Pushing Mongolia’s land-locked boundaries: An investigation into the country’s innovation ecosystem

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Dear Reader,

This past summer (June-August 2016), we conducted research in Ulaanbaatar, Mongolia to investigate the Mongolian innovation and entrepreneurship ecosystem. Our project was initiated as part of the Massachusetts Institute of Technology (MIT)-Mongolia collaboration and the MIT Regional Entrepreneurship Acceleration Program (REAP), and we were recruited through the MIT International Science and Technology Initiative (MISTI). Below, we outline the growing ties between MIT and Mongolia.

The MIT-Mongolia Collaboration was initiated in the fall of 2015. Its primary goal is to develop relations between Mongolia and MIT through the different resources at MIT – from business training through the Sloan School of Business to student research exchange programs. One dimension of this collaboration was sending a team of MIT Innovation Diplomats to Ulaanbaatar for the summer of 2016 to assess the innovation and entrepreneurship ecosystem of the region and to provide their findings and recommendations to the Mongolian stakeholders for the creation of an application for the MIT Regional Entrepreneurship Acceleration Program (REAP).

The MIT Innovation Diplomat program began as part of MIT’s Innovation Initiative. The program is designed to provide MIT students with the opportunity to gain a deeper understanding of their host region through the use of a variety of metrics to assess the region’s innovation and entrepreneurship capacities. Such metrics include number of patents generated, number of STEM graduates per year, components of the GDP, and policies and programs in place to foster innovation and support entrepreneurs. However, the most valuable information is acquired through interviews with stakeholders in the region. For the present report, two full-time Innovation Diplomats conducted interviews and research in Ulaanbaatar, Mongolia. The Mongolia-Innovation Diplomat team worked closely with MIT REAP. REAP is a two-year program in which member regions work with a MIT framework and mentoring network to develop entrepreneurship in their home regions. The program includes two intensive training sessions and access to several MIT resources. Through REAP, participating regions have developed strategic plans and constructive programs. Several Mongolian stakeholders are in contact with MIT REAP, and the present report will likely serve as a launch pad for future discussions in addition to aiding local stakeholders in understanding their home innovation ecosystem.

Thank you for your interest in our analysis of the innovation and entrepreneurship in Mongolia. We hope that you enjoy reading the report as much as we enjoyed researching and writing it!

Sincerely,

Luvena & Megan
# Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definition</th>
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<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
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<tr>
<td>CSR</td>
<td>Corporate social responsibility</td>
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<tr>
<td>E-Cap</td>
<td>Entrepreneurial capacity</td>
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<tr>
<td>FDI</td>
<td>Foreign direct investment</td>
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<tr>
<td>FRC</td>
<td>Financial Regulatory Commission</td>
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<tr>
<td>GDP</td>
<td>Gross domestic product</td>
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<tr>
<td>HEI</td>
<td>Higher Education Institutes – these include technical and vocational schools, universities, institutes, and colleges</td>
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<tr>
<td>ICT</td>
<td>Information communication technology</td>
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<td>IDE</td>
<td>Innovation driven enterprise</td>
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<tr>
<td>IFC</td>
<td>International Finance Corporation</td>
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<td>IMA</td>
<td>Invest Mongolia Agency</td>
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<tr>
<td>IP</td>
<td>Intellectual property</td>
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<td>IPR</td>
<td>Intellectual property right</td>
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<tr>
<td>IT</td>
<td>Information technology</td>
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<tr>
<td>I-cap</td>
<td>Innovation capacity</td>
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<tr>
<td>MAS</td>
<td>Mongolian Academy of Sciences</td>
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<td>MUST</td>
<td>Mongolian University of Science and Technology</td>
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<tr>
<td>NITP</td>
<td>National Information Technology Park</td>
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<td>NMIT</td>
<td>New Mongol Institute of Technology</td>
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<tr>
<td>NUM</td>
<td>National University of Mongolia</td>
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<tr>
<td>S&amp;T</td>
<td>Science and Technology</td>
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<tr>
<td>SME</td>
<td>Small and medium enterprises</td>
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<td>SOE</td>
<td>State-owned enterprise</td>
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<tr>
<td>TRIPS</td>
<td>World Trade Agreement on Trade-Related Aspects of Intellectual Property Rights</td>
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<tr>
<td>TVET</td>
<td>Technical and vocational education and training</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
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<tr>
<td>VC</td>
<td>Venture capitalist</td>
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<td>WIPO</td>
<td>World Intellectual Property Organization</td>
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# Definitions

<table>
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<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Innovation</td>
<td>Taking ideas from inception to impact</td>
</tr>
<tr>
<td>Entrepreneurship</td>
<td>Taking ideas from inception to mature enterprises</td>
</tr>
<tr>
<td>Startup</td>
<td>A company working to solve a problem or introduce a new idea in the region</td>
</tr>
<tr>
<td>I-cap</td>
<td>Innovation capacity; the ability to develop new-to-the-world innovations, taking them from inception through to impact</td>
</tr>
<tr>
<td>E-cap</td>
<td>Entrepreneurial capacity; the ability to start and scale new-to-the-world enterprises, taking them from inception to maturity</td>
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<tr>
<td>IDE</td>
<td>Startups whose competitive advantage and therefore growth potential are driven by innovation: as such, they build innovation-driven entrepreneurial advantage</td>
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I. Executive Summary

As a small nation trapped between two giants, Mongolia has been looking for its economic comparative advantage. Mining contributed to over 20% of the GDP in 2015. The recent commodity price drops have pushed the nation to look into options for diversifying the economy, and many people are turning to entrepreneurial activities.

We are interested in analyzing and identifying gaps in the existing innovation-driven entrepreneurial (IDE) ecosystem in Mongolia. To achieve this, we obtained information from both interviews with 89 individuals from 83 entities and from literature review. We apply the stakeholder model developed at MIT to analyze both the entrepreneurial and innovation capacities of the Mongolian ecosystem. Below we outline the current infrastructure supporting entrepreneurship and the biggest challenges to creating a stronger and more vibrant startup community for promoting the development of IDEs.

Mongolia’s Ecosystem

Government

The government has no laws that explicitly promote entrepreneurship, but it introduced combined-service kiosks to simplify business registration and licensing processes for business owners. Additionally, the government has created policies recently to improve the innovation system by proposing science and technology plans or projects to reform higher education towards a research focus. In general, many legal experts say that the laws are written well, but the major challenge is implementing and enforcing these laws. For example, there have been lapses in IP protection where an inventor’s work is not properly protected or are leaked, resulting in many startups distrusting the system and not prioritizing the proper registration of IP. With the recent election and turnover in the government, it is uncertain what stance the new officials will take towards innovation and entrepreneurship.

Corporation

Corporate representatives often describe their innovations as having the internal impact of increasing productivity and decreasing costs. Large corporations in Mongolia tend to grow horizontally rather than vertically, preferring to branch out to new orthogonal ventures rather than build depth. Many of the companies also do not have a dedicated research and development division, only examining the feasibility of the new direction when proposed. In general, corporations recognize the value of entrepreneurship but have little interest and effect on directly contributing to the development of startups.

Capital

Overall, few high-risk funds are available specifically for entrepreneurs. Venture capital is basically non-existent in Mongolia. While there are private investors that will fund entrepreneurs, few select to publicize their activities. Funds are available for traditional SMEs (smaller than 150 employees) through the government’s SME fund; however, it is unclear how these funds are distributed and whether entrepreneurs receive them. Commercial banks provide loans with interest rates around 18-22% for SMEs and require a one-year history and immobile assets as collateral. These criteria make such funding difficult to obtain for startups.
Universities

Mongolian universities tend to be more teaching focused with heavily theoretical and outdated curricula. With high competition between the more than 200 higher education institutions, many schools are currently restructuring their systems to improve education quality and to better disseminate tacit knowledge. Thus, universities have opened labs and state-of-the-art prototyping space to its students; however, these facilities are not used frequently. Entrepreneurship is also of high interest to universities, with many planning to introduce new courses or open centers to better support their student and faculty endeavors. Although it will be a matter of time before the effectiveness of such efforts can be evaluated, research, innovation, and entrepreneurship programs are still young but growing in universities.

Entrepreneurs

Although entrepreneurship is still quite new in the country, the startup community exists and is growing. Much of the youth, particularly those who studied abroad, have openly embraced the concept and are working towards building their own startups. While many of the entrepreneurs look to produce IT-based startups, a number also focus on developing a Mongolian brand of products that use the country’s natural resources, such as livestock materials and sea buckthorn. Regardless of the sector, all entrepreneurs share a number of challenges. Over 70% regard funding as a major challenge, with many eventually obtaining interest-free loans from friends and family, self-financing out of their own pockets, or finding a private wealthy investor through personal connections. Other major hurdles include understanding the customer, finding human talent, and enforcing intellectual property (IP) rights.

Other

Numerous organizations support the entrepreneurship community by providing trainings or other resources. One of the most impactful has been Startup Mongolia, which adapts the TechStars programs. The contains a collection of programs to educate people on entrepreneurship and innovation, ideathons, and an accelerator program. Together, these programs help foster the young startup culture and community in Mongolia. There are also many resources around that encourage entrepreneurship, including the National IT Park incubator, CLUB Co-working, the Women’s Business Center, and the Startup Council of the Mongolian National Chamber of Commerce and Industry. In general, these programs not only offer invaluable resources for entrepreneurs but also help raise public awareness and education on entrepreneurship and innovation.

Challenges and Recommendations

Under the current ecosystem, the development of IDEs may be stifled by the following major challenges described below. Additionally, we propose a few methods of addressing these issues.

Practical Training

Education quality in Mongolia must be updated and improved to include practical skills training. Current teaching styles tend to be traditional with rigid lectures. As a result, many of the
higher education graduates finish schooling with limited knowledge on the necessary skills for growing a business, such as business planning and market analysis.

- Reform curricula, especially in the technical fields, to include hands-on projects that require creative thinking.
- Provide more programs and opportunities to support individual student endeavors.
- Partner with local corporations and startups to provide real-world experience for students.

Dynamic Governance

Government personnel are often replaced based on the results of the election cycle, occurring every four years. These turnovers often trickle down the hierarchy where even positions far removed from the top are affected. As a result, long-term decisions and policies are often unstable and unpredictable, making business practices difficult.

- Increase transparency of government policies and programs (i.e., through publicly available and accurate statistics)
- Provide publicly available educational programs and literature to inform entrepreneurs and innovators on how best to navigate the legal system.

Investment Climate

The investment climate for startups is generally quite poor. With few resources, entrepreneurs are often left alone to seek their own funding from private individuals. The lack of available capital greatly stifles the development of IDEs.

- Develop a network to connect private investors with entrepreneurs.
- Create programs to educate entrepreneurs on how best to search for funding

Communication

Perhaps the most broadly afflicting difficulty in developing a strong innovation ecosystem is the lack of communication between stakeholders and even within the individual stakeholder groups. Instead of selecting to collaborate with each other, individual stakeholders will often seek to build systems that will be primarily self-promoting. For example, a company working outside the IT sector may choose to build an internal IT development department to develop a mobile application instead of collaborating with an external organization to execute the idea. Part of the limited communication results from the lack of trust. Without rich interactions between the stakeholders, innovation and entrepreneurship development may be stalled.

- Support programs and events that foster in-depth, inter-disciplinary collaboration.
- Build an open network to share useful resources for entrepreneurs.

Mindset

Finally, a mindset gap exists between the older generation and youth on entrepreneurship. The older generation was educated while Mongolia was under communist rule. As a result, their perspective differs greatly from the young population that is educated abroad and has grown up
with access to media from around the globe. The older generation is less interested in startups. With the older generation occupying the high-level decision-making positions, the mindset gap contributes to the limited funding and other factors that discourage entrepreneurship.

- Introduce more events to educate the public on the value of entrepreneurship and innovation

**Conclusions and Future Work**

Although many challenges exist to develop a sustainable innovation ecosystem, Mongolia holds much promise for building a vibrant system. As a young startup community, numerous efforts are being made to improve the current system. Even with the few resources that entrepreneurs can access, many are still able to build and grow their businesses. With a more supportive and integrated ecosystem and appropriate resources, these entrepreneurs have the potential of expanding beyond the local markets.

While our work has provided a foundation for understanding how entrepreneurship occurs in Mongolia, the current model can be further refined through in-depth analysis of how effective existing programs and resources are and of the potential growth of specific sectors. With the abundant opportunities that this young nation offers, the startup community will certainly change quickly, hopefully paving a way for more entrepreneurs to enter the market with their innovative ideas.
II. Introduction

“Mongolia is land-locked but not mind-locked.” The wise words of journalist and economist Jargal DeFacto greatly reflect the current state of innovation and entrepreneurship in Mongolia [1]. In 1991, Mongolia embraced democracy, ending a 70-year rule under the socialist system and heralding the conversion to a market economy. In a mere 25 years, Mongolia’s economy has changed drastically, and the country continues to work towards global competitiveness.

In 2015, Mongolia had the 101st largest economy (out of 140) in the world with a gross domestic product of 11.7 billion USD [2]. As a nation with a nomadic tradition, Mongolia has been reliant on livestock and agriculture for thousands of years. In recent years, large mineral deposits were discovered in the southern part of the country and the economic activity shifted towards mining. Mining is currently the sector that contributes most to GDP (22%), followed by wholesale and retail trade (15%) and agriculture (12%) [3]. With the country heavily dependent on mining and with more than 80% of exports going to China, Mongolia’s economy is susceptible to both commodities price fluctuations and changes in the Chinese economy.

Adding to these challenges is Mongolia’s small size and location. Currently, 2.9 million people live in Mongolia’s 1.5 million square kilometers. In other words, the average population density would be comparable to placing the population of Chicago in a country over twice the size of Texas. Although Mongolia is sparsely populated, nearly 50% of the country’s population reside within the capital city of Ulaanbaatar. The small size of Mongolia brings additional difficulty for the landlocked nation to compete with its two large neighbors, China and Russia. Mongolia, mindful of its close proximity to these powerful nations, boasts a “third neighbor policy” and has established favorable relations with nations such as Japan and the United States. These relations are one aspect of Mongolia’s strong efforts for economic diversification and growth.

However, Mongolia has particular potential for growth through the development of innovation and entrepreneurship. The key component in this development will likely prove to be the Mongolian people themselves. Besides being the most sparsely populated country in the world [4], the Mongolian population is unique in that roughly 45% of its population is under 24 years of age with roughly half of that number being under 14 years of age [5]. This young generation, the first generation since 1924 to be born and raised after the fall of communism, is well-educated, technologically savvy, and hungry for economic change. It is largely thanks to this subpopulation that the innovation and entrepreneurship cultures in Mongolia are alive and rapidly growing.

In the present report, we seek to further examine the innovation ecosystem and provide an analysis of the current stakeholders and future directions of innovation and entrepreneurship in Mongolia. In doing so, we contribute to the MIT-Mongolia collaboration and provide recommendations for the MIT Regional Entrepreneurship Acceleration Program. We hope that our research this summer will not only help build a foundation for future MIT-Mongolia collaborations but also create lasting benefits on Mongolia’s innovation ecosystem. We aim to provide useful information on the innovation and entrepreneurship ecosystems of Mongolia to the stakeholders in the region so that they may further develop policies and programs to promote and nurture the growing community of entrepreneurs and innovators.
References
1. DeFacto, Jargal. Interview. 5 August 2016.
   http://mongolianembassy.us/about-mongolia/demographics/#.V-Cwgz4rK1s
III. Methodology

We used data from both past published reports from sources such as the United Nations, the Asian Development Bank, and the World Bank as well as in person interviews. Methods used for each are discussed in the respective sections below.

Interviews

Our studies were focused on primary interviews with individuals who worked in startups, corporations, government, financial institutions, universities, and legal firms. Most interviews were conducted in person, but due to logistics, three interviews were conducted over video or voice conferencing.

During the interviews, detailed notes were taken. Later, these notes were carefully analyzed to extract observed trends, correlations, and anecdotes. For the most part, the observations reported were sourced from a single meeting with representatives.

We selected a few key stories from our interviewed entrepreneurs to highlight their successes and challenges in more detailed case studies. To develop these case studies, we followed up with entrepreneurs to ensure that the details were accurate. For the situations where multiple parties were involved in a legal conflict, we are reporting primarily from the interviewee’s perspective. We attempted to follow-up on these stories through news searches or research into reports from the participating organizations. Unfortunately, our sources were limited to those in English, and we often found limited information. To rectify this bias, we explicitly cite and note that these cases are published primarily based on a single source perspective (see appendix).

Questions

The interviews conducted had a flexible structure. Figure III-1 depicts the topics of interest about which we would typically ask. While a few questions were consistently asked to all interviewees (in purple), some questions were tailored to the stakeholder group (in blue). For people working outside these stakeholder groups, our questions were often tailored to available services and the impact their organization has on entrepreneurship and innovation.
Figure III-1. Interview Questions for different stakeholder groups. Different stakeholder groups are the categories of questions asked are depicted. Topics circle in purple are common to all interviews, while topics in blue are specific to the listed stakeholder.

Demographics

We attempted to interview people with diverse backgrounds to avoid sampling bias. A number of our interviews were scheduled through referrals or from responses through cold contact. While most background on the interviewees were obtained through the interviews, some information was found through self-reported sources such as LinkedIn.

For the interviewees working in startups, we focused primarily on founders, CEOs, and mentors. Our sources for the university level included department heads, professors, and students. Interviewees working in companies came from many levels, including CEOs, division heads, and employees. Capital interviewees came from both analysts and company heads.

Secondary sources

To obtain more quantitative data, we supplemented our analysis of our primary interviews with data from published reports. We collected data across different reports to trend values.
Our analysis has its foundations in the Innovation Ecosystem Stakeholder Model developed at Sloan School of Management at the Massachusetts Institute of Technology (MIT). Innovation ecosystems are comprised of several key stakeholders that contribute, both through collaborative and individual efforts, to the development of innovation in a given region. Most stakeholders fall into one of five distinct categories imperative for the healthy functions of an innovation ecosystem: entrepreneur, risk capital, corporate, government, and university. In Mongolia, another key stakeholder is the startup community, including community organizations such as accelerator programs, associations, incubators, and co-working spaces. The main sections of this report correspond to our analysis of each of these stakeholder groups and the contributions the stakeholder brings to innovation and entrepreneurship in the country. Interestingly in Mongolia (and to be discussed thoroughly in later sections of this report), there is little to no risk capital in Mongolia, and we thus concluded to examine sources of “capital” rather than specifically “risk” capital.
IV. Mongolia’s Innovation Ecosystem Stakeholders

A. Government

In July 2016, Mongolia celebrated its 2225th anniversary of statehood. Since that time, the structure of the Mongolian government has rearranged several times. The most recent rearrangement occurred in 1990, with a peaceful revolution that shifted the Communist government to a democracy [1]. The modern Mongolian government is actively working to improve the regulations and policies that have been molded over the past 26 years. In particular, the government is focusing its attention on developing science and technology. In 2007, the Mongolian Ministry of Education, Culture and Science in conjunction with the United Nations Educational, Scientific and Cultural Organization (UNESCO) released the “Science & Technology Master Plan for Mongolia.” The plan acknowledges the importance of developing a stronger knowledge-based economy and outlines possible steps to improve the rate and depth of development in scientific fields [2].

During the writing of this paper, a recently-elected Prime Minister and parliament (the State Great Khural) were discussing possible government restructuring and policy changes. It is unknown how this new government will promote science and technology, but there is hope that they will work to further develop innovation and entrepreneurship.

In this section, we examine the role of government in the innovation and entrepreneurship ecosystem in Ulaanbaatar by highlighting aspects of the Mongolian legal framework and the government’s interaction with other key stakeholders within the ecosystem.

Mongolian legal framework relating to innovation and entrepreneurship

There are several legal policies in place that seek to better promote innovation and entrepreneurship. While there is debate over the extent to which the government should promote innovation and entrepreneurship, most interviewees generally agreed that the current legal system does not hinder these areas. However, several interviewees have indicated that gaps in implementation and enforcement of certain laws can indirectly hinder idea generation and business development.

There are several national laws that impact the innovation and entrepreneurship ecosystem of Ulaanbaatar. These include the 1993 Law on Taxation [5], the 1997 Law on Bankruptcy [6], the 2010 Law on Competition [7], the 2012 Law on Credit Guarantee Fund [8], and the 2012 Law on Innovation. However, based on interview feedback, the laws detailed below are those deemed to have the most significant impact on the ecosystem at question. These laws include the Law on Labor, the Law on Investment, and laws relating to intellectual property (IP). Additionally, this section will explain the Japan-Mongolia Economic Partnership Agreement, which will likely influence Mongolian business practices in the near future. This section will not cover the entirety of each legal policy but will instead attempt to highlight the most salient features of those laws with regards to innovation and entrepreneurship in Mongolia.

Law on Labor

The Law on Labor was introduced in 1999 and was last amended in 2003 [9]. It prohibits employment discrimination and sets regulations for the activities of all state-owned and private
entities. Such activities include employment contracts, minimum wage levels, and resolution of employment disputes. The Law on Labor also allows workers to form or join unions and to collectively bargain [10]. Several professionals interviewed agreed that the law is primarily implemented in a way that helps employees rather than employers [11, 12, 13]. For example, employers are required to provide a large amount of both medical and social benefits. In addition to these benefits, the maximum number of work hours per week is 40 hours, and overtime can only be demanded under “emergency” circumstances [11].

One of the more unique aspects of the Law on Labor involves employee contracts. When an employee is hired, he or she enters into a 3-6 month probation period. At the conclusion of that period, the employer may choose to create a new contract with the employee. However, this new contract is required by law to be indefinite. With this indefinite contract, the employee cannot be fired unless specific criteria are met. For example, if an employee is not performing well at seven months into the job, he or she cannot be fired simply because they are not performing well. If the employee exhibits gross negligence, poor work attendance, or any of the other enumerated criteria for termination of employment, he or she must be given a requisite number of notices before the firing process begins [12,13].

In the event that an employer wishes to terminate an employee contract, the owner of the company must create a commission to evaluate the employee’s performance. This commission must include someone from the district government office in order for the process to be considered fair and to ensure an objective evaluation of the employee’s performance. One method employers use to get around these firing procedures is to structurally change or downsize the company so that that position no longer exists. However, this structural change or downsize must be proven to be absolutely necessary [12]. Additionally, the fired employee may be entitled to at least one month’s salary following termination of employment [13]. These regulations apply to both local and foreign employees.

Foreign employees may acquire a work permit visa when joining a Mongolian company. The Law on Labor sets a quota for the number of foreign employees. This quota changes based on the sector. For example, a company in the energy sector must have 15 local employees for every foreign employee. If a company working on certain types of projects, such as construction, can prove that if there are not enough Mongolians to fill these positions, then this quota may be exceeded. Exceeding the quota requires a special permit from the Ministry of Labor [11].

For the past three years, a revised version of the Law on Labor has been at a standstill. It is believed that this revision will provide more opportunities and protection for employers. However, regardless of whether this revision is passed, it is imperative that entrepreneurs and startups consider the Law on Labor before hiring employees. If an entrepreneur constructs proper contracts and documentation from the beginning of employment, several issues involving employment may be avoided later when the business has undergone further developments [11].

Law on Investment and Law on Investment Funds

In 2013, the Mongolian government passed two laws to regulate current practices surrounding investment: the Law on Investment and the Law on Investment Funds. These practices include investment licenses, management, and supervision. Under this law, investment funds can only be established and managed by licensed investment management companies, and all investment funds will be supervised and regulated by the Financial Regulatory Commission
Furthermore, under the Law on Investment, foreign investors and local investors are treated in a similar manner, except when investment occurs in three key sectors: mining, media and communications, or banking. In these sectors, a requisite amount of investment must originate from domestic entities. With regards to entrepreneurship, the investment law is viewed as imposing severe financial requirements. For example, if a foreign entity acquires 25% or more in a Mongolian entity, a minimum of 100,000 USD in investment is required, regardless of whether the Mongolian entity is an established institution or a startup. Additionally, the amount of investment must be proportional among shareholders. If a foreign entrepreneur contributes 100,000 USD, then a local investor must also contribute 100,000 USD. This can lead to local entrepreneurs being less willing to partner with non-Mongolian businesses.

However, the law is a step in the right direction in terms of improving the current ecosystem for foreign investors. Certain damages will be provided for investors, and if an investor invests more than 500,000 USD, the investor may enter into an Investment Agreement with the Invest Mongolia Agency (IMA) that may enable various tax benefits. If an investor invests more than 15 million USD, then the IMA can issue a tax stabilization certificate to hold tax rates for a certain period of time. However, these policies are less likely to be of use in scenarios where startups require less than 500,000 USD for seed funding or business development.

Several interviewees across industries expressed the need for an investment atmosphere that is friendlier to foreign investors. Recently, the new Prime Minister of Mongolia announced the creation of a foreign investment council. The introduction of this new council gives strong signals that the new government will work to improve the current attitude towards and atmosphere surrounding both local and foreign investment.

**Intellectual Property Rights**

The IPOM regards intellectual property rights (IPRs) as a pillar for innovation in Mongolia. The Mongolian people are entitled to intellectual property rights (IPRs) through the Patent Law of Mongolia (last amended in 1999), the Law on Copyright and Related Rights (last amended in 2006), and the Law on Trademarks and Geographical Indications (last amended in 2010). In 2014 alone, a total of 265 patents were filed. Mongolia also belongs to several World Intellectual Property Organization (WIPO) treaties, including the World Trade Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). However, the parliament of Mongolia (the “State Great Khural”) has not yet ratified any WIPO internet treaties.

Several entrepreneurs interviewed were not concerned about registering their IP, stating that although it was on their to-do list, it was not a top priority. Other entrepreneurs decided to register IP soon after product development. Several entrepreneurs interviewed agreed that IP registration is relatively cheap and very straightforward. One entrepreneur found that the registration for a Mongolian patent took six months, 20,000 MNT (9.39 USD), and lasts for 15 years. Overall, the practice of IP registration does not seem to be very popular, possibly due to poor understanding of the importance and registration processes surrounding IP.

Legal experts consulted agreed that the legislative framework for IPRs is there, but there are sometimes difficulties in implementing and enforcing IPRs. One issue identified by...
entrepreneurs was the theft of IP with little government reaction or enforcement of IP laws (see Lhamour and Rockmaster case studies). Additionally, there are issues involving international IP registration. In order to export products, distributors in foreign countries often require that the product hold an international patent. These international patents are considerably more expensive than national patents and require a much more complex process [23].

In the past few years, the State Great Khural has passed several pieces of legislation aimed at improving the IP system in Mongolia. One example of recently introduced legislation, a clause in the 2012 Law on Innovation, is akin to the American Bayh-Dole Act [24]. This clause allows universities to own all IP procured by universities under government funding. Before this law, all IP procured by universities with the aid of government funding would subsequently belong to the state [25]. Additionally, on September 1, 2016, a new amendment to the criminal law will take effect, including a new clause on damages. In Clause 18.4 of Article 18 of the Criminal Law of Mongolia, if an individual copies or produces the product without permission of the IP owner, a 5,400-27,000 unit worth penalty will be imposed. This unit is equal to 2,000 MNT, and thus the penalty will be 10,800,000 – 54,000,000 MNT [12]. There is hope that this strict penalty will be enforced and that this enforcement will help to dissuade future infringing activities.

The IPOM is currently working on several projects that will also hopefully improve the current IP system. With the help of WIPO, the IPOM is working to establish a technology network for technology and innovation support centers throughout Mongolia. This project will create a hub of existing technology transfer and IP offices at universities and institutions around Ulaanbaatar to improve access to trainings and knowledge of IPRs [17].

Japan-Mongolia Economic Partnership Agreement

The Japan-Mongolia Economic Partnership Agreement was signed in February 10, 2015. This bilateral agreement dramatically reduces importation taxes while also seeking to promote investment and protect intellectual property [31]. Trade agreements such as this will likely serve to help Mongolian companies emerge on the global market and increase business capacity.

Future legislation

It is important to note that this September, a new law on security transactions, the Movable and Intangible Property Pledge Law, will be introduced. While it is too early to examine the impact that this law will have, there is a general consensus that this law will greatly improve the investor relations in Mongolia. This law will mandate specific processes for registration, tracking, and monitoring of mobile assets. It will also require detailed records of when a security will expire and who has owned it in the past [15]. Currently, Mongolian commercial banks require immovable collateral in order to obtain a loan. This law may help to ease these requirements and open a door for increased access to bank loans for entrepreneurs and SMEs who do not fulfill the current collateral requirement.

The Mongolian government’s role in the innovation ecosystem

Growing corporate ties

The Mongolian government has ties to numerous corporate sectors. The government has stakes in several mining companies around Mongolia, including Oyu Tolgoi LLC (See
Corporation section for more details on the interaction). Corporations further interact with the government to lobby for or against new legal policies.

The Mongolian government itself has several state-owned enterprises (SOEs) in energy production, mining, and transportation. In 2014, President Ts. Elbegdorg announced a “Smart government” initiative to privatize SOEs [10]. There are several SOEs that are publicly listed as being eligible for partial privatization. This year alone, the government has sold stakes in the Bangaanur coal mine and the Mongol Post [13].

Promoting entrepreneurship

Perhaps the act most demonstrative of the government’s commitment to aiding entrepreneurs and promoting science and technology was the creation of the National Information Technology Park (NITP). Established in 2002, NITP focuses on business incubation and development [3]. NITP offers discounted office spaces to IT startups for up to 2.5 years, and such spaces are awarded through competitive pitch competitions [4]. All centers and businesses associated with NITP are encouraged to conduct R&D, register intellectual property (IP), and develop technologies in-house. The staff of NITP is focused on providing services to improve the management of business, and NITP hosts several training sessions. These sessions include topics such as “What is patent law?” and “How to manage property.” In addition to the above services, NITP hosts a pre-accelerator program called the TechGer Founders Space, which is a competitive program that includes product development and a pitch event with potential investors [4]. The activities of the NITP serve to highlight the government’s desired role in promoting entrepreneurship and innovation.

Although there are no VCs in Mongolia, the Mongolian government has expressed its desire to increase investment. In the State Policy on High Technology Industry (2010), the government states its desire to support VC funds directed towards high technology [28]. The government also interacts with several foreign development banks, including the European Bank for Reconstruction and Development and Asia Development Bank, to inject capital into key sectors such as mining. There are also ongoing efforts to support SMEs and startups that are funded by both foreign development banks and the Mongolian government (see Capital section).

Conclusions and recommendations

It is clear that the Mongolian government is actively shaping its legal framework and policies to better adapt to rapid changes in scientific and technological innovations. Indeed, interviewees generally agreed that the legal framework in place in Mongolia does not directly hinder business development. However, there was also general agreement that there is a need for explicit legislation that is consistently implemented as well as fewer requisite licenses and registrations for conducting business. Additionally, entrepreneurs recommended better fair competition legislation, increased IP protection, and regulations offering a friendlier environment to both foreign and local investors. Although the Mongolian government is relatively young and has yet to develop several policies and programs that exist in developed economies, there is great potential for the role of government in the promotion of innovation and entrepreneurship in Mongolia.
Methods

In the present study, representatives from three government departments (the Intellectual Property Office of Mongolia, the Macroeconomics Statistics Department, and the National Information Technology Park) were interviewed. Additionally, we spoke with individuals from five prominent law firms in Ulaanbaatar. The majority of information gleaned from these interviews was used to investigate the legal framework surrounding innovation and entrepreneurship.

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B. Corporate

Corporations can contribute to innovation and entrepreneurship in many ways, most commonly through acquiring new products and technologies from entrepreneurs. Corporations also have the potential of offering much more through the exchange of human talent and knowledge or by providing physical and financial resources.

In this section, we outline the corporate sector of Mongolia, particularly emphasizing the capital city of Ulaanbaatar. Following, we present our findings for how corporations engage in innovation and entrepreneurship.

**The Corporate Ecosystem**

As highlighted in the government section, the governmental and corporate stakeholders have fairly close interactions in Mongolia, primarily due to the presence of its 377 registered State-Owned Enterprises (SOE) [1] and through permitting and registration. In general, most companies found the procedures to be easy but time-consuming [30,19]. Numerous other laws and regulations apply to corporations. Laws related to ease of doing business are outlined in more detail in the government section, and those that are applicable to a specific sector are discussed below. Typically, business associations such as the Mongolian National Chamber of Commerce and Industry, the Business Council of Mongolia, or the American Chamber of Commerce will advocate for policy changes to the government on behalf of their corporate members [31,32,33].

With such a young market economy and a small population, the business sector in Mongolia is quite small. Of the 126,560 registered establishments in Mongolia in 2015, only 64,301 are active. Of the 2,392 active establishments with more than 50 employees, over 66% are located in Ulaanbaatar [1]. Unfortunately, limited data was found on further segmenting the larger establishments. Under Mongolia’s Law on SMEs (2007), a few of the corporations interviewed would be considered SMEs and have access to special funds such as the government’s SME fund (Table IVB-1) [2].

**Table IVB-1. Definition of SMEs according to the Law on SMEs (2007). Source: Table adapted from [2].**

<table>
<thead>
<tr>
<th>Enterprise Category</th>
<th>Sector</th>
<th>Employees</th>
<th>Annual Turnover (MNT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>All sectors</td>
<td>≤19</td>
<td>≤250 million</td>
</tr>
<tr>
<td></td>
<td>Services</td>
<td>≤49</td>
<td>≤1 billion</td>
</tr>
<tr>
<td>Medium</td>
<td>Wholesale</td>
<td>≤149</td>
<td>≤1.5 billion</td>
</tr>
<tr>
<td></td>
<td>Retail/Manufacturing</td>
<td>≤199</td>
<td>≤1.5 billion</td>
</tr>
</tbody>
</table>

Mongolia’s GDP is overall quite small at an estimated $11.7 billion in 2015 [3]. The major contributors to the economy include mining, agriculture, wholesale and retail trade, and service industries (Fig. IVB-1). Mining dominates the economy by contributing over 20% of the GDP in 2014 and over 78% of exports in 2015. The second largest export at 9% is jewelry, precious metals, and natural or cultured pearls [1]. With the country heavily reliant on mining prospects, many have recognized the need for economic diversification [4,7,14,22,31,32].
Imports and exports add an additional challenge for companies operating in this landlocked country. While a rail extends north into their Russian neighbors, Mongolia currently offers no track from its mineral resource sites to its southern neighbor, China [5]. With China consuming 83.7% of Mongolia’s exports [1], the added costs for transporting materials via trucks becomes exceedingly high, reaching 70-80% the cost of coal in 2013 [5]. Companies that intend to manufacture their own products have added challenges of further inflated costs resulting from double VAT taxes in importing raw materials and of meeting international standards and regulations when few certified laboratories exist [6,7].

Figure IVB-1. Contribution of specific sectors to the 2014 GDP by percentage. Source: National Statistical Office.

Internal Corporate Structure

To sustain itself in the small market, corporations often adopt a horizontal, rather than vertical, model for growth, creating new companies across vastly different areas [8]. For example, one company can hold operations in construction, mining, energy, and wool production. As one interviewee remarks, the corporate structure are quite similar to conglomerates [4].

Business is often done with limited business planning or strategizing, with most companies making decisions on “gut” feelings [6,9]. A few large companies will do research, which also contributes to their sustained success [9]. As a result, most corporations do not have a research and development division. Thus, the type of innovation that each company uses is highly dependent on the company’s operations. Each company has a different relationship with technology, with most companies taking the traditional role as a passive consumer. To demonstrate how corporate innovation occurs, we highlight a few key examples from different industries.

Mining

With mining being the largest industry in Mongolia, international commodities price fluctuations and the mine production rates can greatly influence the country’s economy. Most
interviewees recognize that mining will likely remain the backbone of Mongolia’s economy. Thus, they have the potential of significantly influencing the innovation ecosystem. As a result, the innovation efforts of three companies were explored: the SOE holding company Erdenes Mongol, the Oyu Tolgoi (OT) mine (5000 employees), and the Mongolian Mining Corporation (MMC, 2000 employees).

The government has more involvement with the mining activities due to special laws in place to manage the assets. Under the Law on Minerals (2006), the Mongolian government owns the mineral resources in the country and can grant mining rights. The state is also entitled to own up to 50% of reserves that were found through government-funded explorations and up to 34% for those found by other means [11]. Erdenes Mongol was previously operating under the Law on Human Development Fund (1999), which enabled all citizens to act as shareholders. The company has since transitioned to act as a private entity under the Company Law, allowing board members instead of the prime minister to appoint the CEO [12]. Stalls in the mining projects often occur due to governmental involvement and disagreements between the shareholders [14,12,15,16].

Innovation in mining is primarily driven by the activity of large projects. For example, the development of the mines requires supporting infrastructure both large and small, such as power plants or suppliers of disposable goods. As a result, mining companies often contract out to entrepreneurs to fulfill their needs; however, most the tenders look for goods and services that can be provided by traditional SMEs [17]. Such interaction with entrepreneurs is quite common for companies [20,24]. Occasionally, some consulting companies, such as Sustainability East Asia, will develop training materials for SMEs on topics such as grant proposal writing [34].

Innovations at these large corporations often focus on improving safety and productivity. OT has a growth and innovations team that is intended to acquire talent and expertise for its different business units. These changes are often small-scale, such as extending truck beds safely to allow for increased loads to be transported [14,18]. While these innovations may be small, they can result in millions of dollars in savings [18]. To promote innovation, OT will provide awards to ideas or publicize innovations through in-company newsletters.

Construction, Manufacturing, Energy, and Distribution

Representatives from three companies in these sectors were interviewed: Nomin Construction and Development (200 employees), the furniture manufacturer UMECO (88 employees), and the green energy company Monhorus (70 employees). All three companies actively seek cutting-edge technologies to implement in their production pipelines or use in their
energy installations [19,20,21]. UMECO is the first company in Mongolia to introduce a state-of-the-art automated manufacturing system from Europe [20]. Although the companies do not produce any new technologies in-house and have limited interest in investing in young, under-developed technologies, these corporations will attend annual international fairs and expos to learn about new equipment [19,20]. Monhorus has explored opportunities of building research collaborations with universities, but these efforts were never initiated [21].

One of the largest American companies present in Mongolia is Wagner Asia (500 employees), which is a distributor for heavy equipment in the mining and construction fields. While Wagner serves as a venue for introducing cutting edge foreign technologies and was the first company in Mongolia to implement IT systems in their workflow, the company primarily focuses on business systems innovation. For example, Wagner contains an analytics and innovation division to develop organizational strategies. Although an internal audit process developed by Wagner was adapted by a US company, few innovations have spread beyond the company boundaries [22]. However, Wagner and a few of the larger companies do focus on developing human talent outside its company through providing guest lectures at local universities or offering internships at the company [22,12].

Telecommunications

Mongolia’s ICT sector developed very rapidly, with four major mobile phone service providers and over 4 million mobile users [23]. Unitel (1300 employees) is one of the largest mobile operators and was introduced 10 years after the establishment of MobiCom. To compete in the market, Unitel differentiated itself through its marketing strategies and innovation in both product and business processes. Although new products are released very frequently, the company does not have a research and development division. They will, however, perform business research to predict market trends. Surprisingly, Unitel outsources most of the implementation of their projects and coding to SMEs [24].

Financial

Banks traditionally aid entrepreneurs by providing loans. SMEs make up only 16% of commercial bank loan amounts, and a single SME, on average, receives approximately 20000 MNT in loans [25]. Note that the financial and investment climate of Mongolia is discussed in more detail in the Capital section of this paper. Banks also provide other means of supporting entrepreneurs.

Khan Bank has a specialized Incubation Center that offers lecture-style trainings for its ~400 clients that have obtained loans through the bank. The incubation center is currently more similar to a training center as many of their clients are fairly established. The center is looking to attract more early-stage entrepreneurs by creating an investment fund [26].

Arig Bank has created an innovation infrastructure within the company to develop solutions for its customers. Arig allows ideas to be developed by any employee and will compensate the creator of the new products with a percentage of the revenue earned. To support entrepreneurship, the company worked closely with startup InfinitE solutions to build SWIPE, an affordable card reader that interfaces with mobile devices. These devices later enabled the company to track the payment history of its clients, building confidence for Arig to provide unsecured lending [27].
Consumer Products and Healthcare

APU (1800 employees) is the largest beverage producer in Mongolia. Similar to many of the other companies, innovation happens through changes in the production line to save costs or through introduction of new products. To promote innovation, APU will often provide up to 30% of the earnings or savings as a reward for an employee [28].

The Monos Group is a leader in the Mongolian pharmaceuticals sector, with over 60 pharmacies established throughout the country. Monos is also one of few companies with a dedicated research laboratory (Drug Research Institute – 48 employees), which is funded by 80% of the profits arising from the company’s pharmacies. Monos also hosts one of the few good manufacturing practices (GMP) facilities in the country. Further, the company has been actively commercializing 17 of its 30 patents. Recently, the company has been focused on launching a liver cancer drug, which cost 1.5 million dollars and was in development for the past 15 years [6]. The Monos Group has also worked to collaborate with the National University of Mongolia to develop a tea [6].

Corporate Social Responsibility

Corporate social responsibility (CSR) is a relatively new practice in Mongolia. Although few companies practice CSR, the reception of the projects has been generally positive [29]. Through CSR, companies are often able to develop programs to better support education [27].

Conclusions and recommendations

Innovation in the corporate stakeholder seems to be achieved sporadically and in isolation. For reasons that are unclear, corporations in Mongolia often lack long-term business planning. Thus, many companies do not have dedicated research divisions for either product or business development. Only when a direction is suggested does a team assemble to analyze the potential of the idea. While companies will innovate internally, the effects of these innovations rarely impact the external innovation ecosystem.

This can be better understood by the corporate view of innovation as a means to decrease cost and increase productivity. When innovative ideas are implemented in companies, the changes are often small-scale. For example, typical innovations are often structural changes to the company or small modifications to existing technologies. Some interviewees have noted that the current capacity of Mongolia does not allow for completely novel innovation. These small changes can nonetheless produce an overall impact that is quite large financially.

In general, the current flow of novel technologies is often from international companies abroad to large Mongolian corporations that implement these cutting-edge equipment in their pipelines. Even though the technology may impact downstream consumers, rarely do other stakeholders directly engage with these imported technologies.

Recently, corporations have started to focus their efforts on developing human capital and talent. Many companies are recognizing the importance of innovation and offer trainings to their employees or rewards for those who make an impactful innovation. Companies are also beginning to provide external programs such as guest lectures at local universities or internships for undergraduate students. While these interactions are beneficial for training human talent and for fostering innovate spirit, these programs are still young and quite limited in building deep collaboration between the stakeholders.
In general, corporations do little to directly encourage entrepreneurship. They do, however, help sustain SMEs by posting tenders, through contracted services, or even help develop training materials for SMEs. To grow the innovation ecosystem in Mongolia, corporations can increase collaboration with other local stakeholders, particularly university and entrepreneurs.

**Methods**

To gain insight to the corporate world, we interviewed nine employees across different levels of a few major corporations in Mongolia. Additionally, we asked about potential sectors of economic growth to nearly all of our interviewees. Their collective responses and remarks are included as support for relevant sections.

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C. Capital

The status of capital in Mongolia has gone through several fluctuations since the emergence of democracy. In order to understand the current status of capital in Mongolia, it is important to examine the economic trends of the past six years. In 2011 and 2012, foreign direct investment (FDI) averaged 40% of gross domestic product (GDP), and the annual growth rate was over 15% [1]. At that time, Mongolia boasted the fastest growing economy in the world. This unprecedented growth was due primarily to mining projects. The Oyu Tolgoi copper and gold mine was responsible for over 50% of the GDP, bringing in more than 6 billion USD in investment. By the end of 2012, the mining projects had drastically slowed due to a dispute between Rio Tinto, the primary shareholder in Oyu Tolgoi, and the Mongolian government. Consequently, in 2013, FDI decreased by 50%. This decrease was also in part due to a worldwide price decrease of nearly 66% in coal (one of Mongolia’s leading mineral exports). During this time, the government continued to promote infrastructure development and practice a policy of fiscal expansion [1]. In 2015, the budget deficit jumped to 20% of GDP, GDP grew by 2.5%, FDI decreased by 75%, and the stock index decreased by 18.8% [2]. In December 2015, an agreement was reached to finance (4.4 billion USD) the Oyu Tolgoi underground mines [3]. There is hope that this renewed mining effort will re-stimulate the interest of foreign investors in Mongolia.

Despite the recent economic decline, several entrepreneurs and corporations have managed to survive and thrive, bringing new innovations and products to local and global markets. In this section, we outline the various sources of funding available (or unavailable) to entrepreneurs and innovators in Mongolia.

Sources of Funding

Of the entrepreneurs interviewed for this study, 69.6% (16 out of 23 entrepreneurs) listed funding as a key challenge for startup initiation and growth. These entrepreneurs encountered many difficulties along the way, and the variety of funding sources available are detailed below.

Domestic Sources

Domestic venture/risk capital

When asked about funding, one of the most consistent responses received was that there are no venture capitalists (VCs) in Mongolia. This finding corroborates the ranking system of the World Economic Forum, which ranked Mongolia 137/140 countries for venture capital availability [4]. Other than the current state of the Mongolian economy, there were several factors suggested that might contribute to the lack of VCs. These factors include insufficient knowledge of technology education, the small market size (the population of Mongolia is 2.9 million), and the difficulty in competing with neighboring countries such as China, Russia, and Kazakhstan [5].

Government funds

With regards to funding startups, the government channels its resources through the National Information Technology Park, which provides incubator and discounted office spaces for startups (see Government section for more details). Additionally, the Law of Mongolia on Government Special Funds (last amended in January 2015) sets aside a portion of the state’s
budget for the “Small and Medium Enterprise (SME) development fund.” Article 20 of the same law lists a “Science and Technology Fund” to finance baseline research, projects commissioned by the government, application of research results, and the execution of innovative projects. However, this size of this fund is also subject to the state budget and the parliament’s discretion [6]. These SME funds are not specific for startups or entrepreneurs. One corporation interviewed that received funding from the SME fund is UMECO, a furniture company of 88 people established in 2009 [24]. No startups interviewed have used these funds and it is unclear how these funds have been applied. Future research is necessary to determine the level and impact of aid that these funds have provided.

The Mongolian government has established a credit guarantee fund (CGF) in 2012, with the help of the Mongolian National Chamber of Commerce and Industry and foreign development banks such as the Asian Development Bank (ADB) [7, 8]. This fund, now an entity independent from the government, provides credit guarantee to SMEs with insufficient collateral [8].

Commercial banks

There are 13 commercial banks in Mongolia. Combined, commercial banks comprise over 90% of total deposits and 85% of loans. The commercial bank services most commonly utilized by entrepreneurs include bank loans, current and savings accounts, term deposits, and insurance. All in all, commercial banks are very unlikely to loan to startups, as bank policies often require immovable property collateral and a stable business history. The table below, from adapted from a report published by the International Finance Corporation (IFC), displays commercial bank loan products that are accessible to SMEs (Table IVC-1) [9]. Bank loans are further made inaccessible by interest rates ranging averaging 19-20%. As a result, businesses need very high profits in order to survive the lending rates [10].

**Table IVC-1. Commercial bank loan products accessible to SMEs [9]**

<table>
<thead>
<tr>
<th></th>
<th>Average interest rate per month</th>
<th>Average maturity</th>
<th>Maximum maturity</th>
<th>Collateral requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro and small business loans</td>
<td>1.5 – 2.5%</td>
<td>12 months</td>
<td>48 months</td>
<td>Immovable and movable property</td>
</tr>
<tr>
<td>Working capital loans</td>
<td>1.5 – 2.5%</td>
<td>24 months</td>
<td>24 months</td>
<td></td>
</tr>
<tr>
<td>Investment loans</td>
<td>1.5 – 2.5%</td>
<td>36 months</td>
<td>60 months</td>
<td></td>
</tr>
<tr>
<td>Credit line</td>
<td>1.5 – 2.5%</td>
<td>24 months</td>
<td>24 months</td>
<td>Savings, salary, and immovable property</td>
</tr>
<tr>
<td>Business credit cards</td>
<td>2.0 – 3.0%</td>
<td>24 months</td>
<td>24 months</td>
<td>Leased equipment and additional collateral</td>
</tr>
<tr>
<td>Leasing</td>
<td>1.5 – 2.0%</td>
<td>24 months</td>
<td>60 months</td>
<td></td>
</tr>
</tbody>
</table>
Investment Management

Both domestic and foreign investors are less likely to work with a Mongolian company without a local fund manager. Ulaanbaatar-based investment management companies such as Iarudi LLC, Horizon Partners LLC, and TenGer Capital LLC act as the liaisons between investors and local companies, providing invaluable educational and financial management advice.

The first Mongolia-based private equity fund was the Mongol Opportunities Fund, established in 2008. The fund acts as a fund manager for investors, which are mostly foreign development banks that are interested in investing in established companies. As a result, the fund has little interaction with startups [11].

Personal Funding

Due to the inaccessibility of bank loans and virtual nonexistence of VCs, entrepreneurs are often forced to rely on personal savings or loans for immediate family members. Of the 24 entrepreneurs interviewed, 10 were initially self-funded or funded through immediate family members.

Another source of seed funding for startups in Ulaanbaatar is through connections to wealthy, philanthropic individuals. Eight of the 24 entrepreneurs received some form of initial or later funding through these personal connections. One interviewee familiar with the investment ecosystem in Mongolia encouraged entrepreneurs to find a local, affluent partner. If the entrepreneur has a bullet-proof business plan and enough passion, this highly valuable partner should not be difficult to locate [12].

International Sources

Foreign venture/risk capital

Due to several factors in the current Mongolian economy, foreign VCs are especially difficult to access. These factors include the general lack of knowledge of the Mongolian economy, the small domestic market size, and the absence of a Mongolian startup “success story” to inspire future investment, as has been seen in Estonia [13, 14]. Few Mongolian startups, such as Ymoment, have traveled abroad to seek funding. However, Ymoment failed to seek funding from investors in the United States primarily due to the lack of a solid business plan for funding generation [23].

Foreign development banks

Foreign development banks are prominent in the Mongolian economy and interact extensively with the Mongolian government. Funds from these banks are channeled through the Mongolian government (the Development Bank of Mongolia), local commercial banks, and local boutique banks such as the Mongolian International Capital Corporation [15]. Portions of these funds are involved to a limited extent in promoting entrepreneurship and SME development. Five of the most prominent foreign development funds are the following:

I. Asian Development Bank (ADB)

Mongolia has been a member of the ADB since 1991. As of 2014, ADB has provided 70 loans totaling 1,478.5 million USD and 22 fund grants totaling 318.5 million
USD [9]. In 2015, ADB approved a 60 million USD fund to assist individual businesspeople and very small-scale SMEs. This fund will provide micro-credit loans and will be channeled through the government who will subsequently loan at subsidized rates through commercial banks [16].

II. European Bank for Reconstruction and Development (EBRD)
Mongolia has been a member of the EBRD since 2006. From 2006 to 2012, EBRD contributed 690 million EUR for 52 projects. These projects have involved debt, equity finance, and trade finance guarantees [9].

III. International Finance Corporation (IFC)
IFC, a member of the World Bank Group, interacts with Mongolian banks to “help them increase capital and boost lending to SMEs” [9]. Although IFC does not directly invest in entrepreneurs, it provides several trainings and services to commercial banks that might help promote SME development [17]. For example, IFC offers trainings in financial technologies, best government practices, and international standards. Additionally, IFC provides Mongolian banks with equity, loans, and trade financing. Sectors of particular interest to IFC are agribusiness, logistics, retail, building materials, and manufacturing [9].

IV. United States Agency for International Development (USAID)
USAID funds the Business Plus Initiative (BPI) in Mongolia. Initiated in 2011, the BPI aims to promote SME development through two sub-initiatives. The first sub-initiative is the creation of the Quality Supplier Development Center that connects SMEs with buyers. The second sub-initiative is the Quality Management Program which provides training sessions to SMEs through the help of the Mongolian company Development Solutions [9, 18].

Foreign Direct Investment
Since the fall of mining in 2012, FDI in Mongolia has decreased by 85% [19]. In 2015, inward direct investment was 13,458 million USD in total, with the Netherlands leading direct investment in Mongolia at 7,637 million USD [2]. However, with new projects in mining emerging within the next few years, there is hope that FDI will once again increase.

In addition to the international mining agreements promoting FDI in Mongolia, in 2013 the government passed a series of investment laws. Overall, these laws treat domestic and foreign investment equally and provides a series of incentives and protections for investment (see Government section for more details). There is hope that this protection will encourage investors to place their sights on Mongolian entities.

Government agreements between Mongolia and foreign nations might also promote FDI. One such agreement is the Japan-Mongolia Economic Partnership Agreement, signed in February 10, 2015. This bilateral agreement dramatically reduces importation taxes while also seeking to promote investment and protect intellectual property [20]. Although importation of high quality equipment will likely increase, the growing inflow of Japanese products may compete with Mongolian companies. Another agreement is the Investment Incentive Agreement between the United States and Mongolia. Through this agreement, the Mongolian government
provides national treatment to projects of the U.S. government’s Overseas Private Investment Corporation [19]. Trade agreements such as this will likely serve to encourage foreign investors of the safety associated with investing in Mongolian companies.

As explained by Mongolian journalist Jargal DeFacto, “The positive side of attracting foreign investments is having new financial and human resources, using them in the mid-term and long-term, creating new knowledge and necessity, improving economic discipline and having new political and business partners. The negative side of attracting foreign investment could be drastic changes in exchange rates, dependency on foreign technology, education and funds, foreign companies controlling the majority of exports and discrimination against local people… The ugly side of attracting foreign investment is that it encourages corruption and reduces benefits from natural resource” [21]. The coming years will determine which direction Mongolia pursues if and when FDI increases.

Conclusions and recommendations
Overall, the largest hurdle faced by the entrepreneurs interviewed in this study was capital. In Mongolia, capital, either from banks or investors, is scarce. Many interviewees expressed a desire for a legal and cultural environment that is friendlier to investors. This could be achieved through legal policies catering to foreign investors, entrepreneur trainings that will improve the knowledge and how-to of pitching to investors, and stronger university liaison offices connecting innovative ideas and potential investors [22]. However, until new mining projects prove profitable to foreign investors, it is likely the capital drought will continue.

Methods
In the present study, we interviewed representatives from one boutique bank (Mongolian International Capital Corporation), two commercial banks (Arig Bank, Khan Bank), one foreign development bank (Asian Development Bank), two mining investment departments (Mongolia Mining Corporation, Erdenes Mongol), two investment management companies (Horizon Partners, Mongol Opportunities Fund), and the Credit Guarantee Fund of Mongolia.

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   2012.
D. University

Universities are a major stakeholder in the innovation and entrepreneurial ecosystem. The most apparent role of universities is serving as the powerhouses for training and educating the necessary human talent and skilled workforce for the country’s economic growth. However, universities have the capability of extending beyond this traditional role to utilize their resources to better foster innovation and entrepreneurship in the community.

In this section, we briefly review the development of the education sector in Mongolia, highlighting major policy implementations and reformation and describing the current education system. We then describe our assessment of the innovation and entrepreneurial capacity contribution of a few key institutions in Ulaanbaatar based on the interviews we conducted and the data we gathered from literature. Finally, we identify potential areas of improvement in the current university system, particularly on developing high quality training programs.

History of Innovation and Education in Mongolia

Similar to the government of Mongolia, the recent education system is fairly young. Mongolia’s decision to embrace the open market system immediately after operating under communist rule since the 1920s resulted in restructuring of the country’s different departments, including education [1].

Education in the Soviet Era

During the Soviet Era, higher education institutions served the sole purpose of teaching, and research was delegated to specialized institutes. Under such system, the research arm of the country was separated into two organizations: The Mongolian Academy of Sciences (MAS) focused on basic research and innovation, while the research institutes affiliated with different ministries focused on translating the basic research into applications [1].

Building the legal framework and policies

Upon the transition to democracy, the country first focused on developing legal frameworks for research and development and innovation before implementing educational policies [1]. Out of these laws include the 1998 Government policy on Science and Technology which outlines the legal framework for handling new technologies and innovations.

Later, the 2002 Education Law of Mongolia was enacted to outline the education rights of the country citizens. Through the law, at least 20% of the annual government budget is required to be spent on education [2]. Generally, the spending for education has been consistently around 17% of the general government expenditure and 5% of the total GDP for the past 10 years (Fig. IVD-1). The high fractional spending suggests that education is a priority for Mongolia; however, a closer look reveals that most the funds are spent on primary and secondary education, with only ~12% of the budgeted education expenditure going towards public higher education institutes (HEIs) [3].

A portion of this budget ends up supporting the State Education Fund, which provides grants and loans to students. These loans require immobile collateral and can be forgiven if the students commits to a working five-years at a state organization after graduation. Although these efforts appear to be mutually beneficial, the work contracts are often not honored because open positions are not available, forcing students to be employed at private institutes. Additionally, the
loan repayment system is fairly ineffective, so the state will often write-off loans at a large loss. [39, 40]

![Figure IVD-1. Annual expenditure on education as a percentage of total government expenditure and GDP. Source: National Statistical Office and the Asian Development Bank [8,21-24].](image)

With the legal framework built up, focus on education in the early 2000s came in the form of developing Mongolia’s information and communications technology (ICT) sector. Through the success of numerous policies, Mongolians now begin to learn ICT skills starting in grade four, and general ICT education is fairly strong with high internet access in secondary schools (91%) and low learner-to-computer ratios (17), as of 2015 [4,5,6].

Although ICT remains a priority, the government has more recently focused its attention on developing its innovation infrastructure. After the collapse of the Soviet Era, the Mongolian government allowed all institutions to pursue research. While MAS still exists, universities are now establishing their own laboratories [1]. With a relatively young research infrastructure in the country, numerous reformations in education policy and structure have already occurred. These efforts include the Science and Technology (S&T) Master Plan of Mongolia 2007-2020, the National Innovation System (2008), and the higher education reformation project [1, 7], all of which aim to build the research and innovation capacities of universities.

**University curriculum and structure**

To bring Mongolia up to international standards, the government restructured the secondary school system several times. In 2004, the Mongolian government implemented a shift from a ten-year to an eleven-year school system. Then in 2008, a second change was made to further extend general education to a twelve-year system[6]. Students can continue to obtain tertiary education through technical and vocational education training (TVET) or at universities...
and colleges. Currently, students are placed in tertiary education systems and their respective fields of studies through a national examination.

There are currently over 180 higher education institutions (HEI) (Fig. IVD-2), which experienced a sudden decrease in 2010 from over 200 schools with a growing number of new universities. This significant change likely resulted from the extension of the secondary-school system to twelve years in 2008. Because student tuition and fees contribute to over 60% of funds for public institutions [8], the drastic reduction in entering students for HEI provided selective pressure on schools with higher educational quality [9].

![Figure IVD-2. Number of higher education institutions by year and by type of institution. Source: National Statistical Office [23-26]](image)

Numerous interviewees voiced their concerns on the education quality: with only 40% of HEIs being internationally accredited as of 2010 [3], Mongolia currently offers quantity over quality [9]. After graduation, only 40% of students are employed [7]. Furthermore, some employers remark how they have to retrain the new graduates or must frequently correct their employees’ written Mongolian statements in spite of the country’s 98% literacy rate [10,11,12]. This mismatch in needs has triggered plans to improve practical, technical, and creative thinking skills in HEI [7].

With efforts to improve education quality, numerous institutions are turning to hiring more faculty members. For example, the Mongolian University of Science and Technology (MUST) aims to increase faculty members by 40% over the next 10 years [13]. Unfortunately, under the existing system, teaching positions are not highly desirable due to the low salaries averages ($300/month) [14,15]. HEIs cannot simply raise the teachers’ salaries, due to financial limitations of universities. To supplement their salaries, many teachers will often conduct two or three side projects on top of their teaching duties, such as consulting for different companies or using the laboratory facilities to test products [16,17, 39]. Because these contracts are made with the individual, the school does not receive a portion of the consulting fees.
In addition to quantity, teaching quality also needs to be improved, as textbooks and materials used are frequently outdated [18]. Education at the university level often embodies a strict teacher-centered relationship, in which the teacher lectures and the students learn in a passive manner [18, 19]. Numerous interviewees remarked that universities should teach more tacit or practical knowledge, and even vocational coursework is administered through lectures on theory instead of hands-on training [20, 39]. A recent alumnus had remarked that engineering classes could be taught to be more exciting by demonstrating the usefulness of the field [21].

While teaching and education quality was a concern for numerous interviewees, many also recognized a need for more technically skilled graduates [22]. Currently, STEM degrees account for only ~17% of all university and college graduates. However, this number is
increasing, primarily due to granting more engineering degrees, with over 50% of students selecting to pursue humanities or business degrees (Fig. IVD-3A,B). Through the Higher Education Reform Project with the Asian Development Bank (ADB), the Mongolian government is making efforts to increase the number of STEM graduates. In 2008, the government provided full scholarships for students to study IT, bio/nanotechnology, or mining at universities in developed countries [1].

Universities have also built their own partnerships: An agreement was signed between MUST and Japanese universities to send 1000 Mongolian students abroad to study engineering [13]. In general, the number of Mongolian students going abroad to study have increased over the past decade to over 1000 students (Fig. IVD-3C). Although most universities have international partners, domestic collaborations are quite limited. One interviewee remarked that the relationship was quite competitive, possibly arising due to universities’ dependency on student tuition to survive [16].

**Current capacities in universities**

**Innovation**

A major effort was made in the S&T Master Plan to develop the national innovation system. As of 2015, Mongolia houses 59 research institutes that employs a total of 4125 people, of which 61% of these hold a doctorate, academician, or professor title. These institutes span disciplines from the social sciences to the natural and technical sciences [26]. Currently, most HEIs graduates receive bachelor degrees, which doctorates contributing to only 2% of all students studying (Fig. 3D). The low quantity of doctorates corroborates that universities are currently focusing on teaching and not research.

At many universities, efforts are being made to integrate research into the curriculum. For example, senior thesis projects are now compulsory at some universities such as the MUST and the Mongolian International University (MIU) [27,28]. Often these projects are either self-proposed or developed with a professor and include projects such as creating a 3D-printed prosthetic for a child. Additionally, many students often select to work in a laboratory during their undergraduate studies [16, 29]. To further promote research, a new university the New Mongol Institute of Technology (NMIT) has a requirement for each master’s student to publish an article in an international journal [17]. Emphasis is placed on international journals, because many Mongolian journals are not peer reviewed. Overall, journal publication numbers have been increasing rapidly (Fig. IVD-4)
Part of the challenge in developing the research capacity of universities comes from limited funding. Government financial support is very low, with 0.1% of the GDP spent on the science sector in 2015 and only 0.23% on R&D in 2013 [12, 26]. Universities receive on the whole only 3-5% of the total government budget [13]. Some universities also apply for bids to complete projects through the government’s Science and Technology Fund; however, these applications are open to everyone and are quite competitive [38].

The S&T Master Plan aims to develop the research and development (R&D) sector of Mongolia to create a supportive innovation environment. A major effort of this plan involves developing the university R&D capacities through improving the laboratory quality [30]. With limited funding and a young research infrastructure, university research laboratories are often quite sparse [17]. Sometimes laboratories may appear to be well-equipped, but “are actually dead,” in regards to the defunct equipment [31]. While equipment donations have been made, universities often struggle to provide the funding required for shipping or for paying taxes [39, 41]. Without proper equipment or trained staff, performing research can be very difficult.

Surprisingly, although analytical labs are limited in capacity, an area that has grown substantially is innovative spaces and equipment, such as machine shops and maker spaces. One of such spaces is the Open Innovation Lab (OIL), which was born out of a collaboration between MUST and Startup Mongolia [32]. The OIL lab offers a space to host events and even provides a 3D printer for open access. In addition, the MUST library offers a cutting edge prototype laboratory, and the telecommunications company Unitel, a prominent telecommunications company, funded a laboratory for the National University of Mongolia (NUM) [28]. Unfortunately, despite the high technology present in these spaces, the resources are often not used [28].

Similarly, even with such a young research division, some universities offer a transfer office or are looking to develop one. The usage of these departments may be limited [17]. Patents
are often rarely owned by the HEIs. Instead, the patents are held solely by the professors [13] or may have been obtained prior to joining the university [31].

The efforts of universities to reform education extend outside the campus. Some universities members may consult for government projects or help shape innovation or education laws [32]. Universities are also organizing forums such as the Mongolian Entrepreneurship Summit or an Innovation Week with different ministries to better engage policymakers in promoting innovation and entrepreneurship [13,32].

Entrepreneurship

Entrepreneurship is quite new in Mongolia [14,33]. Through recent promotion of the term through hosting the Mongolian Entrepreneurship Summit, universities are now looking to renew their curriculum to include entrepreneurship elements [16,17]. One of the early introductions was the “Entrepreneurship 101” course that was offered by MUST and Startup Mongolia [9]. Now, MUST has began to teach tailored economics courses for engineers and is introducing new graduate degrees in business administration and management [32]. NUM has also began to offer two new entrepreneurship courses in the past year and will often recruit guest lecturers from local companies [27,37, 38]; however, building entrepreneurship courses has been challenging due to a lack of teaching materials [33].

In addition, university entrepreneurship centers are available or in development [16,32,33]. While still young, NUM’s open access Business Center offers consulting and business training programs for companies [38]. The center is aiming to provide services, courses, and an accelerator program tailored to the needs of students and faculty to develop their startup ideas [33]. MUST’s Center for Entrepreneurship additionally offers technology funds that have already been used to launch a baked goods pilot factory.

Recently, student groups have also emerged, demonstrating the youth interest in entrepreneurship. For example, the Business Case challenges allow students to compete in teams on different business cases. Universities are also launching Student Entrepreneurs Clubs, which host various seminars, pitching sessions, and business plan competitions [33,34]. Unfortunately, these clubs often receive little funding or support from the university, making it challenging for students to realize their startup ideas. Many students have found the current education system to be inflexible in regards to course work or difficult for finding the appropriate technical or business partners due to limited interaction between different departments [29,34].

Additionally, universities have been engaging entrepreneurs and corporations to host career fairs and secure internships for the students. For example, InfinitE Solutions is working with MIU to recruit IT students for required semester-long internships [27]. Students at the Mongolian University of Pharmaceutical Sciences are provided opportunities to work in laboratories through the company and to intern at pharmacies [11]. However, these interactions between universities and entrepreneurs and corporations often lack depth. Other entrepreneurs have attempted to reach out to university labs to help develop or test products, but the labs were not properly equipped or failed due to lack of trust [35,36].

In general, there is limited cross-pollination between the innovation and entrepreneurial resources offered at universities. An exception to this has been the 2016 Global Startups Labs Class resulting from a collaboration between MIT, MUST, and NUM. In this summer program, university-level students with technical and business backgrounds work together over the course of nine-weeks to develop mobile startup applications. The reception of this program has been
very positive regarding both the content and the structure [28, 42, 43]. One professor highlighted that this program provides much needed interaction between technical and business arms of the university [42, 43].

An additional challenge to generating entrepreneurial activities at the university level is legislation limitations. A study in 2002 found that a combination of bureaucracy, unclear tax policies, and lack of non-profit legislature hindered the business activities of universities [41]. For example, a TVET was granted a tender at a mining corporation; however, anti-corruption agencies prohibited the school from receiving the funds, and contracts had to be written to pay the trainers but exclude the school from receiving funds [39]. Even with efforts from the university, additional support through the government is needed to rectify the conflict between the Law on Education and State Funds and the Law on Innovation.

**Partnerships beyond the 4-years**

Until recently, once students graduated from their universities, there was limited support and interaction with the parent institution. In the past two years, many universities began to introduce their alumni network [16, 21, 33]. A few networking events have already been hosted to try to connect current university members with its recent graduates to encourage supporting internships or perhaps even collecting donations [16]. Building such networks is likely one of several connections between universities other other stakeholders in the making.

**Conclusions and recommendations**

Recently, Mongolia has launched numerous programs and policies towards building higher quality HEIs and a stronger innovation system. Although universities have made much progress to expand their functions beyond teaching, there still remains improvements both internally and through policy reform that can be made to better position universities as a stronger stakeholder in the entrepreneurship and innovation ecosystem.

One of the most noticeable gaps is the lack of startups emerging from universities. One possible cause is the limited availability of interdisciplinary projects and coursework in universities. Currently, each department or organization acts separately. Universities would benefit on multiple levels through these interactions: by creating a tighter knit internal network and raising awareness of available resources and services. This could help foster a more supportive community for both students and faculty to engage in innovation and entrepreneurial activities. The Global Startups Labs collaboration with MIT provides a well-supported method for universities to launch startups. Increase support for similar programs can only help improve the innovation and entrepreneurial capacities of universities.

Further, more deliberate advertisements and events can be held to better promote available but underused resources. Even within the university stakeholder, the different schools can focus on increasing collaboration. In general, knowledge of resources offered by other universities is fairly limited.

Additionally, some policies have limited university development of innovation and entrepreneurship. Although universities have the capacity of establishing contracts with private entities, some laws provide additional financial burden or prohibit universities from accepting outside income and equipment. These laws must be reexamined to enable universities to better utilize their resources.
Despite the significant financial restrictions, universities have been able to start new research laboratories, entrepreneurship centers, and alumni networks. By cultivating these systems to improve and expand the services offered, universities can better foster their innovation and entrepreneurial capacities.

**Methods**

The data reported from our studies include a mix of literature review and reported statistics as well as interviews across five local universities and a number of disciplines. Most interviewees had studied in a STEM or business-related field. While size of our interviewee pool limits our capability to draw statistically significant conclusions, the breadth of our interviewee demographics are broad and include current students, recent alumni, faculty members, and department heads that are responsible for decision-making. Such wide scope enables us to report key qualitative findings. We also report findings from interviewees outside the university stakeholder who comment on the education quality and system.

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E. Entrepreneur

Capitalism is relatively young in Mongolia, and thus, entrepreneurship is similarly young. Although Mongolians have been establishing businesses for the past 25 years, the terms “entrepreneurship” and “startup” are not completely understood by the populace. The startup culture has started to take root in the past five years, primarily led by the team at Startup Mongolia (see Startup Community section for more information). With efforts to publicize and encourage entrepreneurship and innovation, startups have become trendy. Nearly every individual we interviewed, regardless of age, was very optimistic about the potential of startups and interested in helping entrepreneurs to grow their ideas and businesses. Several individuals interviewed were not entrepreneurs at the time of interview but planned on eventually starting their own businesses [1,2,3,4,5]. The enthusiasm for entrepreneurship shows the fortification of the startup community and the growing hope that entrepreneurs will help Mongolia diversify and strengthen the national economy. In this section, we discuss trends in emerging startups, highlight the key difficulties faced by entrepreneurs, provide advice to budding entrepreneurs in Mongolia, and explain entrepreneurs’ contributions to entrepreneurial and innovation capacities in the region.

Trends in entrepreneurship

Foreign business models

Several emerging enterprises in Mongolia are using successful business models from foreign countries as inspiration and the base of their own business models. The new models are adapted to better cater to the Mongolian market. For example, Songo, a web application designed to deliver food from restaurants to customers using Songo drivers, closely follows the business model of the American company Door Dash [6]. Another example is Easy Ride, a mobile phone application designed to implement reliable communication between taxi drivers and potential customers. This app functions similarly to the San Francisco-based company Uber [7]. Although these startups have met considerable levels of success, they faced unique challenges. The foremost challenge was consumer understanding, with potential Mongolian customers not understanding the appeal of these new technologies. This challenge and others are discussed in more detail below. Regardless within Mongolia, these companies are modifying consumer behavior and further integrating technology use into the people’s lives. Many of the entrepreneurs are also looking to expand their businesses to neighboring Central Asian countries which share similarities to the Mongolian market [7].

Mongolian-sourced products

In recent years, there has been a movement to develop products using natural Mongolian resources. These local ingredients are often unique to Mongolia or very abundant in the region. For example, the organic incense startup Mon Arts is using traditional Mongolian herbs such as juniper to create compact and easy-to-use incense [8]. The startups Lhamour and Seaberry are both using Mongolian-based ingredients in beauty products. One distinguishing ingredient in Seaberry’s products is sea buckthorn oil from the sea buckthorn berries that thrive in the regions surrounding Ulaanbaatar [9]. Lhamour features products that also contain sea buckthorn oil as well as other traditional ingredients such as Mongolian sheep tail fat [10]. These companies combine traditional Mongolian knowledge with marketing innovation to create unique products.
Many interviewees cited the use of natural, organic Mongolian ingredients in these quality products as catalysts for growing and improving the Mongolian reputation for quality agricultural products [9,26].

Social entrepreneurship

If the term “entrepreneur” is ill-defined, then the phrase “social entrepreneur” is relatively unknown. Several Mongolians do not understand and are skeptical about the benefits or motivation driving the development of a social enterprise [11]. However, there is hope that this will soon change, thanks to startups such as GerHub and Bee Happy. GerHub is creating a business around improving life in the ger districts surrounding Ulaanbaatar (See Appendix 1 for more details.). One project involves collaboration with Hong Kong University to create easy-to-install modules as an incremental development strategy for expanding the facilities offered by traditional Mongolian gers [12]. Bee Happy’s Bee Cafe is a coffee shop where young people can gather without having to pay for refreshments in order to use the space. Additionally, Bee Happy is selling honey products from bee farmers in the Selenge province in Mongolia. The honey there had long been sold in second-hand jars with little to no product labels. With the help of Bee Happy, the honey is now certified and being sold in attractive jars in stores throughout Ulaanbaatar. The Bee Happy team hopes to soon have internationally certified honey products ready for exportation [11]. While social entrepreneurship is a fairly new concept in Mongolia, interest in such ventures is growing, and new social enterprises will pave the path for future enterprises to flourish and improve the lives of inhabitants across Mongolia and abroad.

Key difficulties

The difficulties faced by entrepreneurs in Ulaanbaatar include several that one would expect to see in any budding startup community – accessing mentors, seed funding, expanding into foreign markets, and growing a team. However, several difficulties are more specific to the case of Mongolia, primarily a lack of consumer understanding and mistrust of intellectual property protection. Figure IVE-1 below depicts the percentage of interviewed entrepreneurs (22 total) who listed a particular key difficulty when describing startup initiation and development.
Figure IVE-1. Challenges faced by entrepreneurs. Bar graph depicting the fraction of entrepreneurs interviewed that specify a particular factor as being a challenge in establishing their business. $n = 22$.

1. **Funding**

The largest difficulties faced by entrepreneurs in Ulaanbaatar relate to funding. In most cases, it is extremely difficult for entrepreneurs to find the seed funding necessary to launch a venture or make the product or business developments required to expand to global markets. As discussed in the Capital section of this report, there are no venture capitalists or angel investors in Mongolia. As a result, most of the interviewed entrepreneurs obtained funding through their own savings, informal loans from friends and family, or through wealthy, unnamed individuals. One entrepreneurship expert in Ulaanbaatar estimates that 7000 USD is needed to sustain three founders for the first four-six months of product and business development [14]. In addition to limited access, other financial difficulties include the inaccessibility of commercial bank loans, high taxes, and the high cost of doing business [15].

2. **Consumer understanding**

Consumer understanding is another key difficulty for Mongolian entrepreneurs. This difficulty pertains to both entrepreneurs’ lack of understanding of the current market needs as well as consumers’ lack of understanding of the appeal of innovative products. For example, one entrepreneur interviewed explained that his smartphone application could have gained a larger user base from the time the product launched if the startup had performed more extensive potential user surveys and research [7]. On the other hand, the startup Songo, the food delivery application, faced difficulties in convincing customers of the value of the application. Several restaurants did not immediately grasp the potential impact of using the Songo application, and
the founder of Songo had to pitch the startup idea multiple times [6]. This difficulty could be partially ameliorated if entrepreneurs are given trainings on the importance and know-how of market research and consumer education and if the general public is better educated on the importance of innovation.

3. Human capital

Over 25% of entrepreneurs interviewed expressed difficulties regarding the lack of a skilled workforce. Startups involving IT expressed trouble hiring software developers with strong technical backgrounds [16,17], and as a result a few IT Startups now outsource for their software developing needs [6,18]. Additionally, entrepreneurs disclosed difficulties finding team members that are capable of preparing strong business plans. One startup experienced negative cash flow for over one year while they focused on obtaining a large amount of funding instead of on product development. In the end, they realized that their startups required significantly less capital than they had projected in their initial business plans. Had there been mentors or resources available to the startup in its earliest stages, the startup might have corrected its mistake and began product development much earlier [19]. An International Finance Corporation report published in 2015 also listed the lack of a skilled workforce and lack of capacity in preparing strong business plans was key difficulties facing entrepreneurs [15]. Interestingly, the majority (17/22) of entrepreneurs interviewed had studied or worked abroad. Fourteen of those 17 entrepreneurs who had studied abroad had experience living in the United States. Although clear statistics on the fraction of Mongolians studying abroad who return unavailable, the number of Mongolians that go abroad have been increasing each year. Some worry that Mongolia may later suffer from “brain drain” (where talented and bright youth leave their home country to work abroad). For those that do return after going abroad, several mentioned a sense of familial and national loyalty as well as with an acknowledgement of the plethora of opportunities for startups in Mongolia. Startups in Mongolia, a developing economy of three million people, have the potential to create waves in the society, whereas startups in developed nations such as the United States rarely have such a large impact.

4. Office space

Finding affordable office space was listed as a difficulty by approximately one in four entrepreneurs interviewed. One entrepreneur estimated that an appropriate office space could be rented for 500-700USD per month on average [14]. Several businesses, established corporations and startups alike, prefer to find office space near Chinggis Square, near the center of Ulaanbaatar, and along Seoul Street and Beijing Street (see Innovation Ecosystem map for details). These are attractive locations because there are several restaurants and coffee shops surrounding the areas that offer locations for meeting clients [19]. Additionally, most government buildings and commercial banks are within walking distance of Chinggis Square. However, while startups prefer locating their businesses in these general areas, expensive office space hinders several from doing so. For the entrepreneurs unable to afford office space in prime locations, many resort to finding spaces farther out or even converting apartment into a “home office.” [29]
5. Resources and infrastructure

As entrepreneurship is young in Mongolia, there are very few resources available for startups. Startup Mongolia, the Mongolian National Chamber of Commerce and Industry, and the National IT Park offer key resources such as business trainings, discounted office space, and pitch events. However, outside of these three institutions, support for entrepreneurs is minimal. For example, in starting Lhamour, the founder Ms. Davaadorj had difficulty finding appropriate equipment and space to test and make her skincare products [10]. Ultimately, she resorted to using her own kitchen equipment and space. Lack of physical equipment has also proved troublesome for startups such as the River Club gym [3].

In addition, there are several key systems that have simply not been yet developed in Ulaanbaatar. For example, the startup Easy Ride found that the current state of digital maps of Ulaanbaatar was insufficient to connect their drivers and customers [7]. The incense startup Mon Arts found that there are currently no widely used online payment platforms (although there is currently a collaboration to create one) [8,18,20].

6. Government regulations

Overall, there are no legal hurdles to the development of a startup [22]. There is a kiosk center for all business registration needs, and business registration and licenses are often seen as easy to acquire. Additionally, few government programs and policies specifically aid startups and entrepreneurs. Some entrepreneurs prefer less government involvement and believe that the startup culture should grow organically [12]. Other entrepreneurs would like government involvement in the form of tax breaks and financial aid [10].

One area of government regulation that is particularly lacking relates to product exportation. Once a startup has survived the Mongolian market, the next step is often to expand into the markets of foreign countries. Consumer product companies such as Lhamour, Seaberry, and Mon Art (described above) are currently working to export their products to foreign countries. Issues most commonly arise in the form of international product certifications. In Mongolia, there are currently no labs that are certified to test products for international exportation, posing a problem for foreign distributors who are interested in marketing certified organic or chemical-free products [8]. The economy as a whole would largely benefit from laboratories capable of certifying organic and natural products.

7. IP enforcement

IP enforcement is an area of contention for multiple startups in Mongolia. Startups ranging from organic cosmetics to web applications have reported IP infringement [10,21]. Their experiences usually reflect the government’s poor capacity for IP protection. With little protection of innovative products and methods, incentive to innovate may be lower compared to other developing markets.

Conclusions and Recommendations

Several experienced entrepreneurs and businesspeople provided advice that they would give to a “budding” entrepreneur. Many suggested developing a strong team. Teamwork is critical to the success of startups, and it is especially vital to develop strong communication skills between all startup members [7,11,18,23]. It was also suggested to have at least one
well-connected, slightly older individual with great understanding of how best to communicate across generations in Mongolia [14].

Others gave advice to develop proper business plans. Market research and financial planning are key aspects of a successful business plan [11,12,19,21,24], and such “bullet-proof” plans will be much more attractive to potential investors [25]. One entrepreneur emphasized the importance of listening to customers to develop a more thorough consumer understanding [7]. Additionally, because of the small size of the Mongolian market, it can prove beneficial to a startup to look beyond the domestic market and plan to eventually expand to foreign markets [12,26,27].

To emerge and thrive in the Mongolian government, it goes without question that an entrepreneur needs passion, drive, and the ability to put in a lot of hours and effort [9,21,25,28]. It is important that entrepreneurs do not focus too much on failure or the limited resources available in the country [6,29]. At the end of the day, if entrepreneurs are truly passionate about their ideas and willing to devote the time and effort, necessary to succeed, then they “just gotta do it” [10].

Methods
In the present study, we interviewed 22 entrepreneurs. Thirteen of those entrepreneurs had started IT based companies.

References
F. The Startup Community

An additional stakeholder to the innovation and entrepreneurial ecosystems includes community organizations, such as accelerator programs, associations, incubators, and co-working spaces. In Mongolia, these organizations are playing an active role in promoting the startup culture and general concepts of innovation and entrepreneurship. Through their programs, these organizations offer a means of connecting the different innovation ecosystem stakeholders. In this section, we summarize a few key contributors to the startup scene and the resources they provide to entrepreneurs.

Startup Mongolia

The most visible and largest startup program in Mongolia is Startup Mongolia. This NGO had its humble beginnings in 2011 through hosting Startup Weekend events. In the past five years, the organization has grown drastically and hosted over 300 events [1].

Startup Mongolia consists of a collection of programs (Fig. IVF-1). These programs are adapted from models that were proven successful abroad [2,3]. For example, the “Startup” series came from the TechStars Programs [4]. With such diverse programs, Startup Mongolia offers much to the young entrepreneurial environment of the country.

![Diagram of Startup Mongolia's programs](source: Program logos from Startup Mongolia’s website and Mongol Accelerator Facebook Page.)
Building awareness of entrepreneurship

Perhaps the most apparent impact of Startup Mongolia has been building public awareness of entrepreneurship and innovation. Five years ago when the organization started, the business atmosphere was very different, and many people were unaware of what entrepreneurship meant [2,5]. Startup Mongolia has multiple methods of building excitement for and promoting entrepreneurship and innovation.

The first method is through introducing learning programs such as the Startup Show, where hosts interview entrepreneurs about their experiences in building their own startups. There are now over 80 episodes. In 2013, Startup Mongolia introduced monthly Drink Entrepreneur events for casual meet-ups and discussions on entrepreneurship. One year later, the group added the monthly Startup Grind series. These fire-side chats and question-answer sessions with distinguished lecturers allow for more intimate interaction and networking to occur between established industry members and young entrepreneurs.

Building innovation and entrepreneurship capacity

Startup Mongolia goes beyond providing programs to create a supportive entrepreneurial network. The NGO has also introduced a number of programs and resources to foster innovation. For example, the organization began offering Stanford’s Design Thinking course in 2015. The class is very well received, with some students describing it as being “brilliant” [6].

To provide a space for innovators to gather, Startup Mongolia has also collaborated with the Mongolian university of Science and Technology to create the Open Innovation Lab (OIL) available for public access. This facility offers classroom and office space, as well as a 3D printer [7].

One of the earliest programs Startup Mongolia offered was the Startup Weekend Ideathons. Over the course of a weekend, participants pitch problems and proposed solutions, vote for a business idea, recruit team members, and present a prototype. These ideathons are often themed. For example, the organization hosted the Startup Mom-preneurs Weekend to promote women’s participation in entrepreneurship. The fast pace of the event makes Startup Weekend extremely exciting for newcomers [5]. Often these weekends are also sponsored by large, local companies such as Unitel and Mobicom. These events not only promote innovation but also provide entrepreneurial support for the young community.

In 2015, Startup Mongolia added a new twist to the investment environment. Inspired by the “Geeks on a Plane” concept, the NGO piloted the Startup Train to provide teams with intensive mentorship sessions as they ride on a train to foreign regions to pitch to prospective investors. In the 2016 train, Startup Mongolia brought the teams to Beijing and Moscow, where the participants had the opportunity of experiencing the international investment climate. These ideation programs are open to all startups beyond Mongolia.

Just last year, the NGO added one more program to further support entrepreneurship – the Mongol Accelerator Program. Previously, the organization had the five-week pre-accelerator program Startup Next [1,2]. Additionally, Startup Mongolia has recently run two key initiatives: Code4GreenUB (2015) and the Green Nation Challenge (2016). Both initiatives were supported by the World Bank and the Korean Green Growth Partnership. These initiatives consist of a collection of events and programs that are specifically tailored for green technologies (Fig. IVF-2). As a result, teams have the opportunity of participating in a extensive, cohesive program and intensive training.
Engaging other stakeholders

Startup Mongolia is without a doubt the premier organization in Mongolia for establishing a startup foundation. It is also one of the only organizations to offer a diversity of resources and programs at all stages for developing ideas into entrepreneurial solutions. To accomplish these, Startup Mongolia has interacted with many of the different stakeholders, including other organizations such as the Mongolian National Chamber of Commerce and Industry to create a Startup Council. They have also worked closely with the National University of Mongolia and the Mongolian University of Science and Technology to create tailored coursework. While funding is still early-stage, Startup Mongolia has managed to attract potential risk capital through hosting demo days. Funding sources may even emerge from international partners through its Startup Train event. The NGO also had the capability of engaging corporate sponsors for its events. Just five years old, Startup Mongolia has already become an integral node in the country to connect different stakeholders together to more efficiently stimulate the innovation ecosystem.

Women Entrepreneurs of Mongolia

The Women Entrepreneurs of Mongolia (WEM) was founded by Azjargal Enkhtaivan, a board member of Startup Mongolia, in October 2015 to create a supportive network for women in business. As a result of this connection, WEM works closely with Startup Mongolia to plan certain events, a number of which are focused on women in business. More recently, the organization collaborated with the Ministry of Industry to set up Startup Weekends in the Mongolian countryside to address challenges faced there.
The most well known event was the Startup Weekend Mompreneurs event. This event was very successful, and a number of startups had emerged from it, including the Mama App that allows for a community of mothers to discuss relevant topics [5]. While still young, WEM is building a system of resources for women entrepreneurs.

**Maker Movement and Spaces**

The Maker Movement in Mongolia is also similarly young in Mongolia. Startup Mongolia had initiated a Maker’s Week in October of 2015. This was one of the first times that the Maker’s movement was publicized in Mongolia. Since then, Startup Mongolia has been working to nurture and grow the community [7].

While a few makerspaces do exist in Ulaanbaatar, knowledge of their resources and their usage is fairly limited. Perhaps the most well known resource is OIL; however, details about their exact equipment is not well publicized. The Mongolian University of Science and Technology library also has their own high technology maker laboratory with state-of-the-art laser cutters and 3D printers, but the space does not seem to be used much [7]. In general, many of such makerspaces are available, but the exact reasons for the low usage is unclear.

In addition to these institutional spaces, a private makerspace is also being developed. While the space currently does not contain any equipment, it does host a number of events where makers with varying skill sets from engineers to designers can come together to brainstorm ideas and build projects together. These interactions help build a connected maker community. Further, the environment helps catalyze collaboration between individuals with complementary skill sets to build a strong innovation system [8].

**Training and Business Centers**

**Khan Business Incubator**

While the word ‘incubator’ is in the center’s name, the organization realistically acts more as a training center. Its services, which include training and advice, are provided for free for clients who receive loans from Khan Bank. Since its inception 10 years ago, the number of clients has grown to over 400. These clients are primarily more established SMEs. Additional details about the incubator center can be found in the Corporate section under the Financial subheading.

The Khan Business Incubator is looking to expand its business and target young startups. Although the center currently lacks its own physical space and uses the company lecture halls and meeting rooms for its trainings, the Khan Business Incubator will be moving to a dedicated space in December 2016 [9]. While the details of the new programs are still in discussion, the incubator recognizes the potential growth of the young startups and is looking to potentially provide investments in early stage startups. Through discussions with the government, the incubator is seeking means of better supporting innovation. If the incubator is able to develop an investment program that supports these innovative startups, the center would provide an invaluable funding resource in Ulaanbaatar.

**Development Solutions**

Development Solutions was established in 2013 through the Youth Business Mongolia initiative branched form the Youth Business International as a method of providing support for SMEs. Since then, the organization has focused on developing extensive 3-day training sessions,
mentoring programs, and networking events to connect its clients with financing agencies. The intensive program teaches it attendees details on a number of topics essential for business from market planning to create a viable financial proposal. Development Solutions’s unofficial motto is to “create employees, not jobs” [10]. Much of the funding from the NGO has come from agencies such as USAID, Kiva, and the World Bank. As a result, a few of the projects are focused on specific sectors such as legalizing artisanal miners and improving the quality of agricultural products. The trainings offered by Development Solutions addresses a major entrepreneurship capacity challenge of limited high quality business trainings.

Women’s Business Center

Through funding from the Asia Foundation, Development Solutions was able to launch a Women’s Business Center that opened in July 2016. The center offers co-working space that offers 10 computers for use [10] and aims to increase the number of women entrepreneurs in Mongolia [11].

National University of Mongolia’s (NUM’s) Business Center

The NUM Business School also has their own business center. The center originally focused on providing management consulting, research services, and executive trainings to business. In the past two years, the Business Center has begun to provide services to the school’s students. Recently, NUM began looking to transform the Business Center into an Entrepreneurship Center.

The center aims to do this by providing new curricula and trainings tailored for startups. Additionally, the center focuses to better support student entrepreneurship events by creating an incubation center, building an accelerator program, and offering student competitions [12]. Although the details are still in development, if the new Entrepreneurship Center is able to carry out the above services, it would provide much needed means to build universities’ entrepreneurship capacity and begin launching their own startups.

Executive Excellence International Business Center (EEIBC)

Located just south of the city center, The EEIBC offers both physical and virtual office space in Ulaanbaatar. For the most part, the center is tailored for the needs of larger businesses and companies [13]. Although the contribution of the center to the startup community is limited, the EEIBC is able to bring in international talent such as from the Harvard Business School to provide trainings and run workshops [14].

Incubators

IT Park

The National IT Park is also currently undergoing restructuring and will soon be transitioned to the governance of the National University of Mongolia [15]. More details about the current system can be found in the governmental section.

Mongolian Academy of Sciences (MAS) Technology Incubator

MAS technology incubator offers laboratory and research services for companies to aid in developing new technologies [16]. In Mongolia, certification services are quite limited [17]. The Incubator may potentially help realize the innovations that are developed locally.
CLUB Coworking

Few co-working spaces exist in Ulaanbaatar. Perhaps the newest and premier co-working space is CLUB Coworking. Located centrally in the city, CLUB Coworking offers numerous membership packages to access its 48 seats or private offices and free Wi-Fi (Fig. IVF-3). In addition to building a supportive community work environment, the co-working space will host trainings and events for its members [18].

With high rental costs, coworking spaces are needed to support entrepreneurs who are already limited in funds. Although CLUB offers access to high quality facilities and does much to build the appropriate working community [2], some have remarked that the costs of the spaces are still too high for young entrepreneurs who have recently graduated college [19].

Figure IVF-3. Photo of the main coworking hall of CLUB. This includes a kitchen and open desk spaces.

Business associations

A number of business associations also exist to help advocate for businesses. These associations will lobby for policy changes or act as a liaison between businesses and the government. In general, these organizations work to create a good business environment in Mongolia.

Mongolian National Chamber of Commerce and Industry (MNCCI)

The largest business organization is the MNCCI, with over 3000 members. The chamber of commerce has also 33 councils that focus on specific groups. To promote entrepreneurship, the MNCCI recently established a Startup Council less than one year ago. This council focuses on providing network resources and financial benefits to young companies.

The MNCCI provides special membership discounts to startups, including free use of office space and heavily discounted membership and training fees. The council is currently working with Startup Mongolia to build much needed venture capital funding in Mongolia. Perhaps the most tangible benefit entrepreneurial members have received is connections with
other established businesses. For example, the chamber connected small shoe startup Chansaa to a larger biscuit company for shop space rental deals [20]. With such a large organization focused on supporting the startup community, MNCCI provides much needed advocacy for startups.

**Business Council of Mongolia (BCM)**

BCM is the second largest group after the MNCCI, with 220 members; however, the BCM has a greater number of international members. Like the MNCCI, BCM has a number of focused working groups. While the BCM does not have a startup focus, the organization is looking into hosting pitching events [21]

**American Chamber of Commerce (AmCham)**

The American Chamber of Commerce is primarily comprised of American companies that have a Mongolian presence. This organization is fairly small with roughly 50 members due to the high membership fees [22]. While this organization does not contribute directly to the startup environment, AmCham similarly works to create a friendly business environment.

**Media**

Media plays a critical role in Mongolia. Media consumption is very high in the country, with a survey citing that 80% of Mongolians receive their news from TV [23]. As a result of the high media penetration, media venues have a large potential to shape and promote ideas across the country. Many companies have a Facebook page or use social media to promote their products [24, 25]. While most companies will have their own radio or TV shows, young entrepreneurs are sometimes invited to major networks for interviews [25]. Some shows are focused on entrepreneurship and innovation.

**Young Inventors TV competition**

The Young Inventors TV competition was started six years ago by the national public network to encourage the youth to pursue new ideas. Although the show is hosted in Mongolia, the competition is open to residents in Russia and in Inner Mongolia. Participants are rewarded a 10 million tugrik (MNT) prize and a full, four-year university scholarship [26]. In general, the show tries to target inventors living in the countryside, since there are many problems there that could use innovative solutions. This TV competition is one of the few programs that reward innovation on the national level. Many of the show’s winners are recognized and celebrated. In addition to raising awareness about innovation, the show has the potential to demonstrate that anybody can innovate.

**Informal groups**

In addition to the formal organizations and programs listed above, other informal groups focused on innovation and entrepreneurship likely exist. One of such group is the Facebook group – **Young Mongolian entrepreneurs**. This informal group organizes occasional meet-ups for entrepreneurs to mingle and discuss their ideas [27]. Although there are no explicitly advertised services, the group contributes to the entrepreneurial ecosystem by providing a supportive network for entrepreneurs to share their resources and challenges.

**Conclusions and recommendations**
In general, organizations involved with the startup community, especially Startup Mongolia, are able to address some of the gaps in the innovation ecosystem that other stakeholders are unable to provide. Together, these organizations contribute substantially to the ecosystem through promoting public awareness and interest of innovation and entrepreneurship and by providing programs and trainings in each of these topics. Through these efforts, the startup community is currently growing and building a richer culture.

Because of the nation’s high media penetration rate and a small population, awareness and perception of startups can be easily shifted through media programs and events. For example, understanding of innovation and its usage is enriched through access to the Maker’s Movement or even in viewing the Young Inventors TV competition. Similarly, public awareness of entrepreneurship can be gained through attending networking events or by viewing numerous interviews with entrepreneurs hosted by Startup Mongolia. Together, these programs build the enthusiasm for startups and provide much needed public education on both entrepreneurship and innovation.

With current formal university curricula focused on more theoretical topics, these organizations provide much needed practical training for innovation and entrepreneurship. For example, Development Solutions, the Khan Business Incubator, and the MNCCI offer practical business training for its clients often for free or at a heavily discounted price. Startup Mongolia had built a collection of courses on topics such as design thinking and entrepreneurship 101. Further development of such courses can greatly benefit local entrepreneurs.

More immersive programs and spaces can be available to better support the innovation ecosystem. For now, only one accelerator, a few incubators, and a handful of co-working spaces exist, and many of these spaces are not designed to promote a collaborative culture. However, ideathons and makerspaces provide an environment that supports interdisciplinary interaction. These community organizations recognize that such resources are limited in Mongolia and are beginning to develop different solutions and programs to better support the local entrepreneurs. In the future, many more incubators and accelerators are likely emerge, further strengthening Mongolia’s innovation ecosystem.

**Method**

When possible, we tried interviewing the key heads of the given organization. Otherwise, information was found via the official websites and postings.

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V. Ecosystem Opportunities

Mongolia has tremendous potential for economic diversification and growth. This objective may be achieved through the development of innovation and entrepreneurship through the nurturing of a healthy innovation ecosystem. The current ecosystem faces several challenges, and these challenges represent opportunities for particularly impactful progress in Mongolia. In this section, we outline what we perceive to be the major challenges hindering the advancement of the current ecosystem, and we provide recommendations for programs and policies that might help to ameliorate the present hindrances. We also highlight potential sectors for growth within and beyond the Mongolian market and how the MIT-Mongolia collaboration may be directed to help address some of these challenges.

Challenges

Practical Training

Education quality in Mongolia must be updated and improved to include practical skills training. Current teaching styles tend to be traditional with rigid lectures. As a result, many of the higher education graduates finish schooling with limited knowledge of the necessary skills for growing a business, such as business planning and market analysis.

We suggest that universities reform the current curricula, especially in the technical fields, to include hands-on projects that require creative thinking. This would prompt students to develop a strong understanding of innovative processes required for technological and scientific advancements on a global scale. Additionally, universities should provide a wider array of programs and opportunities to support individual student endeavors and partner with local corporations and startups to provide real-world experience for students. Students would thus gain a larger perspective on the current market demands while receiving support from a familiar institution. Overall, these recommendations would help strengthen the university stakeholder as a key source of innovation.

Dynamic Governance

Government personnel are often replaced based on the results of the election cycle, occurring every four years. These turnovers often trickle down the hierarchy where even positions far removed from the top are affected. As a result, long-term decisions and policies are often unstable and unpredictable, making business practices difficult.

Increased transparency of government policies and programs (i.e., through publicly available and accurate statistics) would greatly improve the populace’s trust in the government and foster collaborations and support networks necessary to improve the current status and rate of innovation. It would also be beneficial to innovation and entrepreneurship if the government was to provide publicly available educational programs and literature to inform innovators and entrepreneurs on how best to navigate the legal system.
**Investment Climate**

The investment climate for startups is generally quite poor. With few resources, entrepreneurs are often left alone to seek their own funding from private individuals. The lack of available capital greatly stifles the development of innovation-driven enterprises (IDES).

The current ecosystem would largely benefit from a network to connect private investors with entrepreneurs as well as the creation of programs to educate entrepreneurs on how best to search for funding. By increasing knowledge about the investment climate, potential investors might be more comfortable investing in Mongolian startups, and Mongolian startups might be able to more successfully approach potential investors.

**Communication**

Perhaps the most broadly afflicting difficulty in developing a strong innovation ecosystem is the lack of communication between stakeholders and even within the individual stakeholder groups. Instead of selecting to collaborate with each other, individual stakeholders will often seek to build systems that will be primarily self-promoting. For example, a company working outside the IT sector may choose to build an internal IT development department to develop a mobile application instead of collaborating with an external organization to execute the idea. Part of the limited communication results from the lack of trust. Without rich interactions between the stakeholders, innovation and entrepreneurship development may be stalled.

We recommend the development of support programs and events that foster in-depth, inter-disciplinary collaboration. This network would prove beneficial to all stakeholders involved and would be especially useful in providing resources for entrepreneurs.

**Mindset**

Finally, a mindset gap exists between the older generation and the youth on entrepreneurship. The older generation was largely educated prior to the Mongolian democratic revolution of 1991. As a result, their perspective differs greatly from that of the younger population that is being educated abroad and has grown up with access to media from around the globe. The older generation is less interested in startups, while the younger generations understands the importance of innovation for the future of the Mongolian economy. With the older generation occupying the high-level decision-making positions, the mindset gap contributes to limited funding and other factors that discourage entrepreneurship.

Based on this mindset gap, we suggest the introduction of more events to educate the public on the value of entrepreneurship and innovation. These events should target the older generation and bridge the inter-generational communication gap.

**Sectors for future development**

There are several sectors in Mongolia that hold large potential for growth and possible modes of economic diversification:

**Agriculture**

Agriculture currently accounts for roughly 12% of Mongolia’s GDP [1], a large percentage of which arises from animal husbandry. Traditional nomadic culture emphasizes the
importance of rearing an abundance of livestock. Currently, the country has a total of 56 million heads of livestock, outnumbering the human population by a factor of 19 [1]. These animals are allowed to roam freely and eat as much grass as they wish (as long as there is no drought). They are also antibiotic-free and completely organic. As there is a large, worldwide market for grass-fed, free-range, antibiotic-free, organic meat, there is a potential to develop livestock-based businesses. However, there are currently no facilities in Mongolia charged with the proper certification of agricultural products, and thus the exportation of these products is nearly non-existent. However, one area of agriculture that can more easily be exported is all-natural, organic beauty products. These products contain a variety of Mongolian-grown ingredients, but they also cannot be certified organic or all-natural by international standards. All in all, agriculture provides an avenue of greater economic diversification, and, with proper regulations and standards, may prove fruitful when products are exported to foreign markets [2,3,4,5,6].

Tourism
Mongolia is the 18th largest country in the world with the lowest population density. The land is covered with breathtaking geological features, rich history dating back to the times of the great Genghis Khan, and a vibrant and unique nomadic culture. With all that Mongolia has to offer, the tourism industry is largely underdeveloped. A number of factors hinder the growth of tourism, primarily poor infrastructure. Many of the country’s attractions lie outside the capital city; however, the country-side offers few paved roads and limited access to public resources such as electricity, running water, and sewage. If Mongolia was to build the infrastructure required to improve the accessibility of its vast landscape, tourism would appeal to a broader market and would likely prove a lucrative business [2,6,7].

Information Technology (IT)
Many interviewees cited IT as a potential sector of growth for Mongolia [2,3,4]. Other countries, such as Estonia, have made names for themselves by growing their IT industries. In the Mongolian market, IT has promise. There is nearly 50% internet penetration [8], and many interviewees claimed that Mongolians quickly adapt to new technologies. Additionally, IT is one of few sectors that can easily transcends physical borders and does not explicitly benefit from having access to a seaport. However, the Mongolian market is relatively small, and an IT business would be forced to expand to foreign markets in order to dramatically increase in size or profit.

Mining
Although we have emphasized the importance of economic diversification away from mining, many interviewees acknowledged the benefits in the development of mining as a catalyst for other businesses and innovations [5,7,9,10]. In this way, excess revenue from mining ventures might trickle down and foster startups that might work to diversify and grow the economy.

Renewable energies
Mongolia is heavily dependent on coal for keeping the populace warm during its harsh winters. The dependence on coal in Ulaanbaatar results in increased levels of pollution and decreased levels of health and well-being. It is imperative that Mongolia develop new
technologies or systems with which the nation might decrease its dependence on coal. Additionally, some interviewees have suggested that Mongolia’s vast lands and large number of sunny days makes solar power a viable option for the country \[6, 12\]. Thus, renewable energies have a large potential for impact in Ulaanbaatar \[6,11\].

**MIT’s contribution**

With MIT offering numerous resources and expertise in technology development and entrepreneurship, Mongolia can potentially benefit in a variety of ways through the established MIT-Mongolia collaboration. Below we highlight a few means by which MIT can help further develop Mongolia’s innovation ecosystem. Primarily, these suggestions focus on MIT as a powerhouse university and how its models and knowledge can be adapted and transferred to the local universities.

*Human talent*

As described above, Mongolia’s education system is in need of reform to provide more practical knowledge and training. MIT offers numerous possibilities of sharing its strength in providing strong problem-solving capabilities and practical skillsets for its students. For example, Mongolia can host guest lectures from leading MIT faculty members. Student-run programs, such as the Global Startups Labs (GSL), can also benefit the local ecosystem. In its first year, GSL was already proven to be a success, where many of the participating Mongolian students found great value in the course in providing practical knowledge towards the approaching innovation and entrepreneurship. Outside of these topics, other collaborative programs from MIT can also be piloted in Mongolia. Particularly, programs that focus on development, such as D-Lab, could mutually benefit both partners. The ger-district of Ulaanbaatar and the Mongolian countryside host a number of challenges and unique infrastructure and cultures that could benefit from creative collaborative solutions. In general, programs and collaborative projects between MIT and Mongolia should result in enriching the human talent pool within the country.

*Resource development*

MIT also offers a number of ancillary centers, programs, and departments that focus on commercializing the fundamental technologies that have been developed in-house and by its students. With many of the local Mongolian universities looking to open its own entrepreneurship or innovation centers, these universities could benefit from MIT’s experience. Initiating dialogue between the different centers can facilitate the development of services and programs that can be better suited to the local university’s needs, thereby strengthening the role of the center in the innovation ecosystem.

**References**

VI. Future Work

While this report provides an overview of the innovation and entrepreneurial ecosystem in Mongolia, our findings have opened new directions for further exploration and analysis. Below we outline the key areas in each of the stakeholder group that can benefit from more in-depth studies.

**Government**

Our current studies on the governmental stakeholder focuses primarily on the legal and intellectual property (IP) aspects and how they affect the ease of doing business. More research can be performed on understanding the depth and breadth of IP knowledge. Additionally, further studies can look into the impact of innovation-related policies the government has, such as the “The Science and Technology Master Plan for Mongolia.”

Elections occurred during our working period in Mongolia, and the opposing People’s Party won a landslide victory in the elections. In the upcoming months, government will soon experience a near complete turnover of personnel. New policies will likely be explored and put into action. Future work would greatly benefit from more closely examining which policies and programs related to entrepreneurship and innovation have survived and what the intentions of the new political party in power are towards each of these fields. Studies on the ecosystem would also benefit from investigating the effects of government leadership instability on the practices and confidence of entrepreneurs.

**Capital**

Although limited capital is accessible to entrepreneurs, how funds such as the governmental SME fund is distributed is currently not transparent. Additional research into awareness of this fund for entrepreneurs, the funding criteria, and institutes that receive funding would be useful to explore.

**Entrepreneurs**

The current study results from interviews with more than 20 entrepreneurs. Although the challenges and needs of entrepreneurs across diverse sectors is characterized, a more thorough analysis can be performed on the needed resources for entrepreneurs at different stages of the company and necessary sector-specific resources. Such information can provide insight on whether particular sectors may be more promising for Mongolia to develop as its economic comparative advantage.

**Corporations**

Our analysis of corporations in Mongolia comes from companies working in diverse fields, and our studies reveals that there are different barriers to the international market depending on the sector. For example, agricultural products are internationally desirable for their grass-fed, organic, and free range properties. However, these products, will undergo large difficulties for exports due to the lack of regulation and regulatory infrastructure in place to meet international standards. In-depth studies can be performed for the different sectors to identify
more barriers to product export and to better understand the current development of policies intended to address this challenge.

Universities

Numerous interviewees had remarked that local university curriculum was often of poor quality and overly theoretical rather than applicable. Future work could help examine the offerings more closely to determine what type of curriculum reform is underway. One could additionally examine whether other programs are offered by the university to better prepare students for a work position after finishing their schooling.

Universities are also currently initiating a number of projects and new laboratory and prototyping spaces. More studies can be performed to examine firsthand how well equipped these spaces are and to determine the extent of the awareness of these resources and how they are being used. Additional statistics on students who study abroad and the percent that return to Mongolia post-graduation would be useful to obtain, particularly because many of the young entrepreneurs interviewed for this study had studied abroad prior to initiating their startups in Mongolia. This data would provide insight to the motility of human talent and whether Mongolia faces particular challenges in recruiting talent.

Community

For the most part, information about the collaborative and prototyping spaces and open laboratories were obtained second hand. First-hand examination of the spaces and their available equipment and resources would be useful to determine what technologies are available for people to use during the design and innovation process.

Because the interviewees revealed that these spaces are often not used frequently, closer studies into the usage statistics and general public awareness of these resources can help determine the reason underlying the low usage. Finally, it would be interesting to determine how effective these spaces are in producing new technologies and ideas.

Infrastructure

One region that must be considered in a developing country such as Mongolia is the presence of infrastructure. Although telecommunications infrastructure was lightly discussed throughout the report, this area can use much more detailed studies. Infrastructure in Ulaanbaatar city center appear to be fairly well developed, but the areas in the ger district still lack basic resources such as water and central heating. Detailed knowledge of the quality of infrastructure would be useful for determining how and whether fundamental resources such as electricity and transportation are hindering the development and growth of startups.

Sectors

While the existing studies examine the general entrepreneurial ecosystem in Mongolia, more work can be focused on specific promising sectors. An informal survey of our interviewees on promising areas of growth found that mining, agriculture/natural products, energy, tourism, and sometimes IT would be listed as the more promising fields. Further analysis is needed on what resources would be necessary for startups and the feasibility of startup penetration in those fields.
VII. Conclusion

With its many resources and recent focused efforts, there is no doubt that Mongolia has the potential for economic growth and diversification. As described in this report, the development of innovation and entrepreneurship in particular will surely prove to expedite this process. By identifying its comparative advantages, Mongolia might be able to better tackle the obstacles currently hindering this development. Upon the conclusion of each interview, we asked interviewees what they see as being Mongolia’s greatest strengths in developing innovation and entrepreneurship. Interviewees described Mongolia’s great untapped land resources [1,2,3], its large neighboring market [1,4,5,6], the plethora of opportunities of a developing nation coupled with limited competition [5,7,8], and the relative ease of business registration processes [4,9,10]. However, a common theme throughout the interview process was the power of the Mongolian people.

Mongolians boast of a rich history underscoring resilience and strength in the face of adversity. The great Genghis Khan himself faced much turmoil in his ultimately successful campaigns to conquer much of the Eurasian continent. Nowadays, Mongolians celebrate this fighting spirit and tap into its strengths when overcoming modern-day issues. Interviewees highlighted the knowledgeable and worldly younger generations as a pillar of strength in driving the future of the economy [1,5,11]. Also mentioned was the adaptability of Mongolians, stemming from their nomadic culture, citing several instances in which Mongolians exhibited impressive resilience and creativeness in solving even the most basic of problems within the nomadic lifestyle. In this way, it may be argued that the Mongolian people are born to innovate and are raised to discover enterprising solutions.

Although many challenges exist to develop a sustainable innovation ecosystem, the Mongolian people hold much promise for building a vibrant system. As a young startup community, numerous efforts are being made to improve the current system. Even with the few resources that entrepreneurs can access, many are still able to build and grow their businesses. With a more supportive and integrated ecosystem and appropriate resources, these entrepreneurs have the potential of expanding beyond the local markets.

While our work has provided a foundation for understanding how entrepreneurship occurs in Mongolia, the current model can be further refined through in-depth analysis of how effective existing programs and resources are and of the potential growth of specific sectors. With the abundant opportunities that this young nation offers, the startup community will certainly change quickly, hopefully paving a way for more entrepreneurs to enter the market with their innovative ideas. In this way, Mongolia has incredible potential to grow its economy and expand its market to foreign nations through the future development of innovation and entrepreneurship. Hopefully, this report, and others like it, will help Mongolia to harness its potential and drive the economy towards greater global competitiveness. Only then will Mongolia surge past expectations and become the “mind-golia” we firmly believe it can be.

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X. Appendix 1: Innovation Ecosystem Map

To visualize the innovation ecosystem, we mapped the different stakeholders using both conceptual mapping and location mapping. Mapping can help in analyzing and identifying how different parts of a system interact.

Location-based map

A snapshot of the map of the innovation ecosystem in Ulaanbaatar is shown below (Fig. X-1). More details to this map can be found at tiny.cc/UBinnomap. In general, most corporate and entrepreneurial activity can be found in the city center, with the highest concentration of entrepreneurs located near Seoul Street and in the National IT Park. Interestingly, many of the training centers and resources available to support entrepreneurs are found dispersed throughout the city, with very few located in the city center.

Conceptual Map

In general, the organizations that contribute to entrepreneurship or innovation are shown on this conceptual map of Mongolia’s startup ecosystem (Fig. X-2). Mongolia’s startups span many sectors with the primary ones being green technologies, natural products, social entrepreneurship, and IT. The entrepreneurial network is primarily supported through community organizations such as the Women Entrepreneurs of Mongolia, Drink Entrepreneurs, and the Mongolian National Chamber of Commerce and Industry. Entrepreneurs also have access to a very small number of incubators, accelerators, and coworking spaces. Generally, corporations
and capital are a bit disconnected with entrepreneurs (as indicated by the dotted lines) - within no venture capital and limited corporate investment in the startup ecosystem. Additionally, while a government stakeholder is currently missing from the map, there are a few efforts dispersed throughout - the Mongolia SME Fund and the National IT Park. The government is also planning on establishing a “Startup” entity and on offering tax benefits to SMEs.

Figure X-2. Conceptual map of Mongolia’s Startup Ecosystem. Different key stakeholders are shown. Dotted lines indicate limited interaction and contribution of a specific stakeholder. Of note, capital does not include any venture capital.
XI. Appendix 2: Resources for Entrepreneurs

Below are a few resources that the entrepreneurs we’ve interviewed have used or mentioned.

Funding/Grants/Programs:

Government of Mongolia SME Fund
Government of Mongolia VAT taxes
Russia’s Sklokoovo Project

Incubator:

IT Park
  ● 90% Discount for Office space rental, then 60, 50%
  ● Some trainings
Khan Bank Incubator

Accelerator Programs:

Startup Mongolia

Co-working and office spaces:

CLUB coworking
UB Lab 33
Executive Excellence International Business Center

Prototyping spaces:

Open Innovation Lab
Makers Mongolia
Mongol Makers

Training Programs:

Development Solutions
MLC training
Khan Bank Incubator
Women’s Business Center

Community/Organizations/Information groups:

FB - Mongolia Young Entrepreneurs group - occasional meet ups (FB group might currently be private)
Drink Entrepreneurs
Mongolian Entrepreneurs Association
Business Council of Mongolia
- “In the classroom” type of trainings
Mongolian National Chamber of Commerce and Industry
- Startup Council
- Business trainings at heavily discounted prices
- Office Space

**Market/ Research/Consulting:**
[Mongolian Business Database](#) - Free database to register company to gain internet/google exposure.
- MDB is one of top hits when searching “Mongolia Business”
- Free communication with other companies
[MIRIM Consulting] - Caters to SMEs. Services provided includes:
- IT development (bringing technology to market)
- Business development
- Marketing
- Training for companies - property rights, specific advice

**Advertisement:**
Facebook
- Advertising on Facebook can be quite expensive (100,000-150,000 MNT)

**Books/Courses/Etc:**
[Startup Nation](#)
[Good to Great](#)
Peter Drucker Management Books
Philip Kotler Marketing books

**How to start a business in Mongolia:**
[bizguide.mn](#)