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Policy Making, Technological Innovation, and Oil Sector
Development in Mongolia



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摘要

石油工業的成功取決於政府的政策和技術創新。蒙古針對石油部門的發展政策仍然十分緩慢。如上所述，主要力量影響著油田的發展。我們採訪了蒙古石油部門的不同關鍵人物，以研究影響石油部門發展的關鍵因素。如果我們在蒙古石油部門實施適當的政策和技術創新，其發展將會更快。

石油部門的發展正在緩慢發展，因為沒有精緻的政策。石油和天然氣行業必須採用石油行業的產業政策來支持基礎廣泛的經濟增長。必須增加技術創新和政策。

由於少量原始數據，大多數數據是通過定性的訪談和調查方法收集的。

關鍵詞：蒙古石油工業、政策制訂、技術創新



ABSTRACT

The success of the oil industry depends on government policies and technological innovation. The development policy in Mongolia for the oil sector is still very sluggish. As mentioned above are the main forces influence the development of the oil field. We have had interview with different key people from the oil sector in Mongolia to study what are key factors affecting oil sector development. If we properly implement well suited policies and technological innovation in Mongolian Oil Sector, whose development will be progressed faster.

The development of the oil sector is slowly moving because there are no delicate policies. The use of industrial policy in the oil sector to support broad-based economic growth is necessary in the oil and gas sector. The technological innovation and policies must be increased.

Due to small amount of primary data, most of the data is collected through qualitative method of interviews and surveys.

Keywords: Oil industry in Mongolia, Policy-Making, Technological Innovation



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CHAPTER ONE INTRODUCTION

1.1 Research Background and Statement of the Problem

Mongolian oil industry has been discussed since 1997 and several projects have been approved, but none of them have been completed. Mongolian government's policy in oil sector is to build oil industry in order to sustain the oil industry's product needs and to strengthen human resource capacity. However, Mongolian innovation of oil refinery and government's policy in oil are still new concepts to Mongolia's people, so I just wanted to explore oil sector's key factors which are effecting the industry development. Furthermore my bachelor degree and previous job experiences are related with oil industry which is the reason why I would like to study this topic.

Oil and gas operations can contribute to improving the livelihoods of communities living in producing areas by promoting the sustainable development of the often-marginalized regions where the resources are typically located. Local developmental impacts of hydrocarbons developments can be realized in various ways: in the form of revenue transfers from the central government; and through what Hirschman called backward linkages (Hirshman, 1958) with the local economy by generating local employment, transferring knowledge, and outsourcing inputs locally. Mongolia is 100 percent depend on fuel imports. Mongolia imported almost 1.5 million tonnes of oil products in 2018, virtually all from Russia. They are amounted to 18 percent of all Mongolia's imports, according to official data. Oil sector is developing in Mongolia.

The collapse of the Soviet Union in 1989 had far-reaching impacts for Mongolia, politically, economically and socially. A parliamentary democracy was put in place, the development of upstream oil operation recommenced, and the Oil Law of Mongolia and related regulations were put into effect in 1991. The government initiated the Oil Program. Classifying prospective oil areas into contract blocks and releasing them for international bidding.

Mongolia produced 7.6 million barrels of oil in 2018, about 21,000 bpd, amounting to 6 percent of its total export earnings. The country's oil industry regulator is expecting its crude oil output to rise over the years prior to the refinery's start-up. Mongolia's big southern neighbour China produces around 3.8 million bpd of crude, and imports more than 9 million bpd, according to official government data.

Oil exploration and production in Mongolia are performed solely under PSCs signed over each oil block between the investor and Government of Mongolia. There is no national oil company (NOC) in Mongolia. As of 2017, there are a total of 32 oil blocks and Mongolia has concluded

PSCs with 22 domestic and foreign companies on 27 blocks so far. Three of these blocks have advanced to production, one was cancelled and one relinquished, while the others are still being explored (IEEJ, 2018).

Natural Resources of Mongolia

Mongolia has rich deposits of copper, coal, gold, silver, iron ore, zinc, fluorspar, molybdenum, uranium, tin, tungsten, natural gas and oil. Abundant mineral reserves are found throughout the country, although only around 30% of Mongolia's territory has been explored.



Table 1. 1 Mongolia's mineral resources

Commodity	Reserves	Unit	Significance
Oil	2.4	Billion barrels	While under-explored, Mongolia's proven reserves are in the east with frontier exploration in the west. Significant reserves of unconventional oil (shale gas and shale oil) are also estimated.
Gold	591,244	Metric tons	Alluvial gold - off limits to miners - accounts for over half of reserves, but several larger deposits are in development. Gold is also associated with large copper deposits like Oyu Tolgoi.
Silver	3,493	Metric tons	Despite only one producing mine in the north, there are several other silver deposits spread across the country.
Copper	53.6	Million metric tons	Mongolia has the world's 12th largest copper reserves. Oyu Tolgoi will become the world's second largest operating copper mine once the underground phase II expansion is completed in 2020.

Source: Mongolia's mineral resources (2016 EITI Report)

1.2 Definition of Terms

1.2.1 Definition of Policy Making

‘Policy’ typically refers to a deliberate plan of action to guide decisions and achieve desired outcomes. Anderson defines it as: A purposive course of action followed by an actor or set of actors (Anderson, 1975) one important aspect of this is that policy encompasses not just discrete decisions, but a set of processes, activities or actions (Neilson, 2001). ‘Purposive’ emphasizes that it is goal-directed, which includes specific solutions to concrete problems as well as frameworks for action. Many thinkers emphasize that it is inherently political (Burchell, 1991), and some languages (e.g. Spanish) use the same word for ‘policy’ as for ‘politics’. This study (and a large portion of the literature) focuses on public policy, which is policy that is adopted and implemented by government that affects or is visible to the public (Court & Young, 2005). As well as focusing on policy at the municipal, regional and national levels of government, this paper also considers policy that is made by bilateral aid agencies and multilateral organizations, as well as other international organizations and NGOs.

There are a number of models that attempt to put boundaries around parts of the policy process. They serve the purpose of focusing attention on different ‘sites’ in the making of policy, within which a range of different actors are involved, different institutions, evidence and knowledge is used, and decisions are made. Broadly speaking, they look at when policy is made, conceived in terms of ongoing stages of decision-making or converging ‘streams’ of ideas, and where it is made, thought of in terms of spaces and different levels.

The rational paradigm of the policy process separates policy-making into different ‘stages’: agenda setting, policy formulation, decision-making, implementation and evaluation (Neilson 2001). This model has been criticized for assuming an unrealistically rational and problem-solving mode of policymaking, and for wrongly positing a sequential progress of clearly-defined parts (Porter, 1995). However, it has been widely defended as a useful heuristic device which provides an analytic point of departure for understanding policy processes by identifying discrete elements that cut across the multitude of actors, institutions, policies and politics etc., which has subsequently lead to a lot of useful stage-focused research (Sabatier, 1993) .

1.2.2 Definition of Technological Innovation

The importance of innovation in creating competitive advantage and improving organizational growth cannot be understated. Toffler offers his views on the future and what it holds for business, while Drucke identifies the world population contraction as a serious threat (Toffler, 1990) .

Burgelman and Moss Kanter offer in Sights into strategic aspects and generating growth for the future. (Burgelman & Christensen, 2004) . It is useful to develop a sound understanding of the dynamics of technology and innovation to be able to audit their respective characteristics. Since different types of innovation are possible, the boundaries to the innovation audit become important. Deciding between radical and incremental innovation can radically alter the questions asked in .the innovation audit. Making an informed decision on the type of innovation, as well as the scope of the audit, is therefore only possible through knowledge of innovation and technology and the management of both these disciplines.

The word 'innovative' is much too often used indiscriminately by the media and general public alike. This can often create the wrong impression and understanding of its real meaning. A technological innovation for instance, is not as many people believe, conceded specifically with computers or electronic products such as cellular telephones or international networks. Neither does technological innovation only occur in complex products, processes or systems.

Technological innovation does not have to be complex, but it has to be new and aim to implement the technology it embodies, in the marketplace. To define innovation one might return to the Latin Origin of the word. Innovation or 'innovate', which means 'to make something new', leads to several conclusions of its deeper meaning. The Latin concept is quite cryptic and can be better understood when divided into three parts. Girifalco identifies innovation is the process by which an invention is first brought into use. It involves the improvement or refinement of the invention, the initial design and production of prototypes. Pilot plant testing and construction of production facilities diffusion is the process of the spread of the innovation into general use as it is adopted by more and more users¹. Making something new one has to three assumptions as generate or realize a new idea (invention and creativity), develop this idea into a reality or product (realization), Implement and market this new idea (implementation).

The making something new' refers to replacing old concepts or products with new ones, continually updating and improving them. When introducing a concept such as defining Technological Innovation technology into the meaning of innovation, and defining the term 'Technological Innovation', the following changes to the above occur:

- Generate or realize a new idea, based on technology, capability or knowledge (Invention)
- Develop this into a reality or product (realization)
- Diffuse, implement and market this new idea, technology, capability or knowledge (implementation) thus technological innovation is a part of the total innovation discipline. It

focuses specifically on technology and how to embody it successfully in products, services and processes.

Technology as a body of knowledge might thus be seen as a building block for technological innovation (L.Girifalco, 1991), serving as cornerstone to research, design, development, manufacturing and marketing.

- Other definitions of technological innovation may be found in literature, yet they all make some reference to Invention, realization, or Implementation (L.Girifalco, 1991) .

1.2.3 Barrel of Oil Equivalent (BOE)

A measure used to aggregate oil and gas resources or production, with one BOE being approximately equal to 6,000 cubic feet of natural gas (James, 2019).

1.2.4 Conventional resources

Discrete accumulations of hydrocarbons contained in rocks with relatively high matrix permeability, which normally have relatively high recovery factors (James, 2019).

1.2.5 Developed reserves

Reserves that can be expected to be recovered through existing wells with existing equipment and operating methods or in which the cost of the required equipment is relatively minor compared to the cost of a new well and, if extraction is by means other than a well, through installed equipment and infrastructure operational at the time of the reserves estimate (James, 2019).

1.2.6 Resources

Quantities of oil and gas estimated to exist in naturally occurring accumulations. A portion of the resources may be estimated to be recoverable, and another portion may be considered to be unrecoverable. Resources include both discovered and undiscovered accumulations (James, 2019).

1.3 Research Questions

Research questions have developed and purposed after reviewing the research background, motivation those are relationship between the policy making and technological innovation of oil industry companies in Mongolia. .

Those are:

- (1) Does policy making affect oil sector development?
- (2) Does technological innovation affect oil sector development?

1.4 Research Methodology

This research is looking at the topic and tried to find the data through qualitative method. Due to small amount of primary data, most of the data is collected through qualitative method of

interviews and surveys. As in many other literatures in the same problem, Interviews and field study has been done.

Qualitative methods focus on the understanding, observation in natural setting, interpretation and closeness to data with a sort of insider view (Ranjit, 2011). For business and management, it is considered to be the best approach. In this case also the most suitable method which can fulfill the purpose of this paper.

1.5 Conceptual Model and Hypothesis

The thesis describes how policies contribute to technological innovation and the growth of the oil industry. Based on the literature review as shown in figure 1, we developed the conceptual model system. For this study, we have used qualitative research methods to find the relationship between policymaking and technological innovation and oil industry development. In this framework policy-making is an independent variable; technological innovation is a more independent variable and oil industry development is a dependent variable.



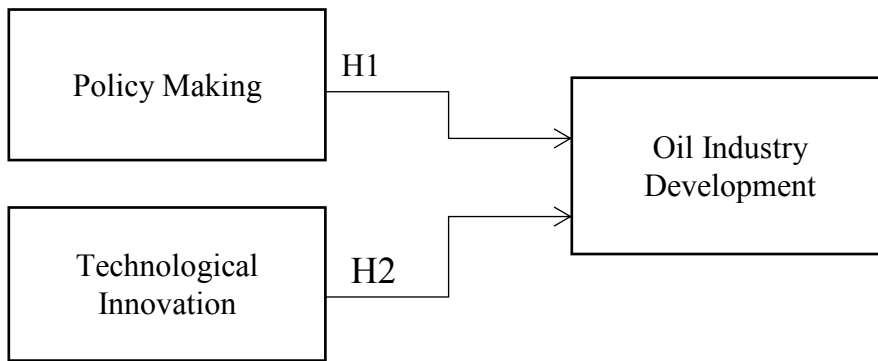


Figure 1.1 The Conceptual Model
Source: The Author

Hypothesis

In this study, we have used qualitative research methods to find out the relationship between the policy making and technological innovation and oil sector development. According to the research objectives and literature review, following research hypotheses are defined below:

H1: Policy making has positively significant related to oil sector development.

The story of the oil-field supply firms' success makes an important contribution to another, more general narrative: the emergence at the frontier of production in all sectors of the economy in the production of resource-based commodities as well as industry and services of a model of collaborative innovation. This model takes as its starting point a world ours in which the speed and uncertainty of technological and market change make it impossible for even the most capable actors to master by themselves the skills needed to remain at the forefront of development. Given this uncertainty even the leading firms come to depend upon shifting constellations of suppliers, large and small, to deploy and develop technologies changing so rapidly that their strengths and weaknesses can only be determined in use The story of the oil-field supply firms' success makes an important contribution to another, more general narrative: the emergence at the frontier of production in all sectors of the economy in the production of resource-based commodities as well as industry and services of a model of collaborative innovation.

This model takes as its starting point a world ours in which the speed and uncertainty of technological and market change make it impossible for even the most capable actors to master by themselves the skills needed to remain at the forefront of development. Given this uncertainty even the leading firms come to depend upon shifting constellations of suppliers, large and small, to deploy and develop technologies changing so rapidly that their strengths and weaknesses can only be determined in use tops the productivity ranking in the OECD (Organization for Economic Cooperation and Development, 2018). The Organization for Economic Cooperation and

Development (OECD) is a group of 34 member countries that discuss and develop economic and social policy. There is extensive state ownership in enterprises (SOEs).

H2: Technological innovation has positively impacts on oil industry development.

The Norwegian oil industry has adopted ‘front end engineering and design’ (FEED) contracts to govern collaboration with large general contractors in designing the system of production in a particular field.

We are suggesting that increasing the positive impacts of policy making on oil sector depends on technological innovative development. This is a crucial stage of development when the innovative integration, in view of basin-specific conditions, of established and novel technologies can determine the profitability of a venture and trigger further cascades of technical innovation as ambitious designs are realized. We discuss these relatively recent and little studied contracts against the backdrop of closely related innovations in contracting in the technological and automobile industries (Herrigel, 2018). The extraction of oil and gas from deep reservoirs offshore under harsh conditions has been transformed in recent decades by new instrumentation and by innovations in subsea or ocean floor technology. One of the most important advances in metrology is 4D or time lapse seismology, which permits observation of a reservoir as it is being drained, revealing untapped reserves (Herrigel, 2018).

The advances in subsea technology make it possible to separate solids and seawater from oil and gas at or near the wellhead; re-inject seawater into the formation to compensate for the decrease in pressure caused by the well flow; compress gas; and pump only the gas and oil purified of the byproducts of extraction, and often together, in a single, multiphase pipeline – to floating storage facilities or to onshore terminals. Used together with advanced metrology such subsea equipment, installed by robot, monitored from shore, and operating in the high-pressure but stable conditions beneath waves and weather dramatically lowers the cost of extracting oil deep offshore, substantially expanding the range of recoverable resources while reducing the risks of harm to human operators and the environment (Herrigel, 2018).

1.6 Review of Related Literature

The literature review studies the relationship between policy making and technological innovation on the development of the oil industry and the relevant studies and research papers have considered affording theoretical support to develop research hypotheses.

1.6.1 Alshadli, Ahmed Edwik. Ph.D Thesis. (2007) Oil Dependency, Economic Diversification and Development a Case Study of Libya .

Libya's economy relies heavily on higher oil sales which may worsen as the price of oil declines (Alshadli A. E., 2007). Over recent decades the Libyan economy has been struggling along with low capital countries. The oil booms of 1973 and 1979 gave Libya unprecedented wealth, but, despite significant oil revenues, Libya is still dependent on oil profits, the price of which continues to fluctuate greatly in the international market. The hydrocarbons and the public sector are also regulated by the Libyan government. Significant oil production has provided Libya's people with decent living conditions, and socio-economic development compares favorably with levels in other North African and Middle Eastern countries. Due to its large deposits, Libya has the ability to significantly boost oil production and sales in the coming years. Based on public funding for a single sector would jeopardize the fiscal balance and stability of the country. In reaction to the winds that went up against world prices, Libya became over consumed.

Libya's government expenditures far surpassed tax losses. Such dramatic increases in government expenditure are difficult to reverse when the bubble stops and often result in significant fiscal deficits instead of surpluses. Yet Libya's primary challenge is to promote non-oil sector development and drive economic diversification. The non-hydrocarbon GDP growth was low and non-hydrocarbon GDP oil variability. Small non-oil GDP growth represents private investment shortfalls and limited capital-import production profitability. Development in efficiency is a requirement for faster growth and more spending. Strong growth in production is also a requirement for successful hydrocarbon diversification.

The expected high oil turnover will provide growth financing, but not generally stimulate sustained non-oil production. Overoptimistic projections of future oil incomes show serious adverse impacts, particularly if a non-oil economy adapts to decreased demand through underdevelopment and capital flight. Policy options to shield an economy from oil revenue fluctuations without sacrificing benefits from rising prices include the creation of the IX Stabilization Fund and foreign hedging techniques. The stability fund will smooth spending and slash variable investment expenses.

Libya wants sound economic management and to resolve oil windfall-related issues. In order to assist in distributing public resources, market mechanisms must take into account fear, vulnerability and development plans when choosing programs. Thus it is important to diversify the economy macro economically in order to avoid the traps that so often threaten developing countries with immense natural resources. It would be easier to agree on public investment in a social-economic system if hydrocarbon windfalls remain unconnected (Alshadli A. E., 2007).

The oil windfalls should be used strategically in order to accelerate non-oil development and the production of jobs, to promote the transition to a dynamic, market-orientated economy. The intermediation of hydrocarbon winds through domestic and market markets will produce longer-term growth over the long term but should be followed by a significant increase in the investment climate. In order to improve competitiveness, diversify energy, particularly services, and compete in the global economy, improved quality of the human resources in Libya will also be necessary.

The level of government should be strengthened because it underlies the policy of transformation in progress. Libya probably would have been better off if it raised a higher proportion of domestic investment and saved a higher proportion internationally by the tighter implementation of business requirements. Good fiscal control of intermittent bubble events obviously permits the economy to increase the economic growth rate momentarily. Additional questions were addressed in this research such as the extent of windfall, the use of Libya and its effect on the non-oil sector.

Adopting sound economic policies and reducing oil losses would enable Libya to direct development on an ongoing basis and to become a major success story for all developing countries.

1.6.2 The Role of Innovative Decisions in the Development of Oil and Gas Companies (Andronova O. , 2017)

This research illustrates how necessary it is for all operational units of O & G companies to develop and take strategic decisions. This thoroughly illustrates the way strategic choices of a creative nature are produced and rendered with a multilevel framework. The decisions taken to execute creative foresight initiatives targeted at potential technological breakthroughs that may have a direct impact on the development and growth of key indicators in different O & G segments have a particular role in the hierarchy of innovative decisions (Andronova O. , 2017).

It also highlights the need to build new opportunities for the company based on its workers. It is the workers with a new mindset that guarantee the quality with which creative actions are planned and executed.

Also listed below are the main requirements for innovators. In fact, the question of this group's special training (innovators) is being addressed. One possible solution is to develop the right curriculum for companies.

1.6.3 The Role of Policy Makers and Institutions in the Energy Sector: The Case of Energy Infrastructure Governance in (Edomah, 2017).

This paper focuses on investigating the linkages and consequences of the policy decision process in the governance of energy infrastructure in Nigeria. It attempts to gain a better

understanding of the role of policy makers and institutions in the provision of energy infrastructure in Nigeria. Using a combination of semi-structured interviews and documentary evidences from published literature, this study reveals three essential areas where the policy-making processes (and therefore policy makers) intervene in the provision of energy infrastructure. These are: (1) granting access to historical data; (2) regulations; and (3) permitting/issuance of licenses. This study also reveals three major unintended consequences of the policy decision processes and institutions in the governance of energy infrastructure provisions in Nigeria, which are: (1) government financing corruption in the energy sector; (2) economic delusion; and (3) uncontrolled growth in energy demand driven more by export and not local internal demand.

1.6.4 Balancing Oil Policy toward Value, Sustainability, and Security (Hurdeman A. R., 2019)

Most federal and other regulatory structures have had to address issues related to the possession, control, and distribution of oil and gas revenues.

The methods they have adopted reflect their political past, their ethos and the value of the institution itself within the national background. They may not have been a concern when the fundamental legislation was drawn up. Federations with committed managers tend to be older federations in which neither the market nor government revenues are essential to the oil sector.

Nevertheless, these federations provide significant fiscal and legal power for federal governments, which they can use to influence the development of the oil sector. In developing countries, federations have appeared to have provided the central government with nearly all management tools related to the oil sector. In some instances, for example for Malaysia and Russia, when the industry became big, the federal government took over these functions through legal or constitutional reform.

Ownership can be linked to management influence, but often not, especially in developing countries. Social impetus to centralize oil sector administration is applied in developing countries with federal regimes. Centralized management reasoning requires a variety of oil production problems and an extremely sophisticated strategy for large foreign oil companies so a country's limited financial and human capital must be focused on building efficient central management capability.

However, it will be necessary to support the federal leadership if the tool is very that. Nevertheless, too often, centralization was done, and the conditions of the manufacturing areas were not very active. Naturally, prosperous regions are highly worried about oil exploration within their

territories because of potential environmental, labor and social impacts. There are also strong reasons for finding a way of offering the production regions true representation in oil management.

The goal is to find a workable equilibrium that facilitates successful and efficient decision making and avoids collision between governments exploiting their powers in order to gain a small political or personal profit. Federation's strategies for increasing and allocating profits are very complex. In all federations the federal government raises profits from taxation and loans more than it expends for its own ends, thus, through revenue sharing and by cash contributions, or some mixture of these, any nationally increased income flows to local units.

If revenue sharing is used, it is possible to determine the division of income using different criteria, including necessity, and derivation. Nevertheless, it was very difficult to choose these requirements among federations. Where the profits from energy are segregated from oil products control, administration and revenue sharing. The derivation theory was granted some weight to 231 other profits for sharing. Most federations, though, pool their capital profits with all other share profit, which are used for allocations other than derivatives.

In other situations, the derivation will not occur (federal transition the simply reduce if the representative unit requires exposure to resource revenues). Other transfers are mainly based on tax transfers. While technical challenges related to the sharing of resources are smaller than those relating to shared management, regulations around this topic may be highly controversial. Some additional fiscal advantages are required for competitive regions, but these advantages should not cause major distortions among regions of the country.

Within constitutions, it is wise to avoid strict rules, which in any case may not be suitable. Although few strict rules exist, federal policy planners would do well to take into account such fundamental economic values as flexibility and fairness and the virtues of transparency and accountability while designing systems for the allocation of natural resources and incomes. It must also take into account the significance in the world of the natural resource industry and the broader political sense or perception underpinning the economy.

1.7 Scope and Limitations

As there are not much studies done on the oil sector in Mongolia, more time is needed to do research on this topic. Moreover few companies could be reached from different parts of the country so this can be a limitation.

1.8 Significance of the Study

This thesis will be written in the fall semester of 2019 as the final requirement of Public Administration department at Nanhua University in Taiwan. When I started thinking about my

research topic. I had considered about my future career. The thesis topics about key impact factors which are effecting development of oil sector in Mongolia. The goal of the thesis has been to propose guidelines a basic understanding of the how the political instability and government regulations and corruption are associated with oil industry achievement in the oil industry in Mongolia.

How to develop oil sector in Mongolia? Additionally, what are the key points that will affect the success of oil industry (such as business growth, international recognition, and multinational sales)? The answer to this question is the main purpose of this research. The purpose about the research is to present key factors which affect success of oil industry in Mongolia. Moreover, to study the current Mongolian oil business sector also, and in particular, to identify the success of oil industry to find the correlation between policy making and technology innovation in oil sector. In another word, the purpose of that study means to investigate oil sector development in Mongolia. Furthermore, this study focuses on the policy making and technological innovation of oil industry companies in Mongolia.

In this context, a sample interviews have taken from Mongolian oil industry experts and made conclusion according to the interviews.

1.9 The Arrangement of the Thesis

This research includes five chapters and the summary of each is as below:

Chapter 1 includes the statement of problem, motivation, questions, objectives, Hypothesis, scope and limitation, literature review, the conceptual model and structure of research.

Chapter 2 introduces the previous Development of oil Sector in Mongolia about definition and historical development of policy making and oil industry development, the developments of research hypotheses their relationships and technological innovation is as moderator.

Chapter 3 describes the development of the conceptual model, measurement of variables and Data processing and collection.

Chapter 4 present the research results from interview, including the correlations relationship between the policy making, technological innovation are positively strength development of oil sector.

Chapter 5 contains the research conclusions defined according to the previous results and findings. The limitations of the also future research described in the end of the paper.

CHAPTER TWO LITERATURE REVIEW

2.1 History of Oil in Mongolia

Mongolia is a large (600,000 square miles), sparsely populated (3 million people) country with a young (70% of the population is under 35), well-educated (97.8% literacy) workforce. The first geologic study was done in 1892 by the Russians, and the first oil discovery was made by the Soviets in the 1940s, based on surface anticlines. The Russians remapped the geology in the 1950s. The Oil Authority of Mongolia (PAM) was established in 1990 as a state-owned oil agency. With the collapse of the Soviet Union, Mongolia became a democracy in 1992. There are 44 different terrains, with mega shear zones in major parts of the country (Finfeed.com, 2019). The geoscientific study carried out in 1892 in central Asia by Russian Scientist, V. A. Obruchev marked the beginning of Mongolian geology. A few decades later, oil exploration in Mongolia begun with the classification of Mesozoic and Tertiary sediments, and the discovery of oil shale outcrops in the Gobi region. Around 1940, the Zuunbayan oilfield was identified in the East Gobi by Mongolian and Soviet geologists. At that time, the Zuunbayan and Tsagaan-Els oilfields reserves were estimated at 6.2 million tons. In 1950, construction of the country's first ever refinery was completed and it started refining oil produced from the Zuunbayan field. Both fields yielded 586 thousand tons of oil until 1969, when the refinery and production ceased activities due to declined rates, a fire at the refinery and economic factors. Since then, Mongolian oil exploration and production activities were idle for over 20 years (IEEJ, 2018).

Exploration, Production, Recent Discoveries in Mongolia

After the resumption of upstream oil activities in the early 1990s, circa 51 million barrels of oil have cumulatively been produced in Mongolia between 1996 and 2017(IEEJ, 2018).

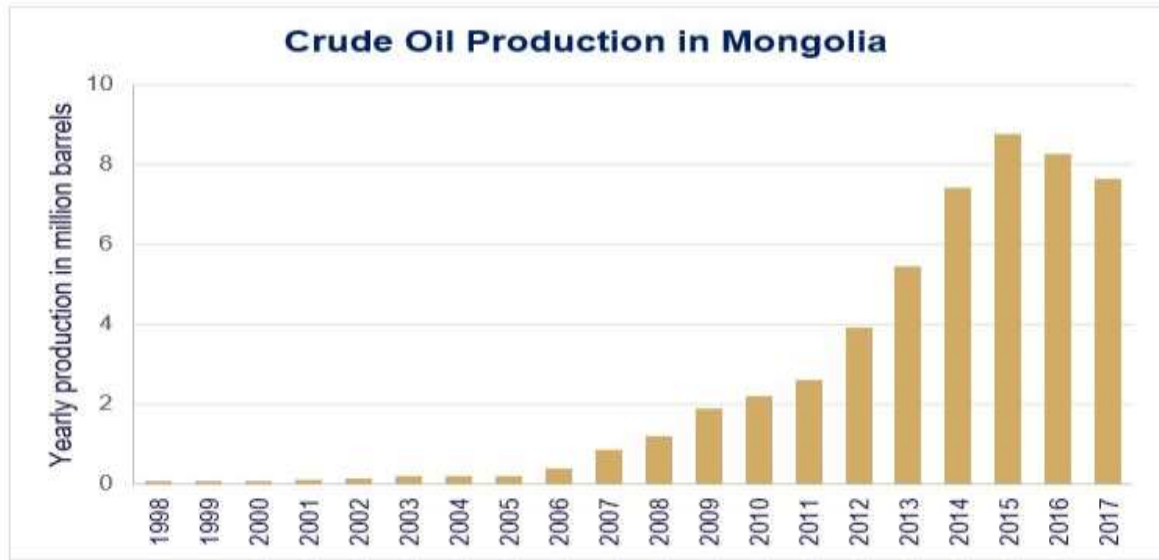


Figure 2.1 Crude Oil production in Mongolia
 Source: Annual report Oil Authority of Mongolia 2018.

Mongolia’s oil production steadily increased until 2015, reaching a daily production of ca. 24,000 barrels of oil. However, it has shown slight decreases in 2016 and 2017. More than 90% of the country’s annual production has been solely from Blocks XIX and XXI in Tamsag basin in eastern Mongolia in recent years (IEEJ, 2018).

Export, Import and Refinery of Oil in Mongolia

Since there is no in-country refinery until today, the produced oil had to be exported. 49 million barrels of oil have been exported to China between 1998 and 2017 (IEEJ, 2018).

Likewise, the demand for refined oil products has been met 100% by imports. Consumption has been increasing nearly every year until it dropped slightly in 2014 and 2015 reflecting the country’s economic downturn during these years. It is now back on upward trend, with the highest ever import of ca. 1.5 million tons oil products in 2017. Further increase is expected in the long-term (IEEJ, 2018).

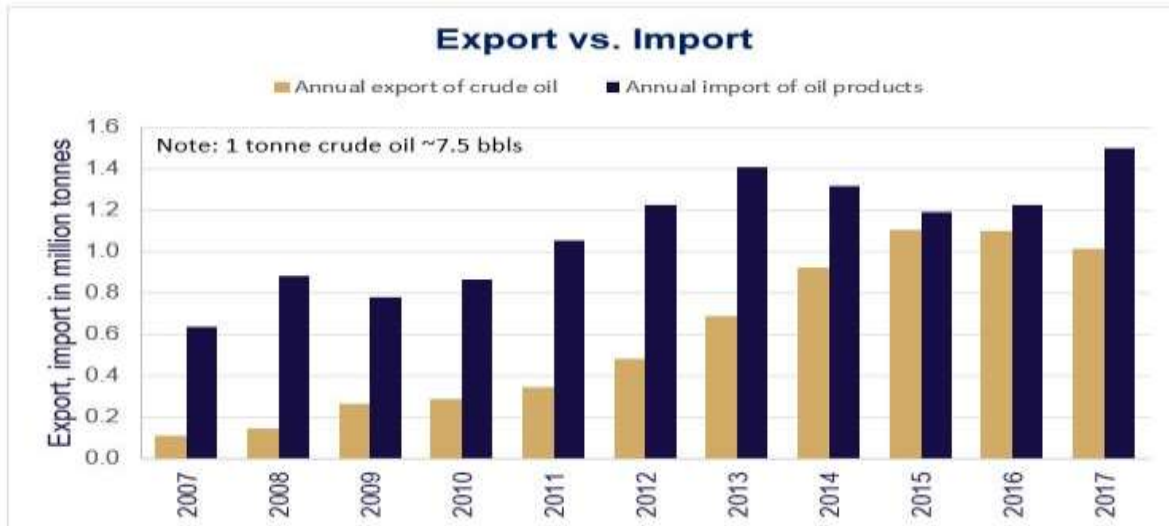


Figure 2. 2 Export and Import of Oil products in Mongolia
 Source: Export and Import of Oil products in Mongolia (IEEJ, 2018).

More than 90% of the imported oil products come from Russia and the remainder from countries such as China, Republic of Korea and others. To reduce its dependence on imports, the Government of Mongolia is seeking to build the country’s own refinery, supported by a 1 Billion USD soft credit line from India. In June 2018, the Ministry of Mining and Heavy Industry reported that the final detailed feasibility study which was completed by Engineers India Ltd had been received. The refinery with an initial capacity of 1.5 million tons p.a. would be built in Altanshree Soum near Sainshand City in Umnugovi Aimag.

Laws and Regulations

The Oil Law of Mongolia was adopted on 18 January 1991. The law was revised in 2014 providing clear and transparent legal environment and creating more conditions for investors. The law regulates the operations of Mongolian and foreign entities or individuals on exploration, production, transportation, storage and marketing of oil in Mongolia (Davaasanbuu, 2019). The Mineral Resources and Oil Authority of Mongolia (MRPAM) is the government agency overseeing the implementation of the Oil Law of Mongolia and relevant regulations (Petro Matad, 2019).

What are the other countries best practices in oil industry development?

If we see closely into Norwegian oil industry history, it was the development of the Condeep platforms on the Norwegian shelf that seriously introduced the Norwegians into the oil innovation system. The Condeeps were large gravity platforms placed on the sea bed, and the construction of these production systems were organized by the use of numerous Norwegian sub-contractors - among them Norwegian Contractors (NC) which was developed and owned by Aker. To manage

the complicated setup, oil companies, suppliers, sub-contractors and authorities had to build up huge bureaucracies in order to control each other. This extremely bureaucratic way of organizing the workplace was to some extent unknown in Norway, although it had long been characteristic of the international oil companies' operations, in order to protect themselves against opportunistic behavior by close monitoring of contractors and a willingness to meet a former client in the court. The production costs became extremely high.

The influential Norwegian stakeholders in the oil industry expanded to include politicians, governmental institutions, oil companies, suppliers and labor unions. They constituted complex networks of interests and objectives in which this phase of the innovation system was further shaped.

2.2 Policy making in Oil industry development

Recognition of national oil companies' growing dominance of the world oil market has led some experts to view this as an energy security issue. The growing strength of the national oil companies implies, at least in a relative sense, the diminished importance of the private international oil companies. This dynamic could transform the reaction of the market to demand and supply signals. Since a major thread of current policy toward oil is let the market take care of it, a change in the way the market works might call for significant adjustments in the policies of oil-consuming nations. Some of the policy options presented below have been extensively debated in the past as features of broadly based energy strategies, while others are controversial and would likely be difficult to implement. Others, such as the creation of a U.S. national oil company are extremely unlikely to be considered while the world oil market continues to function as a viable market.

1. Demand-Based Policy

The success of many economic policy measures designed to alter market outcomes requires consideration of likely actions by both those who demand the product as well as those who supply it. As a result, if oil-importing countries believe that the growing importance of national oil companies are a potential threat to their ability to gain access to desired supplies, not only should importers seek to change the behavior of national oil companies, but they might also change their own energy strategies. The key elements in such a demand-side policy are well known. They include diversifying the supply base, so that potential political problems are less likely to result in economic damage through reduced oil supply. In addition, conservation that reduces demand, or at least reduces the growth in demand, perhaps through taxes on imported oil or oil products, for example,

might serve to reduce the potential influence that oil-based actions have on the domestic economy (James.A, 2007).

2. Supply-Based Policy Oil

Importing nations might also use their political influence to try to encourage the national oil companies and their governments to alter their behaviors. The companies might be encouraged to improve their efficiency and respond to market signals more like privately owned firms. If the national oil companies find a need to access international capital markets more regularly, this result might be achieved as a natural result of exposure to the requirements of lenders. On a more political level, governments might try to encourage the governments of national oil companies to reduce their intervention in the operational decisions of the companies. This might be difficult to achieve in countries like Venezuela under the Chavez government, but progress likely can be made in more democratic environments.

The clearest example might be Statoil and Norway, which operates largely on market principles. CRS-15 20 This alternative was analyzed by Amy Myers Jaffe, *The Changing Role of National Oil Companies in International Energy Markets, Introduction and Summary Conclusions*, a Presentation at the James A. Baker III Institute for Public Policy, Rice University, and March 1, 2007. Oil Investment is an important goal of U.S. energy strategy is to enhance the development of oil and natural gas resources around the world to expand market supply, there are many ways that goal can be achieved. Many of the appropriate policy measures are those that the U.S. government has used in other contexts. Trade agreements, both bilateral and multilateral, can facilitate U.S. economic goals by allowing foreign nation's preferential access to the lucrative U.S. market in return for progress in areas of interest to the United States, in this case expanded oil supply. Even though oil production can make a nation relatively rich, in many cases virtually all sectors of the economy remain poor, except for oil. Such nations might still require some form of foreign assistance to attain their development goals. In some cases, a poor nation just beginning to develop an oil industry might need more traditional forms of aid. In all cases, whether through foreign aid requirements or through access to trading opportunities and international financial markets, national oil companies and their governments could be encouraged to use standard business and accounting practices and employ transparent decision-making processes.

Why is local policy making is important?

Within the Nigerian context permitting and licensing provides the entry points for participation in the energy industry. The federal ministry of oil resources oversees the affairs of the Nigerian oil and gas industry through the Department for Oil Resources (DPR). The DPR also oversees the

affairs of the Nigerian Nuclear Regulatory Authority, responsible for the development and regulation of nuclear power in Nigeria. DPR has the statutory function of processing and granting approvals, licenses and permits across the entire oil and gas value chain. This ranges from exploration and production permits to retailing activities of oil and gas by-products. In addition to granting permits, DPR has responsibility for compliance to regulations, guidelines, and oil laws within the entire oil and gas spectrum in Nigeria. Indeed there is need for regulation and competition in energy markets which assures both the freedom of enterprise and the freedom of choice of the consumers (Brussels.G, 2016). It grants the benefits of efficiency that comes from the choice of available options, and provides an ideal environment for promoting innovation (Schultz & Sharpe, 2014). It is argued that there are no fair competitions in a market where there are no rules, which is why regulations are promulgated to govern the affairs of a sector or market. Since competition does not happen by itself, competition laws and policies are promulgated in order to ensure that entities do not develop unfair market power, which restricts competition (*Koyama, K 2013*). Laws and institutions are set up not only to prevent cases of market power, but also to punish the abuse of such when it arises (Office of Fair Trading, 2004).

In investigating the linkages between energy infrastructure provision and policy making within the Nigerian context, the interviews conducted revealed three major themes, which are viewed as the lenses through which those in the policy space exert some sort of influence on the affairs of the Nigerian energy industry.

These are:

- Issuance of licenses/permitting
- Regulations
- Granting access

Permitting involves the granting of an official permission or authoritative certificate for an entity to perform certain actions (Vann, A. Wind Energy 2012). Energy regulations entail the rules governing the extraction, production, sale, and use of energy (Schwartz, D.L. The Energy Regulation and Markets Review 2012). Granting access to historical data on the sector's activities can help investors shape their business expectations and ascertain some of the embedded business risks, which might still be unclear.

2.3 Technological Innovation and Oil industry development

The recent survey presented in the Newsweek Vantage report Technological Frontiers in the Oil and Gas Industry demonstrates the overriding perception in the oil and gas industry that

competition is a driver, not a threat. Technology is being pursued and applied primarily to enhance the industry's efficiency and competitiveness, which translate immediately into higher returns.

At the same time, oil and gas companies are also investing in new products, such as hydrogen and renewables, to support the global energy transition to a greener, cleaner future although these remain a small proportion of the companies' portfolio, as their commercial benefits are less secured. The decision by BP, once the classic big oil Company, to invest massively in forecourt electricity supply points is a perfect example. There is no reason why the oil and gas sector should be in collision with the age of renewables, with world emissions restraint, with electrified transportation or major changes in energy use or the pattern of energy demand. Big shifts have already taken place with the exponential growth of tight oil and shale gas production (along with big falls in costs) and impressive new recovery techniques in conventional oil and gas areas.

The pressure for new methods is constant, and the opportunities are widening all the time. This is already being reflected in the structure of the energy industry. As elsewhere, while the major players will adapt and survive (providing they show strategic agility), new niches are opening up for smaller firms all the time, whether upstream, midstream or at the distribution and retail consumption levels.

Artificial intelligence (AI) applications and the new possibilities of digital technology will also play their part. As the new frontiers of technology open out, and systems such as carbon capture and storage (CCS), hydrogen utilization, and electricity storage become commercially viable, these will provide not setbacks, but rather exciting new opportunities in combination with the hydrocarbon sector.

Supported by real case studies and interviews with industry leaders, the findings of the Newsweek Vantage survey Newsweek Vantage reveal how the oil and gas industry is taking advantage of technological innovations both energy-related and more general applications to come out leaner, greener and more resilient. The sheer scale of investment oil and gas companies are undertaking in breathtaking technologies is one major indicator that, indeed, they are not going anywhere any time soon. These technologies are shaping the industry's operations and its offerings, marrying old and new practices and products, unlocking resources previously considered unattainable, and resulting in improvements in efficiency and productivity all while reducing the impact of operations and products on the environment.

CHAPTER THREE RESEARCH METHOD

3.1 Type of Research

The research looks at the subject and has sought qualitative approaches to find the data. The bulk of the data is obtained via a qualitative interview and survey approach because of the small amount of primary data. As in much other literature, interviews and field research were performed on the same issue. Qualitative approaches rely on natural environment understanding, assessment, perception and proximity to data in a kind of insider view. It is considered the best strategy for business and management. The most fitting way to serve the function of the present paper in this case too.

A qualitative methodology will be better suited to accomplish this work, provided that this study examines which influences affect the development of the oil industry in Mongolia due to the very complicated quantitative calculation of attitudes, values, ideas, and opinions. In this study, though, quantitative approaches are also used to assess whether or not businesses have evolved. Every business collects data on its value-added output and the number of staff which is the two growth metrics selected for this study. Such data are gathered via a questionnaire sent to the companies and returned via e-mail to the writer.

3.2 The Interview

Interviewing is a commonly used method of collecting information from people. In many walks of life we collect information through different forms of interaction with others. There are many definitions of interviews. According to Monette et al. (1986: 156), 'an interview involves an interviewer reading questions to respondents and recording their answers'. According to Burns (1997: 329), 'an interview is a verbal interchange, often face to face, though the telephone may be used, in which an interviewer tries to elicit information, beliefs or opinions from another person'. Any person-to-person interaction, either face to face or otherwise, between two or more individuals with a specific purpose in mind is called an interview. When interviewing a respondent, you, as a researcher, have the freedom to decide the format and content of questions to be asked of your respondents, select the wording of your questions, decide the way you want to ask them and choose the order in which they are to be asked. This process of asking questions can be either very flexible, where you as the interviewer have the freedom to think about and formulate questions as they come to your mind around the issue being investigated, or inflexible, where you have to keep strictly to the questions decided beforehand including their wording, sequence and the manner in which they are asked.

Unstructured Interviews

The strength of *unstructured interviews* is the almost complete freedom they provide in terms of content and structure. You are free to order these in whatever sequence you wish. You also have complete freedom in terms of the wording you use and the way you explain questions to your respondents.

Unstructured interviews are prevalent in both quantitative and qualitative research. The difference is in how information obtained through them in response to your questions is likely to be used. In quantitative research you develop response categorizations from responses which are then coded and quantified. In qualitative research the responses are used as descriptors, often in verbatim form, and can be integrated with your arguments, flow of writing and sequence of logic (Ranjit, 2011). As unstructured interviews are dominantly used in qualitative research, they are described in greater detail under ‘Methods of data collection in qualitative research’ later in this chapter.

Structured interviews

In a structured interview the researcher asks a predetermined set of questions, using the same wording and order of questions as specified in the interview schedule. An interview schedule is a written list of questions, open ended or closed, prepared for use by an interviewer in a person-to-person interaction. (This may be face to face, by telephone or by other electronic media). Note that an interview schedule is a research tool/instrument for collecting data, whereas interviewing is a method of data collection.

One of the main advantages of the structured interview is that it provides uniform information, which assures the comparability of data. Structured interviewing requires fewer interviewing skills than does unstructured interviewing.

3.3 Respondents

As I said earlier, most of the data collected for this paper are mainly because the secondary data on this topic are low. Secondary statistics were collected by means of the literature that offers general information on the activities of the oil industry as its main development elements in Mongolia. The results were linked to the project goals and the actual data.

Apart from secondary details, the interview also offers primary data and open questions on the growth of the oil industry in Mongolia, market scientists and Mongolian oil industry researchers. In November 2019, questionnaires and interviews were conducted. Each report includes a qualitative interview, but qualitative interviews are also of two forms, unstructured and recorded semi-structured. The researchers should ask a question in the Unstructured Interview, and the respondent should react and explain which investigator will listen to. In a semi-structured interview, a checklist

will be presented of the researchers' questions and the interviewee will reply, meeting the interview criteria. The interview was conducted in Mongolia by 5 specialists at the following four companies and universities. Which are the implementing agency of Mongolian Government Mineral Resources and Oil Authority Agency, Department of Oil, the Ministry of Mining & Heavy Industry in Mongolia, Shunkhlai Group, School of applied sciences at Mongolian University of Science and Technology?

The study shows that people, like the entrepreneurs with productive oil companies in Mongolia, are also experts and university faculty who acquire potential expertise in the oil industry in the country. Each portion presents the research paper's conceptual model, offers theories based on the context, literature and conceptual model and describes variables as well as the research methodology.

3.4. Introduction of the Company Interviewed

3.4.1 Mongolian Government Mineral Resources and Oil Authority Agency

Mineral Resources and Oil Authority of Mongolia (MRPAM) is the main governmental organization applying its geological knowledge and information to recommend areas, policies and plans for preservation, conservation, rehabilitation of geological resources and administration of geological resources and activities. By providing recommendations for improvement, amendment or issuance of laws, regulations and measures concerning administration of geological resources and activities, as well as monitoring and enforcing the relevant laws, regulations and measures. In addition MRPAM conducts geological and mineral surveying, inspecting, studying, researching, knowledge developing, distributing and servicing, and cooperating in geology and mineral resources with other countries and international organizations.

The MRPAM serves the country as a geological fact-finding agency that predominantly studies and researches minerals, fundamental and applied geology in order to provide geological understanding about natural resources condition. The vision is to ensure the responsible and sustainable use of the state's natural resources-water, land, minerals and energy-for the benefit of current and future generations of Mongolia.

3.4.2 Department of Oil, the Ministry of Mining & Heavy Industry in Mongolia

Mongolia, a country with abundant mineral resources such as gold, coal, and copper, is located next to the world's largest consumer of mining products, the People's Republic of China. Taking its geographical advantages, Mongolia is expanding its engagement in the regional infrastructure and economic integration through various development strategies including the

Mongolia-China-Russia Economic Corridor Program and the Belt & Road Initiative. The results from geological surveys, minerals prospecting and exploration works conducted on Mongolian territory indicate that there are over 1,100 known deposits of 80 types of minerals, around 10,000 occurrences and thousands of mineralized areas identified. A mining sector is built on public support and investors' confidence thus we highly prioritize the need for sound Government policies, stable legal environment, information transparency and active engagement with local communities.

The Ministry's mission is to promote responsible and transparent mining and heavy industry sectors in order to enrich the state treasury and achieve a balanced and well-diversified economy. To this end, the Ministry develops all relevant policy, laws, regulations and national programs within the sectors.

The Parliament of Mongolia has recently adopted Resolution #73 to accelerate the development of Tavantolgoi coal mine and list up to 30% of its shares on domestic and international stock exchanges, raising funds for regional infrastructure development such as railways, roads, and a power plant, coal-chemical and washing plants. The proposed infrastructure developments are expected to increase the value of the mineral deposits sitting in the southern region of Mongolia and increase sales turnover of mining products. The preparation work for the proposed IPO is well underway.

Further steps have to be taken to utilize natural resources sustainably without high grading, increase the level of mineral processing, improve border crossing capacity, supply energy from local sources, attract investments in geological exploration, simplify exploration licensing and improve competitiveness. The Government is taking proactive actions in these areas.

The projects including the construction of an oil refinery, coal-to-synthetic gas plant, ferrous and non-ferrous metallurgical plants are being implemented to develop value-added heavy industry production. In addition, the current Government's one of the priorities is to establish a sovereign wealth fund designed to adequately manage the revenues generated by the mining sector, allocate them for today's and next generations and ensure inclusive growth.

The Ministry has been actively promoting the country as an attractive and competitive investment destination among investors, particularly mining sector investors.

3.4.3 Shunkhlai Group

During the past almost 30 years role of the private sector in Mongolia has become more and more apparent and the people who have been inspired by this process have established today's strong private sector.

The company that started up its business in 1992 now has become a group of companies with a diversified investment portfolio in beverages production and distribution, oil products import and trade, communications and so on.

Motto of the Group is “Driving Force of Prosperous Mongolia” is the heartfelt call to be at the forefront of development and to support of and cooperate with all who dedicate their efforts to the nation’s and global growth and development.

The philosophy is “the Company’s path to a development is facilitated by our customers’ progress” means intensive development of all the private sector areas will contribute to improvement of the socio-economic situation of Mongolia and hence our businesses will grow. In particular, improved businesses in mining, agriculture, where we supply our oil products to, will lead to a better purchasing ability of our customers, which in turn will promote us to a growth. They believe, private sector growth will promote the growth of our nation.

3.4.4 School of applied sciences at Mongolian university of Science and technology

School of Engineering and Applied Sciences is a newly founded School at NUM as a result of NUM’s reorganization in December, 2013. SEAS adopted programs and curriculums related to Engineering, Technology and Applied Sciences from School of Mathematics and Computer Science, School of Information Technology, School of Geography and Geology, School of Biology and Biotechnology, School of Chemistry and Chemical Engineering, School of Physics and Electronics and School of Economics, which are constituted the previous organization of NUM. SEAS consists of 4 Professional Departments and a number of Research Centers in order to fulfill research and education programs. SEAS hosted 114 faculty members including 18 professors, 30 associate professors, 53 teachers, 13 emeritus professors, departments’ assistants, and the other part-time teachers and teaching assistants at the 4 professional departments.

An Academic Council, An Administrative Council, School’s Curriculum Committee, 4 Departments’ Curriculum Committees, Department of Academic Affairs, and Student Service Office works at SEAS in order to organize, decision making, and serving for research and education programs.

SEAS aspire to be the leading center of the country’s technical development and a nation-wide base of information that will be utilized for crisis solving.

3.5 Questions of Interviews

Table 3. 1 Introduction of the Interview 1

Name:	The General Engineer of Shunkhlai LLC Kh.Nerguibor
Company name:	Shunkhlai Group
Date:	20 of November , 2019
Time:	14:30 pm

Source: The Author

Questions:

1. What is your own position in the company?
2. When your company was found?
3. How many employees do you have?
4. What the main product or service you are providing?
5. What is your own position in the company?
6. In case of Development what kinds of problems does the oil industry companies in Mongolia face?
7. Do you think policy making is key factor for oil industry development in Mongolia?
8. Do you think technological innovation is key factor for oil industry development in Mongolia?
9. In which sector does company operating in?
10. Are there any other factors which you think affecting development of oil industry in Mongolia?
11. Which are the key problems which are effecting oil industry development in Mongolia?
12. How do you see the solutions to overcome these problems?
13. Do you have any growth strategy for last five years?
14. Did you have any change in your organization such as, technological innovation style during this period?

Table 3. 2 Introduction of the Interview 2

Name:	A.Purev , Senior Analyst
Institution name :	Department of Oil, The Ministry of Mining & Heavy Industry
Date:	25 of November , 2019
Time:	11:30 pm

Source: The Author

Questions:

1. What is your own position in the company?
2. In case of Development what kinds of problems does the oil industry companies in Mongolia face?
3. Do you think policy making is key factor for oil industry development in Mongolia?
4. Do you think technological innovation is key factor for oil industry development in Mongolia?
5. In which sector does company operating in?
6. Are there any other factors which you think affecting development of oil industry in Mongolia?
7. Which are the key problems which are effecting oil industry development in Mongolia?
8. How do you see the solutions to overcome these problems?
9. Do you have any growth strategy for last five years?
10. Did you have any change in your organization such as, technological innovation style during this period?

Table 3. 3 Introduction of the Interview 3

Name:	E.Bat-Erdene is Oil raw material researcher and professor
School name	School of Applied Sciences at Mongolian University of Science and Technology
Date:	25 of November , 2019
Time:	15:30 pm

Source: The Author

Questions:

1. In case of Development what kinds of problems does the oil industry companies in Mongolia face?
2. Do you think policy making is key factor for oil industry development in Mongolia? Why
3. Do you think technological innovation is key factor for oil industry development in Mongolia?
4. In which sector does company operating in?
5. Are there any other factors which you think affecting development of oil industry in Mongolia?
6. Which are the key problems which are effecting oil industry development in Mongolia?
7. How do you see the solutions to overcome these problems?
8. Do the companies in the sector have any growth strategy for last five years?
9. Did the companies have any change in your organization such as, technological innovation style during this period?
10. Do you think companies have they ever received support from oil industry development institutions? If so what kind of supports?
11. Was it difficult for you to get access to new technology?
12. Do you think companies have concern and resources used for Research and Development section?
13. How about the international competitors, do you think they are effecting Mongolian industry growth?
14. Is there any government law which is effecting the oil industry development in Mongolia?

Table 3. 4 Introduction of the Interview 4

Name:	B.Ankhubayar , Head of Regulatory Authority of Oil Policy Implementation
Company name	Ministry of Mining and Heavy Industry, Oil Department
Date:	26 of November , 2019
Time:	11:30 pm

Source: The Author

Questions:

1. What the main product or service of the oil companies in Mongolia are providing?
2. What is your own position in the ministry?
3. In case of Development what kinds of problems does the oil industry companies in Mongolia face?
4. Do you think policy making is key factor for oil industry development in Mongolia? Why
5. Do you think technological innovation is key factor for oil industry development in Mongolia?
6. In which sector does company operating in?
7. Are there any other factors which you think affecting development of oil industry in Mongolia?
8. Which are the key problems which are effecting oil industry development in Mongolia?
9. How do you see the solutions to overcome these problems?
10. Does the ministry have any growth strategy for last five years?
11. Did the companies in oil industry have any change in such as, technological innovation style during last five years?
12. Was it difficult for oil companies to get access to new technology?
13. How companies have concern and resources used for Research and Development section?
14. How about the international competitors in oil industry, do you think they are effecting Mongolian industry growth?
15. Is there any government law which is effecting the oil industry development in Mongolia?

CHAPTER FOUR DATA ANALYSIS

4.1 Interview with Mongolian Government Mineral Resources and Oil Authority Agency

Table 4. 1 Introduction of the person interviewed

Name:	A.Purev, Senior Analyst responsible Mongolian Government Mineral Resources and Oil Authority Agency
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Source: The Author

First of all the mentioned the about the pressing issues for the Mongolian Oil Sector Development from his professional point of view. For his opinion policy making and technological innovation are considered to be most important then in addition transportation and logistics issues are addressed.

For the first interview with Mongolian Government Mineral resources and oil authority agency, I had discussion with Mr.A.Purev who is a senior analyst at the agency according to his interview our first hypothesis has supported.

H1: Policy making has positively significant related to oil sector development.

Policy making

Mr.A.Purev who is a senior analyst at the agency mentioned that he agreed policy development and implementation are priority issues in oil sector. For example, the revised law of oil is aimed at adjusting the state policies on oil sector which will be followed until 2027 with the state policies on mineral sector, and solving many other sectorial problems. In 2016, two years after implementing this law, The Law of Development policy and planning was adopted. In other words, the accountability of developing and approving the oil sector policies in compliance with the Law on Development policy and planning was levied on the Ministry of Mining & Heavy Industry. Then In June 2018, the Government drafted a policy on the development of the oil sector and was approved by the Government Resolution 169 of June 6th. The policy will be implemented until 2027.

The benefits of the state policies on oil sector were already seen. In the policy, there are certain provisions regarding preparation of human resources and labor, advancing and specializing

skills, and increasing jobs. The following policy is implemented in regards with the oil sector production development:

- Establishing state-owned plant which processes the oil extracted from the territory of Mongolia;
- Promoting oil product manufacturing which meets the quality and standard requirements by using internationally patented technology;
- Integrating production of coal and coal-fired fuels with the policy on oil products supply;
- Supporting research, analysis and production of liquid and gas fuel processing from the non-traditional oil sources / coal methane, shale, natural bitumen, oily sand/;

He answered some effective state policies on oil sector that led so far. He pointed out; there has been a considerable progress in terms of staffing. Policy activities such as sending students to India and Australia for oil studies with scholarships are being implemented. In the framework of this program, the number of foreign workers has been significantly reduced in recent years and implementing 50:50 quota in case the total number of Mongolian workers is above 201. “Petro China Dachin Tamsag” LLC, “Donshen Oil Mongolia” LLC and other exploration companies are maintaining the domestic workforce for the 50%.

From the interview with Mr.A.Purev who is a senior analyst at an agency, according to his interview, our second hypothesis was supported based on the information we collected from the interview.

H2: Technological innovation has positively impacts on oil industry development.

Technological innovation

Mr.A.Purev who is a senior analyst at the agency continuously mentioned that the 21st century is a century of technological innovation. Technological innovation, therefore, is obviously one of the main forces influencing the oil sector to develop rapidly.

In our country, the following works are being carried out currently: ensuring the safety of oil product distribution facilities through introducing innovative technologies and equipment, and making oil sector into an integrated base and monitoring the operation with the electronic system technology.

4.2 Interview with Ministry of Mining and Heavy Industry, Oil Department

Table 4. 2 Introduction of the person interviewed

Name:	B.Ankhbayar , Head of Regulatory Authority of Oil Policy Implementation
Sector name	Ministry of Mining and Heavy Industry, Oil Department

Source: The Author

At Ministry of Industry there are three to priority including heavy industry, light industry and small and medium business enterprises. Heavy industry includes oil production, coal chemical production, coke chemical production, copper smelting, and steel production and cement industry.

From the second interview with Mr. B.Ankhbayar, Head of Regulatory Authority of Oil Policy Implementation at Ministry of Mining and Heavy Industry, Oil Department our first hypothesis has supported.

H1: Policy making has positively significant related to oil sector development.

The main role of the Department:

- To ensure the execution of law on oil, standard, charter, guidelines and other relating laws and legislations, and decisions of the Government and State Central Administrative Bodies,
- To monitor the operation of oil deposit exploitation and measurement, storage and transportation of raw oil of the Government of Mongolia,
- To make professional conclusions for reviewing and verifying the investment and recoverable costs of oil exploitation and mining operations,
- To organize transferring deposit to commencement,
- To intensify the oil deposit exploitation and implement policy to increase mining,
- To study and review the reports and materials related to oil exploitation and mining activities, and make recommendations and conclusions,
- To develop and approve operational regulations, rules and standard regarding oil, and provide legal support to enforce them,

There will be many difficulties to conduct these activities. Submitting rules of procedure to the oil sector companies and monitor them is a major challenge.

Policy making

B.Ankhubayar, Head of Regulatory Authority of Oil Policy Implementation stated that let me discuss about the policy of Mongolian Oil Sector in more details. Policy development is, of course, one of the key factors that influence the MOS development and also overall development of Mongolia. The government has been enforcing law on oil sector starting from 2017. The policy reflected the following issues: to create a national oil industry foundation through ensuring national and economic security of Mongolia, intensifying the exploration activities in the strategically important oil sector, increasing the reserves, boosting mining, supporting regional development, establishing oil processing plant, constantly supplying the oil demand and strengthening the human resources capacity.

Within the framework of the state policy towards oil sector, several works have been conducted and started to give their benefits. The new oil plant is planned to be commissioned in the first quarter of 2023. It is estimated that about 600 jobs will be created. A Memorandum of Understanding with EIL stated that their technical staff will come after the plant is built and lead the plant for about one year until the plant operation is stabilized. The memorandum of understanding also mentioned about training Mongolian workers. The engineers and technicians needed for the new plant will be studied in India. Well, so our oil sector has full potential to intensely develop and meet the domestic fuel demand.

From the second interview with Mr. B. Ankhubayar, Head of Regulatory Authority of Oil Policy Implementation at Ministry of Mining and Heavy Industry, Oil Department, our second hypothesis was supported based on the information we collected.

H2: Technological innovation has positively impacts on oil industry development

Technological Innovation

There are many technical and technological problems in our oil sector. Studying from the oil sector development of other countries, they developed more successfully because they implemented the technological innovation with large amount of investment and careful research & analysis in more reliable ways.

Mr. B.Ankhubayar, Head of Regulatory Authority of Oil Policy Implementation at Ministry of Mining and Heavy Industry, Oil Department explained why technological innovation has an impact on oil sector development. According to the interview, a new oil plant will be established in Mongolia with technical and economic indicators. According to the Feasibility Study, hydrocracking technology is considered to be the most appropriate for the plant. The feasibility study was monitored by the independent auditing of KT-Kinetics Technology Company of Italy

which is internationally accepted company that operates in the field of oil processing. This technology is little bit expensive, but flexible. To be more precise, it is possible to adjust which products and what volume to produce. It has an economic significance for that we can choose to produce more diesel fuel in this oil sector developing period and produce less oil in the period when the consumption of electric car is increased. In brief, it is possible to modify technological modifications in compliance with the consumer needs.

4.3 Interview with Shunkhlai Group

Table 4. 3 Introduction of the person interviewed

Name:	The General Engineer of Shunkhlai LLC Kh.Nerguibor
Company name	Shunkhlai Group

Source: The Author

Our company started its operation in 1993 as a car warranty repair service. At a time, car warranty repair was the most needed service sector which was something very new in Mongolia. It also brought a new standard in Mongolia. Currently, there are around 4000 workers. We are a big family that is consistently working for our company’s goals and objectives.

The main business activities of our company are import, storage, transportation and sales of oil products. Today, Shunkhlai LLC has over 90 gas stations in Ulaanbaatar and local areas, 8 oil product warehouses located in the main areas of supply, product delivery, the auto transportation base responsible for distribution and state accredited laboratory. In the progress of extending and developing these activities, there were many challenges found in the frame of state policies and company’s internal policies. This includes number of pressing issues such as need to stabilize the fuel price increase, technical and technological supply and safety, transportation issues and fuel tax etc.

From the third interview at The General Engineer of Shunkhlai LLC with Kh.Nerguibor we can see that our first hypothesis has supported.

H1: Policy making has positively significant related to oil sector development

Policy making

Generally, company creates plan, goals and objectives to determine the further operation and contribution of the business to the country’s oil sector. In correlation with this, the policy development is made in regard with the company’s internal operations and external environment. Therefore, policy development is definitely included in the key factors influencing the oil sector

development. In recent years, there have been many policy activities carried out in oil sector. One example is that the state policies started to be implemented in the oil sector. The oil importer companies are ready for cooperation in the framework of the state policies towards oil sector.

I think, in order to develop the overall oil sector progressively, the government needs to develop an integrated policy and implement it effectively. It will create an opportunity for Mongolia and its oil sector to get out of fuel dependency.

From the third interview with Kh.Nerguibor from The General Engineer of Shunkhlai LLC we analyzed that our second hypothesis has supported.

H2: Technological innovation has positively impacts on oil industry development

Technological Innovation

It is certain that without technological innovation and advancements, it is hard for any company to develop and be successful. Let share the experiences of our company. Our company is one of the top entities which operate in the field of importing and trade, warehouse bases and logistics services of oil products. We are recognized as the leading organization in the Mongolian oil sector and have been awarded as one of “The Top 100 National Entities” by the Government of Mongolia and General Department of National Taxation and “Best Reliable Tax Payer” in 2004-2008. We are leading our operation in the fields of gas stations, foreign and domestic trade and trade intermediary.

The main business areas of our company:

- Gas station planning
- Extension and assembly of oil warehouse
- Assembly of gas station buildings and construction
- Improvement of container, equipment and technological installations
- Measuring equipment supply, configuration and installation
- New technology research, transmission and installation
- Warranty repair service of gas stations, containers and equipment
- Electricity supply & assembly, electrical equipment installation

We earned a success of becoming the leading construction and assembly organization through extending our services in the oil sector, upgrading technical & technological innovation, and performing the construction & installation works conforming to the general and environmental protection provisions on gas station buildings & equipment stated in the international and Mongolian MNS 4628-98 standards.

We have 4 main Divisions consisted of young and highly skilled professionals:

1. Container, Equipment and construction Division
2. 2 container & equipment assembly brigades
3. 2 construction brigades
4. Operation & New equipment configuration and installation unit
5. Mechanical maintenance and call center
6. Electricity supply, electrical equipment assembly part
7. Information and Software Division

Shunkhlai Company’s technical & technological team consists of 1 Mongolian consulting engineer, 1 specialized engineer, 4 senior professional engineers, 10 professional engineers, other specialized and professional workers and technicians, and experienced repairers & electricians. With the skills of these people, we overcame our technical challenges, brought technical innovation and have been leading more creative development paths. We have been seeking a technological innovation in order to ensure safety of gas stations and deliver fuels in environment-friendly and customer-convenient ways. Currently, we are testing the new technologies imported from Russia which will fully-automate the gas stations. As a result, we achieved advantages that ensure safety of our workers and provide fast and reliable services which meet the customer needs and wants.

4.4 Interview with School of applied sciences at Mongolian University of Science and Technology

Table 4. 4 Introduction of the person interviewed

Name:	E.Bat-Erdene
School name	School of applied sciences at Mongolian University of Science and Technology Senior Professor in charge of Chemical Technology Department (PhD) Oil raw material researcher

Source: The Author

School of Engineering and Applied Sciences is a newly founded School at NUM as a result of NUM’s reorganization in December, 2013. SEAS adopted programs and curriculums related to Engineering, Technology and Applied Sciences from School of Mathematics and Computer Science, School of Information Technology, School of Geography and Geology, School of Biology and Biotechnology, School of Chemistry and Chemical Engineering, School of Physics and Electronics and School of Economics, which are constituted the previous organization of NUM. SEAS

consists of 4 Professional Departments and a number of Research Centers in order to fulfill research and education programs. SEAS hosted 114 faculty members including 18 professors, 30 associate professors, 53 teachers, 13 emeritus professors, departments' assistants, and the other part-time teachers and teaching assistants at the 4 professional departments.

From the last interview with PhD. E.Baterdene from School of applied sciences at Mongolian University of Science and Technology we analyzed that our first hypothesis was supported based on the information we collected.

H1: Policy making has positively significant related to oil sector development.

Policy making

E.Baterdene from School of applied sciences at Mongolian University of Science and Technology said that policy development is one of the key factors that influence the development of the Mongolian oil sector. He thinks it certainly is a vital problem which requires a solution. It is easy thing to draft policy and regulations on paper and approve them. In this question, he would like to address more about policy implementation, its effectiveness and practical importance and if it can be continued to be carried through. In Mongolia, the factor which negatively affected to the development of oil sector was that the government does not monitor the implementation, go for it and so it does not happen in practice.

For example, the projects and programs about the crude oil refinery plants have been discussed in the different governments. But, it is still not established and the main reason is because they did not decide the raw materials. Therefore, these great projects were left on the paper. Founding oil plant is not a job that can be done by timely populist promises. This time, they decided to establish the oil plant by the money which will be granted from India. Russia is more interested in giving than taking. And, China is willing to extract crude oil from our country. Therefore, the government should rely on the skillful scholars and find out our potential to produce products out of valuable oil that will be sufficient to cover all the domestic consumption and make the required research. Mongolia should consider the specifications of the raw materials when establishing the oil plant. In that way, we can study the physical and chemical properties of our national oil reservoir and determine the technological procedures for processing. It is not possible to bring any technology and construct the plant, because the chemical composition of our oil is different. The technological decision should be determined based on the composition and specifications of the oil. It should be tasked to the Mongolian engineers who are specialized in the field of oil & oil. The government should believe in Mongolian engineers and maintain its own patriotism. If they bring any equipment from somewhere and establish the plant, it will only be show and the plant will be

just an assembled building with unused equipment in it. In the end, the loan money from India will be worthless. Recently, there was shortage in fuel and its demand was increasing in the society, with that the discussion of the issue of establishing oil plant intensified again. I am cautious that it might be another political show.

From the last interview with PhD. E.Baterdene from School of applied sciences at Mongolian University of Science and Technology we analyze that our second hypothesis has supported.

H2: Technological innovation has positively impacts on oil industry development

Technological Innovation

In the interview, PhD. E.Baterdene from School of applied sciences at Mongolian University of Science and Technology was agreeing that technological innovation is the most important factor for oil sector development. Firstly, we should develop a policy and then we should develop technological innovation progressively. New, advanced international technologies should be introduced. Our country has 4 seasons and so the technological innovation should be made based on the study of weather and environmental aspects of the country. Improving the fuel quality and making additional technological changes are important. To be clear, it gets very hot on the soil during the summer and gets extremely cold during the winter in Mongolia and so we should find the technological innovation that fits our extreme climate conditions.

He continually mentioned the key challenges that influence the development of Mongolian Oil Industry. Fuel importer companies are promoting negative PR. Importer companies are influencing negatively in developing domestic industry and oil sector. To clarify, oil importing companies are putting their own interests first. The next obstacle is the issues of raw material resources and its quality. In order to process the raw materials, we need to conduct a careful research and analysis, because chemical composition which is contained in our country's crude oil is very high. Technological solution is a big challenge in removing the additional toxic chemicals.

CHAPTER FIVE_ CONCLUSION

5.1 Research Findings

According to the interviews, this study found out that development in oil industry depends on policy making and technological innovation. We have had interview with different key people from the oil sector to study key factors affected oil sector development. If we properly implement policy development and technological innovation in Mongolian Oil Sector, the sector development will be progressed faster.

There are the main influencing forces for oil sector development as mentioned above. There are 5 stages in the policy development.

- Determining the pressing issues
- Searching for the solutions and clue to resolve these issues
- Improving the legal environment
- Monitoring the policy implementation
- Introducing the policy results

Policy development will bring its benefits by implementing these stages. Therefore, if the specialists in charge of policy developing process and stages work with integrity and united purpose in the oil sector, the sector is ready for development. Also, they need to intensify the technological innovation then conducting research on new technologies that meet the international standard and solving the financial issue will be very significant.

The development of the sector is slowly moving because there are no delicate policies, especially policies directed to professional scholars and researchers from the government. Following that, there are also problems such as determining the raw material resources and industrial technological solutions etc. After adopting the law and legal regulations on oil sector of Mongolia in 2017, these issues are being resolved and entering into the development path now.

The state policy on oil sector has been implemented since 2017. As a result, new oil processing plant is under establishment now. Also, the works such as publishing of researchers' collective work and preparation of new labor force are being intensified. Here, we can see that all the groundwork for oil sector development is done and that is an important highlight. In recent years, many new technologies are being adopted relatively higher in the oil sector of Mongolia. For example, the technologies of the new oil plant are brought with the Indian government investment. The technology to fully-automate the gas stations is being tested currently. The technological

advancements such as performing analysis in the laboratory condition etc. are playing key role in the oil sector development.

To clarify, oil importing companies are putting their own interests first. The next obstacle is the issues of raw material resources and its quality. In order to process the raw materials, we need to conduct a careful research and analysis, because chemical composition which is contained in our country's crude oil is very high. Technological solution is a big challenge in removing the additional toxic chemicals.

We need to introduce technology which will process the raw materials in terms of raw material quality. To do so, we need to come up with the technology based solution based on the research works done by the professional scholars and researchers of the oil sector.

As we can see from the interview oil sector development depend on technological innovation and the policy making.

5.2 Suggestion for the Future research

It was difficult to infer accurate results when studies are too broad, especially when there are few variables to research. Future researchers also need to determine whether differences in previous research experience by the oil industry innovation and R&D are essential or can affect development. In addition, research should look at how the oil company's social reputation can affect development rates. Oil and gas is a high-technology industry, where companies, scientists, and engineers continually challenge the barriers of what is possible to find and produce energy. New techniques and technologies discovered through R&D have been vital in enabling the industry to meet global energy demand, and will continue to be vital as the industry overcomes current and future challenges.

One of the responsibilities of the research centers and universities is to research and work in these sections that they present policy to companies according to the present situation and lead them to the innovation but unfortunately something which we notice rarely in Mongolia and maybe they even do not. Exist is the part of research and even no connection between the oil industry companies and research institutions and Universities. There are many reasons for this like the lack of knowledge of people about this part, lack of research facilities and research funds for universities and lack of government attention to this part.

Future research is also necessary to determine whether external factors including corruption and government support can influence oil industry development. According to the interviews corruption has become part of the daily life of the people in Mongolia, especially in the oil industry.

It has turned into a tradition where someone should pay a certain amount of money to the government officials or other authorities to solve their problems. The one of the reasons for the increase of corruption. Government procedure which has made the work of the fraud people easier. There are special people who solve your problems in government offices. Most of the time they finish the procedure in lesser time and also it depends on the money you pay as more you pay faster you will get your problem solved. All the respondents have agreed that there are big margins of corruption in every sector of government in Mongolia and the company owners have also accepted that in many cases they bribe to get their work done.

In order to evaluate what has been said and to identify future needs for further study, it is crucial that you check at the literature regularly, particularly where conflicting evidence remains. It is likely that understanding these different oil industry development indicators will help to turn the oil companies around if problems arise this analysis of research should be more helpful assistance to oil company owner and other stakeholders.



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