Fostering Innovation Ecosystem in Mongolia: A Study of Mongolian Strategy and Policy toward Innovation

By

BATZEVEG, Oyu-erdene

THESIS

Submitted to

KDI School of Public Policy and Management

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For the Degree of

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This work is dedicated to my beloved parents and brothers

ABSTRACT

"*Mongolia is landlocked but not mindlocked.*" The wise words of economist and columnist Jargal De Facto have immensely reflected the current situation of technological innovation and entrepreneurship development in Mongolia. Mongolia is the 135th largest economy in the world with a GDP of 14.233 billion dollars. As for the nation with a unique history and a nomadic lifestyle, Mongolia has traditionally been reliant on the two major sectors for all its state existence which are agriculture and animal husbandry. Shortly after the declaration of democracy, several abundant natural resource deposits were found in the southern part of Mongolia known as the "Gobi Area", thus mining immediately became one of the top priority sectors for the Mongolian economy. At present, heavy industry including the mining sector is the major sector that contributes to GDP accounts for 38.2%, secondly service sector, retail trade 15%, and followed by agriculture 12.06%. However, more than half percent of the entire population is a vibrant youth aged around 18-35 years having a different and brighter vision to diversify Mongolia's economy. To reduce heavy dependence on the volatile mineral market and empower to nurture an effective innovation ecosystem to sustain employment opportunities, competitiveness, and generate innovation-oriented startups. This paper attempted to describe the current overview of the Mongolian Innovation Ecosystem by reviewing relevant policy documents, laws and regulations, articles, reports, and interviewing relevant officials of the ecosystem component.

Keywords: Innovation Ecosystem, National Innovation System, Startup, Entrepreneurship

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CHAPTER 1. INTRODUCTION

"*Mongolia is landlocked but not mindlocked*" (Helble, 2020). The wise words of economist and columnist Jargal De Facto clearly reflect the current situation of technological innovation and entrepreneurship development in Mongolia. The nation declared its democracy in 1991, after 70 years of rule under the socialist system, and progressed forward in the transition to the market economy. In the past 30 years, in the path of democratic capitalist development, there has not been much development in terms of greater economic opportunities, freedom or equality; thus, the country still needs to work to achieve global competitiveness.

1.1. Background

According to the World Bank, out of 213 countries, Mongolia is the 135th largest economy in the world with a GDP of 14.233 billion dollars. As a nation with a unique history and a nomadic lifestyle, Mongolia has traditionally been reliant ontwo major sectors for all its state existence: agriculture and animal husbandry. Shortly after the declaration of democracy, several abundant natural resource deposits were found in the southern part of Mongolia known as the "Gobi Area," and mining immediately became one of the top priority sectors for the Mongolian economy. At present, heavy industry including the mining sector is the major sector that accounts for 38.2% of GDP; secondly service sector, retail trade 15%, and followed by agriculture 12.06% (Asian Development Bank, 2020). However, the mining sector has an extremely small portion of the working force. While mining is important for the long-term development, there are needs for development in other industries to increase living standards sustain future development.

The Mongolian economy is not only dependent on the one major industry but also dependent on one major foreign trade counterpart. According to the Mongolian National Statistics Office (2021), Mongolia's top foreign trade counterpart country is China, with which trade accounts for 68 percent of Mongolia's total exports; therefore, the economy is vulnerable to both commodities price fluctuations and changes in the Chinese economy. For instance, due to the severity of the COVID-19, the Mongolian economy experienced a drastic decline by 5.3 percent in 2020, caused by the border closure with China

which was high pressure among crippled the mining-led economies, resulting economy of Mongolia hitting its worst occurrence since the early 1990s.

In addition, the weaknesses of Mongolia include its small population and geographic location. Currently, Mongolia has a population of 3.3 million inhabitants in a 1.5 million square kilometers territory. Simply saying, it has 15 times less people living in the land that is 15 times larger than South Korea. Even though Mongolia is a country with a small population, nearly 50% of the entire population resides within the capital city of Ulaanbaatar. Yet, the country competes with its two giant economic powerhouse neighbors, China and Russia. Mongolia has been aware of its proximity to these powerful nations and developed the s-called “third neighbor policy” to establish strategic partnerships with other countries such as the United States, Japan, and South Korea. Such diplomatic move reflects Mongolia’s persistent effort to gain opportunities for economic diversification and growth.

1.2. Problem Statement

As natural resources dwindle worldwide, countries with significant dependence on natural resources such as Mongolia might lose their competitiveness without effective development of value-added final commercial products or services, which could be the main source of increased revenue (Oyuntsetseg, 2009). Therefore, the new approach of Mongolia's economic diversification is to reduce dependence on the volatile mineral market and nurture an ecosystem for innovation to enhance employment opportunities and competitiveness, generating innovation-oriented startups. Overall, for developing countries, studying the success cases of innovation/entrepreneurship ecosystems in developed countries would help them build wider and healthier ecosystems in communities.

1.3. Methodology

This research attempts to explore the current condition of the innovation/entrepreneurship ecosystem in Mongolia with the context of the current government policy and strategy through a qualitative method. This paper consists of two main parts. In the first part, the literature review provides theoretical background knowledge of the innovation ecosystem in the world and Mongolia's historical approaches to the innovation ecosystem. The second part describes the current overview of the Mongolian innovation ecosystem. The data was collected from both primary and secondary sources through relevant documents such as policy analysis, comparison of policy documents, research articles and interviews.

1.4. Purpose and Research questions

The main purpose of this research paper is to provide an overview of the innovation ecosystem in Mongolia. The following are the major questions to answer: What are the characteristics of the Mongolian Innovation Ecosystem, What are Mongolia's major policies and strategies to support innovation, and how effective are government policies?

CHAPTER 2. LITERATURE REVIEW

This part conducts literature review on existing studies concentrating on the origin and theoretical approaches of the innovation ecosystem, innovation ecosystem model development, and relationships between ecosystem stakeholders. Furthermore, it will briefly provide a historical perspective of the innovation ecosystem in Mongolia.

2.1. Theoretical perspective of the innovation ecosystem

The idea of the "National Innovation System" (NIS) first appeared in the context of industrial policy discussions in Europe around the 1980s. Since then, the "National Innovation System" approach gained its popularity in the international body of knowledge with promising influence. A number of international organizations including Organizations for Economic Cooperation and Development (OECD), European Union (EU) through the European Commission and World Bank have included the concept of NIS as an essential part of their analytic point of view (Lundvall, 2010). The concept of NIS framework is that the research system's ultimate purpose is to foster innovation in the process of an operating system which composes of factors including government, university, and industry and their transactional environment. The system consists of its actors, environments, relationships, and interaction among their characteristics. Thus, from the concept of "Innovation System" has emerged the concept of innovation ecosystem , which has been used recently in science and technology studies. The use of the concept became widespread after a Harvard Business Review articlewas published by Ron Adner (2006), which provides probably the most widely used and cited definition of innovation ecosystems:

> "*the collaborative arrangements through which firms combine their individual offerings into a coherent, customer-facing solution."*

Meanwhile Mason, C.& Brown, R (2014) updates the definition as the following:

> *"a set of interconnected entrepreneurial actors (both potential and existing), entrepreneurial organizations (e.g. firms, venture capitalists, business agents, banks), institutions (universities,*

public sector agencies, financial bodies) and entrepreneurial processes (e.g. the business birth rate, numbers of high growth firms, levels of' blockbuster entrepreneurship', number of serial entrepreneurs, degree of sell-out mentality within firms and levels of entrepreneurial ambition) which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment."

And the most recent definition ofInnovation Ecosystem has come from Granstrand & Holgersson (2020):

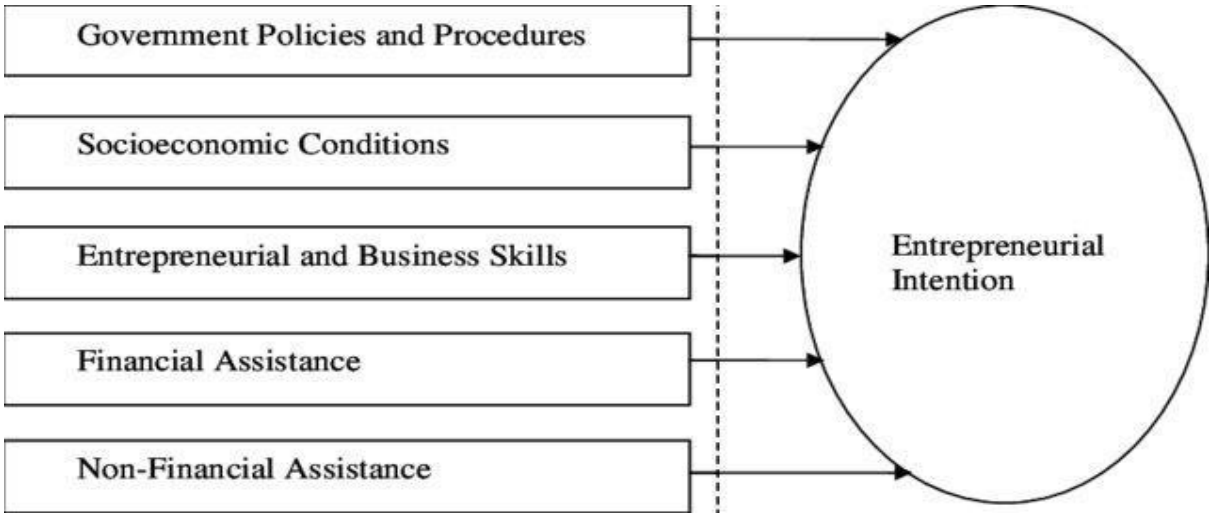
"An innovation ecosystem is the evolving set of actors, activities, and artifacts, and the institutions and relations, including complementary and substitute relations, that are important for the innovative perfor- mance of an actor or a population of actors."

Even though there are many definitions for innovation ecosystem, they have certain common characteristics. They all involve the creation, diffusion, and use of knowledge (Carlsson et al., 2002). Regardless of any definition, the essence of the innovation ecosystem remains as a foundation for the competitiveness of nations, regions, and industrial sectors. The main reason why many countries are devoted to fostering an innovation ecosystem is that they aim to practically respond to the "Fourth Industrial Revolution". Frey and Osbrone (2013) found that unemployment follows after a rapid technological leap, according to which idea, about 47% of all jobs in the U.S. are threatened by automation. Bowl supports this statement by his study which concludes that Europe will be at the risk of in-automation jobs varies between 40-60 percent; specifically, Southern Europe will be more affected by the automation wave. Therefore, in order to survive in a hyper-competitive economy and socioeconomic development, the capacity tosuccessfully bring innovation to the market is a crucial factor for strengthening competitiveness. Studies in developed countries have shown that the most efficient path to fostering innovation is building a strong connection between innovation actors. In another word, effective economic and industrial development are deeply connected to a nation's

capability to obtain, absorb and disseminate new technologies through a functional innovation ecosystem.

2.2. Entrepreneurial ecosystem models

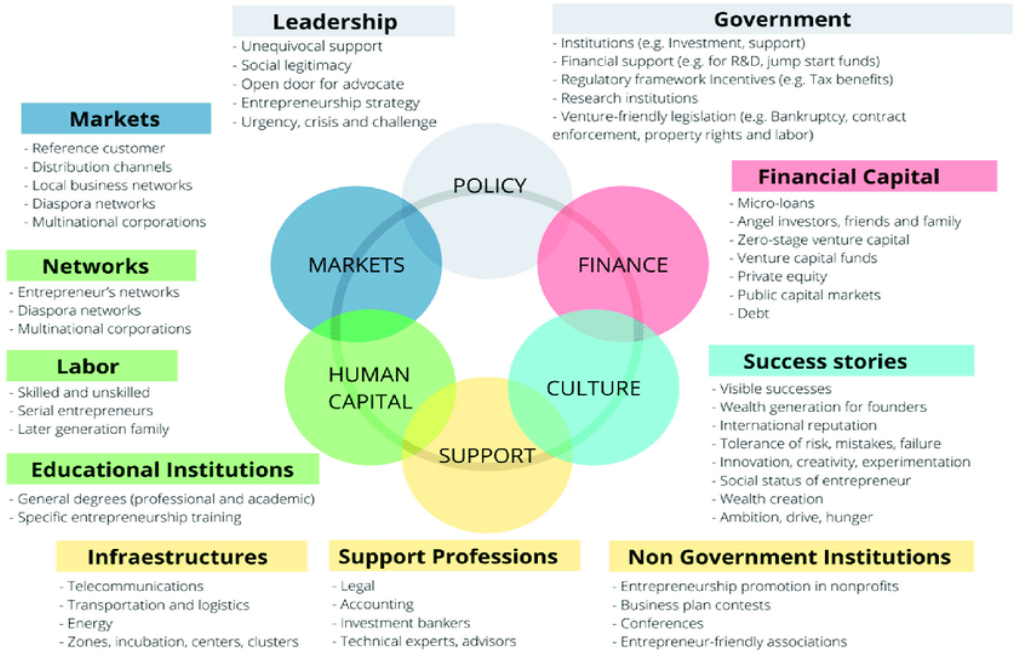
Currently, there are several models of entrepreneurial ecosystems that have been developed by different researchers. The earliest is proposed by Gnyawali and Fogel (1994) , who propose a theoretical framework categorizing by the environmental factors within five element and relationship with the five main components of the startup creation, which, comprises entrepreneurial opportunity, ability to enterprise, and propensity to an enterprise. Furthermore, they described the starting up process as the following. 1) the entrepreneurial opportunity2) the entrepreneur who embraces this opportunity3) the creation of start-ups, 4) the entrepreneurial capabilities (knowledge of economy, management, and technology) to run and manage his business. When these three conditions are intersected, there is a high likelihood of the person setting up the business. The process of setting up the business should be supported by environmental factors, wh9ch are (1) governmental support (policies, procedures), (2) socioeconomic circumstances, (3) entrepreneurial skills, (4) financial assistance, and (5) non-financial assistance. *(Figure 1)*



Source: Gnyawali and Fogel

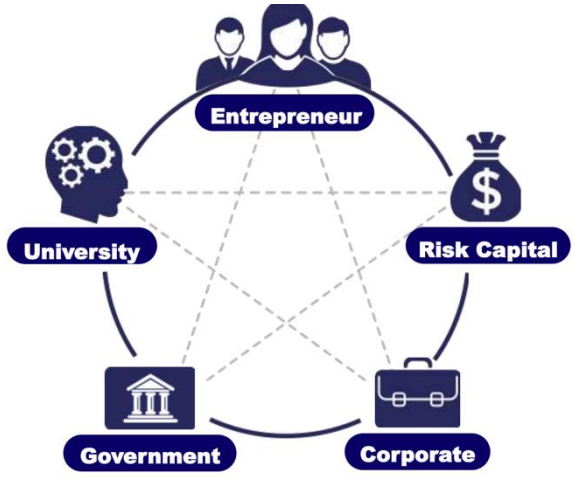
Another model with a distinguished approach has been constructed by Professor Daniel Isenberg at Babson College, who articulates his point as an 'entrepreneurship ecosystem strategy for economic development (Mason & Brown, 2014). Isenberg (2013) suggests the six key domains of the

entrepreneurship ecosystem which are also commonly utilized worldwide: (1) ***policy*** reform and incentive planning, (2) accessibility of ***finance***, (3) dynamic ***culture*** accelerating pro-entrepreneurship (4) strong ***support*** mechanisms strengthening the infrastructure, (5) ***human capital*** with entrepreneurship education, and (6) access to regional ***markets*** and multinationals (Figure 2). These six domains fracture into hundred small elements that interact in highly distinctive and idiosyncratic ways within the array of entrepreneurial activities. *(Figure 2)*



Source: Isenberg

In 2019, Dr. Phil Budden and Prof. Fiona Murray, professors at MIT Sloan School of Management analyze the world's most iconic innovation ecosystems that have been adopted by from ecosystems from Boston, Silicon Valley, through London and Israel, to Singapore and Shenzhen within a historical approach. The study showed that there are five critical stakeholders that lead to the successful creation, continuous growth and acceleration of the innovation-driven entrepreneurship ecosystem. The five stakeholders in innovation-driven entrepreneurship ecosystems are as follows: 1) entrepreneur, 2) university, 3) government, 4) corporate, and 5) risk capital. (Figure 3)



MIT's five stakeholders in an Innovation Ecosystem

The figure illustrates the demand for the 5 key stakeholders to contribute and collaborate with each other as a same community to have a thriving innovation ecosystem.

The authors (2019) also evaluate the existing literature of a variety of perspectives of which actor is crucial to boost economic growth or build an innovation ecosystem in the community. Most of the successful ecosystems in the industrial economy holding concept of cooperation between "industry" and "government," which resulted in industry-government collaboration that mainly focuses on military innovations and research and development. In the late 20th century, with the rise of the knowledge economy, a third stakeholder was involved:higher education institutions. This led to the "Triple Helix" [1] model representing the cooperation of "industry-government-academia". The innovation ecosystem model MIT professors have proposed goes beyond the "triple helix," reflecting the twenty-first century's facts. (There are obviously several other actors relating to socio-economy or political systems, such as trade agreements to legal institutions, the general public to the network and media.However, for the common purpose of enhancing innovation ecosystems, the same five remains showing up around the world as the necessary stakeholders.)

2.3. Stakeholders' role and relationship

The fast-changing environment of the rise of digital technologies created the debate on which stakeholders are key to the innovation ecosystem. For example, Josh Lerner (2012), the author of the

[1] "The **triple helix model of innovation** refers to a set of interactions between academia (the university), industry and government, to foster economic and social development, as described in concepts such as the knowledge economy and knowledge society." (Wikipedia)

book Boulevard of Broken Dreams, argued that while the government can put the efforts to maximize the environment for entrepreneurs to create the conditions for successful innovation-driven growth, government cannot lead such efforts. However, Brad (Feld, 2016) in his book "Start-Up Communities" gives another alternative approach of "Boulder Hypothesis":entrepreneurs who create innovation and make it commercialize are the only builders who can meaningfully lead a healthy innovation ecosystem because they are the ones who lead, not feed on, the innovation frontlines. Another interesting perspective by Mazzucato (2015) in the book "Entrepreneurial State" has illustrated examples of how the state (government and policymakers) has been playing a strong and central role in innovation. Many of the disrupted innovations are actually originated and developed by state projects such as the Internet, touch screen, SIRI (voice recognition technology). According to Mazzucato's approach, one could claim that the government is the central player in the innovation ecosystem. If we take a look at success factors of Israel, Tel Aviv's ecosystem, Israel's diversity brings people together from 70 countries have made Israel their home since its establishment in 1948 where they come from different backgrounds and experiences to foster a wealth of new ideas and solutions (Dan & Saul, 2009).

Silicon Valley, the world's best innovation cluster, is an exceptional case because it has a unique history. Various studies state that Silicon Valley is impossible to duplicate. Several different reasons are provided; for example, O'Mara (2006) states that Silicon Valley is difficult to be copied, due to the unrepeatable effect of the Cold War, political condition in has shaped the American governance system, market mechanism and educational institutions. She also adds that the well-formed business culture, as well as proximity to higher education institutions, had contributed to a vibrant innovative community in the Valley. Nowadays, Boston has more than 85 universities, and Beijing has more than 90 higher education universities; therefore, educational institutes are considered to be significant players for the modern innovation ecosystem. Cai, Ma, and Chen (2020) also supported the statement, and elaborated that the universities have three roles in the innovation ecosystem: major players in the technology transferring process, builder of trust between actors in the ecosystem, and institutional entrepreneur in the society.

To summarize the global literature, scholars debate on which actor has the strongest influence on the innovation ecosystem. Any ecosystem has a fundamental hope to expand the capabilities of every single stakeholder and turn knowledge into innovation in collaboration with other stakeholders. In this context, it becomes highly important to study the relationship between those actors. Certainly, an effective innovation ecosystem all around the world has been formed in its unique way; yet, several common characteristics have been agreed upon by researchers. First, the high quality of higher education institutes has a significant influence. Second, the proper regulatory support (funding and regulatory assistance) from the state is essential. Third, commercialization in the industry is important.

CHAPTER 3. MONGOLIA'S STUDY TO INNOVATION/ENTREPRENEURSHIP ECOSYSTEM

The World Bank published "Innovation Policy: A Guide for Developing countries" in 2010. The study states that the main goal of developed countries nurturing an innovation ecosystem is maintaining an already-established level of competitiveness and growth, while developing countries try to fill the gap of development in a short period of time by introducing pragmatic innovations based on a functional innovation ecosystem befitting country's profile. A developing country's ultimate goal for creating technological innovation is to "catch-up"[2] with other economies as fast as possible. To this end, developing countries should embrace the common challenges that they are facing. For post-communist economies (former socialist countries before the 1990s), Mongolia in particular, the concept of innovation is comparatively new, introduced in the mid-2000s, and the understanding of the innovation processes is still somewhat limited.

[2] The **catch-up effect** is a theory that all economies will eventually converge in terms of per capita income, due to the observation that poorer economies tend to grow more rapidly than wealthier economies. In other words, the poorer economies will literally "catch-up" to the more robust economies. The catch-up effect is also referred to as the theory of convergence. (Investipedia)

Mongolia is ranked 58th place among the 132 economies based on 8 indicators featured in the Global Innovation Index 2021. The indicators is as follows from the lowest to strongest: knowledge and technology outputs, human capital and research, infrastructure are under the regional average score and creative outputs, business sophistication, institutions, and market sophistication (Soumitra et al., 2021).

The percentage of total expenditure on research and development per GDP is 2.75% in the US, 2.4% in Finland, 3.1% in Japan, and 4.6% in South Korea. Meanwhile, expenditure on R&D only accounts for 0.2% of GDP in Mongolia, which is insufficient and lower than the average percentage of other countries (OECD, database 2019). According to international standards, if the indicator is less than 0.4 percent, it shows a slight effect in country's socio-culture; if this indicator reaches 0.8 percent, it shows show economic growth effect; and if it reaches 1.5%, the country would benefit from the investment of R&D.

As in the case of Mongolia's innovation activities, numerous researchers agree that the terms "innovation" and "innovation ecosystem" are often used by science and technology studies. The very first initiative to create an innovation ecosystem in Mongolia occurred during the socialist era of 1944. With the establishment of the first higher education institute, "The National University of Mongolia" in 1942 and the establishment of "Mongolian Academy of Science and Technology," the first system was developed and improved in 1960, 1970 and used until 1992 which includes functions of inventing, registering, transforming knowledge into the industry and diffuse the "invention, and innovative idea system" /Shine Buteel Onovchtoi Sanaachlaga/. (*Figure 4*)

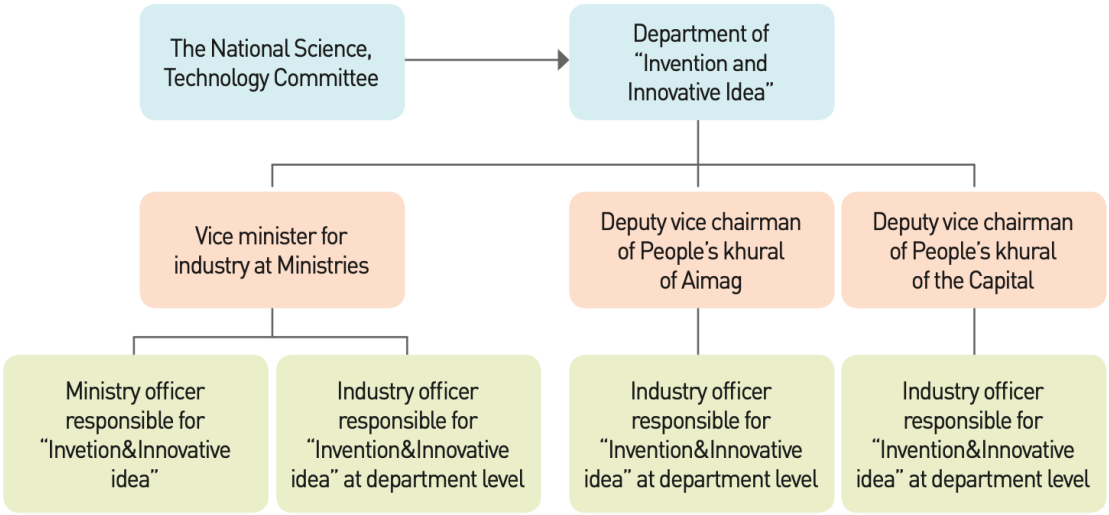


Figure 4. "ShBOS" framework for creation, registration and diffusion of inventions

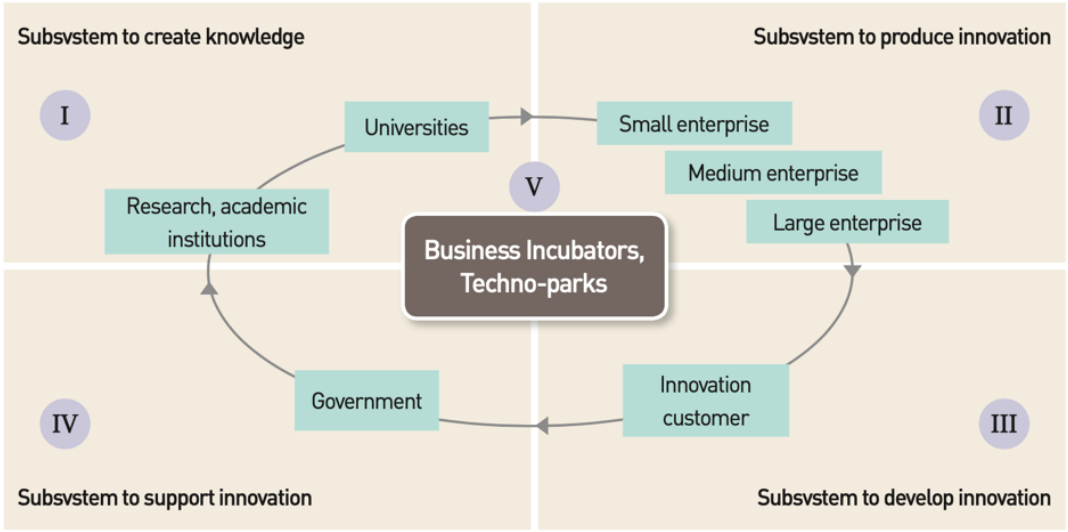
Source: Government of Mongolian People's Republic 1987

The second attempt to develop NIS in Mongolia was "Millennium Development Goal-Based Comprehensive National Development Strategy" from 2007-2021. Mongolia has chosen a democratic path to enhance its competitiveness by acquiring science and technology capacities, developing an innovation-driven system, domesticating advanced foreign technologies, and through local research and development approachesstated to achieve the seven sub-goals from 2007 to 2021 (State Great Khural, 2020). Such efforts for developing NIS continued with the "Vision 2050," Mongolia's long-term development policy adopted in 2019. It sets a goal for creating NIS by fostering employment opportunities and competitiveness, supporting startup businesses, and fostering a knowledge-based economy through an effective entrepreneurship ecosystem.

During the period between 1966 and 1992, a total of 17,000 "inventions and innovative ideas" were registered; however, less than 1,000 were patented. Nevertheless, each "invention and innovative idea" was more or less introduced to the public, consumed, and benefited to a certain extent. On the other hand, less than 1 percent of the more than 5,000 patents for inventions registered between 1993 and 2019 entered production and made profits. This fact indicates that the cooperation between the

elements of knowledge creation and application of knowledge in the innovation system of Mongolia has been interrupted.

As for the academic studies of NIS in Mongolia, research by Dr. Oyuntsetseg (2009) has had a significant impact on NIS principles' model, prerequisite conditions, and the emergence of developing Mongolian NIS. She illustrated cases of the triple helix model which exposes the idea of "government-academic institutions- industries" cooperation (Ranga & Etzkowitz, 2013). "The Quadruple Helix" expands the triple helix model by adding the fourth stakeholder the "civil society" to define the interrelationships between those four stakeholders (Carayannis et al., 2012). The model proposed by Dr. Oyuntsetseg suggests adding the fifth element of "innovation infrastructure" in the Quadruple Helix model to support innovative activities among the elements. (*Figure 5*)



Source: L.Oyuntsetseg

Dashdondov, B., Nergui, S., Choimaa, L. & Zundui, Ts (Batkhuyag Dashdondov et al., 2015), the professors of National University of Mongolia, conducted a survey to evaluate the readiness level of Mongolian NIS with the perspective of base innovation model with five elements: innovation culture, law and regulation, talent, capital and, density. In a result, they found thatthe NIS of Mongolia is incomplete and not operating properly due to the weak connection, interaction and, missing actors of

NIS. Dashdondov et al., stated that the only well-functioning innovation-oriented sector is the ICT sector, and the ecosystem actors of this sector are comparatively sufficient. Thus, the ICT sector will be able to pioneer the NIS by building digital infrastructure, developing ICT products, and nurturing a culture of using new digital technologies. Afurther additional study was conducted by researchers of MIT, Ong, L. & McKnelly, M. (2016), whocollected data from interviews with 89 people and from 83 companies to form to analysis within the existing entrepreneurial ecosystem in Mongolia. This research utilized the stakeholder model as mentioned in the previous chapter to examine the innovation environment in Mongolia. Their study also concluded that entrepreneurial culture and startup community have been growing rapidly; yet, dynamic government support, financing opportunities, and strong innovative universities are in great need to be strengthened as active players in the ecosystem. The most recent study of the entrepreneurship ecosystem in Mongolia has been surveyed by the United Nation Development Programme in Mongolia (UNDP, 2018)), where the following 11 key findings were identified:challenges around the concept of entrepreneurship to the low to medium enterprising tendencies, lack of practical entrepreneurial skills, limited networks, teacher-focused conservative education system, concerns with trust, and failure, generational mindset gap, capital accessibility, unsupportive legal environment, and government.

3.1. Laws and regulation related to innovation

The Mongolian Government is gradually developing and implementing policies and legal documents to establish and nurture the innovation ecosystem, and making some necessary amendments to the policy documents. The following table lists of relevant policies and legal documents since 1992, and demonstrates how the provisions in the documents are related to the innovation system and activities. *(Table 1)*

№	DATE	NAME OF POLICY AND LEGAL DOCUMENT	RELATEDNESS TO INNOVATION
1	**Government Strategy**		
	1994	Mongolia National Security Policy (2011)	direct
	1994	Mongolia's Foreign Policy (2010)	direct

	1995	The concept of establishing a free economic zone in Mongolia	indirect
	1996	Mongolia's Development Strategy (expired accordingly with order#19 by Parliemant in 2016)	indirect
	2001	Mongolia's Regional Development Concept	indirect
	2016	The concept of sustainable development of Mongolia 2030 (expired)	direct
	2020	"Vision 2050" Mongolia's Long-term Development Policy	direct
2	**Government Policy**		
	1996	Government policy on Culture (2014)	direct
	1998	Government policy on Science and Technology (2017)	direct
	2003	Government policy on Food and Agriculture (2015)	direct
	2008	National development policy of Mongolia based on the Millennium Development Goals	direct
	2010	Government policy on High-Technology industry	direct
	2014	Government policy on Mineral Resources	direct
	2014	Green Development Policy	direct
	2015	Government policy on Trade and Industry	direct
	2015	Government policy on Energy	direct
	2017	Government policy on Information Technology, Communication development	direct
	2018	Government policy on Innovation	direct
	2018	Three-pillar development policy	direct
3	**Laws**		
	1993	Law on Patent (2006)	direct
	1993	Law on Copyright and related rights (2006)	direct
	1993	Law on Competition (2000,2010)	indirect
	1998	Law on Technology Transfer	direct
	1998	Law on Science and Technology (2006)	direct
	2002	Law on Higher Education Institutes	indirect
	2003	Law on Trademarks and Geographical Indications	direct
	2012	Law on Innovation	direct
	2013	Law on Investment	direct
	2015	Law on Production Support	direct
	2020	Law on Intellectual Property	direct
		Tax Package Laws	direct
		Other laws with additional provisions under the Innovation Law	direct
4	**Procedures**		
	2014	Procedure for implementing Science and Technology projects	direct

	2014	Procedure for establishing a Start-up company at a Research institution	direct
	2015	Procedure for privatization and possession of intellectual property created as a result of research work funded by the government	direct
	2018	Procedure for National Incentivizing of Innovation	direct
	2018	Procedure for Awarding grants to participants in Innovation activities	direct
	2018	Procedure for efining Innovation priorities	direct
	2019	Procedure for Innovation project registration	direct
	2020	Innovation Priorities 2020-2025	direct
5	**National Programs**		
	2007	Master Plan for the Development of Science and Technology of Mongolia for 2007-2020	direct
	2019	National program for Human Resource developmemt for science, technology and innovation sector 2019-2023	direct
	2020	National Program for Nurturing Innovation Ecosystem 2020-2024	direct

Generally, the basis of the innovation policy is in line with the development policy, and the ways to implement it are reflected in the Master Plan for the Development of Science and Technology of Mongolia for 2007-2020. Therefore, in order to evaluate the implementation of the policy, it is necessary to consider the implementation of this document in terms of the issues raised, its solutions or goals, objectives, directions, and activities to implement the strategies to achieve them, and its evaluation criteria. As can be seen from the table above, the policy and legal documents for establishing and developing an innovation system in Mongolia are divided into the *policy level*, *regulatory level* and *implementation level*. Currently, Mongolian policy and regulatory documents have been established and written well, but there are still no effective operating procedures at the level of implementation to enforce the provisions of the law. For example, the regulation of the procedure to assist the implementation of the "Law on Innovation" has been enacted two years after the adoption of "Law on Innovation." This backwardness demonstrates the decline in the level of leadership in the development of public policy and decision-making at the level of the state central administrative body in charge of innovation and high technology. This has a negative impact on the participation and initiatives of the private sector, which is an important stakeholder in the development of the innovation ecosystem.

Mongolia is working to create a legal environment conducive to innovation, entrepreneurship, and high-tech start-ups. Yet, the implementation of the policy has not yet yielded effective results.

3.2. Innovation Ecosystem Map in Mongolia

The Government of Mongolia has drawn a innovation strategy divided into three stages: the long-term goal of 30 years, the medium-term goal of 10 years, and the short-term goal of 4 years with specific patterns. For the short-term goal, the government needs to overcome the challenge of revising the repeated ideas, loss, and inconsistency of goals, objectives, and activities between strategic documents by 2024.

Currently, the government of Mongolia has two main strategic documents to develop a national innovation ecosystem. 1) The Master Plan for the Development of Science and Technology in Mongolia for 2007-2020 has 4 goals for innovation development strategy and 23 activities to implement. 2) In Vision 2050, the National Program for Nurturing Innovation Ecosystem has 8 goals with 39 activities, while the revised program in 2020 has 3 goals and 11 activities planned accordingly. The essence of the successful implementation of these innovation strategies is to raise public awareness of innovation.

This section outlines the current map for the Mongolian innovation ecosystem based on previous studies. The key players in Mongolia's innovation ecosystem are as follows. *(Table 2)*

REGULATORY INSTITUTION	FINANCIAL INSTITUTION	KNOWLEDGE INSTITUTION	INCUBATORS AND ACCELERATORS	PRIVATE EQUITY FIRMS
The President of Mongolia	Development Bank of Mongolia	National Science Technology Academy	Extension centers	Industrial clusters
The Parliament	State Special Funds	Universities	Technology Transfering Centers	Economic clusters
The Government of Mongolia	SMEs development fund	Research institutions	Incubators	Corportations
Parliamentary Standing Committee on Innovation and e-Policy	Mongolian Stock Exchange	Technical Vocational Education Trainings	Co-working spaces	Trade Industry Chambers
Innovation Council	Commercial Banks	R&D centers	Accelarator Programs	Professional Associations
Intellectual Property Council	Non-banking financial institutions	Research labrotories	Innovation hubs	Startup Companies
Mininistry of Tourism and Environment	Science and Technology fund	Student Clubs	Science and Technology Parks	
Ministry of Foreign Affairs	Venture Capital Firms		Technopolis	
Ministry of Education and Science	Corporation Innovation funds			
Ministry of Mining and Heavy Industries	Private Investors			
Ministy of Food, Agriculture and Light Industry	Angel Investors			
Ministry of Energy				
Ministry of Health				
Ministry of Digital Development and Communication				
National Development Agency				
Intellectual Property Office				
Financial Regulatory Committee				

CHAPTER 4. RESEARCH METHODOLOGY

In this section, data and information were collected by in-depth interviews, which used an online one-on-one interview methodology with stakeholders regarding the current state of the Mongolian innovation ecosystem mentioned in the previous chapter. The survey has covered a total of 14 participants, including 2 policymakers, 3 knowledge institute representatives, 4 startup business founders, 3 community builders, and 2 investors; each interview took an average of 40-50 minutes and included Q&A sessions with directing questions with clarifications. The format and duration of the interviews are attached in the table below. *(Table 3)*

PARTICIPANT CATEGORY	PARTICIPANT CODE	ORGANIZATION	INTERVIEW FORMAT	DURATION
Policy makers	P1	Ministry of Education, Specialist at Innovation Department	Online	34 min
	P2	National Information Technology Park	Online	44 min
Reseachers	R1	National Univ of Mongolia, School of Business	Offline	75 min
	R2	National Univ of Mongolia, School of Applied Science	Offline	45 min
	R3	National Univ of Science and Tech	Online	51 min
Entrepreneurs	E1	Ihotel LLC	Offline	120 min
	E2	Hello Baby LLC	Offline	47 min
	E3	Yazguur LLC	Online	38 min
	E4	Mayara Mongolia LLC	Offline	68 min
Community builders	C1	Startup Mongolia	Offline	80 min
	C2	HUB innovation center	Online	40 min
	C3	Student-Entrepreurs club	Online	32 min

The following guiding questions were asked in open-ended, in-depth interviews, and the collected data was processed in sequence. The script of each interview was recorded, typed, and read in detail, and the ideas were confirmed and summarized from the second sources. Various suggestions and ideas have been raised in regard to the challenges in the innovation ecosystem, so we have grouped them into the following components: the involvement of **regulatory institute**, **financing situation,**

knowledge institutions, the participation of the **private sector**, the, **community builders**, **,** and **human capitals**. The directing questions used in the in-depth interview are attached below. *(Table 4)*

Directing questions

1	Regulatory institution	1.1	What is the government's policy to create an innovation environment and support innovation, how effective are they?
		1.2	How do you rate innovation policy and its sustainability?
2	Funding	2.1	What are the conditions and opportunities for R&D and start-up financing?
		2.2	What are the available sources of financing for start-ups?
3	Knowlegde insitution (Universities)	3.1	What role should universities play in creating innovation? The current situation in terms of research and development.
		3.2	What role should universities play in creating innovation? The current situation in the field of human resource training.
4	Community Builder	4.1	About organizations and their activities aimed at developing start-up businesses to nurture an innovation culture.
		4.2	How are innovations and startup culture being disseminated and made public?
5	Private equity companies (Corporation and Startups)	5.1	How are corporations involved in the innovation ecosystem?
		5.2	The current state of start-up business quality? What are the achievements and challenges they are facing today?
6	Entrpreprenuers (Human Capitals)	6.1	How sufficient and qualified are human capitals in the field of innovation?
		6.2	What are the overall barriers and challenges for its development?

4.1. Regulatory institution

There are numerous national laws directly and indirectly related to innovation and entrepreneurship in Mongolia, as seen in the *Table 1*. The most relevant one is *Law on Innovation* (State Great Khural, 2012) which has addressed the issue of promoting innovation and entrepreneurship for the first time. Mongolian government approved "National Program for Nurturing Innovation Ecosystem" in 2020 within the array of "Government Action Plan 2020-2024". Still, there is no central ministry or administrative body for specifically technology-oriented startups, or innovations, and for promoting entrepreneurship; however, the central administrations for those operations include *Ministry*

of Education and Science (MoES), *Ministry of Labor and Social Protection* (MoLSP) for entrepreneurship; *The Ministry of Food, Agriculture and Light Industry* (MoFALI) for SME business development and Communications Information Technology Authority (CITA) for technology infrastructure; *National Information Technology Park* (NITP) for incubating.

The Ministry of Labor and Social Protection is a lead ministry for policymaking and implementation of employment policies in Mongolia. The MoLSP has been an active player in promoting entrepreneurship in the last 5 years in collaboration with *the Swiss Agency for Development and Cooperation* (SDC), GFA Consulting Group to implement the "Youth Employment Promotion Project" (YEPP), including "Youth Startup Program" (YSP) (The Ministry of Labor and Social Protection, 2017). Likewise, *The Ministry of Food, Agriculture and Light Industry* (MoFALI) is at the center of policy making and the implementation of policies on SME development in Mongolia. The MoFALI has been implementing projects relevant to the accessibility of funding, skill training, and women empowerment in the business sector. A joint initiative between the *Government of Mongolia*, , the *Mongolian National Chamber of Commerce and Industry*, the *Mongolian Union of Employers also* local commercial banks was established the "The Loan Guarantee Fund" of Mongolia in 2012, and set a goal of simplifying the procedure of lending for micro-businesses and startups. The Communications and Information Technology Authority (CITA) is a regulatory agency for ICT sector, providing ICT infrastructure in Mongolia (upgraded as Ministry of Digital Development and Communication in 2021). CITA has launched "E-Mongolia" project to practice e-governance, and eliminate bureaucracy in government services in 2019to provide 181 government services through mobile application and website (CITA, 2020). E-Mongolia assists local entrepreneurs by easing business registration and licensing processes, which is originally complex and time-consuming. CITA deals with several projects to improve citizens' education for digital environment and personal information security, and increase internet-based goods and services cooperating with World Bank and other international organizations. CITA also hosts annual ICT Expo to achieve its goal toward Digital Nation.

Based on the interview with participant from NITP, the most committed effort made by the Mongolian government to address technology-based innovation and entrepreneurship is arguably an initiation to establish the “National Information Technology Park” (NITP). The NITP was founded in 2002 in cooperation with the Government of the Republic of Korea. NITP offers a business incubator program annually by recruiting IT companies with innovative ideas and unique value through a pitch competition. Within the business incubator program, NITP offers discounted co-working spaces for up to 2.5 years and a variety of technical and business skill training opportunities. All activities of the business incubator program are associated with R&D, registering and protecting intellectual property, developing technologies in-house, and hosting sessions for management development. Moreover, NITP hosts a monthly product development pitch competition called “Silicon House” for potential investors. The winning teams are awarded by Tech Ger Founders Space, a pre-accelerator program. All of the activities of the NITP are designed to emphasize the state's role in fostering entrepreneurship and the innovation ecosystem (NITP, 2021).

A specialist from the Ministry of Education and Science of Technology claimed that the government has actively initiated policies and programs to form the innovation system by updating S&T plans or projects and reforming higher education towards an R&D focus; however, although laws can be written well, the real challenge is that there is a large gap between initiation and implementation. Also, he stated that “the most urgent activity is to develop innovation ecosystem and establish open database for every participant of innovation activities. Through this open database, it is easy to check who is doing what, what opportunities are available, what laboratories and types of equipment are available, and what knowledge and patent are registered by whom, etc. There are several cases of attempts to register already existing inventions due to the lack of information and data, thus an open database is necessary as a significant infrastructure for innovation actors.”

4.2. Financial Institution

At the moment, there are few high-risk venture capital firms actively operating in Mongolia, specifically for high technology startups and entrepreneurs. The venture capital industry is basically not

developed in Mongolia, and the startups usually get funded by private investors for seed round and selected to publicize their activities (E1, E2, E4). Some government and project funds are available for micro-businesses; however, it is not strongly accountable and inclusive of the distribution mechanism of those funds due to the lack of public confidence in procurement procedure. Commercial banks and non-banking financial institutes offer loans with interest rates of around 16-22% for SMEs, and most require at least one year of history and immobile assets as collateral. Such conditions of financial support make startups obtain funding. In fact, funding is the major challenge for startup initiation and growth. There are several options for funding available, as described below. *(Table 5)*

№	SOURCES OF FUNDING	DESCRIPTION
1	Venture Capital Firm	75% of the total interviewee consistently agree that the Venture Capital Industry has not been developed in Mongolia. Mongolia is ranked 86/125 countries for venture capital availability according to the Venture Capital & Private Equity Country Attractiveness Index (2019). There are a few circumstances that limit venture capital development: lack of knowledge of technology, digital education and success stories, and market size. In the recent five years, a few venture capital firms were established not only to invest in startups but also to offer incubation programs. (ex, Irbis Venture, Socratus Studio, Mstars)
2	Government funds	The government of Mongolia has established a budget for SMEs annually in accordance with the Law on Government Special Fund. The Law reflects the funding for Science and Technology and Innovative projects. However, the budget of this fund is also within the authority of parliament. The SME funds are not specifically designed for startups or entrepreneurs. (E2)
3	Commercial bank	Loans from commercial banks are a very common investment option for business holders. Currently, 14 commercial banks are operating in

		Mongolia which all offer business loans with around 16-22% annual interest rate (Bank of Mongolia, 2020). However, commercial banks are not likely to lend business loans specifically to startups with regard to their internal lending policy that lenders should validate as immovable assets such as real estate or valuable property. As a result, the fact makes interest expensive for businesses that need to work profitably to get loans from commercial banks.
5	Personal Funding/Angel investors	Due to the limited accessibility of bank and government funding options and the lack of development of VCs, entrepreneurs are forced to rely on personal savings or loans from their immediate family members. Occasionally, entrepreneurs get in contact with individual investors through their connections. All of the interviewees stated that they have experienced receiving investment from individuals in their early stages.
6	International Organization/ Grant aid	Due to the overall underdeveloped VC industry and business environment in Mongolia, foreign investors are not promising to foreign investors to invest in Mongolian startups businesses. However, there is a wide availability of international organizations, cooperation agencies' grants, and funds for supporting SMEs through their country offices or implementing units. For example, in 2019, the US government launched a 5-year, 15 million USD project called "Business Excellence for Sustainability and Transparency," in partnership with "Development Solution" NGO to increase access to financing for local entrepreneurs. JICA has ongoing projects in Mongolia such as (LAP) Loan Aid Project, (GAP) Grant Aid Project, (SME) Support for Japanese SMEs Overseas Business Development. The Asia Foundation has opened Women's

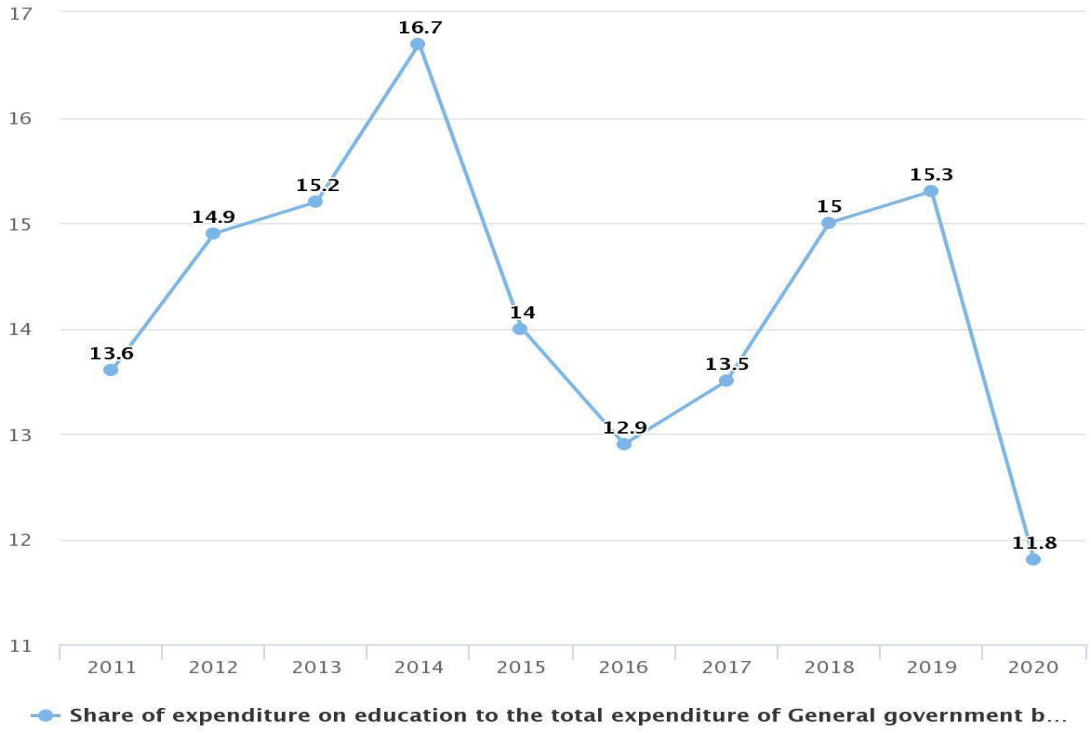
		Business Center with financial support from KOICA in 2016 and still operating efficiently to enable women's entrepreneurship, to improve gender equality in the business sector.

Overall, the most challenging hurdles faced by the entrepreneurs interviewed are the funding issues. In Mongolia, getting funding from commercial banks and non-banking institutes is costly, while opportunities from individual investors or venture capital firms are getting better. Mongolian economic conditions are not good enough to attract foreign investors; thus, foreign direct investment and attracting international venture capitalists could be achieved through effective government policies, improving educational quality and the capability of entrepreneurs, to help them pitch in front of an investor and allow for stronger liaison offices connecting innovative ideas and potential investor. As Mongolia is heavily dependent on the mining sector, until profitable new projects in the mining sector begin, investments for startup companies will likely remain low.

4.3. Knowledge institutions

Higher education institutes, especially universities, are the key players in the innovation hub and entrepreneurial ecosystem. Traditionally, universities serve as the powerhouse for generating well-educated human capital and skillful labor force for the economic growth for the country. However, in this technological age, universities have far more power to utilize their resources for promoting innovation and entrepreneurship in the community. Mongolian universities are still focusing on teaching and learning based on strong theoretical methodology and outdated curriculum. Yet, there have been efforts to reform the school system for better education quality to improve tacit knowledge.

Figure 5. Annual expenditure on education as a percentage of total government expenditure and GDP



Source: *National Statistical Office*

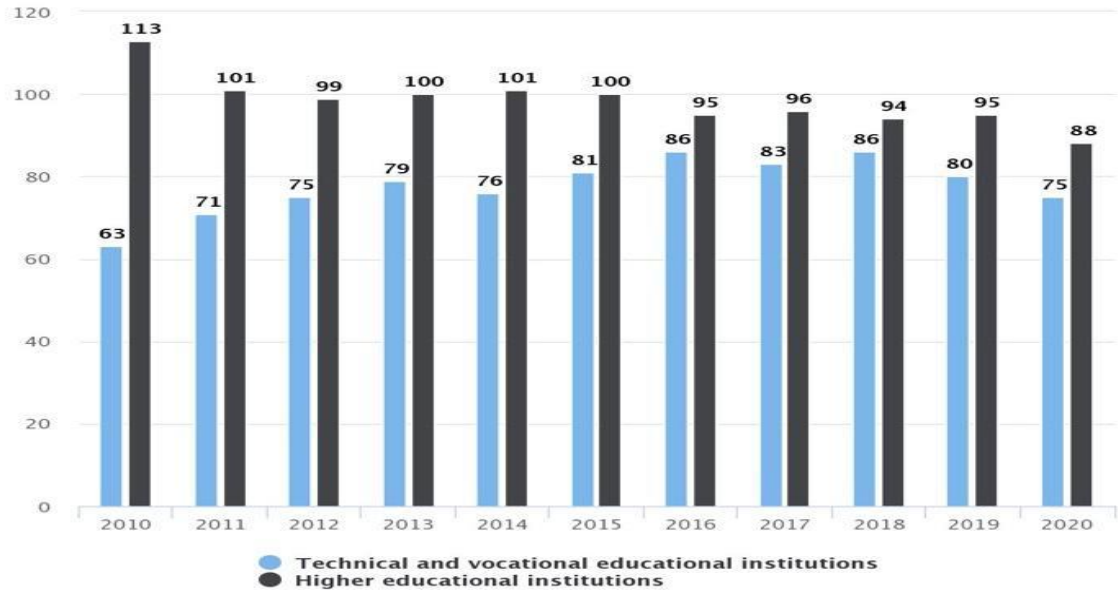
Since the establishment of a market economy, the Government of Mongolia allowed all institutions to conduct research activities. Even though Mongolia has a comparatively young R&D history, the country has practiced several reforms in the education sector to nurture the research and development capacities of higher education institutes. To bring the standard of the Mongolian education to the international level, the government changed the structure of the K-12 general schooling system a few times. For instance, it has changed a ten-year schooling system to the eleven-year and twelve-year schooling systems in 2004 and 2008 respectively. Since then, students can choose to enroll in either technical and vocational training institutes (TVET) or colleges and universities. Regardless, they need to pass a "national examination" in their respective fields of studies.

According to the Statistic office 2020, there are currently over 160 higher education institutions, which is less than 2010. This result was caused by the reform in the K-12 schooling system in 2008. The drastic reduction in admitting new students for higher education institutions provided certain

pressure on institutions with educational quality due to the tuition fees accounting over 60% of funds for public institutions.

Figure 6. Number of higher education institutions by year and by type of institution.

Source: National Statistical Office



Mongolian universities currently offer quantity over quality (R2). Employers in Mongolia tend to prefer employees experienced in computer skills, formal language processing, and practical office activities. This is due to the lack of practical, technical, creative thinking skills in higher education institutes. Mongolian universities started to make efforts to integrate research into their curricula. For example, the largest two state universities, National University of Mongolia (NUM) and Mongolian University of Science and technology (MUST), require thesis as a compulsory research project for graduation. Additionally, some students choose to practice in the laboratory for their bachelor's degree studies. More encouraging research example is that the New Mongol Institute of Technology requires master's degree candidates to publish an article in an international journal.

One reason for the challenge in developing the research capacity of higher education institutes is the limited amount of budget. The government funding level is lower than the international average.

The ratio of expenditure on education to the total expenditure of the general government budget in 2020 is around 15% (National Statistic Office, 2020). University professors and teachers apply to the science and technology fund to get project yet it is designed to be open for the public so that very competitive (R1, R2).

Universities also expand their activities outside the campus within the awareness of entrepreneurship; some university professors provide consultancy for government projects or aid with boosting innovation with an educational perspective. Universities are also engaged in organizing events. For example organizes "Mongolian Entrepreneurship Summit" and MUST organizes "Innovation Week" with relevant ministries and agencies. Through this expansion of universities, they also seek to include entrepreneurship elements in their main curriculum. The very first entrepreneurship adoption in the curriculum was the "Entrepreneurship 101" course offered by the collaboration of MUST and Startup Mongolia NGO. NUM has also begun to offer two new entrepreneurship courses called "Innovation and Entrepreneurship" and "Design Thinking." Additionally, Business School professors often invite guest lecturers from local companies to speak about their success stories. However, building an official entrepreneurship course has still remained challenging in the universities due to a lack of teaching materials (R1, R2, R3). Although adding entrepreneurship elements in universities is quite challenging, entrepreneurship centers are available at NUM and MUST. Those centers provide business consultancy and training programs, and support student's startup activities. Although it will be a matter of time before the effectiveness of such efforts can be evaluated, research, innovation, and entrepreneurship programs are still growing in universities.

Researchers and interviewees agreed that the Mongolian universities' teaching style and quality need to be improved, and textbook and teaching materials need to be constantly updated to fill the gap between labor market demand and higher education supply. The most noticeable gap is a small number of startups emerging from universities. R1, R2, R3 assume that this is because of the lack of accessibility of internal projects and coursework in universities where departments work independently. Universities benefit from these interactions at multiple levels, by creating internal connections and raising awareness

of available resources. This might offer more effective cooperation for the academic community, allowing students and faculty to involve in innovation activities.

4.4. Private equity firms

4.4.1 Corporations.

Large business entities can contribute to entrepreneurship and innovation through several different ways, the most common method of which is acquiring new technologies developed by startups. For corporations, innovation could boost productivity and save cost; therefore, Mongolian corporations mostly aim to expand their business horizontally rather than vertically, preferring to use the same business model to further strategy not build in-depth.

Corporations in Mongolia operate according to the numerous relevant laws and regulations. The private sector has been delivering its challenges and making its voice heard by the government through business associations such as the Mongolian National Chamber of Commerce and Industry, which is the intermediary organization serving as a main representative body of the Mongolian business network; Business Council of Mongolia aims to enhance the business environment by advocating economic freedom and property rights. Also, American Chamber of Commerce serves its members to seek and strengthen business cooperation between US and Mongolia (American Chamber of Commerce, Business Counsil of Mongolia).

Because Mongolia's economy is only a 30 years-old market economy and has a sparse population, the private sector in the country is still relatively small. In 2020, 160,143 business entities were registered in Mongolia; only 73,253 are in active operation. There are 2,397 active business establishments (corporations) with more than 50 employees (National Statistic Office, 2021). The government has established an SME agency, in charge of the implementation of SMEs policies and a Fund for SME development in 2008 and 2009, respectively. SME fund has financed 249 projects with 22 billion MNT (7.8 million USD) in 2020.

(Table 7.) **SME definition by number of employee and annual turnover**

ENTERPRISE SECTOR	EMPLOYEES	ANNUAL TURNOVER (MNT)
Manufacturing	<199	<1.5 billion MNT
Wholesale	<149	<1.5 billion MNT
Retail	<199	<1.5 billion MNT
Service	<49	<1 billion MNT
All sectors	<19/<9	<250 million MNT

Source: SME Development Fund

Mongolia's GDP is at an estimated 14.233 billion dollars in 2020. The major sectors include mining, agriculture, wholesale and retail trade, and service industries (Figure 8). The mining industry economy accounted for 24% of the GDP in 2020 and over 78% of total exports in the same year (National Statistic Office, 2020).

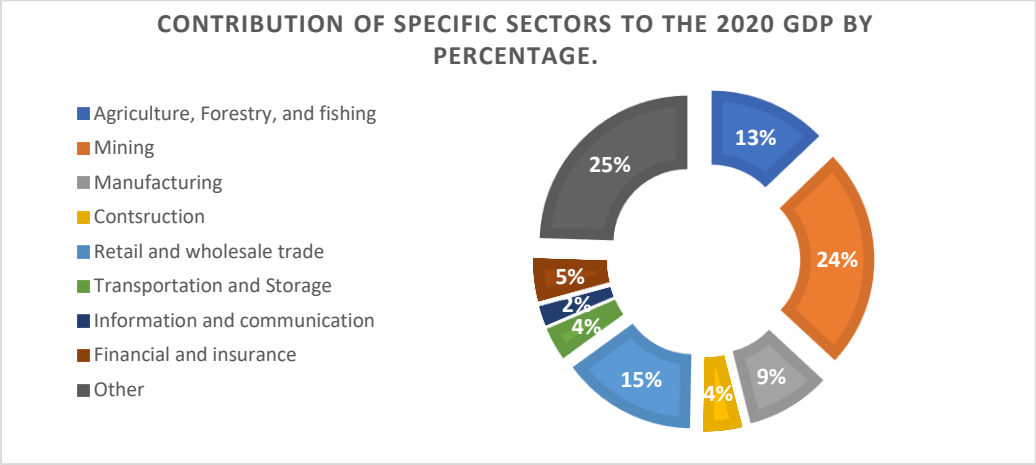


Figure 8. Source: National Statistic Office, Mongolia

Mongolian corporations often hold operations in Mongolia's economic priority sectors such as mining, manufacturing, agriculture, and industry. However, in recent years, large corporations tend to involve innovation and entrepreneurship at a sufficient level by establishing their subsidy companies

and adopting new technologies. Some corporations practice being major shareholders in promising new startups by investment. Also, some ICT leading companies open new co-working spaces for newbie startups. For example, Mobicom LLC invested in the "Moffice Coworking" space; MSC LLC launched the Mstars Accelerator program and coordinated an incubation program for startups. Companies began to pay attention to new talents to encourage innovation within their subsidy companies; therefore, they provide more productive programs including job fairs, guest lectures, or internships and mentorship programs for university students. While these collaborations are beneficial for training human talent and for fostering innovative spirit, tighter connection and cooperation between corporations and higher education institutes are needed.

4.4.2. Startup Companies

The wave of entrepreneurship movement, innovation-oriented companies and technology-based startups has been established since the 2010s, initiated by the newly graduated students who studied abroad, and entrepreneurship-catalyzing organizations were founded (UNDP, 2018). The capital city Ulaanbaatar was ranked at 93rd place out of 100 cities, appearing for the first time in the global index (StartupBlink, 2020). Mongolia has seen an immense growth, though not yet marking a contributing impact on the economy. The rising startup ecosystem has seen potential developments in the technology sector including Fintech, AI, and EdTech. Ulaanbaatar's innovation ecosystem is at the beginning phase, with a prospective future with fast-growing startups PM2. "START" community builder (originated from pioneer community catalyzing organization Startup Mongolia NGO) company has drawn the "Mongolian Startup Map" that includes 78 high-growth startups in 13 fields based on their quality of the scalable business model (Start, 2021). The Covid-19 pandemic has caused health tech companies to be agile worldwide, as well as in Mongolia.

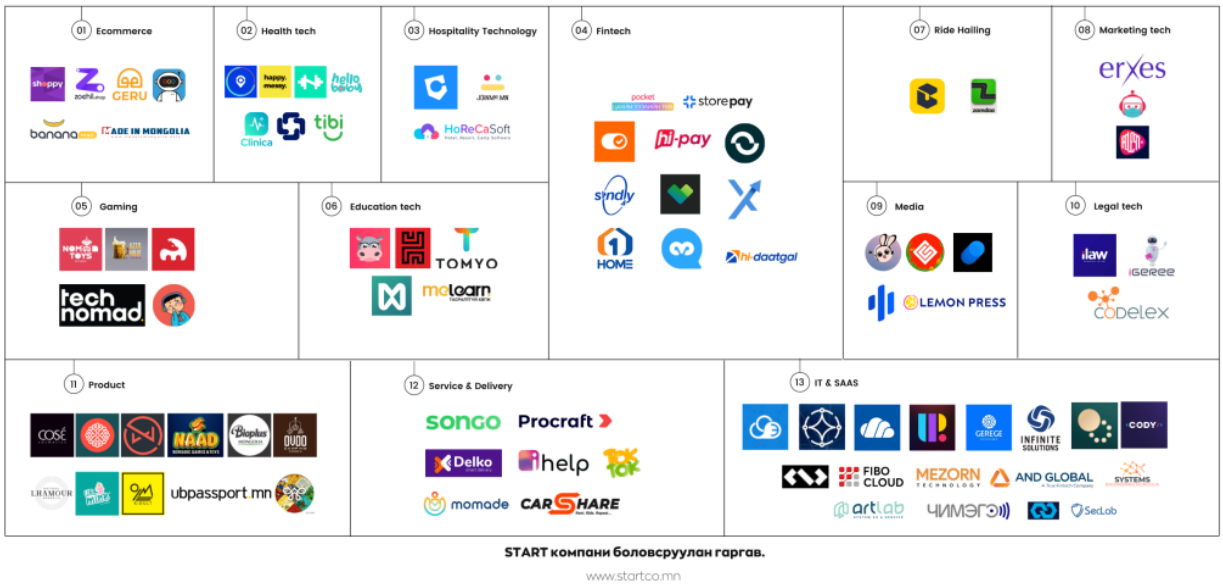


Figure 9. *Source: START LLC*

4.5. Community builders

The capital city office holds "business incubator" centers in the 9 districts of the city to support business activities, incubate, and train them to work independently and capably. The centers focus on supporting small and medium enterprises on household production yet they have independent status (PM2). Besides the state business center, these organizations are working as community-builders like Startup Mongolia NGO, SMS marketing space, National IT Park, HUB innovation center, CLUB Coworking Space, Youth Business Council NGO, the Women's Business Center, and the Startup Council of the Mongolian National Chamber of Commerce and Industry. The most influential community-building events have been conducted by Startup Mongolia, which is already well-known Techstars programs such as Startup Weekend, Design Thinking, Demo Day (C1). These events contain a collection of programs to educate people on entrepreneurship and innovation to foster the startup culture and community in Mongolia.

According to unofficial statistics, the total number of job vacancies that large corporations, such as Khan Bank, Golomt Bank, Mobicom, and MCS LLC have created by opening their own incubator centers to develop innovative technologies, nurture start-ups and public and private co-working offices exceeds 3000. In other words, the data of the total number of incubators, the companies that have been

incubated, and the success rate of currently operating companies are still limited and unclear. The National Information Technology Park (NITP) estimates that 114 information technology startups have grown since 2003, which is not enough for the whole sector of co-working offices and accelerator programs. NITP's technology incubator has been operating since September 2003, and as of 2017, it has fostered a total of 114 companies, has 31 successful graduates, and created 1,752 jobs (NITP, 2021).

In the past 5 years, initiatives to create a new environment for the entrepreneurial ecosystem have been actively implemented in Mongolia, with about 10 co-working offices, five mutual investment funds, and incubator centers established. Unfortunately, venture fund and angel investment initiatives have stalled in 2019 due to uncertainty over the legal framework for venture funds. It is too early to release statistics like the number of start-up companies, new jobs, successful projects due to the lack of a common database (C1, C2. C3). Through the impactful work of community builders, the proper amount of public awareness has been raised regarding entrepreneurship and innovation.

CHAPTER 5. CONCLUSION AND RECOMMENDATIONS

- Over the last 30 years, the concept of innovation in the countries around the world has changed from technological innovation to social innovation. In accordance with technological catch-up theory, developing countries are workingto create an effective national innovation system to boost economic growth by creating inventions and new technologies. Mongolia is attempting to create a national innovation system that learns from international experiences and effective government policies, and sets its own pragmatic goals and objectives. The results of the policy implementation have not yet been released; more detailed research is needed to assess the effectiveness of relevant policies.
- In terms of implementation of innovation policy, there is a lack of knowledge created by knowledge institutions, weak inter-institutional cooperation, lack of innovative human resource capacity and experience, and the management and operation of state-owned institutions are highly dependent on politics.
- The majority of Mongolia's knowledge institutions, or universities, are state-owned. Currently, there are policies that aim to identify innovation sector priorities and development plans for resource allocation; however, detailed planning for effective implementation and organization is incomplete. In the sequence, the goals and working procedures of public organizations are inconsistent with the goals and working procedures of the private sector, which negatively affects their mutually beneficial cooperation. Furthermore, this creates a gap between the supply of knowledge and human resources created by the knowledge institute and the needs of the private sector.
- Start-ups are different from conventional businesses with their unique characteristics. Start-ups usually introduce new technologies, innovative products, and services to the market, grow rapidly, and are radical. Therefore, a legal environment is needed to differentiate, support, and fill this form of the private sector from SMEs.
- The most challenging issue for entrepreneurs in creating an innovative start-up business is financing matters. As mentioned above, start-ups are unique in that, government funding

programs for SMEs do not always reach out to start-ups. Also, the allocation of state funds is not a reliable source of funding for the public. The policy document envisages the establishment and development of funding mechanism for innovation, but the legal framework for its implementation has not yet been established. Therefore, it is necessary to establish financial institutions such as innovation funds and venture capital firms, create a legal framework for their operations, and establish and operate an industrial development fund.

- The World Economic Forum and other global indexes show that cooperation is a significant indicator of innovation. All interviewees agree that Mongolia lacks public-private partnership and cooperation culture to work between insititutions even in the same sector, which is very weak and sometimes has a negative impact on each other. Thus, a public and private partnership has to be strengthened.
- Despite some difficulties associated with innovation legal environment, the community builders have been active and innovation-friendly in disseminating a culture of innovation, educating the public and expanding international cooperation.

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