O&G industry and ICT with regards to Kazakhstan's accession to the WTO, and industrial trends toward accelerated digitalisation of the O&G industry in Kazakhstan and diversification, Chapters 3 - 5 explored different perspectives of the theme of how emerging countries can achieve greater domestic capabilities development in the volatile environment of the O&G sector. While the papers presented in the chapters are standalone in their specific research focus, they are connected with the core theme of LCD in the O&G industry and the role of value co-creation in endogenous development.

The research is motivated by the fact that little is known about how effective LCP in the specific settings of emerging resource-rich economies (for details see Chapter 1 and Chapter 2 where this point is discussed more fully). The three papers have examined the topic in the following order:

a) How do different stakeholders strategically respond on LCPs? Who are the main stakeholders of LCPs and their activities? What is the role of LCP in the value co-creation process? What is the role of LCP in technological upgrade? (Chapter 3).

b) What are the main characteristics of information and ICT adoption by O&G companies in the Kazakhstan energy sector? How do participants in this multiple-stakeholders' ecosystem align different IT resources to equitably partake in value co-creation? What is the role of foreign direct investments, and particularly, international O&G companies in endogenous industry development? (Chapter 4).

c) How is value co-created in the network of actors around the subsidiary of the international ICT service provider for O&G companies? (Chapter 5).

These questions have been researched through the case study of international companies and consortiums, for example major exploratory projects in Kazakhstan - *KPO*, as well as a number of local enterprises (Chapter 3). These case studies were based on primary and secondary sources of data, including interviews with companies and industry experts, policies and company documents of different actors in the O&G industry network. The comparative case studies on information technologies adoption in local SMEs, the National O&G Company "KazMunayGas" and International O&G Company "China National Petroleum Corporation" in Kazakhstan were also based on multiple sources of information (Chapter 4). The comparative case studies of ICT service provider for the O&G sector in Russia was based on interviews with managers of this company in the headquarters and the subsidiary (Chapter 5).

As concluded in my theoretical framing of endogenous development in the O&G sector presented in Chapter 2, most of the theories that look at LCD do so from an economics or political economy perspective, and the strategic management perspective is missing. This dissertation applies a value co-creation theoretical framework to the settings of LCD in a multiple-stakeholders' environment of the O&G industry.

Findings from these case studies shed the light on the following themes of the thesis' approach to investigating development:

- understanding of LCPs as a tool enables domestic producers to expand their activities, at least partially with domestic inputs, and gain access to international technological and managerial expertise (Kalyuzhnova et al. 2016). As demonstrated in this study, the role of international technological and managerial expertise transfer in emerging countries is very significant. As such expertise is often missing in these countries, the role of foreign direct investments as an alternative source of technological and managerial expertise, compared to import, is increasing. International and local companies respond on LCPs through cooperating strategies such as joint ventures, joint project, providing training and sharing information and technological platforms. The role of LCP in the new service-based economy has come to support value co-creation between foreign and local companies (Chapter 3);
- value co-creation theory emphasises that value emerges when actors integrate and apply resources together with other actors (Gummesson and Mele, 2010; Jaakkola and Hakanen, 2013). Stakeholders participating in the O&G industry, namely international and local companies, the government, represented by local authorities, the national O&G company, development agencies, banks, and IFCs, for example industry associations, aim to benefit from cooperation and value creation. LCP will be a more effective instrument of technological upgrade if it supports value co-creation through interaction between foreign-owned actors and indigenous companies (Chapter 3);
- the impact of ICT investment on firm performance and long-term survival is significant and positive (Kohli and Devaraj, 2004; Melville et al., 2007). ICT can help companies in emerging countries to better compete in the global economy

(Salnikova, 2013). Scholars including Melville et al. (2004); Marshall et al. (2005); Ashurst et al. (2008), and Ward and Daniel (2012) developed theoretical models that explain the interconnections between ICT and business value, however network or a multiple-stakeholder perspective is missing. This dissertation explains ICT-enabled value co-creation in the multiple-stakeholders' environment of O&G industry at network level, that includes international and domestic O&G companies (Chapter 4);

- Governments might facilitate the positive externalities of foreign investments for local development promoting of industrial districts and clusters. Porter (1990) and Enright (2000) demonstrated that agglomerations of interlinked firms, including MNEs that compete and cooperate in a particular activity in a particular location are frequently a potent source of locally based economic development, and a centre for attraction of foreign investments and expertise. They also represent an alternative mode of organizing production to central planning that combines some of the efficiency of large and small size, but which also exploits and sometimes adds to the social capital of host countries (Dunning, 2006; Pitelis, 2000; Dunning and Pitelis, 2008). In the clusters, local and foreign-owned companies can share and exchange technological and managerial resources what lead to the technological upgrade (Chapter 4);
- foreign investments in a country may occur in the form of greenfield investments when the foreign firm establishes a subsidiary in the host country, or through the acquisition of the existing indigenous company (Brouthers and Hennart, 2007). Firms in the service industry frequently use cross-border acquisitions as a tool to expand business to the international stage in order to generate higher value and profit (Ahlstrom, 2010). A subsidiary is a node in a greater network, through which it builds relationships with the internal and external actors (Rugman and Verbeke,

2003b). The value creation process in a service network environment differs significantly in comparison to the manufacturing sector, as the main assets of service companies, namely people and customers, are intangible by nature, and can move to competitors. This research shows that the value co-creation process should be the focus of the management when acquiring indigenous companies in emerging markets (Chapter 5).

Specific findings from the three chapters related to the general themes outlined above will be discussed in the next section.

6.2 Research findings

6.2.1 Chapter 3: Paper 1. "Value co-creation and local content development"

Prior research (Kalyuzhnova et al, 2016) suggests that the aim of LCP is to enable domestic producers to expand their activities, at least partially with local inputs, and gain access to international technological and managerial expertise in order to enhance their competitiveness. The findings in this dissertation reveal that the business environment is affected by the policy comprising of different stakeholders, including international and local companies, the government (represented by the National O&G company - NOC), development agencies, banks, universities and research institutions, and finally institutions for collaboration, such as industrial associations. The aim of LCP in line with its contemporary definition is to support enhancing local companies' competitiveness while these companies are participating in this multiple-stakeholders' environment. This is in contrast to previous aims such as "picking winners", i.e. preferential treatment of specific industries, or companies in the form of lower taxes, subsidies, or protection from foreign competitors and investors. Competitiveness results from the increasing organisational performance, particularly based on the improved technology and managerial capabilities,

where technological capability refers to the activities, which enable firms to choose and use technology to create a competitive advantage (Kim, 1999). In the literature, such multiple-stakeholders' networks are often referred to as clusters (e.g. Porter, 1998a; Delgado et al, 2011) or ecosystems (Peltoniemi and Vuori, 2004; Vargo et al, 2015).

However, the definition of clusters varies, depending on the stream of research and structure of the cluster. The most popular definition of clusters was defined by Porter (1998a:197): as "geographic concentration of interconnected companies, specialised suppliers, service providers, firms in related industries and associated institutions … in particular fields that compete but also co-operate". This definition adopts a geographical view on clusters. In emerging countries such as Kazakhstan and Russia, a cluster is often viewed as the geographically limited association of SMEs and SOEs, as the state still plays an important role in the economy of these countries. In Paper 1, an example of *Atyrau Refinery LLP*, a company of *NOC KMG Group*, a member of petro-chemical cluster in Atyrau is considered. In Paper 1, I integrated different definitions of clusters focusing on clustering of MNEs with an indigenous industry and gave a definition of clusters focused on the view of the cluster as a network of inter-connected international and local companies, with my understanding of international company as an enterprise with some share of foreign ownership registered according to the law of RK.

The data shows that companies with foreign ownership play an important role in economic exchange activities in Kazakhstan. International O&G companies such as *ENI* (Italy), *Total* (France), *Royal Dutch Shell* (UK/Netherlands), *INPEX* (Japan), *CNPC* (China), *Lukoil* (Russia) are taking part in three major oilfield exploratory projects. Complex technological services are provided solely by foreign contractors. However, international contractors are working together with local companies on the development of production and service cluster for Karachaganak and other O&G projects in Kazakhstan. Stakeholders participating in local development include project operators; international and national O&G

companies; local and foreign engineering, constructors and service providers; institutions of collaboration (industry associations, chambers, unions), development agencies, and finally, government and citizens. The reason why different actors participate in cooperative activities and a core purpose of economic exchange is value creation. In the multiple-stakeholder environment it transforms into value co-creation, a process where actors access and integrate their resources, interacting and stimulating the formulation of a dynamic network. Co-creation "encompasses all the specific theoretical and empirical occurrences in which companies and customers generate value through interaction" (Vargo and Lusch, 2008). Galvagno and Dalli (2014) define co-creation as the interaction for the development of new business opportunities. This is in contrast to co-production which is a component of co-creation of value that assumes the active involvement of a customer in production and delivery (Auh et al, 2007).

As such, we can apply the theory of value co-creation as a new lens through which to view LCD, and conclude that one of the major factors of competitiveness of domestic companies is LCD through technological upgrade and growth, based on value co-creation in clusters comprising of foreign and domestic companies. Based on three theories: competitiveness in clusters, value co-creation theory and spillover effects from FDI, I proposed a conceptual model of LCD (Figure 3). This framework guided the case study research in Paper 2 and Paper 3. In Paper 2 I have explored the role of the ICT technological upgrade stage and in Paper 3, the value co-creation stage in LCD.

6.2.2 Chapter 4: Paper 2. "The business value of IT in a multiple-stakeholder environment: the case study of the O&G industry".

In Paper 2, I researched the role that information and communication technologies (ICT) play in technological upgrade (Figure 3, Stage 3), in a multiple-stakeholder environment of the O&G industry contributing to LCD. First of all, based on the review of the literature I

drew on the business-ICT valuation model for a single O&G company (Figure 6). The aim was to apply a theory on the role of ICT technologies in the business performance of one single organisation, to the settings of the O&G industry, and thus to inform the case study design. Further empirical research included assessment of the levels of ICT adoption in the O&G industry in Kazakhstan. Interviews shows that the level of ICT adoption depends on the size and type of company. I found that local SMEs have the lowest levels of ICT adoption, which is not surprising. The main reason why SMEs adopt ICT at a slow rate is the lack of financial resources for investment in equipment and services, which then leads to lack of modern technologies, as well as a skills gaps. The reason why SMEs cannot accumulate financial resources is their inability to provide evidence of financial stability. SMEs often have no staff responsible for ICT technologies, a function often performed by financial departments. There is no formal or informal digitalisation strategy. ICT is not used to increase efficiency, reliability, or control costs, or in the customer service of product innovations, digital technologies are unavailable.

In contrast, national O&G companies of *KazMunayGas Group* are state-owned by *NWF Samruk-Kazyna* (the sole shareholder is the state) are undergoing transformation and digitalisation. *NMF Samruk-Kazyna* also owns, either in whole or in part, many major companies in the country, including the telecommunication holding *Kazakh Telecom* (51% of stock) which is an important player in the ICT market, as well as owning numerous financial groups which are providers of finance. The National *ICT Holding Zerde* is a subdivision of the Ministry of Information and Communication of the RK. In 2015, *NWF Samruk-Kazyna* started a project on business and ICT transformation that also affected *NOC KazMunayGas*, including the project on a shared service centre (SSC) creation in 2016. The main idea behind this was accelerated digitalisation of the O&G sector. At the moment, the level of ICT technologies does not allow a business to develop its full potential. One of the reasons is that Kazakhstan does have not enough personnel with specific knowledge in ICT.

Government together with the private sector need to put more effort into the transformation of the ICT educational sector. Another problem is that ICT expenditure currently does not contribute to value creation, because the company invest less in business platforms, and more in procuring equipment.

However, international O&G companies operating in Kazakhstan have the highest level of ICT adoption, including the most advanced digital technologies available from the headquarters. The *Chinese National Petroleum Corporation (CNPC)*, one of the largest integrated energy groups in the world, is actively expanding into the Kazakhstani O&G sector. Thus, in June 1997, the company bought a controlling stake in the Aktobe Oil Company of Kazakhstan, and in August 2005 it was announced that CNPC agreed to buy the Canadian company *PetroKazakhstan* that has all of its business focused in Kazakhstan, at that time the largest overseas acquisition by a Chinese company. *CNPC* owns a number of other companies in the Kazakhstani O&G sector, including the wholly-owned subsidiary of *Richfit International LLP* (*Richfit Kazakhstan Subsidiary Company*) – an ICT holding affiliated with *CNPC*. *Richfit International LLP* was established in 2014, and in 2016 *CNPC* also established a R*ichfit International FZ-LLC* (*Richfit Dubai Subsidiary Company*). *Richfit* provides services to 12 *CNPC*-owned companies in Kazakhstan, as well as to some other Chinese companies operating in Kazakhstan and Central Asia (more than 20 companies in total). This network of companies comprises of organisations of different sizes: from large, for example *CNPC-AktobeMunayGaz* (6300 employees), to SMEs (50 employees) and therefore they have different levels of ICT adoption. An ICT service provider integrates a network of companies, enabling them access to their cloud solutions. This service can also be offered to local companies, independent of their ownership.

The contemporary view on value co-creation proposes that actors apply resources and integrate with other actors through the application of information technology platforms (Gummesson and Mele, 2010; Vargo and Lusch, 2011; Jaakkola and Hakanen, 2013). Porter

also (2005) suggested that economic development is a collaborative process taking place in industrial clusters. Rugman and Verbeke (2003a) have included MNEs in the process of knowledge generation within localized clusters. According to UNCTAD (2010), the business linkage with MNEs represents the best way for SMEs to enhance their competitiveness. Therefore, a successful policy for LCD should support inter-industrial linkages between the different sectors, i.e. between the O&G and ICT sectors, and between international companies and local industry. Government should also foster information technology education.

Based on the empirical findings above in Paper 2, I proposed a business–ICT value co-creation model at the network level for the O&G industry (Figure 7), a business–ICT value co-creation model at the individual level for the cases of IOC and SMEs (Figure 7a), a business–ICT value co-creation model at the relationship level for the case of IOC and SME (Figure 7b), as well as a framework for IT collaboration in the O&G industry cluster (Figure 14).

6.2.3 Chapter 5: Paper 3. "Value co-creation in ICT services company: a case study of a cross-border acquisition".

If in Paper 2 I considered the case of greenfield investment in ICT provider in the O&G industry in emerging countries, in Paper 3 I researched the value co-creation in subsidiaries of knowledge-intensive service companies where investments come in the form of the acquisitions (Figure 3, Stage 2). In the paper 2, I suggest that the main actors in the value co-creation process in the service industry, namely people and customers, are intangible by their nature of relationships with an organisation. In contrast to goods in manufacturing sector people and customers are not bound by the mechanism of property right and therefore can any time move to competitors, thus leading to competitive disadvantages. In knowledge-

intensive services businesses, co-operation between *the headquarters, subsidiary, employees, local market (suppliers or subcontractors) and customers* can play a crucial role. This is in contrast to acquisition in the manufacturing sector, where a foreign owner gain mostly tangible assets in the form of production facilities, or equipment, for example. Specific features of the service sector make management of ICT companies riskier in terms of post-acquisition integration, with management of the process of value co-creation becoming a key success factor in performance management. I conceptualize the digital value co-creation in the O&G industry as a value creation process occurring through dynamic interactions and changes within the network of actors built around the ICT provider with foreign ownership, where the actors strive to improve their positions, in order to access better resources and affect others. These actors and their interactions are presented in the value co-creation model for a knowledge-intensive industry at MNE network level (Figure 14). The actors in this model interact with each other in trying to achieve customer satisfaction, taking into account customer needs. To this end, each of the actors adds value to the chain. However, it should be taken into consideration that the very needs and knowledge of customers are also major values that play a role in the cycle of resource transfer, managed by the foreign-owned companies. Each cycle of adding value is preceded by a transaction of resource exchange. I would like to emphasize that the result of this process does not create any value for the actor. The value is generated once a transaction is complete, and this value is transferred to another actor by means of this transaction. Thus, in different periods each of the actors specified by the model can be either a supplier or a recipient of resources.

6.2.4 Value co-creation and LCD in the O&G sector of resource-rich emerging countries and the role of information technologies in this process

Having outlined the empirical findings in relation to the research questions, this section discusses whether the evidence and themes from the findings validate the central theoretical arguments of this thesis. This thesis was motivated by the question of how theory can explain the strategic perspective of LCP, and the role of information technologies in the development of local capabilities in the O&G sector of ERRCs. The theory of value co-creation (e.g. Gummesson and Mele, 2010; Vargo and Lusch, 2011; Aarikka-Stenroos and Jaakkola, 2012; Jaakkola and Hakanen, 2013; Galvagno and Dalli, 2014) has been applied as a theoretical lens in viewing the economic development in the O&G industry contributing to the strategy, economic development and the literature on international business.

The value co-creation theory perspective is presented and developed as a mean of exploring the logic of why and how different actors such as foreign-owned companies, local suppliers and subcontractors, employees, citizens and other actors in the O&G industry in EERCs agglomerate in networks. The interaction between actors, which technological platforms mediate, leads to innovation, participation, and improved services (Galvagno and Dalli, 2014). This enables firms to perform activities building technological capability by choosing and using new technology to create a competitive advantage. This process if it involves ICT technologies, can lead to ICT technological upgrade, i.e. increasing organisational performance and competitiveness based on the improved technology capabilities. Technology upgrading is a multidimensional conceptual framework which goes beyond R&D in explaining the building of technological capabilities which accompany long-term growth (Radosevic and Yoruk, 2018), with managerial upgrading playing an important role in technology upgrading (Yoruk, 2013).

The upgrading often takes place in networks or clusters of different actors: technological, organisational and knowledge (Cowan, 2005). The definition of cluster in ERRC includes the concepts that all together co-create value and influence LCD through interactions and exchange of resources, technology and management skills with each other in the settings of certain local environments. However, from a policy point of view, knowing what could become a cluster (perhaps with proper policy stimulation) is frequently more important than knowing what a cluster is (Bergman and Feser, 1999). In other words, for the policymakers it is important to predict what cluster or industrial policy will be successful rather than to study already known clusters. As the business settings are always changing, it is difficult to transfer practices from one country to another and from one century to another. Therefore, LCP has to be designed for a specific industry, country and time settings. However, overall it needs to support value co-creation in a network environment.

Many see the role of the government as an essential direct contributor to the competitive performance of selected strategic industries. Others share the view that the economy should be left to the working of the "invisible hand" of the "free market", however, according to Porter (1990) both views are incorrect. Recently, the idea that independent research by rivals is wasteful and duplicative has been embraced, that collaborative efforts achieve economies of scale, and that the individual companies underinvest in R&D. The idea of more direct cooperation has been developed. However, in practice companies have rarely contributed their best resources in such projects, as they do not want to share the knowledge related to their competitive advantage. Porter (1990), however, has explained this is because projects need to be in areas of basic products and process research, not in areas closely connected to a company's proprietary source of advantage. From this point of view ICT collaborative development projects can be more successful than collaborative projects on products, where foreign-owned companies probably do not want to transfer technologies. Information technologies enable LCD, to connect different actors such as IOC and local

SMEs in networks where they co-create value and advance their business processes. The development of ICT technologies for the O&G sector can create horizontal linkages, having positive effects from FDI on the productivity of domestic firms within the same industry (Görg and Strobl, 2000; Görg and Greenaway, 2004; Görg and Strobl, 2005; Altomonte and Pennings, 2009; Javorcik and Spatareanu, 2008; Kaplinsky et al, 2011). In these project international companies and local SMEs, as well as other actors collaborate and co-create value for all participants of the network.

6.2.5 Model of LCD

In order to understand how LCP can enable local development, this thesis pursued the development of a generalized model of LCD in resource-rich emerging countries through the lens of a value co-creation framework (Paper 1, Figure 3), exploring the main components of this process. The LCD process is viewed in the thesis as follows:

(a) **LCP** needs to be designed with a more collaborative approach, defining the expectations of the government, while providing the IOC with flexibility to develop its own LC plans and procurement procedures, in order to achieve greater results, coordinating actors and stimulating value co-creation. Based on the definition of LCP as an industrial policy that can enable domestic producers to expand their activities, at least partially with domestic inputs, and gain access to international technological and managerial expertise to enhance their competitiveness (Kalyuzhnova et al. 2016:3), in this thesis I understand increasing domestic inputs as intermediate inputs from Kazakhstani companies, including those with both foreign and domestic ownership and extend and adapt the definition of cluster to the context of ERRC. This includes the role of local SMEs and SOEs, as well as the value co-creation view on LCD through

interactions and exchange of resources, technology and management skills between different actors in the settings of certain local environment. In terms of its import-substitution component, LCP in this dissertation is viewed as a policy stimulating foreign companies to locate their production, service and other value-adding activities on the territory of the RK in the form of legal entity with partial or full foreign ownership, and to share their technological and managerial expertise with local actors. Policies should encourage owners of international technological and managerial expertise to cooperate with different partners on the development of domestic industrial capacity through integration of foreign technologies. The business environment is affected by the local policy, comprising of different stakeholders, including international and local companies, the government, represented by national O&G company, development agencies, banks, and institutions for collaboration, such as industry associations. The aim of LCP is therefore to support the enhancement of local producers' competitiveness, while participating in this multiple-stakeholders' environment. Competitiveness results from increasing organisational performance, particularly based on the improved technological and managerial capabilities, where technological capability refers to the activities which enable firms to choose and use technology to create a competitive advantage. In the literature, such multiple-stakeholders' networks are often referred to as clusters (e.g. Porter, 1998a; Delgado et al, 2011). LCP should facilitate value co-creation in such networks.

(b) **Value co-creation** is a process of interactions between actors, evaluating the available and potential resources, in order to understand what they have, and what they can do (e.g. Mele, Russo Spena and Colurcio, 2010). Companies with both domestic and foreign ownership will interact with each other, as well as with the

other actors in the network, only if the value for all actors is created, in this case we can talk about value co-creation. As the access to international technological and managerial expertise can only be gained through interaction with foreign-owned actors, owners of international expertise, this type of link is critical for LCD. The locus of ICT business value generation in a multiple stakeholder's environment of the O&G industry is the owner of the technology – an ICT provider, which can be a subsidiary of an O&G international company (in this case desired transfer of technology can be generated). The ICT provider invests and deploys resources available at the headquarters level in order to set up an ICT subsidiary in a host country or acquire indigenous company (as described in Paper 2 and Paper 3 subsequently). The subsidiary will provide services to the group of companies where the international company owns stakes, as well as providing services for indigenous companies from the O&G network. This is visualised in the value co-creation model for the O&G industry which comprises three domains: the ICT provider and its Tier 1 environment, a competitive industry environment and finally, a macro-environment (Paper 2, Figure 7). The value co-creation in the network around foreign-owned ICT provider is conceptualized as a value-creating process occurring through dynamic interactions and changes within the MNE network, where the actors strive to improve their positions, in order to access better resources and affect others. This process is visualized in the value co-creation model at the MNE network level (Paper 3, Figure 14). The model considers the value co-creation process from the subsidiary's perspective as MNE's activities in the host country are organized around the subsidiary.

(c) **Technological upgrade** is defined in this research as increasing organisational performance and competitiveness based on improved technological capabilities,

where technological capability refers to the activities which enable firms to choose and use technology to create a competitive advantage. Companies may also share resources and jointly make ICT investments. Value co-creation, when based on ICT technologies, will lead to the ICT technological upgrade. In this case ICT is used as an instrument of business value co-creation (Kohli and Grover, 2008). The increased competitive advantage of local companies will lead to LCD.

In an organisation, generating and sustaining competitive advantages resides in the set of available strategic resources and capabilities. Information and knowledge resources are particularly significant and arguably the most important among these (Drucker, 1993). In a single organisation, alignment between strategy and IT is a key factor in realising value from IT investments (Henderson and Venkatraman, 1989; 1993). The strategic alignment model is based on two assumptions: first, that economic performance is directly related to the ability of management to build a strategic fit between the strategic position of the organisation and an appropriate administrative structure; second, that strategic alignment is not static, but a process of continuous change. However, this model does not take into account the multiple-stakeholders' environment of the O&G industry.

The business-ICT valuation model (Paper 2, Figure 7) for a single O&G company developed in this thesis is based on a strategic alignment model, and a resource-based view of the organisation (Penrose, 1959) is adapted to the circumstances of the O&G industry. This model aims to explain how the value from ICT technologies is created specifically in the O&G industry in order to guide further research. The alignment of business and ICT technologies is demonstrated on the left side of the model. It shows how the activities of both business and ICT are aligned at operational and strategic levels, and that the activities of both functions overlap and take the form of information exchange. This is transformed in the individual business processes into business processes performance, and further into

organisational performance. As a result of alignment, new business processes are launched, and existing business processes are improved. This will secure organisational performance, as shown in the right side of the model. The target is to achieve customer satisfaction, specified by the marketing function in the organisation. Customer focus plays a key role here. The target function of ICT in these processes is achieving robust management of a business; in other words, such management that pre-empts negative developments instead of waiting for them to happen. This model describes the specifics of ICT technologies in a single O&G company, taking into consideration the influence of trading partners, industry's and country's characteristics on the business processes of the firm. However, it does not take into account the specific multiple-stakeholders' environment of the O&G industry, or the re-distribution of the value and expertise.

Therefore, the next step in this thesis was development of a model that would explain the integrating role of ICT technologies in a multiple-stakeholders' environment of the O&G industry, including re-distribution of the value and technological and managerial expertise (Paper 2, Figure 7). Based on the literature and data in this research I concluded that the locus of ICT business value generation in a multiple stake-holders' environment of the O&G industry is the ICT provider, which can also be a subsidiary of an O&G international company. In this model, the IOC invests in the ICT subsidiary and deploys ICT resources. External factors also play a role in shaping the extent to which ICT business value can be generated and captured (Melville et al, 2004). Therefore, the model comprises three levels:

(a) the ICT provider and its Tier 1 environment;

(b) the competitive environment including industry characteristics and multiple stakeholders such as National O&G Company, International O&G Companies, Local SMEs and Banks;

(c) the macro environment, including the government.

Previous research demonstrated that information technology, diffuses organisational boundaries, links foreign-owned firms via electronic networks and software applications and fuses their business processes (Basu and Blanning, 2003; Hammer, 2001; Mukhopadhyay and Kerke, 2002; Straub and Watson, 2001). In line with previous findings, this research has demonstrated that the application of digital ICT and complementary organisational resources by the ICT provider in the O&G industry may result in the improvement of business processes, and impact performance in the multiple-stakeholders' environment, as well as develop ICT capabilities.

6.3 Implications

The thesis theorisations have implications for theory and practice which are discussed below.

6.3.1 Implications for theory

Previous studies have almost exclusively focused on a theoretical macroeconomic and political economy perspective on LCPs. The reason is that LCPs are supposed to regulate the whole economy in the first instance. However, little is known about how organisations are affected by the implementations of such policies. This research has demonstrated that strategic responses of O&G companies on LCP in Kazakhstan are based on a cooperative approach to the interactions between local and foreign-owned companies. This is because of their aim to build long-standing relationships with partial co-operation, and joint ventures, as well as advantage of the human capital and competences of their suppliers (Cowan, 2005). The value co-creation perspective suggests that there is a significant shift in orientation among actors in networks, away from the primacy of conflict, toward the primacy of cooperation and coordination, and the perspective explains how this cooperation actively leads to value co-creation (Vargo and Lusch, 2017). Although the theory of value co-creation acknowledges the essential role of institutions in the process of value co-creation,

institutional factors and arrangements as the foundational facilitators of value co-creation have received relatively little attention until now (Vargo and Lusch, 2016). This research adds to the existing knowledge of how institutional arrangements related to LCP can contribute in indigenous industry development through value co-creation and technological upgrade in the O&G industry. The findings confirm previous findings that the government can help foster linkages between SOEs, MNEs, and SMEs in order to promote development (Callen, Cherif, Hasanov, Hegazy, and Khandelwal, 2014). The proposed value co-creation approach to LCP also aligns with the new macro-economic view of New Structural Economics (NSE) on the development policy which emphasises the central role of the market in resource allocation, but advises the state to play a facilitating role to assist business in the process of industrial upgrading by addressing externality and coordination issues (Lin, 2011). The findings in this thesis are also in line with the view that successful technology transfer is distinguished by the ability of states to act as a facilitator of foreign-domestic networks (Radosevic, 1999). The research expands knowledge about the main actors involved in the process of value co-creation and their roles. The proposed conceptual models contribute to the previous theory and expand it by combining multi-disciplinary theoretical perspectives. This creates the basis for further research on this topic.

6.3.2 Implications for practice

Findings in this research allows practitioners, decision- and policy-makers to be better informed. Rather than focusing on the macro-economic theories based on perfect competition, resource allocation and maximisation utility assumptions, the suggested collaborative approach to LCD is based on consideration of the larger ecosystems of multiple actors, and resource exchange between them, with the common purpose of value co-creation.

Implications for companies

This research suggests that international O&G companies should take a strategic approach to LCD when taking part in exploratory projects in resource-rich countries, recognizing the wider business benefits of collaboration, sharing wealth and co-creating value in the O&G industry, beyond the payment of royalties and taxes. This is important for diversification of the economy and growth of new industries, as royalties and taxes tend to be accrued centrally, rather than going to regional government (Klueh et al, 2007), and thus distort the economic decision-making (e.g. Stiglitz and Rosengard, 2015). O&G companies should develop a more collaborative approach to working with key suppliers such as sub-sea equipment providers and engineers and construction companies. Rather than dictating detailed component designs and product specifications, companies should engage with their suppliers to solve challenges together, as well as tap into their design expertise to meet specific functional requirements. The next stage in a collaborative approach would be for O&G companies to cooperate on common design solutions, building on the joint industry projects. This would require intercompany collaboration on specific modules and pieces of equipment to develop common designs that could be used across the whole industry. Since competitors working together may raise potential concerns, companies will need to follow appropriate legal requirements and communicate the benefits of working together (Barbosa, Hart, Santoni and Seitz, 2017).

As has been reported recently in the literature (Pagani and Pardo, 2017), digital technologies are transforming the relationships companies have with other actors in the business networks, yet these new activities and value propositions remains unclear especially in the O&G industry, a latecomer of digitalisation (Kohli and Johnson, 2011). This research extends the existing knowledge of how organisations can cooperate with the aim of co-creating value and benefit from the digitalisation of the O&G industry. Information technology can support value co-creation by connecting SMEs and international O&G

companies. This improves the competitiveness of indigenous companies. Foreign-owned companies need to develop a value co-creation perspective on the business network environment in the knowledge-intensive services, acknowledging the important role of external actors, such as indigenous customers and employees. This is especially important in strategic change setting. This research has raised awareness about the specifics of both greenfield investments and acquisitions.

Implications for policymakers

As already mentioned in Chapter 1 (p.23), previous studies have emphasised that as there are no strong economic incentives for international companies to contribute in indigenous development (Mariotti et al, 2009), international oil companies specifically tend to procure intermediates from their global value chains, i.e. to import (Hansen et al, 2015). Therefore cooperation between international and local companies is only feasible if governments participate in collaboration. This research will help policymakers to adopt and formulate more collaborative policies when aiming to support indigenous development. Under a collaborative approach government needs to work closely with international O&G companies to set realistic LC targets, collect information and develop a supportive regulatory and institutional environment, including providing financial support for public-private projects aiming at development of ICT capabilities and links between O&G and ICT sectors. To achieve this aim, policymakers should look at supporting private-public projects aiming at the development of ICT capabilities for the O&G industry. Policymakers should also benefit from the understanding of differences between risks associated with greenfield investments and acquisitions in the knowledge-intensive business environment, when aiming at domestic capacity development in both the O&G and ICT industries.

6.4 Conclusion

This chapter has presented findings from the studies reported in Chapters 3 to 5 of the present thesis, relating to strategic responses of the companies on LCPs and the value co-creation process in the multiple-stakeholders' environment of the O&G industry. The finding has been discussed with regards to the broad research question and theoretical issues raised in the literature review. The discussion and substantiation of the central argument of the thesis has been further developed in an attempt to find regularities that might inform the basis of re-conceptualisation of the LCP. The implications of the findings in this work for theory and practice have also been discussed in this chapter. In the conclusion chapter that follows, contributions, limitations and direction for further research will be discussed.

Chapter 7. Conclusions

Summary

While new countries are adopting LCPs, economic, institutional and political factors are changing in these countries, and digitalisation of the O&G industry is gathering new impetus. Specifically, this thesis strives to justify a new strategic approach to the LCPs based on cooperation between different actors, through the lens of value co-creation theory. Through the collection of three papers that report findings from different but related studies on value co-creation in the O&G industry in two ERRC, namely Kazakhstan and Russia, this thesis explores the question of how LCP can facilitate LCD in a more cooperative way. The thesis has demonstrated the capacity of the value co-creation framework to help address various theoretical questions related to industrial policy in resource-rich countries, as well as the theoretical and empirical problems related to the design and implications of such policies under going liberalisation and digitalisation of the O&G sector in these countries context.

Contributions

The individual papers make specific contributions to their issue, the relevant literature and research domain. Paper 1 (Chapter 3) develops the central arguments of the thesis and advances the value co-creation theory and economic development literature on LCP. The research adopts a value co-creation perspective defining LCP as an institutional arrangement (set of inter-related formal and informal institutions), of different levels of aggregation (from micro- to political) that aims to create balanced value propositions in the economy. The proposed LCD framework operationalises the key propositions of the value co-creation perspective by integrating some of the insights from the theory of competitiveness in clusters

and the concept of spillovers. Two major stages of LCD are proposed: value co-creation and technological upgrade.

Paper 2 (Chapter 4) explores the link between value co-creation and technological upgrade (second stage in the conceptual framework), applying a value co-creation approach to a strategic view on an ICT technological upgrade through the development of a business–IT value co-creation model at the network level for the O&G industry. This model describes the process of inter-organisational alignment between ICT and organisational strategy in the ecosystem of organisations. The main contribution of the paper is the development of a model of ICT-enabled value co-creation in the multiple stakeholder's environment and use it for investigation of the O&G industry. This model explains the role of ICT in the value co-creation process in the network with different stakeholders at network, relationship and individual levels for IOCs and indigenous SMEs.

Paper 3 (Chapter 5) applies the value co-creation perspective to the international business literature integrating it with the network view on MNEs in emerging markets, exploring how the value is co-created in a knowledge-intensive industry (first stage in the conceptual framework). The proposed model considers the value co-creation process from the subsidiary's perspective, as MNE's activities in the host country are organized around the subsidiary. Co-creation in MNE settings is conceptualised as interaction between headquarters, subsidiary, employees, subcontractors, and customers with each other for the development of new business opportunities.

Overall, these three contributions add to our understanding of the process through which LCP may lead to LCD in the O&G industry of resource-rich countries through technological upgrade resulting from the value co-creation in network of organisations.

Significance and reflections

My motivation to research industrial policies, and particularly LCP in resource-rich countries, was guided by the contradictory opinions reported in the literature and in the academic community on the problem of economic diversification in ERRC. Most of the governments of countries at the early stage of industrialisation have enforced high barriers and adopted policies such as import substitution in response to the perception of these countries as sources of primary commodities, in exchange for imported goods. Developing countries have rejected the idea of comparative advantage[40], which was understood to imply a *laissez-fair* or *free trade* doctrine based on the principles of rational resource allocations in those countries (Krueger, 1982). This approach failed in the face of the Latin American debt crisis, as a result of import substitution programmes adopted in these countries. However, the abandoning of trade barriers and adaptation of laisse-faire doctrine by these countries as well by the Eastern European and former USSR regions has also resulted in controversial results[41]. In the search for a proper theory which could support successful economic development, a neo-classical approach was taken, based on the view that market is an ideal resource-allocating mechanism, and that the role of government is to facilitate the process of industrial upgrading, taking into consideration a country's comparative advantages.

As the aim of LCP in Kazakhstan is the diversification from the O&G sector into new emerging industries around the country's comparative advantage industries, this thesis has built a foundation for re-examining the relationships between LCP and LC development. How is LC developed in the complex ecosystems in the O&G industry? What is the role of various participants? What is the role of ICT services in this development? How might public

[40] Principle of comparative advantage assumes that growth is promoted by specialisation (Chenery, 1961).
[41] For overview of policies see Table 4 in this dissertation, as well as Stevens (2008) and Bruno et al. (2015).

policy be modified to become more beneficial to society by encouraging collaboration and cooperation between firms in national and global service ecosystems? These questions are of importance for ERRC, striving to build a sustainable economy where digital technologies will play the major role.

While the countries on the edge of ICT are already introducing digital components into the traditional processes and boosting the R&D and industrial capacity of electronic engineering, the emerging and transition markets have not yet learned from the experience of past decades related to failures in the implementation of LCPs. LCPs in most countries are still focused on import substitution, rather than the development of national economic clusters, and therefore require firms to use domestically manufactured goods or domestically supplied services to be able to operate in an economy (OECD, 2016). In such an environment the New Digital Economy may fail to meet the expectations of levelling economic development, and may on the contrary, widen the gap between various nations and deepen poverty issues for many of them.

The problem is more serious, as many transition and emerging countries, including former USSR member-states in their attempt to transit to market economy, initially focused on building economic systems based on hierarchical systems of administration, while developed economies have massively turned to alliance capitalism economic systems (e.g. Dunning, 1995) based on networks and value-co-creation. Limited and incorrectly designed LCPs may allow governments to achieve certain short-term goals but constrain any long-term competitive industrial advantage. At the same time value co-creation theory integrating some of the insights from the theory of competitiveness in clusters and concept of spillovers aims at sustainable economic growth based not on import restrictions and protectionism, but on business involvement in the value co-creation processes, education and confidence building. This thesis is dedicated to building the foundation for the modern LCP concept based on a value co-creation framework.

Value co-creation theory has its roots in the marketing discipline. Prahalad and Ramaswamy (2000) suggested that in the new economy, companies must incorporate customer experience into their business. However, Vargo and Lusch (2004) noted that marketing inherited its model of exchange from economics. This model had a logic based on the exchange of goods, which are usually manufactured outputs of a tangible nature. Their value can be measured, and transactions of exchange are registered. However, over the past decades with the rise of the tertiary sector in many countries, developed economies have turned to alliance capitalism systems (Dunning, 1995) based on networks, relationships, intangible resources and value-co-creation (Vargo and Lusch, 2004). The view has shifted from the goods to the services as a core of exchange: services are not considered anymore as something offered to enhance goods, but rather the application of specialized competences (knowledge and skills) for the benefit of another entity. This logic represented a new philosophy applicable to all exchanges, including tangible outputs constituted in the service provision (Vargo and Lusch, 2004). In this approach, resources can be subdivided into two groups: operand resources (on which the transaction is performed to produce effects) and operant resources (which are employed in the transactions on operand resources). A country has factors of production (operand resources) and technology, knowledge, information, competences or business processes (operant resources), which are used by the firm to convert operand resources into outputs at lower costs and therefore maintain their value. These resources, intangible and dynamic by nature, are at the heart of competitive advantage and performance (Madhavaram and Hunt, 2008).

This view is consistent with the modern neoclassical approach to development policies. Traditional classical economics considered an economy's endowments as consisting of land and natural resources, labour and capital, and in a dynamic interpretation, also innovation and technology (Lin, 2011). It defines the comparative advantage of the country as the goods the opportunity costs of producing of which are lower given to the

country's endowment structure. In contrast, modern approaches, such as NSE, emphasises that the role of the state in industrial diversification is to provide information about the new industries, the coordination of related investments across different firms in the same industries, the compensation of information externalities and nurturing of new industries through incubation and encouragement of the FDI. It also suggests that the economy that follows its comparative advantage in the development of its industries will be most competitive in the domestic and world markets (Lin, 2011; 2012). However, within the same theoretical framework, Rodrik (2011) contends this that comparative advantage needs to be defied. He further adds that firms are not motivated to allocated resources in the new industries where prices can be higher, and government needs to support creation of the new industries acting against comparative advantage.

This thesis suggests the significance of the facilitating role of LC policy in the process of value co-creation between different actors in the O&G industry. From the value co-creation view, the comparative advantage is co-creative. This expands our vision to identify mutual gains from specialisation as well as diversification, through co-creation in the economy (Chakrabarti and Ramaswamy, 2013). This resolves the conflict represented in NSE, adding to this development economics theory.

This research has also studied value co-creation from the perspective of the ICT provider contributing to the literature by developing a theoretical foundation for business–IT value co-creation – drawing on a value co-creation framework and the theory of competitiveness in clusters. This helps us to understand how IT can create value in the O&G industry and offers insight into the value co-creation process. The existing studies do not offer a vigorous model or guidelines of how to create business value from IT through a co-creation process within a network of organisations. The thesis moves the focus of business–IT alignment from one company to a network of organisations – explaining the type of alignment with the external environment. The value-creation process involves different

stakeholders who form a network through which resources are integrated and applied through interaction (Gummesson and Mele, 2010; Jaakkola and Hakanen, 2013; Vargo and Lusch, 2011). This thesis has shown that between the O&G company, the ICT provider, and trade partners, such as local O&G SMEs, IT–business alignment can be achieved when actors co-operate on ICT technologies. Business-ICT alignment between strategy and IT is a key factor in realising the value of ICT (Henderson and Venkataraman, 1989; 1993). Increased value is based on the local technological capability development, i.e. activities, which enables local firms to choose and use technology to create a competitive advantage (Kim, 1999).

This thesis places the foreign-owned enterprise at the centre of the value co-creation process. It shows the applicability of the theory of value co-creation to the circumstances of the high technological service industry in international business settings. The research on service companies has received significantly less academic attention in terms of the internationalisation process (Panibratov and Latukha, 2014), and there is no research on value co-creation in the international business literature. This is in contrast to the traditional view of value co-creation where an individual – a consumer, an employee, an investor or a suppler is central to the co-creation experience (Prahalad and Ramaswamy, 2004b).

Overall, this thesis has demonstrated that value co-creation theory has the capacity to explain that LCP can facilitate value co-creation in a network of international (foreign-owned) companies, local companies and other actors, such as industry associations, banks, and government, as well as research and education institutions in the O&G industry of ERRC. To return to my initial motivation: this is the problem of economic diversification in these countries in the face of the ongoing digitalisation of the global economy and liberalisation of the energy sector. A value co-creation framework builds a foundation for a new approach to LC development based on cooperation between indigenous and foreign-owned companies, as well as other actors in the O&G industry. Investigation of such a

complex phenomenon further requires application of multiple case study research in order to reveal the complex interactions between multiple actors.

Limitations of the research

Since this research is a first attempt at integration of the theory of value co-creation with development studies, this provides an opportunity for extensive research, and the limitations of this study provide opportunities for future research. Taking into consideration that the objective of this qualitative research is to explore a new phenomenon through the lens of the value co-creation theoretical framework, the findings must be interpreted with caution as the analysis is based on a set of case studies in two countries. Although this study has applied the theory of value co-creation to the settings of two transition countries – Russia and Kazakhstan only, the main actors, their roles and activities have been identified. Identical relationships can be expected in any industry, irrespective of the national context in similar, resource-rich economy, as in the environment where the policy intervention is needed, this specific relationships prevail over country specific settings. However, to confirm the findings of this thesis, more studies on how value is co-created within the O&G network in the other resource-rich countries need to be conducted. Such a comparative approach might result in more generalizable claims about a new approach of LCD in resource-rich countries.

In order to do this, firstly, more research on development policy in resource-rich counties needs to be conducted in O&G industry settings. However, future research need to to explore cases in different industries and different countries in order to generate a solid theory. Future research could focus on different cases exploring the role of the other actors, for instance educational institutions, including universities and research tanks. For example, Di Nauta et al. (2018) call for a re-definition of the classical mission of these actors, adding a focus on the development of local economy through collaboration and co-creation with

local actors. In addition, the study would benefit from a quantitative study, such as a survey of companies which could explore the intensity of interaction between actors, and measure the performance and value re-distribution in the network environment. The process of value co-creation could also be investigated in more detail. A measure of value for operant resources needs to be developed as well, on order to be able to estimate the effectiveness of the policies *ex ante*.

Finally, other industries and levels need to be included in research, as LCP is a complex institutional arrangement at different levels of the economy.

Future research

The limitations of this research create a basis for future research opportunities what was already partly mentioned in the previous section. In this section, I summarise these ideas. First of all, to advance the findings of this thesis, proposed theoretical frameworks and concepts can be further developed. Evidence-based research is needed to link the theory and practice to develop a robust theoretical approach to LCP.

Guided by the theory of value co-creation as an overarching framework of market-based value creation (Vargo and Lusch, 2017), *the conceptual research* can be further advanced through synthesis of this framework in transdisciplinary research. Thus, based on the model proposed in Paper 3, on the integration of the value co-creation framework and network view on the MNEs, further research exploring this model for example from the cluster theory point of view could be useful (i.e. Porter, 1985; 1998a). Cluster theory has prompted policy-makers in emerging countries to take a closer look at the cluster approach, and to consider the possibility of using this perspective to boost both economic growth and national competitiveness. However, this has not led to wider use of cluster analysis as a major instrument for studying complex economic processes in these countries. The reason

for this is that most of the reviewed concepts of cluster development implemented in emerging countries, such as Kazakhstan and Russia, use of the cluster approach is based on international experience, disregarding the importance of initial local conditions. Thus, a more formal study of value co-creation in clusters in emerging countries, considering the impact of institutional factors and the individual structural uncertainty of economic systems, recurrent crises and market shocks, is required. This could create theoretical foundations for the transformation of national economic clusters, which is strategically important for national governments seeking to increase a country's FDI stocks and LC, thus attracting MNEs to invest in national economies (Ambalov and Heim, 2018). This can be applied to an analysis of links between O&G and other industries, including but not limited to, industries responsible for the development of ICT. This requires research on the possibility of increasing the LC and accelerating the growth of the ICT cluster of Kazakhstan by linking it with the O&G cluster, integrating this pool with national clusters of other countries, thus making use of the mutually beneficial cooperation with the unified international cluster system.

Since the LCD results from the transfer of technologies from MNEs to indigenous companies, the integration of a value co-creation perspective with one of the theories describing structure and the genesis of MNEs would be beneficial for our understanding of the narrative and the processes in the clusters. The modern MNE is a 'meta-integrator' leveraging information, knowledge and technologies within and between the different constituent parts of its international network. On the other hand, the major success factors for competitiveness of domestic companies is not protection of the market against MNEs, but rather LCD through technological upgrade and growth, based on value co-creation in clusters comprising foreign and indigenous companies. The OLI paradigm (Dunning 1980; 1988; 1995) and internationalisation theory (Rugman, 2003a and b; 2010) can serve as a

solid underpinning for describing the structure and the genesis of economic systems when integrated with a value co-creation paradigm.

This research can be supported by *exploratory case study research*, involving analysis of the success and failure practices in LCD in clusters in other ERRCs. The analysis of inter-sectoral links between different sectors of the economy can give a representation of the economy with respect to LC strategies.

As can be seen from the new suggested directions of further research, the theoretical path and general approach adopted in this thesis to investigate value co-creation in networks of the O&G industry in ERRC have potential to explore and gain further insights into how LCP can contribute to the diversification in the O&G sector into new emerging industries around the country's comparative advantage industries.

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Appendices

Appendix 1. List of interviews.

N	Interviewee's role	Company type	Interviewee type
1	Director	Kazakh Institute of Oil and Gas	Industry expert
2	Dean, Faculty of IT	Kazakh-British Technical University	Industry expert
3	Managing Director	Local O&G machinery SME	O&G local SME
4	Director	Major international ICT company	Industry expert
5	Managing Director	China National Petroleum Corporation, Richfit International	O&G International
6	Director, IT consulting	Major international consulting company	Industry expert
7	ICT engineer	International O&G consortium	O&G International
8	Local content manager	KPI Inc	O&G International
9	Budget and reporting specialist	International O&G consortium	O&G International
10	Head of corporate training centre	NOC KazMunayGas, Kazakh-British Technical University	Industry expert
11	Researcher on innovations and IT	National research university	Industry expert
12	Dean, Faculty of IT	National O&G university	Industry expert
13	Deputy of Economy	LINA Ltd	O&G local SME
14	Managing Director	LLP KazTechOil Services	O&G local SME
15	ICT Director	MH Industries	O&G local
16	Deputy head of legal department	MH Industries	O&G local
17	Head of Shared Services Centre	NOC KazMunayGas	O&G National
18	Vice-President ICT	NOC KazMunayGas	O&G National
19	Head of Metrology department	Atyrau Refinery LLP (NOC KazMunayGas Group)	O&G National
20	Head of ICT department	Atyrau Refinery LLP (NOC KazMunayGas Group)	O&G National
21	Managing Director	International law company	Industry expert
22	Head of ICT centre	China National Petroleum Corporation, Richfit International	O&G International
23	Government advisor	National development agency	Industry expert
24	Managing Director	International advisory firm for ICT market	Industry expert

Appendix 2. Interview guideline.

1. Business and ICT Strategy Alignment

Could you list the top five business initiatives in terms of how much they are leading your company's agenda for the next 12 months?

1. Regulatory compliance
2. Product or services innovation
3. Supply-chain/procurement efficiency
4. Sales performance improvement
5. Marketing effectiveness improvement
6. Customer experience enhancement
7. Digital transformation
8. Security and data protection
9. Omni-channel business operation strategy
10. Organisational restructuring or M&A activities
11. Reducing operational costs
12. Expansion into new markets/businesses
13. Asset operation efficiency

Could you please list the top five objectives for your IT organisation?

1. Real-time monitoring of business performance
2. Align IT projects and build flexible IT systems to support strategic business priorities
3. Lower the costs of IT
4. Integrated and secure access to data and applications
5. Proven data privacy protection
6. Improve the quality of IT skills within the organisation
7. Speed and cost of regulatory compliance adaptation
8. Improve IT governance
9. IT systems consolidation

What are your organisation's top three information security priorities for the next financial year?

1. Cloud security (public, private, and hosted private cloud)
2. Mobile device security
3. Data loss/leakage prevention
4. Compliance monitoring (including regulation)
5. Implementing standards (e.g., ISO 2700x)
6. Identity and access management
7. Addressing data privacy issues

8. Offshoring or outsourcing security operations

9. Security incident and event management (including predictive threat and forensic analytics)

10. Attack and penetration testing

11. Security governance and management (e.g., reporting, metrics, risk management)

2. Organisational Infrastructure (Staff and Skills)

Which skills were the most difficult to find? Why? Please consider the following technologies.

1. Mobility and mobile apps development

2. Cloud computing

3. Data analytics (e.g., "big data")

4. Social media technologies

5. The Internet of Things (IoT) (incl. wearable computing)

3. IT Infrastructure (Systems), Solutions, and New Technologies

Which type of cloud deployment are you using or planning to use?

1. Private cloud, run in your company's own set of hosts

2. Private cloud, delivered by a cloud service provider on a dedicated set of hosts

3. Public cloud, provided as a packaged solution from a third-party supplier

4. Hybrid cloud, a combination of public and private cloud

Which of the following solutions are or will be deployed in the cloud?

a. ERP (one or more ERP modules)

b. CRM

c. Content management

d. BI/analytics

e. Collaborative

f. Security

g. Storage including back-up and/or disaster recovery

h. Infrastructure/compute power

i. Databases

j. Other solution

k. Application development and testing

l. Web site/web server hosting

For your big data/analytics initiative, where are/will be the business intelligence/analysts located in your organisation?

1. IT department

2. Functional areas

3. Shared analytics center

4. External service provider

Do you use or plan to use big data and analytics for any of the following use cases?

1. Sensor-based pipeline optimization

2. Maintenance management

3. Compliance checks and audits

4. Natural resource exploration

5. Seismic data processing

6. Drilling surveillance and optimization

7. Disasters and outages management

The next few questions are about industry-specific IT solutions at your organisation.

Do you plan to invest in the following solutions in the next 12 months?

1. Hydrocarbon accounting

2. Geology and geophysics

3. Well management

4. Energy trading & risk management (ETRM)

5. Environment, health & safety (EH&S)

6. Network/pipeline automation and control

7. Project portfolio management

8. Supply chain management (SCM)

9. Work and asset management

10. Engineering and design

11. ERP

12. Cyber security

13. Plant operations

14. CRM

Is your organisation using or planning to use the following technologies?

1. Cognitive systems (systems that observe, learn, analyse, offer suggestions, and even create new ideas)

2. Robotics (robots, self-driving cars, drones, nano-robots, and more)

3. 3D printing (materializing all sorts of physical things from digital blueprints – from food to clothing to eventually even living tissues and organs)

4. Natural interfaces (more simply and powerfully connecting people and systems – through speech, vision, motion, touch, and beyond)

Regarding the Internet of Things, are you using or planning to use IoT in the following areas?

1. Production management and control/sensors on the production floor or pipelines

2. Sensor-based asset diagnostics and maintenance

3. Automatic track and trace of materials, tools, and products outside the organisation (along the supply chain)

4. Remote workforce/field service technician monitoring

5. Fleet and transportation equipment management

6. Remote asset surveillance (e.g., preventing physical intrusion)

7. Sensor-based staff identification (both for access control and time reporting)

8. In-company smart lighting/HVAC/elevator for energy saving

9. Other IoT use cases

4. How ICT is used to improve performance (cost saving, revenue generation, operational efficiency, acceleration of innovations, people empowerment, integration in the O&G value network, communications)

In the next financial year, do you expect your organisation's external IT spending (including hardware, software, and IT services) to increase, decrease, or stay the same?

In the next financial year your organisation will spend (more/the same/less/nothing) on the following solutions:

1. PCs and peripherals

2. Smartphones and tablets

3. Other hardware (e.g., servers, storage, networking)

4. Enterprise application software (e.g., ERM, CRM, etc.)

5. Industry-specific software

6. Collaborative applications

7. Middleware/application development and deployment

8. System infrastructure software

9. IT consulting and system integration services

10. IT outsourcing services

11. Other IT services

12. Telecom services (fixed and mobile)

13. Business consulting services

14. Business process outsourcing (BPO)

5. How is ICT used to Improve Interaction with Partners in the Value Co-Creation Process?

How companies in the O&G industry cooperate with each other in order to co-create value?

1. How do local SMEs, NOC, and IOC co-create value within the O&G value network?

2. What is a role of governmental structures in this process?

3. How do banks participate in the process of value co-creation in the O&G industry?

4. What is the role of IT providers in the value network?

6. How do Industry Characteristics Affect the ICT Technologies Used in Your Organisation?

What are the main characteristics of the IT industry?

1. What is the level of IT industry development?

2. Who are the main players in the IT industry?

7. How do Country Characteristics Affect the ICT Technologies Used in Your Organisation?

What are the institutional constraints of the IT and O&G industries that may affect ICT technologies in your organisation?

Appendix 3. List of interviews.

№	Respondent, job	Working experience in the company, full years	Department	Nationality	Type of interview
1	Consulting Director	5-10	Consulting, Subsidiary	Russia	Notes
2	Consulting Director	5-10	Consulting, Subsidiary	Russia	Notes
3	Sales Director	>10	Sales, Subsidiary	Russia	Notes
4	Director in Sales department	5-10	Sales, Subsidiary	Russia	Notes
5	Director in Consulting department	>10	Consulting, Subsidiary	Russia	Audio record
6	Head of Finance	5-10	Finance, subsidiary	Russia	Audio record
7	Regional Controlling Manager	>10	Corporate controlling, HQ	Bulgaria	Audio record
8	Regional Finance Director	>20	Regional finance and controlling, HQ	Germany	Audio record
9	Audit, Processes & Quality Manager	8	Corporate audit, processes & quality, HQ	Germany	Audio record
10	Managing Director	>10	Subsidiary management	Russia	Notes
11	Director Business Development	5-10	Subsidiary management	Russia	Notes
12	Head of HR Department	5-10	HR, Subsidiary	Russia	Notes
13	Sales Director	>10	Sales, Subsidiary	Russia	Notes
14	Consulting Director	5-10	Consulting, Subsidiary	Russia	Notes
15	IT Director	>20	HQ management	Germany	Notes
16	Compliance manager	>10	HQ management	Germany	Notes
17	Software developer, member of development team	5-10	HQ IT services	Germany	Notes

Appendix 4. Interview guideline.

Topic: Value co-creation in knowledge-intensive industries

Proposed questions:

1. What organisational changes happened in subsidiary and/or headquarters in 2009 and after?

2. Did cooperation with headquarters change and how?

3. What knowledge does headquarters have about the market in Russia. How is the learning process regarding it?

4. Did the process of taking decisions change?

5. How did contacts with headquarters develop? What influence did it have on the performance from your point of view?

6. What negatively influenced revenue? Please give examples from your practice.

7. Why was consulting revenue declined? Why were fewer contracts signed?

8. Were the consulting projects not profitable anymore? What is the profitability of consulting projects in Russia on average?

9. Why did expense grow?

10. Could the decline in consulting revenue have influenced software license revenue?

11. Why did people leave the company? What were the reasons?

12. Can the subsidiary successfully work without managing director when everything is managed from headquarters?

13. How have expatriate employees helped to improve performance in Russian subsidiary? Were these assignments successful and why?

14. How has the organisational culture affected the performance in the subsidiary?

15. Who are the actors in the process of value co-creation in your company and how do they interact?

Appendix 5. Press Conference Kazakhstan Content in Oilfield Service Industry

(Audio record is retrieved from https://www.youtube.com/watch?v=bSAX5rVhfcM)

The chairperson: Our conference is about the work of domestic companies in the oilfield industry, particularly about our plans to establish joint ventures with anchor investors and also about the preparation of oilfield service companies for admission to the Work Trade Organisation. Here are some representatives of the Association of the Oilfield Service Companies of Kazakhstan; let me introduce them:

At this press conference we have the chairperson of the Presidium of the Association of the Oil Service Companies of Kazakhstan Mr. Rashid Zhaksylykov; the chairperson of the Association of the Oil Service Companies of Kazakhstan Mr. Almas Қudaibergen; the managing director of the Association of the Oil Service Companies of Kazakhstan Mr. Dauyrzhan Augambai; the managing director of LLP Engineering Company KAZGIPRONEFTETRANS Mr. Fuad Serikov and the deputy managing director for new project development of LLP MHINDUSTRIES Mr. Askar Temirtashev.

The Managing Director of the Association of the Oil Service Companies of Kazakhstan Mr. Dauyrzhan Augambai:

The Association of the Oilfield Service Companies of Kazakhstan was founded in October 2011. Its main aim is to increase the local content share in large expansion projects that are implemented in the O&G industry of this country, by involving local companies of this industry to the maximum. Since the oilfield service industry is over-shadowed by the O&G industry, I want to draw your attention to the breadth of this industry with lots of sub-industries, such as well-drilling, engineering, industrial construction, chemical drill, mud supply, new technical specialists' involvement, equipment and component delivery, electric installation, transport and logistic services. As you can see, the industry has such broad sub-industries it supplies work for about 150,000 people and, if we take into account their

families, the industry involves around 500,000 people. That's why the social factor we take into account when working with the branch of the economy is so important and we can talk now of the great competitive ability of our domestic companies when the admission of Kazakhstan to WTO is close. When we talk about the interactions with the key participants of our industry we mean that today we have extensive communication with the top managers of the governmental authority - the Ministry of Energy of the Republic of Kazakhstan and its departments, the National company KazMunaiGaz, the National Chamber of the Businesspeople of Kazakhstan, big explorers such as TSO (TengizShevrOil), KPO, NKOK and CNPC, foreign associations of the same industry, such as Norwegian INSOK, French (name), Dutch (name) and oil engineer association (name). All this allows us to grasp the international experience to the maximum, and communicate with foreign partners who seek partners here to establish consortiums and joint ventures to implement the projects within the framework of the idea of the explorers' expansion. Thus, we come to the point that today these joint projects of our companies and their foreign partners help our companies-explorers of O&G: firstly, trust in these re-established consortiums, secondly, get experience and thirdly, be fully involved, for the close contact with foreign partners provides the companies with the experience our industry needs so much. This is especially vital before Kazakhstan becomes a member of WTO, since highly-educated technical specialists help companies be efficient and able to meet competition. Through our membership in WTO we anticipate today that when companies from neighboring countries-WTO members come to our market step by step, this will make our companies more vulnerable. That's why I'd like to state that today our Association is a well-known information exchange spot where the local content and expansion project consortium and joint venture creation problems are discussed.

The chairperson of the Association of the Oilfield Service Companies of Kazakhstan Mr. Almas Қudaibergen:

Let me say a few words about O&G construction. If you have a look at the oilfield service industry, the oil construction is the biggest sub-industry. The yearly budget is over USD 2

billion without the expansion projects. And when the expansion projects are taken into account and new plants are erected, the yearly budget is over USD 4 billion. Why is this significant? There are over 20 world-known contractors, out of top 100 contractors working in Kazakhstan. And when there are tenders, Kazakhstani companies often can't get big. Why not? Because they lack bank guarantee, equipment and human resources and companies have no policies. As a result, Kazakhstani companies are often hired as subcontractors. Having small salaries, they can't increase grow; buy equipment or investing in new production. That's why we don't see any big Kazakhstani companies.

Now the project of the future expansion of Tengiz field costing USD 34 billion is being discussed. Such projects have 1/3 of their budgets for building and assembly work. So, we can see how to involve Kazakhstani companies in such big projects. How is this possible? Via joint ventures and consortiums. Right now, the Association is working to establish 4 consortiums that could participate in the expansion and do the construction and assembly work for the plant. Here a consortium is different from subcontract work due to the equality of Kazakhstani companies with foreign enterprises: they get sufficient profit, so they can pay good salaries to their employees and invest to the expansion of their equipment and in new technologies.

Among the 4-5 consortiums I'd like to focus on GATE Logic. It includes two big Turkish companies, Teqven and Gamma, that work in Kazakhstan via joint venture. It participated in Kashgan projects and Aktuazsk oil processing plant enlargement project. And our Association helped these Turkish companies with new Kazakhstani partners, who had not worked with any Kazakhstani companies before. So, four Kazakhstani companies (names given) form six companies making a big Kazakh consortium. We hope this consortium will take part in future expansion projects. It can give jobs to 3,000 - 3,500 people. If we have a look at the consortium members - the Turkish companies, - they are world leaders that participated in big projects and have over USD 5 billion turnover

throughout Kazakhstan. And among the Kazakhstani members I would emphasize PSI. It's a very powerful industrial construction company that works at big production sites of Kazakhstan and even operates in Mongolia. The companies of Turkey and Kazakhstan unite their efforts for big projects of the future enlargement of the Tengiz field. What will be the gain? The gain will be that in some years Kazakhstani companies may have a fair profit and in future will be able to claim big projects and have a higher share of the local content and also provide a decent social provision for their workers. So, we hope such consortiums will be a benchmark for the industry.

The Managing Director of LLP Engineering Company KAZGIPRONEFTETRANS Mr. Fuad Serikov:

In the Association "Kazservice" I work for the project part of engineering. The project part of engineering is the beginning of practically every significant O&G project, civil infrastructure, or construction object. What is our current feeling? We are feeling the worldwide trend to reduce the investments in big sites. If during the previous years they invested about USD 700 billion in big object engineering, this year about USD 580 billion investment is expected, i.e. roughly 15-20% reduction. If the money investment is not sufficient, in 5-10 years there'll be no project at all. The O&G industry system in any industrialized nation expects that it takes 10 years before any big project starts the design process. The design process itself includes about ten stages, beginning from the investment study, pre-FS (feasibility study), the feasibility study itself, then comes the stage of the work with project estimate documentation and work papers. Then we, as design and engineering departments support the project at the field supervision and technical supervision stages, so now in this country there's a tendency to pass the bigger part of responsibility for the commissioned big objects from governmental authorities to engineering structures. In years to come, the full responsibility for big sites will be given to engineering structures.

We feel in Kazakhstan the trend of big site investment is decreasing, although we

have some O&G fields at work with some development projects of the 2nd and the 3rd turns. What I want to add is that at the design stage the key decisions are made. If we, the project institutions and engineering companies of Kazakhstan, don't make import substitution decisions, the following stages provide little technological impact. If at the project FS stage we take decisions about 50-60% equipment and material to use by, at the construction stage, then the work documentation impact drops to 5-10%. So, at that stage it's next to impossible to settle the issue of the use of domestic equipment. That's why it's a national concern, to have decent design organisations that can work with big European companies. For it isn't a secret that any big industrial group of Europe or the USA has a well-developed engineering company which traditionally works on its behalf at any stage of a project: design, construction, commissioning, operation. And as for our O&G sites, they can be operated for 30 - 50 years, so what we begin to design now, will be working in the second half of the 21st century. These projects are really long-term, and, for instance, gas transmission pipelines are supposed to work for 30 - 50 years: they must have the resource stock and all the issues of their operation are of importance during the life of an entire generation of people.

There are some problems of course, in our design sphere, related to brain drain because traditionally industrial enterprises pay a different salary and if we have young talented people, they can be found involved in certain big projects, but still they return to engineering after many years. Recent years have seen an increase of Kazakhstan project engineering workers and at present we're working in such big projects as these mentioned earlier, in particular in the Tengiz field expansion, the Kashagan project and Karachaganak field exploration; we're working with world leading engineering companies, also in consortiums and as a part of joint ventures. It is us, as planners, who lay the foundation of the success of our domestic enterprises at the subsequent stages as I've already said. So, it's a very important thing to be ready for it; there are at least 5 big companies in Kazakhstan which are active enough in designing and we'll continue using this market to promote, first

of all, the interests of the national industry.

The deputy Managing Director for new project development of LLP MHINDUSTRIES Mr. Askar Temirtashev:

I represent the interests of the service drill companies of the Republic of Kazakhstan. I'd like to draw your attention with my talk to the accomplishments made by the drill companies, and also to some problems. For the last 5-7 years the service drill companies achieved considerable success, namely they bought over 50 drill units of different load bearing capacities, a lot of special gyro fracturing equipment, coiled tubing drilling rigs; for the first time in Kazakhstan over 650-ton load capacity drill was made and set into operation, joint ventures are established with foreign countries and huge investments were made to advance technology application. These measures increased the service quality and reduced the work deadlines. At the same time, I'd like to draw your attention to the fact that due to the current crisis conditions there are some problems to be solved together with state authorities and field explorers. Because of the continuous decline of oil prices, the service drill companies' work has shrunk significantly starting from this year. Due to the USD exchange rate increase the costs of wellsite construction increase and the rates for this work remain the same. No indexation has been carried out since 2011.

At the same time to provide for continuous work and high-quality service and to avoid mass redundancy in the neighborhoods, the enterprises have to bear a high level of social responsibility and increase their expenses by paying for forced downtime. Attention must be paid to the discrepancies and violations made during the tender processes and during the execution of the obligations of the parties. It's well-known that the draft contracts which field explorer customers include in tender documents contain enslaving terms for potential suppliers. Still the potential suppliers have to agree to all these conditions not to lose the work. Also, there are cases when the specification requirement of a customer's tender documents does not comply with the main document, i.e. the project documentation. The

quality of the given project documentation can be spoiled by inconsistencies, wrong calculations etc. Meanwhile, this document governs the wellsite construction, boring holes I mean. Tender documents as well may have unjustified - for this work conditions - requirements of drill units that only one specific participant can meet. Thus, particular special barriers are created against other suppliers, the competitors.

Tender organizers may demand international normative documents and certificates, for example, those complying with American Petroleum Institute, though every service drill company has permissive documents in compliance with the laws of Kazakhstan. The requirements of international standard give a better chance for foreign companies taking part in tender competitions. So, the concept of domestic producer attraction is violated. There are cases when, in the work process, the customer binds the contractor to work with a certain subcontractor organisation to the disadvantage of its own production business.

Moreover, I want you to pay attention to the situation where a customer requires the contractor to do some work unspecified by the contract or the engineering documentation. This unspecified work is unpaid usually due to the claim that the established price of the contract mustn't be increased. Sometimes, field explorers charge drill contractors unjustified fines. For example, due to the downtime during the above-mentioned period the 650-ton load capacity drill unit production, the deadline for which was extended for some reasons, the customer charged a fine despite justified reasons of the downtime and certain failures of the customer - the unprepared service roads.

Unfortunately, all the above-mentioned does not help development, and in the current crisis even challenges the oilfield service enterprises' ability to maintain production and survive. The President of the nation now and again talks about the need to support the domestic producers and enterprises that hold high-quality specialists. To solve the problems, it is necessary to sign memorandums on cooperation with regional akimats (local

administrations), regional national chambers, help make long-term contracts, the question of the wellsite construction shall be considered as well as the establishment of joint ventures and so on.

In these three or four reports we have tried to explain the development and disadvantages in the provision of services. As you know the “Hundred specific steps” have been implemented. Fifty-six of these steps are about the establishment of joint ventures in the priority sectors of the economy with “anchor investors”. People who work in the O&G sphere have a lot of experience in the issues mentioned in this step: they started as a small number of people, now there are 5,000 of them. It shows how great impact make anchor investors for the Kazakhstani economy. Therefore, the advice we want to give to our domestic companies is not to fear of foreign companies, but learn from them to improve your company. Our state economy is young and the things that we don’t know are much more than what we do know, so we should learn from specialists that work in the field of exploration. Thank you, Alua. I think it’s time for questions.

Appendix 6. Information technology in the energy sector. Speech of the IT Managing Directors and IT managers of the energy companies at the conference Profit Energy Day 2015 11.06.2015 (selected)

(Audio record is retrieved from https://www.youtube.com/watch?v=i0FJhlTRMds)

My name is David Tuganov and I am a manager of the IT unit of the central business transformation team of NWF Samruk-Kazyna which is a group of companies. The transformation began on October 6, 2014. This project includes fourteen companies, four out of which are a part of KMG. They are Prospecting and Extraction, Processing and Marketing, KMG International, and KMG Corporate Center, KEGOK, Samruk-Energo, KazAtomProm, Kazpochta, Kazakhstan Temir Zholy, and the Fund Samruk-Kazyna itself. So, there are many companies, but they have one methodology.

They differ only in the start cycle. We began transformation with Kazakhstan Temir Zholy, and then proceeded to Kazpochta, etc. Why did we begin the transformation? In 2013, we showed the management how IT could save money, by changing business processes, business, and changing thinking. Only when we build effective processes and change the thinking of people, can IT harmoniously supplement and computerize these things, bring additional income, optimize costs, etc. The official promotion began on October 6.

What do we want? I represent the IT unit. We work in different areas. There are business process unit, change management unit, IT unit, and project management unit. I am responsible for IT, i.e. the design of the IT corporate management, the IT landscape of our main companies. My team and I give methodological support to all our companies. We have studied the IT conditions in our companies for the last four years and IT is slow, the business is slow, too. IT should be a business partner. IT can bring the business to new niches and new markets vertically. What happens, for example, with Kazpochta? IT is a key instrument for business success there now, and the company has become digital. Why is IT slow? Because the management has such thinking. We need Chief Financial Officer and Chief

Operational Officer. There is IT but there is no Chief Information Officer. Only Air Astana and Kazakh Telecom have this position. Nobody considers it important. When there is no C-level, when there is no person who can speak with the management in the same language, it is very difficult to explain these things and to explain why IT should be a business partner and how it should be a business partner. Ideally, the transformation should allow a connection between IT and business. It means that IT and business should look in one direction.

We use the scheme "people-processes-technology." The classic history goes from right to left in many companies so far. IT is considered as the technology. We bought the program, and the business automatically improves but, unfortunately, many projects are filing. Why? Because they are called IT projects. The automation of the financial statements is the IT project (SAP, Oracle or Microsoft). While the IT specialists make and are responsible, the business refuse to participate and change its requirements. As a result, the project fails due to the terms, cost, and expectations. It was in the past: one began with the technology, then adapted the software to the processes, and only then thought about how people would work.

Our approach is different. We begin with people. We have created a transformation team from people engaged in the operating activities. Each company selected the best specialists in each area and created local transformation teams. There are 35-40 people in each company. “Kazakhstan Temir Zholy” has 100 specialists. KMG has more than 100 specialists. These teams aim to transform the business from inside according to the methodology. It takes people’s time to change their thinking from inside, transform, and understand new concepts. Therefore, members of transformation teams are not engaged in the business. Nothing should divert transformation teams because the operational work and creative process are incompatible. If you want to create something better, you need to choose the best employees, put them in the separate place, and give them a creative latitude. We

work under the scheme "People, Processes, and Technology." People create optimal processes and companies of the future. One should begin with the business processes. When they are modelled and described, IT is connected as the automation instrument. Not vice versa, and this is very important.

I would like to structure my report in three sections. First, what is in IT? Second, how do we transform the technology? Third, what do we do to describe the organisation structure when the processes are modelled. How to make IT to be ready to support the business. As in IT, we cover these three elements (people, processes, and technology).

The first element is “People”. As I have mentioned, the IT problem consists of the old thinking paradigm of both management and IT. The management think of IT as something supportive. The IT specialists will do what they are told. If you tell them to computerize, they will do it. If you tell them to change the document control, they will. If you tell them to change the website, they will. IT did what it was told to do, and IT never refused. It is impossible to refuse the director. One cannot do this project now because the investment will not be returned. IT did not speak in terms, such as the investment return, cash back, or business case. These terms appear only now. We ask the IT directors whether they said no to the business. They answered that they had never refused. Now we teach them to ask the following questions: "Why do you need this project?" "What is the investment return?" "What is the benefit?" It means that we, the management and IT, begin to teach to think in terms of the benefit estimation, i.e. the value-based decision is an estimate and decision-making based on the value. CIO can help to organize this correctly. As I said earlier, there were only two companies with this position. CIO appeared at KazMunayGas in March 2016 and at Kazpochta in November. In 2015, we engaged five more CIOs over three months. So, these positions have appeared in the largest national companies. We facilitated the rise of IT with a new role. It means that the IT director remained and is responsible for the operational activity, while CIO is responsible for the strategy. CIO thinks a business and

talks like a business. Yes, CIO is probably a former IT director, but it grew out of this role. CIO talks with the top management of its company, as well as with the management of subsidiaries on the following topics: innovation, how to make IT drive business. That is to say, we have created a new vector of IT development and facilitation. There is one problem, which is a lack of personnel. There was no C-level IT. It appeared as some companies have not established a role for the IT architect.

What did we do under the transformation program? The companies established the role of the IT architects. It means that there are at least five people in each of our companies: an application architect, data architect, infrastructure and security architect, process architect, and the fifth person is a manager of this field, i.e. the IT unit manager. These people are engaged in the architecture and design. These roles were distributed between the IT director and manager before. The current role of IT department in any company is to do all things. IT performs a marketing analysis, draws up a technical specification, concludes a contract, i.e. IT performs not only its direct duties. What does it mean for the national company to buy a laptop or large IT system? Over two years, the IT specialist becomes a good lawyer, accountant, and security specialist. Now we separate these things.

There should be a regular architect or a group of architects who design the architecture and architectural IT landscape. How do we do it? We change the organisational structure. It is a transformation result when the processes are described, including IT, and the organisational structure is clear. CIO should be in this structure. We will also develop a security area. This area is not developed. Chief Information Security Officer (CISO) will appear in some companies where it is relevant. They will be responsible for internal security first of all. There is an internal threat for most companies rather than an outside one. It depends on that how you classify this information, etc. How will we do it? We will change people and awareness. The architects, who have just begun to work, lack qualification. There

were no application or data architects in Kazakhstan. Were they competent in hardware? They can design the network and select the servers.

What is data management, data governance, MDM, and competent architectural approach? Unfortunately, this knowledge is very limited. Very few specialists in Kazakhstan has expert knowledge. What did we do? We took the best experts to our team, including neighboring countries and Russia, who worked on the projects of Rosatom, Lukoil, and Gazprom and implemented these things for decades. They transferred knowledge to the teams of the national companies through workshops and trainings. We established the IT academy. It is a knowledge fabric. Groups of people will come through this academy in the group of companies of the fund. These people will get knowledge that they do not have. The do not have knowledge in the following fields: IT processes, corporate management in IT, project management, data management, and company architecture management. As a result, we will get qualified personnel. We also understand that this academy will not solve all problems. The problem is deeper.

We carried out an analysis and understood that specialists graduating from our universities are not prepared. Graduates do not suit the companies. We brought up this issue, met with the universities, and began the program. Serious programs with the universities will appear this year. Some universities agreed to be flexible and to adapt their courses. For example, we asked why the universities did not have any project management courses. The higher educational institutions have this discipline in very small amounts. This discipline is optional and only for the Master's programme. Any IT project needs the qualified project manager. As a rule, the project manager certified and trained at his own expense. We would like to change this so that more prepared specialists will graduate from the universities.

We took 30 selected students on the summer probation on Monday. They came from the international university of information technology for three months and were sent to the

transformation teams. They will study processes, architecture, project management, and business processes within three months. It is a rotational program. We expect not more than thirty persons to be trained in six companies. We expect that they will come to all organisations of the country next year.

There is another issue regarding the advance training. Last year, we developed the professional standards in the IT field. I would like to say briefly, what it is. No IT specialist knows his/her career pathway to IT director level. A graduate will come and get a position. How many years should he/she work to become the IT director? Nobody knows. If he/she is lucky, he/she will become the IT director. If not, he/she will not become the IT director. Well, the professional standards are a set of documents regulating the career pathway. What path should you follow?

For example, if you are the project manager, you have three levels: elementary, middle, and expert. A minimum level of knowledge and competencies is specified for each level. If a person wants to become a project manager, this person should undergo training at least at the elementary level. If you want to become an expert, you should have a minimum certification level at the expert level. The IT specialists do not need to go to the HR manager and ask for money to pass the certification now. If you are the project manager, you have an appropriate professional standard and you know that you must have appropriate certifications and competencies at this level. The HR manager must include money for the qualification and certification of these specialists in the budget. The project manager is an example. We drew up a document for all kinds of profiles and positions, such as engineers, operators, administrators, project managers, security specialists, etc. This document describes everything, and we plan to begin to implement these standards in the companies under the transformation program. It is a system process, which begins with people. It begins not with the company. It begins earlier, from the universities.

The second element is the “Processes” with the following characteristics. We have the IT processes. One of these processes is the IT corporate management or whole management. Well, there were no processes when there was no CIO. CIO answers questions about how to build the corporate management. If I am CIO of a group of companies, how will I build relations with the subsidiaries? Should I standardize, unify, or optimize anything? What do I do with the procurement? Can I impose the corporate standards, so that same computers are procured for my group of companies in order to agree on certain discounts and terms with the supplies? The same questions related to program products. What is to be done with corporate templates of program products? What about making a private cloud? Why not? There are questions which were questioned earlier when the companies tried to do something inside the group. Now, the strong IT corporate management has appeared within the group. These are the following questions: will we create any committee of IT directors inside our group? Who will make decisions? What decisions will be made? Will these decisions be powerful?

We are now passing this way together. I come to each company with my own team. We deliver workshops with each CIO and his/her team. There are the IT directors, IT managers, and transformation group. We begin the workshops with the IT strategy; how will it support the business strategy? The first question we ask IT is whether it sees the business strategy. Earlier, we were often asked why we are developing the IT strategy. Of course, we explain that IT should support the business, how to combine business goals with the IT goals. We change the awareness and teach people to think appropriately. It needs time. What is the advantage of our transformation program over the program of the Russian Federation? For example, our employee participated in the Rosatom program. Rosatom wanted something and did it. It is one company. Twelve companies use our program simultaneously. We have one methodology and vertical management. The President of the country orders transformation and no manager can say that he/she will not transform. It is very important

that there is a presidential order. Therefore, we will do everything right. Yes, we should change. We explain at all levels now why companies should change. External and internal conditions change. Companies earlier randomly changed. Changes should be managed. They are effective in this case. It is the same in the IT field. We change the processes; we change awareness and explain why there are such processes. We use framework COBIT 5 to manage the IT enterprise.

We took about 200 people to our IT academy over the last seven months, and decided to make the IT academy open. You can visit the corporate website of the Samruk-Kazyna University in two weeks. We will publish the total program of the IT academy for one year. We decided to make all training courses open, not only for the group of companies of the fund but also for everyone who wishes.

The third element is Technology. We analysed the IT expenses by the group of companies of the fund and understood that there are not investments, there are expenses. These investments very rarely bring value. There are mainly expenses. There are expenses for hardware and software. These expenses did not have any significant effect. Why not? We fall behind technically. Everyone has a smartphone or tablet. We use Whatsapp. We use high-end technology that facilitates our lives. However, the companies do not use Enterprise Resource Plannning (ERP), Customer Relationships Management (CRM), or Business Intelligence (BI) solutions. The do not have any normal automation. IT hampers the business there. ERP, CRM, or BI technologies which have existed for decades. For some reason, our companies still are not able to use this technology. We try to use technology in our lives. We get non-monetary investment return. For example, everyone uses Dropbox. The companies do not do the same. Why not? We think that the procurement of technology, hardware, and software should be used appropriately. One should computerize when the processes are optimized. If we computerize chaos, we will get chaos. And this is crucial, if CIO believes that the ERP system can be implemented and that everything will be OK, then there are

problems. We will teach the business to work with the software. Our experience shows that it will be not enough just to set up the ERP system. For example, KayMunayGaz has implemented the ERP systems several times, because it is impossible to implement ERP once, as system implementation is a permanent process. We want to do it properly. The years pass, new technology appears, and business does not keep pace with new technology. Why? Because business underestimates the importance of new technology. Business does not understand that new technology can create competitive advantage and new opportunities. We return to the scheme "People, processes, and technology" again. We began the transformation program in this sequence. This program will not end in one or two years. Therefore, people are the medium that we create. They should lead it further. The companies will change, the conditions will change, and the main factors of success is to understand that average educated person can make appropriate things. Any technology or any process will only become affective for the company and give results with the educated personnel.

Appendix 7. Kazakhstani Content
(retrieved from http://tengizchevroil.com/corporate-responsibility/kazakhstani-content)

One of Tengizchevroil's key priorities is to build the local capacity and capabilities of Kazakhstani businesses. TCO views our dedication to continuing to grow the use of Kazakhstani goods and services as supporting Kazakhstan's sustainable development as well as good business. TCO's strategy in increasing our use of Kazakhstani goods and services centers on four elements:

- Creating opportunity
- Growing manufacturing and production capabilities
- Transferring skills
- Maximizing local content

This focus has enabled us to increase our Kazakhstani goods and services spending tremendously. In 2012, 60 percent of our total in-country spend was spent with Kazakhstani companies. Tengizchevroil actively works with the Republic of Kazakhstan, KazMunaiGas and industry unions such as the Union of Machine Builders of Kazakhstan to identify and capture opportunities for manufacturers in Kazakhstan. Further, TCO proactively identifies qualified suppliers to include in tenders and helps develop qualified suppliers where none exist. TCO uses loans and educational forums to support this effort. We also work hand-in-hand with companies to help them adopt international standards.

TCO placed a pilot order with Nitrogen Plant LLP for liquid nitrogen delivery in support of TCO's KTL turnaround exercise. Nitrogen Plant LLP used equipment and personnel to TCO's standards during the turnaround. Additional orders were placed with Nitrogen Plant LLP for upcoming maintenance & repair and infrastructure projects. In April

2012, TCO signed a master contract for a nitrogen supply and blowdown of trunk pipelines as part of the SGP/SGI and KTL turnarounds.

HILL Corporation (HILL) plant produces high quality lubricants. The plant is the first of its kind in Kazakhstan. HILL is trying to create a vertically integrated cluster of lubricants by producing a wide range of oils meeting international quality standards. TCO's logistics group decided to test HILL's product on certain types of vehicles used by TCO. The test results were favorable so TCO began using the domestic company HILL Corporation to supply oil for use in TCO vehicles and partially replaced foreign-made oil.

Local Content and Small Business Development

Ensuring that there are world-class suppliers of goods and services in Kazakhstan is essential to Tengizchevroil's sustainable growth. In order to help improve availability of goods and services in Kazakhstan, Tengizchevroil and Karachaganak, another leading Kazakhstani energy producer, annually co-host forums for interested companies such as the 2012 Western Kazakhstan Investment forum on the creation of new industries in Western Kazakhstan.

Representatives of local and international equipment manufacturers, service companies, heads of international and Kazakh oil companies and state bodies discussed the mechanisms for improving the level of professionalism and skills and continued development of Kazakhstan's goods and services suppliers to the energy business. A variety of workshops were offered to help businesses learn the standards, processes and best practices in working with large companies such as TCO. Local companies also met with international suppliers to create potential joint ventures. Joint ventures between Western and Kazakhstani companies have proved successful over the life of Tengizchevroil in helping Kazakhstani companies develop products and services that comply with international standards.

Another example of building local capabilities and creating employment is our loan program for small and medium businesses. Under this program, we provide interest-free loans to entrepreneurs which manufacture goods, or provide services for the O&G industry. Since the beginning of the program, TCO has invested almost $9 million in these loans, which have created about 1,400 jobs in Kazakhstan. TCO assists the businesses we support through these loans with business planning.

Appendix 8. TengizChevroil: Kazakhstani Content Development

Appendix 9. Secondary, archival and web data sources consulted.

Level	Type	Organisation	Abbreviation	Website
National	State agency	National Agency for Development of Local Content	NADLOK	http://nadlok.kz
		Internet-portal Kazakhstani Content		http://ks.gov.kz
		State procurement of the RK	Goszakupki	http://goszakup.gov.kz/
		Entrepreneurship Development Fund	Damu	http://damu.kz
		Ministry for Investments and Development	MID RK	http://mid.gov.kz
		Technical regulation and Metrology Committee	TRMC MID RK	http://memst.kz
		Geology and Subsoil Use Committee	GSU MID RK	http://geology.mid.gov.kz
		Ministry of Energy of the Republic of Kazakhstan	-	http://energo.gov.kz
		Ministry of National Economy of the RK Committee on statistics	Kazstat	http://stat.gov.kz
		National center of accreditation	NCA	http://nca.kz
		Council for business development of RB	-	http://ced.by
		Republican confederation of Entrepreneurship	RCE	http://rce.by
		National Certification Authority	NSA	http://pki.gov.kz
	National Welfare Fund	Samruk-Kazyna	SK	http://sk.kz
	Investment Bank	Halyk Finance	Halyk Finance	http://halykfinance.kz
	Development Bank	Development Bank of Kazakhstan	DBK	http://kdb.kz/
	Special economic zones	Alatau Innovation Park	Tech Garden	http://techgarden.kz

	National Industrial Petrochemical Technopark Atyrau	SEZ Atyrau	http://www.atyrau-sez.kz
Enterprise	NOC “KazMunayGas”	KMG	http://kmg.kz
	TengizChevroil LLP	TCO	http://www.tengizchevroil.com
	North Caspian Operating Company	NCOC	http://www.ncoc.kz
	Karachaganak Venture	KPO	http://www.kpo.kz
	Lina Ltd	-	http://lina.kz
	MHINDUSTRY	MHI	http:/kazpetrodrilling.kz
	China National Petroleum Corporation	CNPC	http://cnpc.com
	JSC “CNPC-AktobeMunaiGas”	CNPC-AMG	http://cnpc-amg.kz
	Richfit International	-	http://richfitint.net
	Richfit	-	http://www.richfit-en.com
Professional Body	Kazakhstan Association of O&G and Energy Sector	KazEnergy	http://www.kazenergy.com
	Kazakhstan Association of IT companies	ITKZ	http://www.itk.kz
	The National Chamber of Entrepreneurs of Kazakhstan	Atameken	http://atameken.kz
	Association of participants of special economic zones of Kazakhstan	SEZ Union	http://sezunion.kz
	Association of the service companies of Kazakhstan	KazService	http://kazservice.kz
International Agreement	Aktau Declaration on Joint Actions	Aktau Declaration	http://aktaudeclaration.org

	Technology Provider	Kazakhstan National info-communication holding	Zerde	http://zerde.gov.kz
Regional	Regional block	Eurasian Economic Union	EEA	http://eaeunion.org
	Regional state agency	Eurasian Economic Commission	EEC	http://www.eurasiancommission.org
		European Commission	EC	http://ec.europa.eu
International	Think Tank	Information Technology & Innovation Foundation	ITIF	http://itif.org
	Consulting	Practical Action Consulting	PAC	http://practicalaction.org
		Law and Strategy for international trade and investment	TILPA	http://tilpa.ch
	Professional body	Global O&G industry Association for Environmental and Social Issues	IPIECA	http://ipieca.org
	Research Center	Columbia Centre on Sustainable Investment	CCSI	http://ccsi.columbia.edu
		Stigler Center for the Study of the Economy and the State	Stigler Center	http://research.chicagobooth.edu/stigler
		Centre for International Development Harvard Kennedy School	CID	http://hks.harvard.edu/centers/cid
	Supra-national organisations	United Nations Conference on Trade and Development	UNCTAD	http://unctad.or
		Organisation for Economic Cooperation and Development	OECD	http://oecd.org
		United Nations Industrial Development Organisation	UNIDO	http://unido.org
		World Trade Organization	WTO	http://wto.org
		World Bank Group	WBG	http://worldbank.org
		Organization of the Petroleum Exporting Counties	OPEC	http://opec.org

Appendix 10. A certificate of origin of goods of the form "CT-KZ" for confirming the share of local content in the goods, in purchasing goods purchased under a subsoil contract.

1. Тауарды өндіруші (атауы және почталық мекен-жайы)
Производитель товара (наименование и почтовый адрес)

ТОО "Талдыкорганский
Кабельный Завод"
Алматинская область
г. Талдыкорган, ул. Желтоксан, д206
Республика Казахстан

4. № KZ 4 05 00492

ТАУАРДЫҢ ШЫҒУ ТЕГІ ТУРАЛЫ СЕРТИФИКАТ
СЕРТИФИКАТ О ПРОИСХОЖДЕНИИ ТОВАРА

СТ-KZ НЫСАНЫ
ФОРМА СТ-KZ

2. Тауарды алушы (атауы және почталық мекен-жайы)
Получатель товара (наименование и почтовый адрес)

Қазақстан Республикасында (елдің атауы) **берілді**

Выдан в Республике Казахстан (наименование страны)

3. Тауардың шығу тегі туралы сертификатты алу мақсаты
Цель получения сертификата о происхождении товара

Для внесения в Реестр отечественных товаропроизводителей, для участия в тендерах, госзакупках

5. Қызметтік ескертулер үшін
Для служебных отметок
Выдан на серийное производство

6. №	7. Орындар саны және қаптама түрі Количество мест и вид упаковки	8. Тауардың сипаттамасы Описание товара	9. Шығу тегінің өлшемдері Критерии происхождения	10. Брутто/нетто салмағы (кг) Вес (кг) брутто/нетто
1		Кабель силовой с изоляцией из сшитого полиэтилена сечением от 25 до 800 кв.мм напряжением 10, 20 и 35 кВ: марки ПвВ нг Кол-во : 1 Ед. изм : Километр	Д8544 90.7 % ДКС	

11. **Куәлік.** Осы арқылы өтініш берушінің декларациясы шындыққа сәйкес келетіні куәландырылады
Удостоверение. Настоящим удостоверяется, что декларация заявителя соответствует действительности

Алматинская областная Торгово-промышленная палата
Республика Казахстан, Алматинская область
040000, г.Талдыкорган, ул.Тауелсиздык 101/37
8(7282) 272040

Атауы/Наименование

Омарова Б.Н.
Аты-жөні/Ф.И.О.

18.04.2014
Күні/Дата

Мөрі/Печать

12. **Өтініш берушінің декларациясы:** Төменде қол қоюшы жоғарыда көрсетілген мәліметтер шындыққа сәйкес келетінін, барлық тауарлар толығымен

Қазақстан Республикасында (елдің атауы)

өндірілгенін және жеткілікті өңдеуден/қайта өңдеуден өткенін және олардың барлығы да осындай тауарларға қатысты белгіленген шығу тегінің талаптарына сәйкес екендігін мәлімдейді.
Декларация заявителя: Нижеподписавшийся заявляет, что вышеприведенные сведения соответствуют действительности, что все товары полностью произведены или подвергнуты достаточной обработке/переработке/ в

Республике Казахстан (наименование страны)

и, что все они отвечают требов[illegible] установленным в отношении таких товаров

Кравцев Г.А.
Қолы/Подпись

18.04.2014
Күні/Дата

Мөрі/Печать

1400254

Appendix 11. A training certificate in programming for O&G equipment issued by Siemens AG.

СЕРТИФИКАТ

Гузиев Виталий

Прослушал курс

ST7-PRO1 Программирование

С 05.09.2011г. по 09.09.2011г.

Содержание курса

ST7-PRO1 Программирование

- Ознакомление с типами контроллеров S7-200/300/400
- STEP7- инструментальный программный комплекс для разработки и тестирования и документирования программ
- Структура программы для контроллера
- Типы и блоки данных, передача данных между программными структурами
- Анализ системной информации
- Параметрирование аналоговых модулей, обработка аналоговых сигналов
- Операции преобразования, арифметики и условного перехода. Функции символьного программирования
- Программирование функций и функциональных блоков с параметрами
- Программирование блоков программных прерываний
- Гомогенные коммуникации на основе MPI интерфейса

Appendix 12. A letter to the Director of Atyrau Refinery LLP (Atyrau).

Гендиректору ТОО «Атырауский нефтеперерабатывающий завод»

Амангулину Галымжану Жыршыбековичу

от студентки университета Рединга (Великобритания)

Хейм Ирины Владимировны

Уважаемый Галымжан Жыршыбекович!

Я участвую в Казахстанско-Британской программе научного сотрудничества между университетами Рединга (Рединг, Великобритания) и КБТУ (Казахстанско-Британский Технический Университет, Алматы, РК). Вы можете прочитать о моем исследовании на сайте http://kbcc.kbtu.kz/en/irina-heim/.

Прошу Вас оказать мне содействие в подготовке научного материала для написания диссертации на тему ***«Местное содержание и роль информационных технологий в развитии нефтегазового комплекса Республики Казахстан»***. Моя диссертация имеет своей целью внести вклад в дальнейшее развитие нефтегазового комплекса РК и повышение его конкурентоспособности в современных условиях. С этой целью мне необходимо провести ряд интервью со специалистами по закупкам, информационным технологиям и юристами, связанными по своей работе с данной тематикой. Продолжительность интервью около 40 минут. Поскольку мне отведено всего два дня 02 и 03 августа на подготовку данной информации, прошу организовать эти интервью по Скайпу, которые будут проходить между городом Астаной и Атырау.

Перечень тем для интервью:

1. Местное содержание, как вы видите пути его дальнейшего развития в РК с учетом вступления РК во Всемирную Торговую Организацию? Как можно повысить конкурентоспособность и уровень развития нефтегазовом комплексе РК с помощью поддержки местных компаний? Работаете ли вы совместно с другими предприятиями или организациями над этой тематикой (например с партнерами по отрасли, ассоциациями, университетами, государственными органами?)
2. Роль информационных технологий в развитии местной промышленности? Как можно повысить конкурентоспособность и уровень развития нефтегазовой промышленности РК за счет внедрения новых информационных технологий, такие как цифровые технологии, облачные технологии и интернет вещей? Какие шаги предпринимает или планирует предпринять ваше предприятие по внедрению таких технологий? Работаете ли вы совместно с другими предприятиями или организациями над этой тематикой (например с иностранными инвесторами, партнерами по отрасли, ассоциациями, университетами, государственными органами?)
3. Как вы оцениваете роль иностранных инвестиций в развитии местного содержания и информационных технологий нефтегазового комплекса РК.

Благодарю за оказанную помощь!

С уважением, Хейм Ирина Владимировна г.Астана, 02 августа 2017

Appendix 13. Selected quotations.

Footnote 8 (page 121): "Since the oilfield service industry provides for the continuous work of the O&G sector, we understand that particularly difficult work conducted by local companies, e.g. pipeline servicing, construction, module block, vessel and complicated equipment erection, all require the notion of LC. As regards the exclusion of the idea of "Kazakhstani content" from the laws, the reason for this is that WTO norms require most preferential conditions for all WTO members and the reduction of national protectionism. Nevertheless, Kazakhstan has negotiated some privileges for the local companies, in particular, there are some privileges and preferences for the companies that employ 50% local staff, and until 2021 this will also include those explorers that purchase intermediate products from local companies, or companies with 50% LC level. Thus, there is some transformation of the notion "Kazakhstani content and 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 high technology… and give us all the innovations [available] in the oilfield service industry"

Footnote 9 (page 130): "Orders are placed in Kazakhstan on platforms, like tender.kz, Samruk Kazyna and gosyakupki.kz. The LC should account for at least 40-60%. This requirement is hard to meet. LCP is a good idea; however, it does not work, because oil companies require equipment which is not produced in Kazakhstan. Therefore, the focus of this policy should be on equipment, as the share of LC in services is already high. The goal of the policy should be relocation of equipment production from abroad to Kazakhstan. There are free economic zones, reduced tax rates. However, foreign companies are not here yet. For example, Siemens sells its products through dealers in Almaty. Why? The reason is political concerns. They are afraid of political uncertainty in the event of a power change, as recently happened in Uzbekistan. They are also discouraged by inflation and the lack of stability. They bypass the LCP. Maybe it is even good that this policy does not work, because

Siemens is unrivalled. No other company in the world can boast such high-tech equipment. It took the company decades to develop it, and local companies cannot come close.

Another reason why foreign companies shy away from relocating their operations to Kazakhstan is corruption. It is a serious problem here and it scares away foreign companies. The only products that can be manufactured in Kazakhstan are low-technology products such as cables, stones, wires, insulators, and bearings. These products can be procured from local producers. At the same time, high-technology equipment has to be procured from foreign companies, like Siemens, Schneider Electric, ABB Group, but they import their products. The only thing they do in Kazakhstan is training and certification of specialists and 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 in part of training in information technologies".

Footnote 10 (page 131): "In line with the procurement requirements for our product, the LC should be at least 50%. However, according to the LC laws regulating procurements, if the LC in a product exceeds 70%, in other words, if components for this product were made in Kazakhstan, no tender for purchasing such products is announced. It means that it becomes easier to sell such products. A great part of raw materials for these products is imported, for example, from Germany. That is why for us it is difficult to meet the requirements. A procurement process is often not transparent - it is not clear why a particular company has won it and why… Of course, the National Chamber of Entrepreneurs of Kazakhstan Atameken conducts an investigation into such incidents and can include such a company on a black list. However, entrepreneurs often register a new company and take part in a tender again. I believe that the LCP as such should not be blamed for it. The true reason is the absence of legal opportunities to make money in Kazakhstan. Information technology infrastructure will help make many processes more transparent. For example, the results of

tenders announced by major companies will be available to the public. The public will be able to know what products certain companies have brought and how much they have paid. In this case, we will be able to make it right. Associations of manufacturers should be able to exercise effective public control over procurements to prevent companies from purchasing products and services from some questionable producers or suppliers. Accounting and reporting regarding the level of LC requirements can be retained, but purely for statistical purposes, without the need to submit relevant reports to government regulators. Using statistical data government decision-makers can come up with advice on how to promote the local manufacturing industry".

Footnote 11 (page 132): "The plant has not been built yet, because this is an innovative and high-tech project, we cannot build it on our own, and there is a lack of specialists. We use foreign technologies. We have bought licenses. The grantor of the licenses is Lummus Technologies Inc, a subsidiary of Chicago Bridge & Iron Company headquartered in Texas, USA. The general contractor for building a plan is a Chinese company. KPI will operate the plant. Initially Sinopec was short-listed as a contractor, however the cooperation ceased in 2013. Over a year we tried to find a new contractor. China National Chemical Engineering company (CNCEC) tried to open an office and get registered in 2016. Licenses might have run out over this time. Chinese contractor will choose the equipment, it should be companies like Siemens or Chinese companies… Kazakhstan is trying to increase the LC. In my view, this program is not effective; it is better to improve the quality [of local goods]. Companies are forced to buy products with a high LC, while the focus should be on improving product quality and boosting entrepreneurship. The terms of doing business should be eased. Simultaneously with increasing LC, it is necessary to work on improving a business environment and competitiveness… State-owned companies should be privatised"

Footnote 12 (page 132): "Now everything in our company is measured remotely: the pneumatic drive is connected to the industrial control systems. It is of foreign origin – either from Japan or Honeywell from the US. A separate system is responsible for production safety. The share of imported equipment is large. We chose foreign equipment because we prefer specific brands. This equipment has been in operation for a long time and has proved to be good. We have few devices that were made in Kazakhstan. Among them are water measuring devices, however, locally manufactured equipment is represented by few devices, with no critical equipment produced in Kazakhstan. We support the LCP, but if equipment does not meet the requirements in terms of technical specifications, we do not buy it. Our plant is *especially dangerous industrial object*[43]; therefore, the number one priority is reliability and safety of equipment, not a low price or LC. The LCP should take into consideration the needs of an enterprise. The same situation is with software – are there highly qualified specialists in the country? What would I suggest to local manufacturers? To establish contacts with Honeywell, examine their technologies, production and the way they cooperate, develop indigenous technology. It will be necessary to invest in equipment to produce similar goods locally. Honeywell does not have production facilities in Kazakhstan, it imports from America and Europe. Here localization of production is possible. We often choose the country of origin on our own, in particular, when some equipment elements break down, because elements produced in different countries might not fit each other. Localization requires highly qualified engineers. It is imperative to invest in engineering education in Kazakhstan. It is necessary to monitor the procurement and identify products that can be used. The market of Kazakhstan is now open, and it is not saturated with goods.

[43] The industry where different kinds of emergency situations (incidents or disasters) are possible. This require a number of additional permissive documents and procedures to be implemented with a focus on technological security, safety engineering.

Appendix 14. Copyright (Figure 2).

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Appendix 15. Authorship form (Paper 2).

10 December 2018, Reading

Authorship contribution

To the paper: **"Value co-creation between foreign firms and indigenous SMEs in Kazakhstan's oil and gas industry: the role of information technology spillovers"**

Submitted for publication in the journal **Thunderbird International Business Review**

We defined each author's contribution to the paper as follows:

Conception of design of the work – Irina Heim and Prof. Kecheng Liu (7 and 7 points out of 100 each)

Literature review – Irina Heim solely (15 point out of 100)

Data collection – Irina Heim solely (15 point out of 100)

Data analysis and interpretation – Irina Heim solely (15 point out of 100)

Drafting the article – Irina Heim solely (16 points out of 100)

Critical revision of the article – Irina Heim and Dr. Weizi Li (6 and 6 point out of 100 each)

Final approval of the version to be published – Irina Heim, Dr. Weizi Li and Prof. Yelena Kalyuzhnova (6, 6 and 6 points out of 100 each).

We define contribution in total as follows:

Irina Heim (80%)

Prof. Yelena Kalyuzhnova (6%)

Dr. Weizi Li (6%)

Prof. Kecheng Liu (7%)

Appendix 16. Authorship form (Paper 3).

01 May 2017, Reading

Authorship contribution

to the paper **"Value co-creation in ICT services company: a case study of a cross-border acquisition"**

submitted for publication in the Journal of East-West Business

We defined each author's contribution to the paper as follows:

Conception or design of the work – Irina Heim solely (12 points out of 100)

Literature review – Irina Heim and Tian Han (10 and 10 points out of 100 each)

Data collection – Irina Heim solely (12 points out of 100)

Data analysis and interpretation – Irina Heim solely (12 points out of 100)

Drafting the article – Irina Heim solely (12 points out of 100)

Critical revision of the article – Irina Heim solely (12 points out of 100)

Final approval of the version to be published – Irina Heim and Prof. Abby Ghobadian (10 and 10 points out of 100 each)

Professor Ghobadian has also contributed into the paper is the form of general supervision of his PhD students Irina Heim and Tian Han. We define contribution in total as follows: Irina Heim 80%, Tian Han 10% and Prof. Abby Ghobadian – 10%.

Irina Heim

Tian Han

Prof. Abby Ghobadian